REPLACEMENT PARTS CATALOG

NO. 302

DIESEL ENGINES MODEL 645

SEE P.L. B01 FOR ENGINE MODEL DESIGNATIONS

MARINE PROPULSION and GENERATION

MARINE DRILL RIG

STATIONARY GENERATION

HOUSED GENERATION

DRILL RIG

2nd Edition

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Parts Department

6600 River Road
P.O. Box 430
Hodgkins, Illinois 60525 U.S.A

Litho in U.S.A.

FOREWORD

Replacement Parts Catalog 302 provides parts ordering information for Series 645 Diesel Engines powering General Motors Marine Propulsion and Generation, Marine Drill Rig, Stationary Generation, Housed and Skid Mounted Generation and Drill Rig Models.

The catalog is divided into four major sections – Alphabetical Index, Table of Contents, Parts Lists, and Numerical Index. The proper use of these sections in the correct sequence permits easy identification of the correct replacement part and its ordering reference.

ALPHABETICAL INDEX

This section is an alphabetical listing of the noun descriptions used to identify replacement parts. Each description is referenced to the parts list number in which it appears. For example:

BEARING .. Carrier insert	A07
BEARING .. Connecting rod	A07
BEARING .. Main - Crankshaft	B18

The applicable parts list for a Connecting Rod Bearing is A07. This parts list number can now be referenced in the table of contents.

TABLE OF CONTENTS

The table of contents is a listing of the parts lists in numerical sequence. Under the general headings of each parts list are detailed subject descriptions, the page on which they appear, and the applicable engine models. For example:

Parts List Number	Subject	Page Number	Engine Application
B26	Camshaft Drive Gear Train		
	Idler Gear Stubshaft Arrangement	1	8,12,16-645E1
	Camshaft Drive Gear Train	2-3	

The idler gear stubshaft in Parts List B26 is on Page 1 for 8,12, and 16-645E1 engines.

Catalog 302 has five specific tables of contents which correspond to different end product applications. These tables of contents and the pages on which they appear are as follows:

Marine Propulsion and Generation	Pages 1-13
Marine Drill Rig	Pages 15-20
Stationary Generation Units	Pages 21-34
Housed Generation and Skid Mounted Units	Pages 35-39
Drill Rig	Pages 41-45

In addition, there is a cross reference list at the beginning of each table of contents (except Marine) relating engine to end product model. The alpha prefix in the parts list number indicates the revision level; "A" being a new parts list, "B," the first revision, "C," the second revision, etc.

PARTS LISTS

Parts lists contain the ordering references for serviceable replacement components of the engine assembly. The method of listing items within a parts list is called the "Indented System." Components of any assembly will have descriptions indented to the right and appear directly beneath the assembly. For example:

Ref. No.	Part Number	Qty. Req.	Description
1	9515339	1	GEAR ASSEMBLY .. Spring drive
2	9515336	1	GEAR ASSEMBLY .. Upper idler - 58 teeth
3	8407341	2	BEARING .. Hub
4	8261101	1	BEARING .. Gear
5	8448310	1	GEAR .. Turbo drive - 70 teeth

The bearings (Ref. Nos. 3 and 4) are components of the idler gear assembly (Ref. No. 2), which is a component of the gear assembly (Ref. No. 1), if the idler gear assembly was ordered, the bearings would be included. This does not mean that all items of an assembly are cataloged. Items which are not considered serviceable are not listed.

Items not identified by a part number in the parts list may be ordered by specifying the following information on the purchase order – catalog number, parts list number, page number, reference number, complete description of the part and the assembly part number of which this item is a component. For example:

Ref. No.	Part Number	Qty. Req.	Description
1	9542965	1	MOTOR ASM. .. Air start - Low pressure
2		1	HOUSING .. Motor - 2-1/2 in. threaded exhaust

Order Quantity 1, Motor Housing, Catalog 302, Parts List B25, Page 22, Reference Number 2, applied to 9542965 Motor Assembly.

Illustrations in the catalog are assigned plate numbers. These plate numbers use the parts list number as a base and then are prefixed with a revision letter and suffixed with a serial number. For example, Plate A26-1 is a new unrevised illustration and is the first plate appearing in Parts List 26. The plate prefix and the parts list prefix may not always match since it is possible to revise one without revising the other.

These illustrations are intended to be used as a visual guide for locating a replacement part. They may not always be an exact representation of your particular equipment.

PARTS LIST HEADINGS

Reference Number – Indicates part number location in the text and corresponds to the part identification in the illustration.

Part Number – Indicates number to be used for ordering purposes.

Quantity Required – Lists total quantity required in that particular application. A dash (-) in this column indicates that the part is not a component of that particular application or assembly, or that optional quantities appear in the description column. "As Required" or its abbreviation in this column indicates the quantity will vary for each application.

Description – Gives a detailed description of the part. Also used for application information, part number change references, part numbers with optional quantities, or part numbers for oversize and undersize replacements. For example:

Ref. No.	Part Number	Qty. Req.		Description
1	8069014	1	-	GEAR .. Crankshaft - 79 teeth - Except 20 cylinder engines
1	8360843	-	1	GEAR .. Cranksahft - 79 teeth - 20 cylinder engines
2	8483087	1	1	SLINGER .. Oil
3	----	A.R.		SHIM .. Oil slinger 8035526 .. .010 thick 8035527 .. .020 thick 8035528 .. .030 thick

In the above example, only components with a quantity listed in the second column would be applicable to 20 cylinder engines. The oil slinger shims (Ref. No. 3) should be ordered in quantity and size as required. Reference numbers 2 and 3 are applicable to all engines.

PART LIST SYMBOLS

Asterisk (*) – Precedes the reference number when the part or its location is not shown in the illustration.

Option (ϕ) – Precedes the reference number when two or more different types of a component have been used in that application. This may be due to design changes, different suppliers, or a part that is applied by customer specification. For example:

Ref. No.	Part Number	Qty. Req.	Description
ϕ10	8534979	2	CORE ASSEMBLY .. Aftercooler (Harrison)
ϕ10	8435460	2	CORE ASSEMBLY .. Aftercooler (Young)
ϕ11	8477713	1	TUBE .. Oil suction - Standard capacity oil pan
ϕ11	8443779	1	TUBE .. Oil suction - Increased capacity oil pan

The option symbol for Ref. No. 10 indicates that either part number may be ordered, since the only difference is the supplier. The option symbol is used for Ref. No. 11 because the customer will have to choose which tube to order based on the type of oil pan on his engine assembly.

Note (ƒ) – Precedes the reference number when additional information regarding the part is located within the parts list in the form of an italicized note. For example:

Ref. No.	Part Number	Qty. Req.	Description
2	9534859	1	GEAR ASSEMBLY .. Upper idler
ƒ3	8407341	2	BEARING .. Hub
ƒ4	8261101	1	BEARING .. Gear

ƒ Replacement bearings must be precision bored after assembly.

Plus (+) – Precedes the reference number when a part listing is not in its primary location, but shown for clarity or reference. For example:

Ref. No.	Part Number	Qty. Req.	Description
+15	9323945	1	DAMPER .. Gear - See Parts List No. B20

The plus symbol in this example was used to show that the gear damper is shown in Parts List B22 for clarity. However, its primary location is in Parts List B20.

NUMERICAL INDEX

Located in the back of the catalog is the numerical index. This is a listing of every part number in the catalog and is sequenced by part number, parts list, page, and reference number. This index is used to find the description, application, or quantity required for a part when only the part number is known.

ALPHABETICAL INDEX

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For quick reference and convenience, the following alphabetical index denotes the Parts Lists applicable to the most commonly referred to items by description. Additional information, application and further definition of the Parts List can be found in the Table of Contents immediately following this index.

Description	P.L. No.
A	
ACCESSORY DRIVE COUPLING	B24
ACCESSORY DRIVE GEAR	B22
ACCESSORY DRIVE HOUSING	B58
ADAPTER .. Air Intake Silencer	B78
ADAPTER ASM. .. Exhaust Stack	B82
ADAPTER .. Fuel Oil Filter - Spin On	B50
ADAPTER .. Raw Water Pump	B44
ADAPTER .. Spacer - Exhaust Duct	B82
ADJUSTING LINK .. Injector	A15
AFTERCOOLER ASM. .. Turbocharger	B74
AIR DUCT .. Turbocharger Inlet	B78
	B80
	B81
AIR FILTER .. Oil Bath	B80
AIR FILTER .. Paper And Fiberglass	B81
AIR INTAKE ADAPTER	B78
AIR INTAKE SILENCER	B78
ANCHOR SHACKLE BASE .. Engine	B01
ARM .. Rocker - Exhaust Valve	A13
ARM .. Rocker - Injector	A13
AUXILIARY GENERATOR DRIVE	B62
B	
BALANCER .. Harmonic	B20
BEARING .. Camshaft	B30
BEARING .. Carrier Insert	A07
BEARING .. Connecting Rod	A07
BEARING .. Main - Crankshaft	B18
BLIND COVER .. Accessory Drive	B24
BLOCK ASM. .. Bearing - Camshaft	B30
BLOWER .. Engine - Roots	B85
BOOSTER PUMP .. Governor	B33
BOX .. Junction - Engine Shutdown	B33
BOX ASM. .. Outlet - Thermocouple	B72
BRACKET .. Camshaft Bearing	B30
BRACKET .. Manifold - Piston Cooling	B01
BRACKET .. Toggle Lever - Overspeed Trip	B32
BRACKET .. Trip Pawl - Overspeed Trip	B32
BRIDGE .. Exhaust Valve	A13
BRUSH .. Starter Motor	B25
BUSHING .. Blower Drive	B26
BUSHING .. Floating - Stubshaft	B26
BUSHING .. Idler Gear	B26
BUSHING .. Rocker Arm	A13
C	
CAMSHAFT BEARING BRACKETS	B30
CAMSHAFT DRIVE GEAR TRAIN	B26
CAMSHAFT .. Engine	B28
CAMSHAFT DRIVE HOUSING AND COVER	B60
CAMSHAFT .. Pawl - Overspeed Trip	B32
CAPS .. Main Bearings	B18
CARRIER .. Piston - Engine	A07
CHAMBER .. Exhaust - Engine	B72
COLLAR .. Trust - Crankshaft	B18
CONNECTING ROD .. Engine	A07
CONTROL LINKAGE .. Injector	A15
CONVERSION .. Filter - Fuel Oil.	B50
COOLING SYSTEM .. Engine	B44
CORE .. Aftercooler - Turbocharger	B74
COUNTERWEIGHT .. Camshaft	B28
COUPLING .. Accessory Drive	B24
COUPLING .. Crankshaft	B24
COVER .. Camshaft Drive Housing	B60
COVER .. Blind - Accessory Drive	B24
COVER .. Cylinder Head	B54
COVER .. Handhole	B04
COVER .. Lube Oil Relief Valve	B58
COVER .. Overspeed Trip Housing	B32
CRAB .. Cylinder Head	B10
CRAB .. Fuel Injector	B06
CRANKCASE PRESSURE DETECTOR	B59
CRANKCASE & OIL PAN ASM. .. Engine	B01
CRANKCASE TO OIL PAN GASKET	B01
CRANKCASE TO OIL PAN SEAL	B01
CRANKSHAFT .. Engine	B18
CYLINDER HEAD ASM.	B06
CYLINDER HEAD CRABS	B10
CYLINDER LINER	B06
CYLINDER TEST VALVE	B04
D	
DAMPER .. Gear	B20
DEFLECTOR - Water Inlet	B06
DETECTOR .. Low Water	B59
DETECTOR .. Pressure - Crankcase	B59
DIPSTICK .. Gauge - Lube Oil Level	B01
DISC .. Engine Coupling	B24
DRIVE .. Auxiliary Generator	B62
DRIVE .. Governor	B70
DRIVE .. Starter Motor	B25
DUCT .. Air - Intake Silencer	B78
DUCT .. Air Intake Filter	B80
	B81

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Description	P.L. No.
E	
EDUCTOR TUBE .. Lube Oil	B42
EJECTOR .. Lube Oil	B42
ELBOW .. Water Outlet	B06
ELECTRIC ENGINE SHUTDOWN	B33
ELEMENT .. Air Filter - Fiberglass Bag	B81
ELEMENT .. Air Filter - Paper	B81
ELEMENT .. Air Filter - Impingement	B80
ENGINE MOUNTING HARDWARE	B01
ENGINE .. 645 Diesel	B01
EXHAUST CHAMBER .. Engine	B72
EXHAUST STACK ADAPTER ASM.	B82
EXHAUST VALVE .. Engine	B06
EXHAUST VALVE BRIDGE	A13
F	
FILTER .. Air Intake - Fiberglass Element	B81
FILTER .. Air Intake - Impingement Type	B80
FILTER .. Air Intake - Oil Bath	B80
FILTER .. Air Intake - Paper Element	B81
FILTER .. Fuel	B50
FILTER .. Lube Oil - Turbocharger	B34
FILTER .. Soak Back	B34
FLANGE .. Water Pump	B44
FLYWHEEL .. Engine	B24
FRAME .. Support - Cylinder Head Cover	B54
FUEL FILTER	B48
	B50
FUEL INJECTOR	A11
FUEL OIL PIPING .. Engine	B48
FUEL PUMP	B40
G	
GASKET .. Cylinder Head	B06
GASKET KIT .. Index	B99
GASKET .. Crankcase To Oil Pan	B01
GAUGE .. Dipstick - Lube Oil Level	B01
GEAR .. Accessory Drive	B22
GEAR .. Blower Drive	B26
GEAR .. Camshaft Drive	B26
GEAR .. Crankshaft	B26
GEAR DAMPER	B20
GEAR .. Governor Drive	B70
GEAR .. Lower Idler	B26
GEAR .. Ring - Starter Motor	B24
G (Continued)	
GEAR TRAIN .. Camshaft Drive	B26
GEAR .. Turbocharger Drive	B26
GEAR .. Upper Idler	B26
GENERATOR .. Frequency	B33
GENERATOR .. Tachometer	B70
GOVERNOR BOOSTER PUMP	B33
GOVERNOR DRIVE AND DRIVE GEAR	B70
GOVERNOR .. Model EGB	B67
GOVERNOR .. Model LSG-10	B64
GOVERNOR .. Model PG	B66
GOVERNOR .. Model UG-8	B65
H	
HANDHOLE COVER	B04
HARMONIC BALANCER	B20
HEAD .. Cylinder	B06
HEADER .. Water Inlet	B44
HOUSING .. Accessory Drive	B58
HOUSING .. Camshaft Drive	B60
HOUSING .. Governor Drive	B70
HOUSING .. Overspeed Trip Linkage	B32
I	
IDLER GEAR AND STUBSHAFT	B26
IMPINGEMENT AIR FILTER	B80
INDICATOR .. Air Intake Pressure	B78
INDICATOR .. Engine Timing	B25
INDICATOR .. Restriction - Air Filter	B81
INJECTOR CONTROL LINKAGE	A15
INJECTOR .. Fuel	A11
INSERT .. Lower Liner	B01
INSULATION .. Exhaust Chamber	B72
J	
JACK .. Engine Turning	B24
JOINT .. Expansion - Exhaust MANIFOLD	B72
JOINT .. Slip - Injector Control	A15
K	
KIT .. Cylinder Head	B06
	B99
KIT .. Cylinder Liner	B06
	B99
KIT .. Engine Detector	B59
KITS .. Gasket - Engine	B99
KIT .. Injector Repair	B52
KIT .. Main Bearing Shell	B18
KIT .. Seal - Water Pump	B46

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Description	P.L. No.
L	
LATCH .. Cylinder Head Cover	B54
LAYSHAFT .. Injector Hand Control	A15
LEVER .. Toggle - Camshaft Overspeed Trip	B32
LIMIT SWITCH .. Overspeed Trip	B32
LINER .. Cylinder	B06
LINKAGE .. Injector Control	A15
LINKAGE .. Overspeed Trip	B32
LOWER LINER INSERT	B01
LUBE OIL LEVEL GAUGE .. Dipstick	B01
LUBE OIL LEVEL SWITCH	B01
LUBE OIL SYSTEM	B34
M	
MAIN BEARING CAPS	B18
MAIN BEARING .. Crankshaft	B18
MANIFOLD .. Cooling Water	B44
MANIFOLD .. Fuel Oil	B48
MANIFOLD .. Lube Oil	B34
MANIFOLD .. Piston Cooling Tube	B01
MANIFOLD .. Water	B44
MOTOR .. Speed Setting - EGB Governor	B67
MOTOR .. Starter - Engine	B25
MOTOR .. Synchonizing - UG8 Governor	B65
O	
OIL BATH AIR FILTER	B80
OIL LINE .. Blower Supply	B34
OIL LINE .. Rocker Arm	A13
	B34
OIL PAN ASM. .. Engine	B01
OVERSPEED TRIP ASM.	B28
OVERSPEED TRIP HOUSING	B32
OVERSPEED TRIP LINKAGE	B32
P	
PACK .. Power	A09
PAN .. Oil - Engine	B01
PAWL .. Overspeed - Camshaft	B32
PIN .. Piston - Engine	A07
PIPING .. Cooling Water	B44
PIPING .. Lube Oil	B34
PISTON COOLING MANIFOLD BRACKET	B01
PISTON COOLING TUBE	B34
PISTON COOLING TUBE .. MANIFOLD	B01
PISTON .. Engine	B08
PISTON RING	B08
PLATE .. Name - Injector Timing	B01
POWER PACK	A09

Description	P.L. No.
P (Continued)	
PRESSURE DETECTOR .. Crankcase	B59
PUMP .. Fresh And Raw Water	B46
PUMP .. Fuel Oil	B40
PUMP .. Governor Booster	B33
PUMP .. Lube Oil Pressure	B38
PUMP .. Scavenging - Lube Oil	B40
Q	
QUADRANT .. Hand Control - Injector	A15
R	
RAMP .. Engine	B03
RING GEAR .. Starter Motor	B24
RING .. Piston	B08
ROCKER ARM .. Exhaust Valve	A13
ROCKER ARM .. Injector	A13
ROD .. Connecting - Engine	A07
ROOTS BLOWER	B85
ROTOR SET .. Roots Blower	B85
S	
SCAVENGING PUMP .. Lube Oil	B40
SCREEN ADAPTER .. Air Intake Filter	B78
SCREEN ASM. ..Adapter - Exhaust Manifold	B72
SEAL .. Crankcase To Oil Pan	B01
SEGMENT .. Camshaft	B28
SEPARATOR .. Lube Oil	B42
SHAFT .. Injector Control	A15
SHAFT .. Rocker Arm	A13
SHIELD .. Heat - Exhaust Chamber	B72
SHUTDOWN .. Engine - Electric Operated	B33
SILENCER .. Air Intake	B78
SLEEVE .. Water Manifold	B01
SLINGER .. Oil - Crankshaft	B26
SOAK BACK FILTER	B34
SOLENOID .. Engine Shutdown	B33
STARTER MOTOR .. Engine	B25
STRAINER .. Lube Oil	B36
STRAP .. Saddle - Water Manifold	B44
STUBSHAFT .. Governor Drive Gear	B70
STUBSHAFT .. Idler Gear	B26
STUBSHAFT .. Tapered - Drive Gear	B22
SUPPORT .. Engine Blower	B85
SUPPORT .. Lube Oil Separator	B42
SWITCH .. Limit - Overspeed Trip	B32
SWITCH .. Lube Oil Level	B01
SWITCH .. Solenoid - Starter Motor	B25
SWITCH .. Vacuum - Air Filter	B81

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Description	P.L. No.
T	
TACHOMETER GENERATOR	B70
THERMOCOUPLE .. Exhaust Chamber	B72
THERMOCOUPLE .. Turbocharger	B74
TRANSDUCER ASM. .. LSG Governor	B64
TRIP ASM. .. Cylinder Head	B32
TRIP .. Overspeed	B28
THRUST WASHER .. Piston Carrier	A07
TUBE .. Piston Cooling - Manifold	B01
TUBE .. Water Inlet - Manifold	B44
TURBOCHARGER ASM. .. Engine	B74
TURBOCHARGER DRIVE GEAR	B26
TURBOCHARGER LUBE OIL FILTER	B34
V	
VALVE .. Cylinder Test	B04
VALVE .. Exhaust	B06
VALVE .. Low Water Safety Shutdown	B59
VALVE .. Lube Oil Relief	B34
VALVE .. Variflow - Cycoil Air Filter	B80
VALVE .. Cut-Off - Low Water	B59
W	
WASHER .. Thrust - Piston Carrier	B07
WATER MANIFOLD	B44
WATER MANIFOLD SLEEVE	B01
WATER PUMPS	B46
WELL .. Thermometer - Cooling Water	B44

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Marine Propulsion and Generation

This Table of Contents references Engine Designations. See Part List B01 for Model Designations.

For 645F7B Engines, see Special Table of Contents on Page 9.

Engine Designation	
Normally Aspirated	Turbocharged
8-645E2,E6 12-645E2,E6 16-645E2,E6	8-645E5,E7,E7B,E7C 12-645E5,E7,E7B,E7C 16-645E5,E7,E7B,E7C 20-645E5,E7,E7B,E7C

Parts List Number	Subject	Page Number	Engine Application
B01	Engine, Crankcase and Oil Pan Assembly		
	Reference Chart	1-6	
	Crankcase and Oil Pan Assembly	9-12,14	
	Lube Oil Level Switch	15	
B04	Handhole Cover and Cylinder Test Valve		
	Safety Handhole Cover Assembly	1-2	8,12,16-645E2,E5,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Handhole Cover Assembly	2-3	
	Cylinder Test Valve	6	
A05	Power Assemblies and Associated Components Locating Reference	1	
B06	Cylinder Head and Liner (Replaces P. L. A06-S)	1-2	
A07	Connecting Rod Bearing, Carrier and Piston Pin (Replaces P. L. A16 & A16-S)		
	Connecting Rod Bearing, Carrier and Piston Pin	1	8,12,16-645E2,E5,E6,E7 & 20-645E5,E7
	Connecting Rod Bearing, Carrier and Piston Pin	2	8,12,16,20-645E7B,E7C
B08	Pistons and Rings (Replaces P. L. A14 & A14-S)		
	Piston Assembly Reference Chart	1	
	Piston and Rings	2-15	
A09	Power Pack Assemblies (Replaces P. L. A06 & A07-S)		8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Complete Power Packs	1-2	
	Mini and Partial Power Packs	3	
B10	Cylinder Head Crabs (Replaces P.L. A10-S)		
	Cylinder Head Crabs	1	8,12,16-645E2,E5,E6,E7,E7B & 20-645E5,E7,E7B
	Cylinder Head Crabs	2	8,12,16,20-645E7C
A11	Fuel Injector (Replaces P.L. A52 & A52-S)		
	Fuel Injector Reference Chart	1	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Fuel Injector Assemblies	2-3	
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Parts List Number	Subject	Page Number	Engine Application
A12	Injector Control Linkage (Replaced By P.L. A15)		
A13	Exhaust Valve Bridge, Rocker Arms and Oil Lines (Formerly in P.L. A08 & A08-S)	1-2	8,12,16-645E2,E5,E6,E7, E7B,E7C & 20-645E5,E7,E7B,E7C
A14	Piston Assembly, Pistons, Ring Sets and Rings (Replaced By P.L. B08)		
A15	Injector Control Linkage (Replaces P.L. A12)		
	Control Shaft, Support Bracket and Bearings	1	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Two-Piece Control Shaft Kits	2	16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Spring-Loaded Adjusting Link	3	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Standard Type Adjusting Link	4	
	EGB Governor Lever and Control Rod With Layshaft Hand Control Lever On Left Bank	5	20-645E7B
	Previous PGA Governor Lever and Control Rod Applied With Quadrant Layshaft Hand Control Lever On Right Bank	7	8,12,16-645E2 & 12,16,20-645E5
	Previous PGA Governor Lever and Control Rod Applied With Single Layshaft Hand Control Lever on Right Bank	8	8,12,16-645E2,E5,E6,E7 & 20-645E5,E7
	Current PG,PGA, PGR Governor Lever and Control Rod Applied With Single Layshaft Hand Control Lever on Left Bank	9	8-645E2,E5,E6,12-645E2,E5 E7, 16-645E2,E5,E6,E7 & 20-645E5,E7
	Current PGA Governor Lever and Control Rod Applied With Two Layshaft Hand Control Levers	10	8,12,16-645E2,E6 & 8,12,16, 20-645E5,E7,E7B,E7C
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	11	8-645E6 & 20-645E7
	UG8 Governor Lever and Control Rod With Layshaft Hand Control Lever on Right Bank	12	8,12,16-645E2,E6 & 20-645E7
	Quadrant Layshaft Hand Control Lever	14	8,12,16-645E2 & 12,16,20-645E5
	Throttle Position Indicator Application	15	12-645E5,16-645E2,E5 & 20-645E5,E7
A16	Connecting Rod, Bearings, Carrier and Piston Pin (Replaced By P.L. A07)		
B18	Crankshaft, Main Bearings and Main Bearing Caps		
	Crankshaft and Main Bearings	1-4	
	Main Bearing Caps	5	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
B20	Harmonic Balancer and Gear Damper Assemblies (Replaces P.L. A20-S)	1	
B22	Accessory Drive Gear Assembly		
	Accessory Drive Gear Assembly Applied To Crankshaft With Integral Stubshaft	1-2	8,12,16-645E2,E6, & 8,12,16-645E5,E7,E7B,E7C
	Accessory Drive Gear Assembly Applied To Crankshaft With Bolt On Stubshaft	3	8-645E7C & 12,16-645E6,E7

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B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1-3	8,12,16-645E2,E5,E6,E7,E7B,E7C, & 20-645E5,E7,E7B,E7C
	Front End Accessory Drive	5-6	8,12,16-645E6,E7,E7B,E7C 8,20-645E7,E7B,E7C
	Front End Accessory Drive For Crankshafts With Bolt On Stubshaft	7	8,12,16-645E6,E7,8-645E7C
	Blind Cover Application	8	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	
	Dual Air Start Motors - Left Bank	2,20-21	12,16-645E6,16-645E7B & 20-645E5,E7
	Dual Air Start Motors - Right Bank	3,20-21	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Single Air Start Motor	4-5,20-21	8-645E2,E6
	Single Air Start Motor	8,14-19	12,16-645E2,E5
	Flywheel Indicators	9	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
B26	Camshaft Drive Gear Train		
	Idler Gear Stubshaft Arrangement	1	8,12,16-645E2,E6
	Camshaft Drive Gear Train	2-3	
	Camshaft Drive Gear Train	4-5	
	Idler Gear Stubshaft Arrangement	6-7	8,12,16,20-645E5,E7,E7B,E7C
	Upper Idler and Turbo Drive Gear	8-9	
B28	Camshaft and Camshaft Counterweights (Replaces P.L. A28-S)		
	Camshaft Assembly	1-8	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Counterweights and Overspeed Trip	9-13	
B30	Camshaft Bearing Brackets		
	Camshaft Bearing Brackets	1	12,16,20-645E2,E5,E6,E7,E7B,E7C
	Camshaft Bearing Brackets	2-3	8-645E2,E5,E6,E7,E7B,E7C
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies	1	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly	5	
	Previously Applied Overspeed Trip and Reset Levers	7	8,12,16-645E2 & 8,12,16,20-645E5
	Overspeed Trip Lever, Reset Lever and Limit Switch	8	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Trip Housing Cover (Formerly in P.L. A56)	9-11	
	Trip Linkage Housing	12-13	
	Cover Plates	14-15	
	Overspeed Trip Limit Switch and Reset Lever	16	8-645E2
B33	Electric Operated Engine Shutdown		
	Electric Operated Engine Shutdown Solenoid	1	16-645E7
	Frequency Generator Mounting	2-3	12-645E6,E7
	Junction Box and Cable Application	4	8,12,16-645E6 & 8,12,16,20-645E7,E7B,E7C
	Junction Box and Cable Application	5	20-645E7B
	Junction Box and Cable Aplication	6-7	12,16-645E6,8,12,16-645E7 & 16-645E7B

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B33	Continued		
	Booster Pump Mounting	9	8,12,16-645E6 & 12,20-645E7
	Servo-Booster Pump Application	10	8,12,16-645E6 & 8,12,16,20-645E7,E7B,E7C
	Servo-Booster Pump Assembly	11	
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	8,12,16-645E2,E6 & 8,12,16,20-645E7,E7B,E7C
	Soak Back Filter Assembly	2-3	8,12,16,20-645E5,E7,E7B,E7C
	Soak Back Lube Oil System With Flanged Connections	4-5	8,12,16-20-645E7,E7B,E7C
	Soak Back Lube Oil System With Threaded Connections	10-12	12,16,20-645E5
	Turbocharged Lube Oil Filter	13	8,12,16,20-645E5,E7,E7B,E7C
	Piston Cooling, Camshaft Stubshaft, and Rocker Arm Lube Oil Lines and Turbocharger Filter	14-15	8,12,16,20-645E5,E7,E7B,E7C
	Piston Cooling, Camshaft Stubshaft and Rocker Arm Lube Oil Lines	16	8,12,16-645E2,E6
	Rear End Lines Mounting and Piping	17	
	Manifold Relief Valve	18	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Lube Oil By-Pass Presure Relief Valve Assembly	19	
	"Y" Type Lube Oil Strainer and By-Pass Valve Arrangement - Left Hand Rotating Engines	20-21	
	Scavenging and Piston Cooling Pump Arrangement With "Y" Type Strainer - Left Hand Rotating Engines	22-23	
	"Y" Type Lube Oil Strainer and By-Pass Valve Arrangement - Right Hand Rotating Engines	24-25	
	Scavenging and Piston Cooling Pump Arrangement With "Y" Type Strainer - Right Hand Rotating Engines	26-27	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer - Left Hand Rotating Engines	28-30	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer - Right Hand Rotating Engines	31-33	
B36	Lube Oil Strainer	1-4	8,12,16-645E6 & 8,12,16,20-645E7,E7B,E7C
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B40	Lube Oil Scavenging and Fuel Oil Pump	1-7	
B42	Lube Oil Separator (Replaces P.L. A42-S)		
	Lube Oil Separator	1	8,12,16-645E2,E6
	Lube Oil Separator, Ejector and Eductor Tube Assembly	2-3	8,12,16,20-645E5,E7,E7B,E7C
	Lube Oil Separator Support Assembly	6	8,12,16-645E2,E6
B44	Cooling System		
	Water Manifold Bracket Application	1	16-645E5,E7,E7B,E7C
	Water Manifold Application	2-3	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
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	Fresh Water Pump Appl. - R.H. Rotation	9	
	Engine Mounted Raw Water Pump Appl.	10-11	8,12,16-645E2,E6;8,12,16,20-645E5 12,16-645E7,E7B & 20-645E7B
	Companion Flanges	12	8,12,16-645E2,E6;8,12,16,20-645E5 & 12,16,20-645E7,E7B
	Water Inlet, Outlet Drain Piping	13	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Water Drain Piping	14	8,12,16,20-645E7,E7B,E7C & 16-645E6
	Aftercooler Piping	15	8,12,16,20-645E7,E7B,E7C
B46	Water Pumps		
	Raw Water Pumps	1	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Fresh Water Pumps	2-3	
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	
	Duplex Fuel Oil Filter Piping With Previous Threaded Type Pump Connections	6-9	8,12,16-645E2,E5 & 20-645E5
	Duplex Fuel Oil Filter Piping With Flange Pump Connections	10-11	12,16-645E6,E7 & 20-645E7
	Duplex Fuel Filter Piping	12-13	8,12,16-645E2,E5,E6,E7,E7B,E7C 20-645E5,E7,E7B,E7C
	Fuel Filter Manifold to Fuel Pump	14-15	
	Fuel Manifold and Valve Assembly	18	
B50	Fuel Oil Filter		
	Duplex Fuel Filter Assembly	2-3	
A52	Fuel Injector (Replaced By P.L. A11)		
B54	Cylinder Head Covers and Support Frames		
	Round Top Inside Frame Corner Design Applied to Engines With Flame Arrestor Safety Handhole Covers	1-3	
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	Cover Assemblies Applied to Engines Without Flame Arrestor Safety Handhold Covers	9	
	Previous Design Cover Assembly For Square Inside Corner Frame Assembly	10	8,12,16-645E2 & 12,16-645E5
	Cover Latches and Support Assembly	11	
A56	Overspeed Trip Housing and Cover (Replaced By P.L. B32)		
B58	Accessory Drive Housing Assembly		8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
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	Crankcase Pressure Detector Application	7	
	Crankcase Pressure Detector Assembly	9	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
B60	Camshaft Drive Housing and Cover	1	
B62	Auxiliary Generator Drive Assembly		
	Auxiliary Generator Drive Assembly	1	12,16-645E2,E6
	Auxiliary Generator Drive Assembly	2	8,12,16,20-645E7,E7B,E7C & 12,16,20-645E5
B65	Governor Assembly - Model UG-8		
	Reference List	1	8-645E2,12-645E2,E5,8,12,16-645E6, E7,E7B,E7C & 20-645E7,E7B,E7C
	Governor Assemblies	2-14	
B66	Governor Assembly - Models PG,PGA,PGR and PG-PH		
	Reference List	1-4	
	Governor Assemblies	5-37	
B67	Governor Assembly - Model EGB13		
	Reference List	3-4	
	Governor Assemblies	5-26	
			8,12,16-645E2,E5,E6,E7,E7B,E7C
A68	Governor Drive Gear and Stubshaft (Replaced By P.L. B70)		& 20-645E5,E7,E7B,E7C
B70	Governor Drive and Governor Drive Gear (Replaces P.L. A68 & A70-S)		
	Governor Drive Gear Application	1	
	Governor Drive Assemblies	2-3	
B72	Exhaust Chamber Assembly (Replaces P.L. A72-S)		
	Exhaust Chamber and Heat Shield Application For Normally Aspirated Engines	1-2	8,12,16-645E2,E6
	Exhaust Chamber and Heat Shield Application	5-6	8-645E5,E7,E7B,E7C
	Exhaust Chamber and Heat Shield Application	7-8	12-645E5,E7,E7B,E7C
	Exhaust Chamber and Heat Shield Application	9-10	16-645E5,E7,E7B,E7C
	Exhaust Chamber and Heat Shield Application	11-12	20-645E5,E7,E7B,E7C
	Previously Applied Exhaust Chambers Having Blanket Type Insulation	13-15	12,16,20-645E5
	Thermocouple Application With Ungrounded Hot Junction and Rigid Conduit	16	8,12,16-645E2,E5,E6,E7 & 20-645E5,E7
	Thermocouple Application With Ungrounded Hot Junction and Flexible Conduit	17	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Thermocouple Application With Grounded Hot Junction	18	8,12,16-645E2 & 12,16,20-645E5
B74	Turbocharger Application (Replaces P.L. A74-S)		
	Reference Chart	1-3	
	Turbocharger, Aftercooler Air Duct and Auxiliary Generator Drive	3-8	8,12,16,20-645E5,E7,E7B,E7C
B78	Engine Air Intake Silencer and Adapters		
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	Siamese Air Intake Adapter and Mounting	3	12-645E2,E6 & 16-645E6
	Siamese Air Intake Adapter and Mounting	4	12,16-645E6
	Engine Silencer and Duct Assembly	5-7	8-645E5,E7B & 12,16,20-645E5,E7,E7B

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B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Oil Bath Air Intake Filter, Manifold and Mounting	1-2	8,12,16-645E2,E6
	Oil Bath Air Intake Filter and Silencer Assembly	3	12-645E2
	Cycoil Oil Bath Air Inlet Filter Assembly Less Rainshields	10	12,16-645E2,E5 & 20-645E5
	Cycoil Oil Bath Air Inlet Filter Assembly with Rainshields	11-12	8-645E2,E5,E6; 12,16-645 E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Oil Wetted Impingement Type Air Intake Filter Assembly	14	12-645E5
B81	Paper and Fiberglass Engine Air Intake Filters		
	Paper Element Engine Air Intake Filter Appl.	1	8,12,16-645E2,E6
	Paper Element Engine Air Intake Filter Appl. With Vacuum Switch	2	8,12-645E5 & 12,16,20-645E7
	Fiberglass Element Bag-Type Engine Air Filter Application With Restriction Indicator	5	8-645E2,E6 & 12,16-645E6
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	6	8-645E5,E7,E7B,E7C
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	7	8-645E5,E7B;12-645E5,E7,E7B,E7C & 16-645E6
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	8	16,20-645E5,E7,E7B
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	9	12-645E7B
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	10	16-645E7,E7B & 20-645E7,E7B,E7C
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch	11	8-645E6,E7B; 12-645E5,E7; 16-645E5, E7,E7B & 20-645E5,E7
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch	12	16-645E6,E7B,E7C & 20-645E7B
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator - Twin Engine Marine Drive	13	16-645E7,E7B & 20-645E7
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Restriction Indicator	14	16,20-645E7B
	Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch and Louver Assembly	15	12,20-645E7
B82	Exhaust Stack Adapter Assembly	1-2	8,12,16,20-645E5,E7,E7B,E7C

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B85	Roots Blower and Blower Support		
	Air Duct, Blind Cover, Blower and Blower Support Mounting Application	1	8-645E2,E6
	Roots Blower Support Mounting Application	2	12,16-645E2,E6
	Roots Blower Assembly	3-5	8,12,16-645E2,E6
B99	Engine Gasket Kits		
	Engine Gasket Kit Index	1-4	8,12,16-645E2,E5,E6,E7,E7B,E7C & 20-645E5,E7,E7B,E7C
	Engine Gasket Kits	5-12	
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16 and 20-645F7B Engines

NOTE: This is a special table of contents for 16 and 20-645F7B marine engines. Because technical and sales data was not available when the revision to Catalog 302 was being prepared, this supplemental table of contents is furnished to provide the latest parts information for these engines.

Parts List Number	Subject	Page Number	Engine Application
B01	Engine, Crankcase and Oil Pan Assembly		
	16 and 20-645F7B Engine Equipped part numbers are listed below. L indicates left-hand rotation. R indicates right-hand rotation. Part numbers for Crankcase and Oil Pan Assemblies will be provided upon request.		
	Engine Model / Engine Equipped / C/Case & Oil Pan: L16-645F7B 9557938, R16-645F7B 9557939 } 40017897; L20-645F7B 9557930; R20-645F7B 9557931		
	Crankcase and Oil Pan Assembly	9-12,14	16,20-645F7B - Application same as 16,20-645 engines, except as noted below:
	NOTE: Use 9319169 insert in place of 8268641 and 9318158 elbow in place of 8344765 elbow (Page 9, Ref. No.'s 15 and 16)		
	Lube Oil Level Gauge		
	8335969 .. 16-645F7B engine	12	
	8374643 .. 20-645F7B engine	12	
	Lube Oil Level Switch 8464151	15	
B04	Handhole Cover and Cylinder Test Valve		
	Safety Handhole Cover Assembly 8499419	2	
	Handhole Cover Assembly 9314870	3	
	Cylinder Test Valve 8048880	6	
A05	Power Assemblies and Associated Components		
	Locating Reference		
B06	Cylinder Head and Liner		
	NOTE: See Page 3 for Cylinder Head Asm. applicable to 645F7B engines		16,20-645F7B
	Cylinder Liner Assembly		
	Cast Iron, Laser Hardened Upper Bore 9318833		
	Chrome Plated Bore 9090233	2	
	Cylinder Head Assembly 9556060	3	
A07	Connecting Rod, Bearings, Carrier, and Piston		
	Pin - Use Columns C and D	2	
B08	Pistons and Rings	13-15	
A09	Power Pack Assemblies	4	
B10	Cylinder Head Crabs	2	
A11	Fuel Injector		
	Fuel Injector 5229320 (Special)	1-4	16-645F7B
	Fuel Injector	5	16,20-645F7B

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Parts List Number	Subject	Page Number	Engine Application
A13	Exhaust Valve Bridge, Rocker Arms and Oil Lines	1-2	
	NOTE: Use Column B for 645F7B engines		
	ARM ASM. .. Rocker - Exhaust valve - 9319505		
	ARM ASM. .. Rocker - Injector - 9319506		
A15	Injector Control Linkage		16,20-645F7B
	Control Shaft, Support Bracket, and Bearings	1-2	
	Spring - Loaded Adjusting Link - Use Columns C&D	3	
	Current PGA Governor Lever and Control Rod Applied with Two Layshaft Hand Control Levers	10	
B18	Crankshaft, Main Bearings and Main Bearing Caps	3-5	16,20-645F7B - Application same as 16,20-645 engines except as noted below:
	NOTE: On 16-645F7B engines, use 9558555 A.B.S. Crankshaft in place of 8440023. On 20-645F7B engines, use 8439963 A.B.S. Crankshaft.		
B20	Harmonic Balancer and Gear Damper Assemblies Gear Damper Assembly 9323945	1	16,20-645F7B
B22	Accessory Drive Gear Assembly Accessory Drive Gear Assembly 8365300	2	
B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1	
	Standard Engine Coupling Disc - L.H. Rotating Engines - 8360898	2	16,20-645F7B
	Standard Engine Coupling Disc - R.H. Rotating Engines - 8464348	2	
	Heavy Engine Coupling Disc - L.H. Rotating Engine - 8383442	2	
	Heavy Engine Coupling Disc - R.H. Rotating Engine - 8383474	2	16-645F7B
	Front End Accessory Drive	6	20-645F7B
	Blind Cover Application	8	16,20-645F7B
B25	Starter Motor and Mounting		
	Magnetic Pick-up Application - Column C	1	16,20-645F7B
	Dual Air Start Motor Mounting with Heavy Engine Coupling Disc - Column A	3	L16,20-645F7B
	with Standard Engine Coupling Disc - Column C	3	
	with Standard Engine Coupling Disc - Column D	3	R16,20-645 F7B
	with Heavy Engine Coupling Disc - Column B	3	R16-645F7B
	Flywheel Indicators with Heavy Engine Coupling Disc - 8377431	9	R,L,16,20-645F7B
	with Standard Engine Coupling Disc - 8354872	9	
	Air Starter Motor Assembly	20-21	16,20-645F7B
B26	Camshaft Drive Gear Train		
	Camshaft Drive Gear Train - Use Columns F & G		
	NOTE: Use 8360843 Crankshaft Gear on 16-645F7B engines instead of 8069014	4-5	
	Idler Gear Stubshaft Arrangement - Use Column C	6-7	16,20-645F7B
	Upper Idler and Turbocharger Drive Gear R.H. Rotating Engines use 9531160 Gear Asm. L.H. Rotating Engines use 9515331 Gear Asm.	8	

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B28	Camshafts and Camshaft Counterweights		
	Camshaft Asm. .. L.H. Rotating Engines - Use Column B Camshaft Asm. .. R.H. Rotating Engines - Use Column D	5-6	16-645F7B
	Camshaft Asm. .. L.H. Rotating Engines - Use Column B Camshaft Asm. .. R.H. Rotating Engine - Use Column C	7-8	20-645F7B
	Counterweights and Overspeed Trip		
	L.H. Rotating Engines - Use Column A R.H. Rotating Engines - Use Column B	12	16-645F7B
	L.H. Rotating Engines - Use Column A R.H. Rotating Engines - Use Column B	13	20-645F7B
B30	Camshaft Bearing Brackets - Use Columns B and C	1	
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies - Use Columns C and D	1	
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly - Engines with Manual Trip Lever	5	
	Overspeed Trip Lever, Reset Lever, and Limit Switch - Use Column B	8	
	Trip Housing Cover - 9522706 - Use Column H	9,11	
	Trip Linkage Housing - Use Column C	12-13	
	Cover Plates	14-15	
B33	Electric Operated Engine Shutdown Junction Box and Cable Application	4	
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	
	Soak Back Filter Assembly - With Flanged Connections	3	16,20-645F7B
	Soak Back Lube Oil System - With Flanged Connections - Use Columns C & D	4-5	
	Turbocharger Lube Oil Filter	13	
	Piston Cooling, Camshaft Stubshaft, Rocker Arm Lubricating Oil Lines, and Turbocharger Filter - Use Columns C & D	14-15	
	Manifold Relief Valve	18	
	Lube Oil By-Pass Pressure Relief Valve Assembly	19	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer - Left-Hand Rotation Engines - Use Columns C & D	28-30	
	Lube Oil Pump and "Box" Type Lube Oil Strainer - Right-Hand Rotation Engines - Use Columns E & H	31-33	
B36	Lube Oil Strainer		
	Lube Oil Strainer - Special 8186776 Lube Oil Strainer - Basic 8269263	1-4	
B38	Piston Cooling and Pressure Pump		
	16-645F7B Engines - 9330012 20-645F7B Engines - 9330013	1-5	

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B40	Lube Oil Scavenging and Fuel Oil Pump		
	Lube Oil Scavenging and Fuel Oil Pump - 8417074	1-3	
	Fuel Oil Pump Assembly - 8410219	4	
B42	Lube Oil Separator		
	Lube Oil Separator, Ejector, and Eductor Tube Assembly - Use Column C	2-3	
B44	Cooling System		
	Water Manifold Bracket Application	1	
	Water Manifold Application - Use Columns F & G	2-3	
	Fresh Water Pump Application - L.H. Rotation - Use Columns C & D	8	
	Fresh Water Pump Application - R.H. Rotation - Use Column C	9	
	Water Inlet, Outlet and Drain Piping - Use Column B	13	
	Water Drain Piping - Use Column B	14	
	After Cooler Piping	15	
B46	Water Pumps		
	Fresh Water Pumps	2-3	
	L.H. Rotation Engines, Right Bank - 9530406		
	L.H. Rotation Engines, Left Bank - 8347607		
	R.H. Rotation Engines, Right Bank - 8364236		
	R.H. Rotation Engines, Left Bank - 8364237		
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	
	Duplex Fuel Filter Piping	12-13	
	Fuel Filter Manifold to Fuel Pump	14-15	16,20-645F7B
	Left-Hand Rotation Engines - Use Column D		
	Right-Hand Rotation Engines - Use Column E		
	Fuel Manifold and Valve Assembly	18	
B50	Fuel Oil Filter		
	Fuel Oil Filter - 8451532	2-3	
B54	Cylinder Head Cover and Support Frame		
	Round Top Inside Frame Corner Design Applied to Engines with Frame Arrestor Safety Handhole Covers - Use Columns F & G	1-3	
	Cover Assemblies Applied to Engines with Flame Arrestor Safety Handhole Covers	8	
	16-645F7B Engine - 9087069		
	20-645F7B Engine - 9087068		
	Cover Latches and Support Assembly	11	
B58	Accessory Drive Housing Assembly		
	L.H. Rotation Engines - 9531366	2	
	R.H. Rotation Engines - 9531365		
B59	Engine Crankcase Pressure Detector Assembly (Use Items 1 through 4 Only - See Balance of Application in Parts List B33, Page 4)	7	
B60	Camshaft Drive Housing and Cover Use Column C	1	
B66	Governor Assembly		
	Governor .. PGA - 9554500	-	16-645F7B
	Governor .. PGA - 9513093 and 9521453	3	20-645F7B

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B70	Governor Drive and Governor Drive Gear		
	Governor Drive Gear Application	1	
	Governor Drive Assembly - 8175893 - Use Column D	2	
B72	Exhaust Chamber Assembly		16,20-645F7B
	Thermocouple Application with Ungrounded Hot Junction and Flexible Conduit - Use Columns F&G	17	
	Exhaust Chamber and Heat Shield Application	19-20	
B74	Turbocharger Application		
	Turbocharger - 9528223	3	L 16-645F7B
	Turbocharger - 9546633		R 16-645F7B
	Turbocharger - 9546635		L 20-645F7B
	Turbocharger - 9546528		R 20-645F7B
	Turbocharger Application	3-8	16,20-645F7B - Application same as 16,20-645 engines except as noted below:
	NOTE: On 16,20-645F7B engines, use: *9541961 Aftercooler in place of 8409891* *8435460 Aftercooler Core in place of 8352305* *8534979 Aftercooler Core in place of 8534519* *9531625 R.B. Aftercooler Duct in place of 8460309* *9531624 L.B. Aftercooler Duct in place of 9327567*		
B78	Engine Air Intake Silencers and Adapters		
	Engine Silencer and Duct Assembly	8	16,20-645F7B
B80	Oil Bath and Impingement Type Engine Air Intake Filter		
	Cycoil Oil Bath Air Inlet Filter Assembly with Rainshield		
	8412789 Filter Assembly - Use Column K	11-12	16-645F7B
	8415645 Filter Assembly - Use Column L		20-645F7B
B81	Paper and Fiberglass Engine Air Intake Filters		
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch	12	16-645F7B
	Fiberglass Element Bag-Type Engine Air Filter Application with Restriction Indicator	16	20-645F7B
B82	Exhaust Stack Adapter Assembly		
	ADAPTER ASM. .. 90° fore and aft 9549893	1-2	
	ADAPTER ASM. .. 0° straight up 8365027		16,20-645F7B
B99	Engine Gasket Kits		
	Engine Gasket Kit Index	3-4	
	Engine Gasket Kits	5-12	
	NOTE: Use Gasket Kits Designated for 16 and 20-645E7C Engines Except for Cylinder Head - See Parts List B06, Page 3, Ref. No. 23		
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12-645E8 - MD12E8	16-645E9 - MD16E9	16-645E9B - MD16E9B
16-645E8 - MD16E8	20-645E9 - MD20E9	20-645E9B - MD20E9B

Parts List Number	Subject	Page Number	Engine Application
B01	Engine, Crankcase and Oil Pan Assembly		
	Reference Chart	8	
	Crankcase and Oil Pan Assembly	9-12,14	
	Lube Oil Level Switch	15	
B04	Handhole Cover and Cylinder Test Valve		
	Safety Handhole Cover Assembly	1-2	
	Handhole Cover Assembly	2-3	
	Cylinder Test Valve	6	
A05	Power Assemblies and Associated Components Locating Reference	1	
B06	Cylinder Head and Liner (Replaces P.L. A06-S)	1-2	
A07	Connecting Rod Bearing, Carrier and Piston Pin (Replaces P.L. A16 & A16-S)		
	Connecting Rod Bearing, Carrier and Piston Pin	1-2	
B08	Pistons and Rings (Replaces P.L. A14 & A14-S)		8,12,16-645E8 & 12,16,20-645E9,E9B
	Piston Assembly Reference Chart	1	
	Piston and Rings	2-12,15	
A09	Power Pack Assemblies (Replaces P.L. A06 & A07-S)		
	Complete Power Packs	1-2	
	Mini and Partial Power Packs	3	
B10	Cylinder Head Crabs (Replaces P.L. A10-S)		
A11	Fuel Injector (Replaces P.L. A52 & A52-S)		
	Fuel Injector Reference Chart	1	
	Fuel Injector Assemblies	2-3	
	Repair Kits	4	
A12	Injector Control Linkage (Replaced By P.L. A15)		
A13	Exhaust Valve Bridge, Rocker Arms and Oil Lines (Formerly in P.L. A08 & A08-S)	1-2	
A14	Piston Assembly, Pistons, Ring Sets and Rings (Replaced by P.L. B08)		

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Parts List Number	Subject	Page Number	Engine Application
A15	Injector Control Linkage (Replaces P.L. A12)		
	Control Shaft, Support Bracket and Bearings	1	8,12,16-645E8 & 12,16,20-645E9,E9B
	Two-Piece Control Shaft Kits	2	16-645E8,E9,E9B; 20-645E9,E9B
	Spring-Loaded Adjusting Link	3	12-645E8,E9B; 16-645E8
	Standard Type Adjusting Link	4	8,12,16-645E8 & 12,16,20-645E9,E9B
	EGB Governor Lever and Control Rod With Layshaft Hand Control Lever On Left Bank	5	8-645E8,20-645E9,E9B
	EGB Governor Lever and Control Rod Applied With Two Layshaft Hand Control Levers	6	12,16-645E8,16-645E9,E9B
	Current PG,PGA,PGR Governor Lever and Control Rod Applied With Single Layshaft Hand Control Lever On Left Bank	9	16-645E8
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	11	
A16	Connecting Rod, Bearings, Carrier and Piston Pin (Replaced By P.L. A07)		
B18	Crankshaft, Main Bearings and Main Bearing Caps		
	Crankshaft and Main Bearings	1-4	
	Main Bearing Caps	5	
B20	Harmonic Balancer and Gear Damper Assemblies (Replaces P.L. A20-S)	1	8,12,16-645E8 & 12,16,20-645E9,E9B
B22	Accessory Drive Gear Assembly		
	Accessory Drive Gear Assembly Applied to Crankshaft with Integral Stubshaft	1-2	
B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1-3	
	Blind Cover Application	8	
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	
	Dual Air Start Motors	3,20-21	12,16-645E8 & 12,16,20-645E9,E9B
	Single Air Start Motor	4-5,20-21	8-645E8
	Low Pressure Air Start System	6	12,16-645E8,16-645E9B
	Flywheel Indicators	9	8,12,16-645E8 & 12,16,20-645E9,E9B
B26	Camshaft Drive Gear Train		
	Idler Gear Stubshaft Arrangement	1	8,12,16-645E8
	Camshaft Drive Gear Train	2-3	
	Camshaft Drive Gear Train	4-5	
	Idler Gear Stubshaft Arrangement	6-7	12,16,20-645E9,E9B
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B28	Camshaft and Camshaft Counterweights (Replaces P.L. A28-S)		
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	Camshaft Bearing Brackets	2-3	8-645E8
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies	1	
	Trip Linkage Application	2-3	8,12,16-645E8 & 12,16,20-645E9,E9B
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly	5	
	Overspeed Trip Lever, Reset Lever and Limit Switch	8	
	Trip Housing Cover (Formerly in P.L. A56)	9-11	8,12,16-645E8 & 12,16,20-645E9,E9B
	Trip Linkage Housing	12-13	
	Cover Plates	14-15	
B33	Eclectric Operated Engine Shutdown		
	Electric Operated Engine Shutdown Solenoid	1	12,16-645E8 & 16-645E9B
	Frequency Generator Mounting	2-3	12,16-645E8 & 16,20-645E9B
	Servo-Booster Pump Application	10	
	Servo-Booster Pump Assembly	11	8,12,16-645E8 & 12,16,20-645E9,E9B
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	
	Soak Back Filter Assembly	3	
	Soak Back Lube Oil System With Flanged Connections	6-7	12,16,20-645E9,E9B
	Soak Back Lube Oil System For Units with Immersion Heaters	8-9	
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	Piston Cooling, Camshaft Stubshaft, and Rocker Arm Lube Oil Lines and Turbocharger Filter	14-15	12,16,20-645E9,E9B
	Piston Cooling, Camshaft Stubshaft and Rocker Arm Lube Oil Lines	16	8,12,16-645E8
	Rear End Lines Mounting and Piping	17	
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	Lube Oil Pumps and "Box" Type Lube Oil Strainer	34-37	
B36	Lube Oil Strainer	1-4	8,12,16-645E8 & 12,16,20-645E9,E9B
B38	Piston Cooling and Pressure Pump	1-5	
B40	Lube Oil Scavenging and Fuel Oil Pump	1-7	
B42	Lube Oil Separator (Replaces P.L. A42-S)		
	Lube Oil Separator	1	8,12,16-645E8
	Lube Oil Separator, Ejector and Eductor Tube Assembly	2-3	12,16,20-645E9,E9B
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	Water Manifold Application	2-3	8,12,16-645E8 & 12,16,20-645E9,E9B
	Fresh Water Pump Application	4	8-645E8
	Fresh Water Pump Application	6	12,16-645E8
	Fresh Water Pump Application	7	12,16,20-645E9,E9B
	Aftercooler Piping	15	
B46	Water Pumps		
	Fresh Water Pumps	2-3	
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	
	Duplex Fuel Filter Piping - Spin On Elements	16-17	
	Fuel Manifold and Valve Assembly	18	
B50	Fuel Oil Filter		8,12,16-645E8 & 12,16,20-645E9,E9B
	Duplex Fuel Filter Assembly	2-3	
A52	Fuel Injector (Replaced by P.L. A11)		
B54	Cylinder Head Covers and Support Frames		
	Round Top Inside Frame Corner Design Applied to Engines with Flame Arrestor Safety Handhole Covers	1-3	
	Round Top Inside Frame Corner Design Applied to Engines without Flame Arrestor Safety Handhold Covers	4-5	8,12,16-645E8 & 12,16,20-645E9
	Cover Assemblies Applied to Engines with Flame Arrestor Safety Handhold Covers	8	
	Cover Assemblies Applied to Engines without Flame Arrestor Safety Handhold Covers	9	
	Cover Latches and Support Assembly	11	8,12,16-645E8 & 12,16,20-645E9,E9B
A56	Overspeed Trip Housing and Cover (Replaced by P.L. B32)		
B58	Accessory Drive Housing Assembly		
	Applied to Engines with Bottom Drain Overspeed Trip Housings	1	
	Applied to Engines with Rear Drain Overspeed Trip Housings	2	12,16-645E8 & 12,16,20-645E9,E9B
B59	Engine Crankcase Pressure Detector Assembly		
	Crankcase Pressure Detector Application	7	
	Crankcase Pressure Detector Assembly	9	8,12,16-645E8 & 12,16,20-645E9,E9B
B60	Camshaft Drive Housing and Cover	1	
B62	Auxiliary Generator Drive Assembly		
	Auxiliary Generator Drive Assembly	1	8,12,16-645E8
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B66	Governor Assembly - Models PG,PGA,PGR and PG-PH		
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B67	Governor Assembly - Models EGB-10 and EGB-13		
	Reference List	3-4	8,12,16-645E8 & 12,16,20-645E9,E9B
	Governor Assemblies	5-26	
A68	Governor Drive Gear and Stubshaft (Replaced by P.L. B70)		
B70	Governor Drive and Governor Drive Gear (Replaces P.L. A68 & A70-S)		
	Governor Drive Gear Application	1	8,12,16-645E8 & 12,16,20-645E9,E9B
	Governor Drive Assemblies	2-3	
B72	Exhaust Chamber Assembly (Replaces P.L. A72-S)		
	Exhaust Chamber and Heat Shield Application For Normally Aspirated Engines	1-2	8,12,16-645E8
	Exhaust Chamber and Heat Shield Application	7-8	12-645E9,E9B
	Exhaust Chamber and Heat Shield Application	9-10	16-645E9,E9B
	Exhaust Chamber and Heat Shield Application	11-12	20-645E9,E9B
	Thermocouple Application with Ungrounded Hot Junction and Rigid conduit	16	12,16-645E8 & 20-645E9
B74	Turbocharger Application (Replaces P.L. A74-S)		
	Reference Chart	1-3	12,16,20-645E9,E9B
	Turbocharger, Aftercooler Air Duct and Auxiliary Generator Drive	3-6	
B78	Engine Air Intake Silencer and Adapters		
	Siamese Air Intake Adapter and Mounting	3	16-645E8
	Engine Silencer and Duct Assembly	5-7	16,20-645E9B
B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Panel Type Oil Bath Air Intake Filter and Mounting	4	8,12,16-645E8
B81	Paper and Fiberglass Engine Air Intake Filters		
	Paper Element Engine Air Intake Filter Appl. with Vacuum Switch	3-4	12,16,20-645E9 & 16-645E9B
	Fiberglass Element Bag-Type Engine Air Filter Application with Restriction Indicator	5	8,12,16-645E8
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch and Restriction Indicator	9	12-645E9,E9B
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch and Restriction Indicator	14	16,20-645E9,E9B
B82	Exhaust Stack Adapter Assembly	1-2	12,16,20-645E9,E9B

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	Roots Blower Support Mounting Application	2	12,16-645E8
	Roots Blower Assembly	3-5	8,12,16-645E8
B99	Engine Gasket Kits		
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Turbocharged Right Hand Rotation Engines 12-645E4 - S12E4 16-645E4 - S16E4 16-645E4B - S16E4B & SG16E4B 20-645E4 - S20E4 20-645E4B - SG20E4B	

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B01	Engine, Crankcase and Oil Pan Assembly		
	Reference Chart	7-8	All Stationary Gen. Units
	Crankcase and Oil Pan Assembly	9-13	All Stationary Gen. Units
	Lube Oil Level Switch	15	12,16,20-645E4 & 16,20-645E10B L.H. Rotation & 12,20-645E4 R.H. Rotation
B03	Engine Ramps		
	Hinged Engine Ramps	1-3	8,12,16-645E1 & 8,12,16,20-645E4
	Stationary Engine Ramps	4	12,20-645E4
B04	Handhole Cover and Cylinder Test Valve		
	Handhole Cover Assembly	3-5	
	Cylinder Test Valve	6	
A05	Power Assemblies and Associated Components Locating Reference	1	All Stationary Gen. Units
B06	Cylinder Head and Liner (Replaces P.L. A06-S)	1-2	
A07	Connecting Rod Bearing, Carrier and Piston Pin (Replaces P.L. A16 & A16-S)		
	Connecting Rod Bearing, Carrier and Piston Pin	1	8,12,16-645E1 & 8,12,16,20-645E4
	Connecting Rod Bearing, Carrier and Piston Pin	2	8,12,16,20-645E4B & 16,20-645E10B
B08	Pistons and Rings (Replaces P.L. A14 & A14S)		
	Piston Assembly Reference Chart	1	All Stationary Gen. Units
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B10	Cylinder Head Crabs		
	Cylinder Head Crabs (Replaces P.L. A10-S)	1-2	
A11	Fuel Injector (Replaces P.L. A52 & A52-S)		
	Fuel Injector Reference Chart	1	
	Fuel Injector Assemblies	2-3	All Stationary Gen. Units
	Repair Kits	4	
A12	Injector Control Linkage (Replaced by P.L. A15)		
A13	Exhaust Valve Bridge Rocker Arms and Oil Lines (Formerly in P.L. A08 & A08-S)	1-2	
A14	Piston Assembly, Pistons, Ring Sets and Rings (Replaced by P.L. B08)		
A15	Injector Control Linkage (Replaces P.L. A12)		
	Control Shaft, Support Bracket and Bearings	1	8,12,16-645E1,8,12,16,20-645E4,E4B 8,16,20-645E10B
	Two-Piece Control Shaft Kits	2	16-645E1,E4,E4B
	Spring-Loaded Adjusting Link	3	12,16,20-645E4,E4B
	Standard Type Adjusting Link	4	8,12,16-645E1,8,12,16,20-645E4,E4B 8,16,20-645E10B
	EGB Governor Lever and Control Rod with Layshaft Hand Control Lever On Left Bank	5	8-645E1 & 8,12,16-645E4,E4B
	EGB Governor Lever and Control Rod Applied with Two Layshaft Hand Control Levers	6	12-645E1,E4,E4B & 16-645E4
	Current PG,PGA,PGR Governor Lever and Control Rod Applied with Single Layshaft Hand Control Lever on Left Bank	9	8,12,16-645E1 & 16,20-645E4B
	Current PGA Governor Lever and Control Rod Applied with Two Layshaft Hand Control Levers	10	8-645E1
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	11	8,12,16-645E1 & 8,12,16,20-645E4,E4B, 16,20-645E10B
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Right Bank	12	8,12,16-645E1, 16-645E4
	Throttle Position Indicator Application	15	16-645E1,E4
A16	Connecting Rod, Bearings, Carrier and Piston Pin (Replaced by P.L. A07)		
B18	Crankshaft, Main Bearings and Main Bearing Caps		
	Crankshaft and Main Bearings	1-4	All Stationary Gen. Units
	Main Bearing Caps	5	
B20	Harmonis Balancer and Gear Damper (Replaces P.L. A20-S)		
	Damper Assembly	1	8,12,16,20-645E4,E4B & 16,20-645E10B
	Harmonic Balancer Assembly	2	8,12,16-645E1

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B22	Accessory Drive Gear Assembly		
	Accessory Drive Gear Assembly Applied to Crankshaft with Integral Stubshaft	1-2	All Stationary Gen. Units
B24	Crankshaft Couplings		
	Coupling Disc. & Flywheels	1-3	All Stationary Gen. Units
	Front End Accessory Drive	4	12-645E1; 8,12,16,20-645E4,E4B
	Front End Accessory Drive	6	20-645E4
	Blind Cover Application	8	All Stationary Gen. Units
	Engine Turning Jack Assembly	9	8,12,16-645E1; 8,12,16, 20-645E4,E4B
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	All Stationary Gen. Units
	Dual Air Start Motors-Left Bank	2,20-21	12,16-645E4 & 16-645E4B
	Dual Air Start Motors-Right Bank	3,20-21	12,16-645E1,E4,E4B & 20-645E4,E4B
	Single Air Start Motor	4-5,20-21	8-645E1,E4,E4B
	Dual Electric Start Motors	7,10-13	8,12,16-645E1 & 16,20-645E4,E4B
	Flywheel Indicators	9	All Stationary Gen. Units
B26	Camshaft Drive Gear Train		
	Idler Gear Stubshaft Arrangement	1	8,12,16-645E1
	Camshaft Drive Gear Train	2-3	
	Camshaft Drive Gear Train	4-5	8,12,16,20-645E4,E4B & 16,20-645E10B
	Idler Gear Stubshaft Arrangement	6-7	
	Upper Idler and Turbo Drive Gear	8-9	
B28	Camshaft and Camshaft Counterweights (Replaces P.L. A28-S)		
	Camshaft Assembly	1-8	All Stationary Gen. Units
	Counterweights and Overspeed Trip	9-13	
B30	Camshaft Bearing Brackets		
	Camshaft Bearing Brackets	1	12,16-645E1,E4,E4B,20-645E4,E4B & 16,20-645E10B
	Camshaft Bearing Brackets	2-3	8-645E1,E4,E4B
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies	1	All Stationary Gen. Units
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly	5	
	Overspeed Trip Limit Switch and Reset Lever Application	6	
	Overspeed Trip Lever, Reset Lever and Limit Switch	8	
	Trip Housing Cover (Formerly in P.L. A56)	9-11	
	Trip Linkage Housing	12-13	
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	Frequency Generator Mounting	2-3	12-645E1 & 12,16,20-645E4,E4B
	Booster Pump Mounting	9	12-645E1 & 12,16,20-645E4
	Servo-Booster Pump Application	10	8,12,16-645E1 & 8,12,16,20-645E4,E4B
	Servo-Booster Pump Assembly	11	
	Single Motor-Driven Booster Pump Application	12	12,16-645E1 & 12,16,20-645E4,E4B
	Booster Pump Assembly	13	
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	All Stationary Gen. Units
	Soak Back Filter Assembly	2-3	
	Soak Back Lube Oil System with Flanged Connections	6-7	8,12,16,20-645E4,E4B & 16,20-645E10B
	Soak Back Lube Oil System For Units with Immersion Heaters	8-9	
	Soak Back Lube Oil System with Threaded Connections	10-12	16,20-645E4
	Turbocharger Lube Oil Filter	13	8,12,16,20-645E4,E4B & 16,20-645E10B
	Piston Cooling, Camshaft Stubshaft, and Rocker Arm Lube Oil Lines and Turbocharger Filter	14-15	8,12,16,20-645E4,E4B; 16,20-645E10B
	Piston Cooling, Camshaft Stubshaft and Rocker Arm Lube Oil Lines	16	8,12,16-645E1
	Rear End Lines Mounting and Piping	17	
	Manifold Relief Valve	18	All Stationary Gen. Units
	Lube Oil Pumps and "Box" Type Lube Oil Strainer - Right Hand Rotating Engines	31-33	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer	34-37	
B36	Lube Oil Strainer	1-4	
B38	Piston Cooling and Pressure Pump	1-5	
B40	Lube Oil Scavenging and Fuel Oil Pump	1-7	
B42	Lube Oil Separator (Replaces P.L. A42-S)		
	Lube Oil Separator	1	8,12,16-645E1
	Lube Oil Separator, Ejector and Eductor Tube Assembly	2-3	8,12,16,20-645E4,E4B & 16,20-645E10B
	Lube Oil Separator Support Assembly	6	8,12,16-645E1
B44	Cooling System		
	Water Manifold Bracket Application	1	16-645E4,E4B,E10B
	Water Manifold Application	2-3	All Stationary Gen. Units
	Fresh Water Pump Application	4	8-645E1
	Fresh Water Pump Application	6	12,16-645E1
	Fresh Water Pump Appl. - L.H. Rotation	7	8,12,16,20-645E4,E4B & 16,20-645E10B
	Fresh Water Pump Appl. - R.H. Rotation	9	12,16,20-645E4,E4B
	Water Drain Piping	14	12-645E4 & 16,20-645E4,E4B R.H. Rotating
	Aftercooler Piping	15	8,12,16,20-645E4,E4B; 16,20-645E10B
B46	Water Pumps		
	Fresh Water Pumps	2-3	All Stationary Gen. Units

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B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	All Stationary Gen. Units
	Twin Spin-On Fuel Oil Piping (Formerly Viscose)	2-3	All Stationary Gen. Units
	Duplex Fuel Oil Filter Piping	4-5	12,16-645E1 & 16,20-645E4
	Duplex Fuel Filter Piping - Spin-On Elements	16-17	8,12,16,20-645E4,E4B
	Fuel Manifold and Valve Assembly	18	8,12,16,20-645E4,E4B
B50	Fuel Oil Filter		
	Spin-On Fuel Oil Filter Assembly	1	All Stationary Gen. Units
	Duplex Fuel Filter Assembly	2-3	8,12,16,20-645E4,E4B
	Viscose Fuel Oil Filter Assembly	4-5	8,12,16-645E1 & 8,12,16,20-645E4
	Filter Conversion - Viscose to Twin Spin-On	6	8,12,16-645E1 & 8,12,16,20-645E4
A52	Fuel Injector (Replaced by P.L. A11)		
B54	Cylinder Head Covers and Support Frames		
	Round Top Inside Frame Corner Design Applied to Engines with Flame Arrestor Safety Handhole Covers	1-3	16,20-645E4B
	Round Top Inside Frame Corner Design Applied to Engines without Flame Arrestor Safety Handhold Covers	4-5	All Stationary Gen. Units
	Previous Design Square Top Inside Frame Corners	6-7	8,12,16-645E1
	Cover Assemblies Applied to Engines with Flame Arrestor Safety Handhold Covers	8	16,20-645E4B
	Cover Assemblies Applied to Engines without Flame Arrestor Safety Handhold Covers	9	All Stationary Gen. Units
	Previous Design Cover Assembly for Square Inside Corner Frame Assembly	10	8,12,16-645E1
	Cover Latches and Support Assembly	11	All Stationary Gen. Units
A56	Overspeed Trip Housing and Cover (Replaced by P.L. B32)		
B58	Accessory Drive Housing Assembly		
	Applied to Engines with Bottom Drain Overspeed Trip Housings	1	8,12,16-645E1 & 8,12,16,20-645E4,E4B
	Applied to Engines with Rear Drain Overspeed Trip Housings	2	12,16-645E1, 12,16,20-645E4,E4B & 16,20-645E10B
B59	Engine Crankcase Pressure Detector Assembly		
	Low Water Safety Shut Valve Application	1	16-645E4 L.H. Rotation
	Low Water and Crankcase Pressure Detector Application	3	12-645E4B
	Low Water and Crankcase Pressure Detector Application	4	12,16-645E1; 12,16,20-645E4 L.H. Rotation
	Crankcase Pressure Detector Application	5	8,12,16-645E1,8-645E4,E4B & 12,16,20-645E4,E4B L&R Rotation
	Crankcase Pressure Detector Application	7	16-645E1,8,16-645E4B,20-645E4,E4B & 16,20-645E10B
	Crankcase Pressure Detector Assembly	9	12,16,20-645E4 R.H. Rotation & 16-645E1, 8,12,16,20-645E4, 8,16-645E4B, 16,20-645E10B L.H. Rotation

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B59	Continued		
	Low Water and Crankcase Pressure Detector Assembly	10-11	12,16-645E1,12,16,20-645E4 & 12-645E4B L.H. Rotation
	Crankcase Pressure Detector Assembly	12	8,12,16-645E1,E4,E4B & 20-645E4,E4B L.H. Rotation
	Low Water Safety Shutdown Valve Assembly	13	16-645E4 L.H. Rotation
	Cutoff Valve Assembly	14	12,16-645E1; 12,16,20-645E4 & 12-645E4B L.H. Rotation
B60	Camshaft Drive Housing and Cover	1	All Stationary Gen. Units
B62	Auxiliary Generator Drive Assembly		
	Auxiliary Generator Drive Assembly	1	8,12,16-645E1
	Auxiliary Generator Drive Assembly	2	8,12,16,20-645E4,E4B & 16,20-645E10B
B65	Governor Assembly - Model UG-8		
	Reference List	1	8,12,16-645E1; 8,12,16,20-645E4,E4B & 16,20-645E10B
	Governor Assembly	2-14	
B66	Governor Assembly - Models PG,PGA,PGR and PG-PH		
	Reference List	1-4	12,20-645E4 & 16,20-645E4B
	Governor Assemblies	5-37	
B67	Governor Assembly - Models EGB10,EGB13 and EGB35		
	Reference List	1-4	8,12,16-645E1; 8-645E4; 12,16,20-645E4, E4B L.H. Rotation and 12-645E4, 16,20-645E4,E4B R.H. Rotation
	Governor Assemblies	5-26	
A68	Governor Drive Gear and Stubshaft (Replaced by P.L. B70)		
B70	Governor Drive and Governor Drive Gear (Replaces P.L. A68 & A70-S)		
	Governor Drive Gear Application	1	8,12,16-645E1;8,12,16,20-645E4,E4B & 16,20-645E10B
	Governor Drive Assemblies	2-3	
B72	Exhaust Chamber Assembly (Replaces P.L. A72-S)		
	Exhaust Chamber and Heat Shield Application For Normally Aspirated Engines	1-2	8,12,16-645E1
	Silencing Type Exhaust Chamber Application	3	
	Exhaust Chamber and Heat Shield Application	5-6	8-645E4,E4B
	Exhaust Chamber and Heat Shield Application	7-8	12-645E4,E4B
	Exhaust Chamber and Heat Shield Application	9-10	16-645E4,E4B,E10B
	Exhaust Chamber and Heat Shield Application	11-12	20-645E4,E4B,E10B
	Previously Applied Exhaust Chambers Having Blanket Type Insulation	13-15	12,16,20-645E4
	Thermocouple Application with Ungrounded Hot Junction and Rigid Conduit	16	20-645E4
	Thermocouple Application with Grounded Hot Junction	18	16-645E4
B74	Turbocharger Application (Replaces P.L. A74-S)		
	Reference Chart	1-3	8,12,16,20-645E4,E4B,E10B
	Turbocharger, Aftercooler Air Duct and Auxiliary Generator Drive	3-6	
B78	Engine Air Intake Silencer and Adapters		
	Air Intake Adapter and Mounting	2	12-645E1 L.H. Rotation
	Siamese Air Intake Adapter and Mounting	3	12,16-645E1 L.H. Rotation
	Engine Silencer and Duct Assembly	5-7	12,16,20-645E4, 16-645E4B L.H. and R.H. Rotation

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B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Panel Type Oil Bath Air Intake Filter and Mounting	4	8,12,16-645E1 L.H. Rotation
	Panel Type Oil Bath Air Intake Filter and Mounting	5	12-645E4 L.H. Rotation
	Panel Type Oil Bath Air Intake Filter and Mounting	6	16-645E4 L.H. Rotation
	Panel Type Oil Bath Air Intake Filter and Mounting	8-9	12-645E4B & 20-645E4,E4B L.H. Rotation
	Cycoil Oil Bath Air Inlet Filter Assembly with Rainshields	11-12	16-645E4,E4B & 20-645E4 L.H. Rotation
B81	Paper and Fiberglass Engine Air Intake Filters		
	Paper Element Engine Air Intake Filter Appl. with Vacuum Switch	3-4	12,20-645E4 & 16,20-645E4B
	Fiberglass Element Bag-Type Engine Air Filter Application with Restriction Indicator	5	8,12,16-645E1
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch and Restriction Indicator	9	8,12-645E4 & 12-645E4B
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch and Restriction Indicator	14	16,20-645E4,E4B
B82	Exhaust Stack Adapter Assembly	1-2	12,20-645E4 R.H. Rotation & 8,12,16,20-645E4,E4B L.H. Rotation
B85	Roots Blower and Blower Support		
	Air Duct, Blind Cover, Blower and Blower Support Mounting Application	1	8-645E1
	Roots Blower Support Mounting Application	2	12,16-645E1
	Roots Blower Assembly	3-5	8,12,16-645E1
B99	Engine Gasket Kits		
	Engine Gasket Kit Index	1-4	All Stationary Gen. Units
	Engine Gasket Kits	5-12	
	NUMERICAL INDEX		

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NOTE: This is a special table of contents for 12,16-20645E4C and 16,20-645F4B industrial engines. Because technical and sales data was not available when the revision to Catalog 302 was being prepared, this supplemental table of contents is furnished to provide the latest parts information for these engines.

Model Designation	
12-645E4C - S12E4C, SC12E4C 16-645E4C - S16E4C 20-645E4C - S20E4C	16-645F4B - SC16F4B 20-645F4B - SC20F4B

Parts List Number	Subject	Page Number	Engine Application
B01	Engine, Crankcase and Oil Pan Assembly Engines equipped and crankcase and oil pan assembly part numbers are listed below. Part numbers for 12-645E4C, 12-645F4B and 20-645F4B crankcase and oil pan assemblies will be provided on request. Engine Model / Engine Equipped / Crankcase & Oil Pan Asm. 12-645E4C / 9546431 / ---- 16-645E4C / 9546424 / 8384863 20-645E4C / 9546436 / 8405115 16-645F4B / 9557936 / ---- 20-645F4B / 9557932 / ----		
	Crankcase and Oil Pan Assembly	9-13	12,16,20-645E4C, and 16,20-645F4B Application same as 12,16,20-645 engines except as noted below:
	NOTE: Page 9, Ref. No. 16 - Use 9318158 elbow in place of 8344765 elbow		
	Lube Oil Level Gauge		
	8325439 .. 12-645E4C,16-645E4C,F4B engines	12	
	8378325 .. 20-645E4C,F4B engines	12	
B03	Engine Ramps		
	Hinged Engine Ramps		
	12-645E4C - Use Column B 16-645E4C,F4B - Use Column E 20-645E4C,F4B - Use Column H	1-3	12,16,20-645E4C and 16,20-645F4B
B04	Handhole Cover and Cylinder Test Valve		
	Safety Handhole Cover Assembly - 8499419	2	
	Handhole Cover Assembly - 9314870	3	
	Handhole Cover at Starter Motor Location	5	20-645E4C
	Cylinder Test Valve - 8048880	6	12,16,20-645E4C and 16,20-645F4B
B06	Cylinder Head and Liner		
	Cylinder Head Assembly - 9319736	1-2	12,16,20-645E4C
	Cylinder Liner Assembly		
	Cast Iron, Laser Hardened Upper Bore - 9318833	2	12,16,20-645E4C and 16,20-645F4B
	Chrome Plated Bore 9090233	2	
	Cylinder Head Assembly - 9556060	3	12,20-645F4B

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Parts List Number	Subject	Page Number	Engine Application
A07	Connecting Rod, Bearings, Carrier and Piston Pin	2	12,16,20-645E4C and 16,20-645F4B - Columns B,C, and D
B08	Pistons and Rings	13-15	12,16,20-645E4C and 16,20-645F4B
A09	Power Pack Assemblies		
	Power Pack Assemblies	1-3	12,16,20-645E4C
	NOTE: Use Power Packs designed for 645E7C engines		
	Power Pack Assemblies	4	16,20-645F4B
B10	Cylinder Head Crabs	2	12,16,20-645E4C and 16,20-645F4B
A11	Fuel Injector		
	Fuel Injector - 5229335	1-4	12,16-645E4C
	Fuel Injector - 5229320		20-645E4C
	Fuel Injector - 5226210	5-6	16-645F4B
	Fuel Injector - 5226430 - 900 RPM		20-645F4B
	Fuel Injector - 5226160 - 750 RPM		20-645F4B
A13	Exhaust Valve Bridge, Rocker Arms, and Oil Lines	1-2	12,16,20-645E4C and 16,20-645F4B
	NOTE: Use Column B		
	ARM ASM. .. Rocker - Exhaust valve - 9319505		
	ARM ASM. .. Rocker - Injector - 9319506		
A15	Injector Control Linkage		
	Control Shaft, Support Bracket, and Bearing	1-2	12,16,20-645E4C, and 16,20-645F4B
	Spring-Loaded Adjusting Link - Use Column D	3	20-645F4B
	Standard Type Adjusting Link	4	12,16,20-645E4C, and 16,20-645F4B
	EGB Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	5	16,20-645E4C and 16,20-645F4B
	EGB Governor Lever and Control Rod Applied with Two Layshaft Hand Control Levers	6	12-645E4C
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	11	12,16,20-645E4C and 16,20-645F4B
B18	Crankshaft, Main Bearings, and Main Bearing Caps	2-5	12,16,20-645E4C and 16,20-645F4B - Application same as 12,16,20-645 engines except as noted below:
	NOTE: On 16-645F4B engines, use 9558552 Crankshaft in place of 8034708		
B20	Harmonic Balancer and Gear Damper Assemblies		
	Gear Damper Assembly - 9323945	1	12,16,20-645E4C and 16,20-645F4B

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B22	Accessory Drive Gear Assembly		
	Accessory Drive Gear Assembly - 8250686	1	12-645E4C
	Accessory Drive Gear Assembly - 8365300	2	16,20-645E4C,F4B
B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1	12,16,20-645E4C, and 16,20-645F4B
	Standard Engine Coupling Disc - 8360898	2-3	12,16,20-645E4C
	Standard Engine Coupling Disc - 9553715 - Serrated Mounting Pilot - Timing Mark Location 303° OB	-	16-645F4B
	Standard Engine Coupling Disc - 9553716 - Serrated Mounting Pilot - Timing Mark Location 303° B	-	20-645F4B
	Special Wide Flange - Square Pilot Coupling Disc - 9539372	2-3	12,16-645E4C, 20-645F4B
	Special Wide Flange - Half Heavy - Square Pilot Coupling Disc - 9084260	2-3	16-645E4C
	Engine Flywheel - 8370850		
	Front End Accessory Drive - 8323180	4	16-645F4B
	Blind Cover Application	8	12,16,20-645E4C, and 16,20-645F4B
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	12,16,20-645E4C and 16,20-645F4B
	Dual Air Start Motor Mounting - Use Column C	3	
	Dual Electric Start Motors	7,10-13	20-645E4C
	Air Start Motor Assembly	20-21	12,16,20-645E4C and 16,20-645F4B
B26	Camshaft Drive Gear Train		
	Camshaft Drive Gear Train - Use Column G		12,16,20-645E4C and 16,20-645F4B
	NOTE: Use 8360843 Crankshaft Gear on 16-645F4B engines instead of 8069014	4-5	
	Idler Gear Stubshaft Arrangement - Use Column C	6-7	
	Upper Idler and Turbocharger Drive Gear 9515331	8	
B28	Camshafts and Camshaft Counterweights		
	Camshaft Asm. - Use Column B	3-4	12-645E4C
	Camshaft Asm. - Use Column B	5-6	16-645E4C,F4B
	Camshaft Asm. - Use Column B	7-8	20-645E4C,F4B
	Counterweights and Overspeed Trip		
	Use Column A - Overspeed Trip - 8383745	10	12-645E4C
	Use Column A - Overspeed Trip - 8350518	11	16-645E4C,F4B
	Use Column A - Overspeed Trip - 8389517 for 900 RPM or 8432599 for 750 RPM	12	20-645E4C,F4B
B30	Camshaft Bearing Brackets	1	12,16,20-645E4C and 16,20-645F4B
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies Use Columns B,C, & D	1	12,16,20-645E4C and 16,20-645F4B
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly - Engines with Manual Trip Lever	5	
	Overspeed Trip Lever, Reset Lever, and Limit Switch	8	
	Trip Housing Cover - 9522706 - Use Column H	9-11	
	Trip Housing Cover - 9537509 - Use Column J - Applied with Overspeed Trip Solenoid	9-11	20-645F4B

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B32	Camshaft Overspeed Trip Linkage (Continued)		
	Trip Linkage Housing - Use Column C	12-13	12,16,20-645E4C and 16,20-645F4B
	Cover Plates	14-15	
B33	Electric Operated Engine Shutdown		
	Electric Operated Engine Shutdown Solenoid	1	20-645F4B
	Servo-Booster Pump Application - EGB Governor	10	16,20-645E4C
	Single Motor - Driven Booster Pump Application	12	12,20-645E4C
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	
	Soak Back Filter Assembly - With Flanged Connections	3	12.16,20-645E4C and 16,20-645F4B
	Soak Back Lube Oil System with Flanged Connections	6-7	
	Soak Back Lube Oil System - For Units with Immersion Heaters	8-9	12,16,20-645E4C
	Turbocharger Lube Oil Filter	13	
	Piston Cooling, Camshaft Stubshaft, Rocker Arm Lube Oil Lines and Turbocharger Filter - Use Columns B,C, and D	14-15	12,16,20-645E4C and 16,20-645F4B
	Manifold Relief Valve	18	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer - Use Columns E,F, and G	34-37	
B36	Lube Oil Strainer		
	Lube Oil Strainer - Special 8186776	1-4	20-645F4B
	Lube Oil Strainer - Basic 8269263	1-4	12,16,20-645E4C and 16,20-645F4B
B38	Piston Cooling and Pressure Pump		
	12-645E4C engine - 8084556 16-645E4C,F4B engines - 9330012 20-645E4C,F4B engines - 9330013	1-5	12,16,20-645E4C and 16,20-645F4B
B40	Lube Oil Scavenging and Fuel Oil Pump		
	Lube Oil Scavenging and Fuel Oil Pump - 8417754	1-3	12-645E4C
	Lube Oil Scavenging and Fuel Oil Pump - 8417074		16,20-645E4C,F4B
	Fuel Oil Pump Assembly - 8410219	4	12,16,20-645E4C and 16,20-645F4B
B42	Lube Oil Separator		
	Lube Oil Separator, Ejector, and Eductor Tube Assembly - Use Column C	2-3	12,16,20-645E4C and 16,20-645F4B
B44	Cooling System		
	Water Manifold Bracket Application	1	16-645E4C,F4B
	Water Manifold Application - Use Col's. D,F, & G	2-3	
	Fresh Water Pump Application - Use Col's. B,C, & D	7	12,16,20-645E4C and 16,20-645F4B
	Aftercooler Piping		
	12-645E4C engine - Use Column A 16,20-645E4C,F4B engines - Use Column B	15	
B46	Water Pumps		
	Fresh Water Pumps		
	12-645E4C engines, Left Bank - 9336390 12-645E4C engines, Right Bank - 8269664 16,20-645E4C,F4B engines, Left Bank - 9530407 16,20-645E4C,F4B engines, Right Bank - 9530406	2-3	12,16,20-645E4C and 16,20-645F4B
	20-645F4B engine - 750 RPM Operation	4-5	20-645F4B
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Line	1	12,16,20-645E4C and 16,20-645F4B
	Twin Spin-On Fuel Oil Piping	2-3	
	Duplex Fuel Filter Piping - Spin-On Elements	16-17	16,20-645E4C,F4B

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B48	Fuel Oil Piping (Continued)		
	Fuel Manifold and Valve Assembly	18	16,20-645E4C,F4B
B50	Fuel Oil Filter		
	Spin-On Fuel Oil Filter Assembly	1	12,16,20-645E4C and 16,20-645F4B
	Duplex Fuel Oil Filter Assembly - Twin Spin-On Type - 8451532	2-3	16,20-645E4C,F4B
B54	Cylinder Head Cover and Support Frame		
	Round Top Inside Frame Corner Design Applied to Engines with Flame Arrestor Safety Handhole Covers - Use Columns D and F	1-3	12,16-645E4C
	Rounded Top Inside Frame Corner Design Applied To Engines Without Flame Arrestor Safety Handhole Covers	4-5	12,16,20-645E4C and 16,20-645F4B
B58	Accessory Drive Housing Assembly		
	Accessory Drive Housing Assembly - Use Col. A	2	12,16,20-645E4C, and 16,20-645F4B
B59	Engine Crankcase Pressure Detector Assembly		
	Crankcase Pressure Detector Application - Use Style "B"	5	12,16,20-645E4C
	Crankcase Pressure Detector Application	7	12,16,20-645E4C, and 16,20-645F4B
	Crankcase Pressure Detector - 8362040	9	
	Crankcase Pressure Detector - 8370362	12	12,16,20-645E4C
B60	Camshaft Drive Housing and Cover		
	Camshaft Drive Housing - Use Column C	1	12,16,20-645E4C and 16,20-645F4B
B65	Governor Assembly - Model UG8		
	Governor - 8446901	1-14	20-645F4B
	Governor - 8455659		20-645F4B
	Governor - 8446902		12-645E4C
	Governor - 8449920		16-645E4C
B67	Governor Assembly - Models EGB 10,13 and 35		
	Governor - Model EGB 13 - 8460853	3,5-26	12,16-645E4C and 20-645F4B
	Governor - Model EGB 13 - 8458791	3,5-26	20-645E4C
	Governor - Model EGB 13 - 9540279	4	12-645E4C
	Governor - Model EGB 13 - 9546031	-	20-645F4B
	Governor - Model EGB 13 - 9568535	-	16-645F4B
	Governor - Model EGB 13 - 9552596	-	20-645E4C
B70	Governor Drive and Governor Drive Gear		
	Governor Drive Gear Application	1	12,16,20-645E4C and 16,20-645F4B
	Governor Drive Assemblies - Use Columns A,D, and E	2	
B72	Exhaust Chamber Assembly		
	Exhaust Chamber and Heat Shield Application	7-8	12-645E4C
	Exhaust Chamber and Heat Shield Application - Use Column B	9-10	16-645E4C
	Exhaust Chamber and Heat Shield Application - Use Column B	11-12	20-645E4C
	Exhaust Chamber and Heat Shield Application	19-20	16,20-645F4B

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B74	Turbocharger Application		
	Turbocharger - 9554355 (16.8:1 Ratio)		12-645E4C
	Turbocharger - 9546632 (16.8:1 Ratio)		16-645E4C
	Turbocharger - 9546525 (16.8:1 Ratio)		20-645E4C
	Turbocharger - 9546632 (16.8:1 Ratio)	3	16-645F4B
	Turbocharger - 9528223 (17.9:1 Ratio)		16-645F4B
	Turbocharger - 9546525 (16.8:1 Ratio)		20-645F4B
	Turbocharger - 9546635 (17.9:1 Ratio)		20-645F4B
	Turbocharger Application	3-6	12,16,20-645E4C - Application same as 12,16,20-645 engines shown. 16,20-645F4B - Application same as 16,20-645 engines except as noted below:
	NOTE: On 16,20-645F4B engines, use: 9541961 Aftercooler in place of 8409891 8435460 Aftercooler Core in place of 8352305 8534979 Aftercooler Core in place of 8534519 9531625 R.B. Aftercooler Duct in place of 8460309 9531624 L.B. Aftercooler Duct in place of 9327567		
B78	Engine Air Intake Silencers and Adapters		
	Exhaust Silencer and Dust Assembly	8	16,20-645F4B
B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Panel Type Oil Bath Air Intake Filter and Mounting - Use Column A	8-9	12-645E4C
B81	Paper and Fiberglass Engine Air Intake Filters		
	Fiberglass Element Bag-Type Engine Air Filter Application with Vacuum Switch and Restriction Indicator - Use Column B	14	16-645E4C
	Fiberglass Element Bag-Type Engine Air Filter Application with Restriction Indicator - Use Column B	16	16,20-645F4B
B82	Exhaust Stack Adapter Assembly		
	ADAPTER ASM. .. 0° Straight up - 8365027	1-2	16,20-645E4C,F4B
	ADAPTER ASM. .. 0° Straight up - 8298999		12-645E4C
B99	Engine Gasket Kits		
	Engine Gasket Kit Index	2-4	
	Engine Gasket Kits	5-12	
	NOTE: Use Gasket Kits designated for 12,16,20-645E4B except as follows:		12,16,20-645E4C, and 16,20-645F4B
	Power Assembly Installation - 9327287	2-5	
	Cylinder Liner Installation - 9525089		
	Cylinder Head - See Part List B06, Page 3, Ref. No. 23	–	16,20-645F4B
	NUMERICAL INDEX		

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Housed Generation Units

16-645E4	-	Model MP36
20-645E4	-	Model MP45
20-645E4	-	Model 999-20 Skid Mounted
20-645E4	-	Model MP45M
20-645E4B	-	Models MP45B & HG20E4B

Parts List Number	Subject	Page Number	Model Application
B01	Engine, Crankcase and Oil Pan Assembly		
	Reference Chart	8	All Housed Gen. Units
	Crankcase and Oil Pan Assembly	9-13	
	Lube Oil Level Switch	15	999-20
B03	Engine Ramps		
	Hinged Engine Ramps	5-6	MP36,MP45 & E999-20
B04	Handhole Cover and Cylinder Test Valve		
	Handhole Cover Assembly	3-5	
	Cylinder Test Valve	6	
A05	Power Assemblies and Associated Components Locating Reference	1	All Housed Gen. Units
B06	Cylinder Head and Liner (Replaces P.L. A06-S)	1-2	
A07	Connecting Rod Bearing, Carrier and Piston Pin (Replaces P.L. A16 & A16-S)		
	Connecting Rod Bearing, Carrier and Piston Pin	1	MP36, MP45, MP45M, 999-20
	Connecting Rod Bearing, Carrier and Piston Pin	2	MP45B, HG20E4B
B08	Pistons and Rings		
	Piston Assembly Reference Chart	1	
	Piston and Rings (Replaces P.L. A14 & A14-S)	6-12	
A09	Power Pack Assemblies		
	Complete Power Packs	1-2	
	Mini and Partial Power Packs (Replaces P.L. A06 & A07-S)	3	
B10	Cylinder Head Crabs (Replaces P.L. A10-S)	1	All Housed Gen. Units
A11	Fuel Injector (Replaces P.L. A52 & A52-S)		
	Fuel Injector Reference Chart	1	
	Fuel Injector Assemblies	2-3	
	Repair Kits	4	
A12	Injector Control Linkage (Replaced by P.L. A15)		
A13	Exhaust Valve Bridge, Rocker Arms and Oil Lines (Formerly in P.L. A08 & A08-S)	1-2	

HOUSED GENERATION 999 & 920

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Housed Generation Units

Parts List Number	Subject	Page Number	Model Application
A14	Piston Assembly, Piston, Ring Sets and Rings (Replaced by P.L. B08)		
A15	Injector Control Linkage (Replaces P.L. A12)		
	Control Shaft, Support Bracket and Bearings	1	All Housed Gen. Units
	Two-Piece Control Shaft Kits	2	
	Spring-Loaded Adjusting Link	3	999-20
	Standard Type Adjusting Link	4	MP36,MP45,MP45M,MP45B & HG20E4B
	EGB Governor Lever and Control Rod with Layshaft Hand Control Lever On Left Bank	5	MP45,MP45B & HG20E4B
	UG8 Governor Lever and Control Rod with Layshaft Hand Control Lever on Left Bank	11	MP45M, HG20E4B & 999-20
	LSG Governor Lever and Control Rod	13	MP36
A16	Connecting Rod, Bearings, Carrier and Piston Pin (Replaced by P.L. A07)		
B18	Crankshaft, Main Bearings and Main Bearing Caps		
	Crankshaft and Main Bearings	3-4	
	Main Bearing Caps	5	
B20	Harmonic Balancer and Gear Damper Assemblies (Replaces P.L. A20-S)	1	
B22	Accessory Drive Gear Assembly		All Housed Gen. Units
	Accessory Drive Gear Assembly Applied to Crankshaft with Integral Stubshaft	2	
B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1-3	
	Front End Accessory Drive	4	
	Engine Turning Jack	9	MP45,MP45B,MP45M
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	MP45,MP45B,MP45M,999-20 & HG20E4B
	Dual Air Start Motors-Left Bank	2,20-21	999-20
	Dual Air Start Motors-Right Bank	3,20-21	MP45,999-20 & HG20E4B
	Dual Electric Start Motors	7,10-13	MP45,MP45B,MP45M
	Flywheel Indicators	9	
B26	Camshaft Drive Gear Train		All Housed Gen. Units
	Camshaft Drive Gear Train	4-5	
	Idler Gear Stubshaft Arrangement	6-7	
	Upper Idler and Turbo Drive Gear	8-9	
B28	Camshaft and Camshaft Counterweights (Replaces P.L. A28-S)		
	Camshaft Assembly	5-6	MP36
	Camshaft Assembly	7-8	MP45,MP45M,MP45B,999-20 & HG20E4B
	Counterweights and Overspeed Trip	12	MP36
	Counterweights and Overspeed Trip	13	MP45,MP45M,MP45B,999-20 & HG20E4B
B30	Camshaft Bearing Brackets	1	All Housed Gen. Units

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Housed Generation Units

Parts List Number	Subject	Page Number	Model Application
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies	1	
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly	5	
	Trip Housing Cover (Formerly in P.L. A56)	9-11	
	Trip Linkage Housing	12-13	MP36,MP45,999-20 & HG20E4B
	Cover Plates	14-15	
B33	Electric Operated Engine Shutdown		
	Electric Operated Engine Shutdown Solenoid	1	
	Frequency Generator Mounting	2-3	
	Junction Box and Cable Application	8	999-20
	Single Motor-Driven Booster Pump Appl.	12	
	Booster Pump Assembly	13	MP36,MP45,MP45M,MP45B, 999-20 & HG20E4B
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	
	Soak Back Filter Assembly		
	Soak Back Lube Oil System with Flanged Connections	3 6-7	MP45M,MP45B, & HG20E4B
	Soak Back Lube Oil System with Threaded Connections	10-12	MP36,MP45, 999-20, & HG20E4B
	Turbocharged Lube Oil Filter	13	
	Piston Cooling, Camshaft Stubshaft, and Rocker Arm Lube Oil Lines and Turbocharger Filter	14-15	MP36,MP45,MP45M,MP45B, 999-20 & HG20E4B
	Manifold Relief Valve	18	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer	34-37	
B36	Lube Oil Strainer	1-4	MP36,MP45,MP45M,MP45B, 999-20 & HG20E4B
B38	Piston Cooling and Pressure Pump	1-5	
B40	Lube Oil Scavenging and Fuel Oil Pump	1-7	MP36,MP45,MP45M,MP45B, 999-20 & HG20E4B
B42	Lube Oil Separator (Replaces P.L. A42-S)		
	Lube Oil Separator, Ejector and Eductor Tube Assembly	2-3	
	Lube Oil Separator and Ejector Assembly - Previous Design	4-5	MP36,MP45

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Housed Generation Units

Parts List Number	Subject	Page Number	Model Application
B44	Cooling System		
	Water Manifold Bracket Application	1	MP36
	Water Manifold Application	2-3	
	Fresh Water Pump Application	7	
	Aftercooler Piping	15	
B46	Water Pumps		MP36,MP45,MP45B,MP45M,
	Fresh WWater Pumps	2-3	999-20 & HG20E4B
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	
	Twin Spin-On Fuel Oil Piping (Formerly Viscose)	2-3	MP36,MP45,MP45B,MP45M&HG20E4B
	Duplex Fuel Oil Filter Piping	4-5	999-20
B50	Fuel Oil Filter		
	Spin-On Fuel Oil Filter Assembly	1	MP36,MP45 & HG20E4B
	Duplex Fuel Filter Assembly	2-3	MP36,MP45,999-20 & HG20E4B
	Viscose Fuel Oil Filter Assembly	4-5	
	Filter Conversion - Viscose to Twin Spin-On	6	MP36 & MP45
A52	Fuel Injector (Replaced by P.L. A11)		
B54	Cylinder Head Covers and Support Frames		
	Round Top Inside Frame Corner Design Applied to Engines without Flame Arrestor Safety Handhold Covers	4-5	MP36,MP45,MP45B,MP45M, & HG20E4B
	Previous Design Square Top Inside Frame Corners	6-7	999-20
	Cover Assemblies Applied to Engines without Flame Arrestor Safety Handhold Covers	9	MP36,MP45,MP45B,MP45M,&HG20E4B
	Previous Design Cover Assembly For Square Inside Corner Frame Assembly	10	999-20
	Cover Latches and Support Assembly	11	All Housed Gen. Units
A56	Overspeed Trip Housing and Cover (Replaced by P.L. B32)		
B58	Accessory Drive Housing Assembly		
	Applied to Engines with Bottom Drain Overspeed Trip Housings	1	MP36,MP45, & 999-20
	Applied to Engines with Rear Drain Overspeed Trip Housings	2	MP45,MP45B,MP45M, & HG20E4B
B59	Engine Crankcase Pressure Detector Assembly		
	Crankcase Pressure Detector Application	5	MP45,MP45B,MP45M, & HG20E4B
	Crankcase Pressure Detector Application	7	999-20
	Low Water and Crankcase Pressure Detector Application	8	MP36
	Crankcase Pressure Detector Assembly	9	999-20
	Low Water and Crankcase Pressure Detector Assembly	10-11	MP36
	Crankcase Pressure Detector Assembly	12	MP45,MP45M,MP45B,HG20E4B
	Cutoff Valve Assembly	14	MP36
B60	Camshaft Drive Housing and Cover	1	MP36,MP45,999-20,MP45M,MP45B & HG20E4B

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Housed Generation Units

Parts List Number	Subject	Page Number	Model Application
B62	Auxiliary, Generator Drive Assembly		
	Auxiliary Generator Drive Assembly	2	MP45,999-20,MP45M,MP45B&HG20E4B
B64	Governor Assembly-Model LSG-10		
	Automatic Load Sensing	1-15	MP36
B65	Governor Assembly-Model UG-8		
	Reference List	1	MP45,999-20,MP45B,HG20E4B
	Governor Assembly	2-14	
B67	Governor Assembly-Models EGB-10 and EGB-13		
	Reference List	1-3	MP45,999-20&HG20E4B
	Governor Assemblies	5-26	
A68	Governor Drive Gear and Stubshaft (Replaced by P.L. B70)		
B70	Governor Drive and Governor Drive Gear (Replaces P.L. A68 & A70-S)		
	Governor Drive Gear Application	1	MP36,MP45,MP45M,MP45B,
	Governor Drive Assemblies	2-3	999-20, HG20E4B
B72	Exhaust Chamber Assembly (Replaces P.L. A72-S)		
	Exhaust Chamber and Heat Shield Application	9-10	MP36
	Exhaust Chamber and Heat Shield Application	11-12	MP45,MP45M,MP45B,HG20E4B
	Previously Applied Exhaust Chambers Having Blanket Type Insulation	13-15	999-20
B74	Turbocharger Application (Replaces P.L. A74-S)		
	Reference Chart	1-3	All Housed Gen. Units
	Turbocharger, Aftercooler Air Duct and Auxiliary Generator Drive	3-6	
B78	Engine Air Intake Silencer and Adapters		
	Engine Silencer and Duct Assembly	5-7	999-20
B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Panel Type Oil Bath Air Intake Filter and Mounting	7	MP36
	Panel Type Oil Bath Air Intake Filter and Mounting	8-9	MP45,999-20,MP45B,MP45M&HG20E4B
	Cycoil Oil Bath Air Inlet Filter Assembly with Rainshields	13	999-20
B81	Paper and Fiberglass Engine Air Intake Filters		
	Paper Element Engine Air Intake Filter Appl. with Vacuum Switch	3-4	MP45,MP45B,MP45M
B82	Exhaust Stack Adapter Assembly	1-2	All Housed Gen. Units
B99	Engine Gasket Kits		
	Engine Gasket Kit Index	1-4	
	Engine Gasket Kits	5-12	
	NUMERICAL INDEX		

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Drill Rig

Model Designation	
Engine	Model
8-645E1	SR11E1A,SR11E1W
12-645E1	SR12E1W,SR12E1G&3-12E-W7M
16-645E1	SR16E1G,SR16E1GW&2-16E-7M

Parts List Number	Subject	Page Number	Engine Application
A01	Engine, Crankcase and Oil Pan Assembly		
	Reference Chart	8	8,12,16-645E1
	Crankcase and Oil Pan Assembly	9-13	8,12,16-645E1
	Lube Oil Level Switch	15	12-645E1
A03	Engine Ramps	1-3	
A04	Handhole Cover and Cylinder Test Valve		
	Handhole Cover Assembly	3-5	
	Cylinder Test Valve	6	
A05	Power Assemblies and Associated Components Locating Reference	1	
B06	Cylinder Head and Liner (Replaces P.L. A06-S)		
A07	Connecting Rod Bearing, Carrier and Piston Pin (Replaces P.L. A16 & A16-S)		
	Connecting Rod Bearing, Carrier and Piston Pin	1-2	
B08	Pistons and Rings (Replaces P.L. A14 & A14-S)		
	Piston Assembly Reference Chart	1	
	Piston and Rings	2-5	8,12,16-645E1
A09	Power Pack Assemblies (Replaces P.L. A06 & A07-S)		
	Complete Power Packs	1-2	
	Mini and Partial Power Packs	3	
B10	Cylinder Head Crabs		
	Cylinder Head Crabs (Replaces P.L. A10-S)	1	
A11	Fuel Injector (Replaces P.L. A52 & A52-S)		
	Fuel Injector Reference Chart	1	
	Fuel Injector Assemblies	2-3	
	Repair Kits	4	
A12	Injector Control Linkage (Replaced by P.L. A15)		
A13	Exhaust Valve Bridge, Rocker Arms and Oil Lines (Formerly in P.L. A08 & A08-S)	1-2	
A14	Piston Assembly, Pistons, Ring Sets and Rings (Replaced by P.L. B08)		

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Drill Rig

Parts List Number	Subject	Page Number	Engine Application
A15	Injector Control Linkage (Replaces P.L. A12)		
	Control Shaft, Support Bracket and Bearings	1	8,12,16-645E1
	Two-Piece Control Shaft Kits	2	16-645E1
	Spring-Loaded Adjusting Link	3	8-645E1
	Standard Type Adjusting Link	4	8,12,16-645E1
	Previous PGA Governor Lever and Control Rod Applied with Single Layshaft Hand Control Lever On Right Bank	8	8-645E1
	Current PG,PGA,PGR Governor Lever and Control Rod Applied with Single Layshaft Hand Control Lever On Left Bank	9	
A16	Connecting Rod, Bearings, Carrier and Piston Pin (Replaced by P.L. A07)		
B18	Crankshaft, Main Bearings and Main Bearing Caps		
	Crankshaft and Main Bearings	1-4	
	Main Bearing Caps	5	
B20	Harmonic Balancer and Gear Damper Assemblies (Replaces P.L. A20-S)		
	Harmonic Balancer Assembly	2	
B22	Accessory Drive Gear Assembly		8,12,16-645E1
	Accessory Drive Gear Assembly Applied to Crankshaft with Integral Stubshaft	1	
B24	Crankshaft Couplings		
	Engine Coupling Disc and Flywheel Application	1-3	
	Blind Cover Application	8	
	Drill Rig Coupling Arrangement	10	
	Gear Box Drive Coupling	11	
	Bonded Coupling Arrangement	12	
B25	Starter Motor and Mounting		
	Magnetic Pick-Up Application	1	
	Dual Air Start Motors-Right Bank	3,20-21	12,16-645E1
	Single Air Start Motor	4-5,20-21	8-645E1
	Single Air Start Motor	8,14-19	12,16-645E1
	Flywheel Indicators	9	
B26	Camshaft Drive Gear Train		
	Idler Gear Stubshaft Arrangement	1	
	Camshaft Drive Gear Train	2-3	8,12,16-645E1
B28	Camshaft and Camshaft Counterweights		
	Camshaft Assembly (Replaces P.L. A28-S)	1-6	
	Counterweights and Overspeed Trip	9-12	
B30	Camshaft Bearing Brackets		
	Camshaft Bearing Brackets	1	12,16,20-645E1
	Camshaft Bearing Brackets	2-3	8-645E1

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Drill Rig

Parts List Number	Subject	Page Number	Engine Application
B32	Camshaft Overspeed Trip Linkage		
	Overspeed Pawl Camshaft and Trip Assemblies	1	
	Trip Linkage Application	2-3	
	Overspeed Trip Assembly	4	
	Overspeed Trip Pawl Bracket Assembly	5	
	Previously Applied Overspeed Trip and Reset Levers	7	8,12,16-645E1
	Overspeed Trip Lever, Reset Lever and Limit Switch	8	
	Trip Housing Cover (Formerly in P.L. A56)	9-11	
	Trip Linkage Housing	12-13	
	Cover Plates	14-15	
B34	Lube Oil System		
	Lube Oil Manifold Assembly	1	
	Piston Cooling, Camshaft Stubshaft and Rocker Arm Lube Oil Lines	16	
	Rear End Lines Mounting and Piping	17	
	Manifold Relief Valve	18	
	Lube Oil Pumps and "Box" Type Lube Oil Strainer	34-37	
B36	Lube Oil Strainer	1-4	
B38	Piston Cooling and Pressure Pump	1-5	8,12,16-645E1
B40	Lube Oil Scavenging and Fuel Oil Pump	1-7	
B42	Lube Oil Separator (Replaces P.L. A42-S)		
	Lube Oil Separator	1	
	Lube Oil Separator Support Assembly	6	
B44	Cooling System		
	Water Manifold Application	2-3	
	Fresh Water Pump Application	4	8-645E1
	Fresh Water Pump Aplication	6	12,16-645E1
B46	Water Pumps		
	Fresh Water Pumps	2-3	
B48	Fuel Oil Piping		
	Fuel Oil Manifold and Injector Fuel Oil Lines	1	8,12,16-645E1
	Twin Spin-On Fuel Oil Piping (Formerly Viscose)	2-3	

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Parts List Number	Subject	Page Number	Engine Application
B50	Fuel Oil Filter		
	Spin-On Fuel Oil Filter Assembly	1	
	Viscose Fuel Oil Filter Assembly	4-5	
	Filter Conversion - Viscose to Twin Spin-On	6	
A52	Fuel Injector (Replaced by P.L. A11)		
B54	Cylinder Head Covers and Support Frames		
	Round Top Inside Frame Corner Design Applied to Engines without Flame Arrestor Safety Handhold Covers	4-5	
	Previous Design Square Top Inside Frame Corners	6-7	8,12,16-645E1
	Cover Assemblies Applied to Engines without Flame Arrestor Safety Handhold Covers	9	
	Previous Design Cover Assembly for Square Inside Corneer Frame Assembly	10	
	Cover Latches and Support Assembly	11	
A56	Overspeed Trip Housing and Cover (Replaced by P.L. B32)		
B58	Accessory Drive Housing Assembly		
	Applied to Engines with Bottom Drain Overspeed Trip Housings	1	
	Applied to Engines with Rear Drain Overspeed Trip Housings	2	12,16-645E1
B59	Engine Crankcase Pressure Detector Assembly		
	Low Water and Crankcase Pressure Detector Application	2	8-645E1
	Low Water and Crankcase Pressure Detector Application	3	
	Low Water and Crankcase Pressure Detector Assembly	10-11	
	Cutoff Valve Assembly	14	8,12,16-645E1
B60	Camshaft Drive Housing and Cover	1	
B62	Auxiliary Generator Drive Assembly	1	
B65	Governor Assembly-Model UG-8		
	Reference List	1	12-645E1
	Governor Assembly	2-14	
B66	Governor Assembly-Models PG,PGA,PGR and PG-PH		
	Reference List	1-4	
	Governor Assemblies	5-37	8,12,16-645E1
B67	Governor Assembly-Models EGB-10 and EGB-13		
	Reference List	2-3	
	Governor Assemblies	5-26	
A68	Governor Drive Gear and Stubshaft (Replaced by P.L. B70)		

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Drill Rig

Parts List Number	Subject	Page Number	Engine Application
B70	Governor Drive and Governor Drive Gear (Replaces P.L. A68 & A70-S)		
	Governor Drive Gear Application	1	
	Governor Drive Assemblies	2-3	
B72	Exhaust Chamber Assembly (Replaces P.L. A72-S)		8,12,16-645E1
	Exhaust Chamber and Heat Shield Application For Normally Aspirated Engines	1-2	
	Silencing Type Exhaust Chamber Application	3	8-645E1
	Exhaust Chamber Application	4	
B78	Engine Air Intake Silencer and Adapters		
	Siamese Air Intake and Mounting	3	12,16-645E1
B80	Oil Bath and Impingement Type Engine Air Intake Filters		
	Panel Type Oil Bath Air Intake Filter and Mounting	4	8,12,16-645E1
B81	Paper and Fiberglass Engine Air Intake Filters		
	Fiberglass Element Bag-Type Engine Air Filter Application	5	8,12,16-645E1
B85	Roots Blower and Blower Support		
	Air Duct, Blind Cover, Blower and Blower Support Mounting Application	1	8-645E1
	Roots Blower Support Mounting Application	2	12,16-645E1
	Roots Blower Assembly	3-5	
B99	Engine Gasket Kits		8,12,16-645E1
	Engine Gasket Kit Index	1-4	
	Engine Gasket Kits	5-12	
	NUMERICAL INDEX		

ENGINE, CRANKCASE AND OIL PAN ASSEMBLY

MARINE ENGINE CONSTRUCTION AND ROTATION DESIGNATION	
RL	Indicates Right Hand Construction, Left Hand Rotation
LL	Indicates Left Hand Construction, Left Hand Rotation
RR	Indicates Right Hand Construction, Right Hand Rotation
LR	Indicates Left Hand Construction, Right Hand Rotation
L	Indicates Left Hand Rotation
R	Indicates Right Hand Rotation

MARINE ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY REFERENCE CHART

8-645E2,E6,12-645E2,E6, and 16-645E2,E6 Normally Aspirated Marine Engines
8-645E5,E7,E7B,E7C,12-645E5,E7,E7B,E7C,16-645E5,E7,E7B,E7C, and 20-645E5,
E7,E7B,E7C Turbocharged Marine Engines

Normally Aspirated Marine Engine Equipped includes complete engine with flywheel, ring gear, engine blowers, air intake filters, lube oil level switch (if applicable), starter motors, exhaust chambers, and engine governor.

Turbocharged Marine Engine Equipped includes complete engine with flywheel, ring gear, starter motors, turbocharger, aftercoolers, lube oil level switch (if applicable), exhaust chambers, and engine governor.

PLATES A01-1 Thru A01-4

Original Engine Equipped		Replacement Engine Equipped		Application	Crankcase and Oil Pan Asm.
Part Number	Designation	Part Number	Designation		
8391216	RL 8-645E2	8391215	L8-645E2	GM,GMB, & MG 8E2	/9320385
8391215	LL 8-645E2				
8391217	RR 8-645E2	8391218	R8-645E2		
8391218	LR 8-645E2				
8429639	RL 8-645E5	8435883	L8-645E5	GM & GMB 8E5	/- - - -
8435883	LL 8-645E5				
8435884	RR 8-645E5	8423981	R8-645E5		
8423981	LR 8-645E5				
8450761	RL 8-645E6			GM 8E6 RL	/9320385
8497372	L 8-645E6			GM & GMB 8E6	
8452158	R8-645E6				
8476592	L8-645E8			MG 8E6	
8473361	L8-645E7			GM & GMB 8E7	/- - - -
8473360	R8-645E7				
9511373	L8-645E7B			GM & GMB 8E7B	
9510759	R8-645E7B				
9546856	L8-645E7C			GM 8E7 CA	/- - - -
8371609	RL 12-645E2	8371608	L12-645E2	GM,GMB, & MG12E2	8379796
8371608	LL 12-645E2				
8371610	RR 12-645E2	8371611	R12-645E2	GM & GMB 12E2	
8371611	LR 12-645E2				
8369113	RL 12-645E5	8369112	L12-645E5	GM & GMB 12E5	8372547
8369112	LL 12-645E5				
8369114	RR 12-645E5	8369115	R12-645E5		
8369115	LR 12-645E5				
8421578	LL 12-645E6			MG 12E6 LL	8379796
8480665	L 12-645E6			GM & GMB 12E6	
8480666	R12-645E6				

/ *When replacing an 8 cylinder crankcase manufactured before January, 1976, Accessory Kit 9319605 is also required.*

(Chart Continued on Page 2)

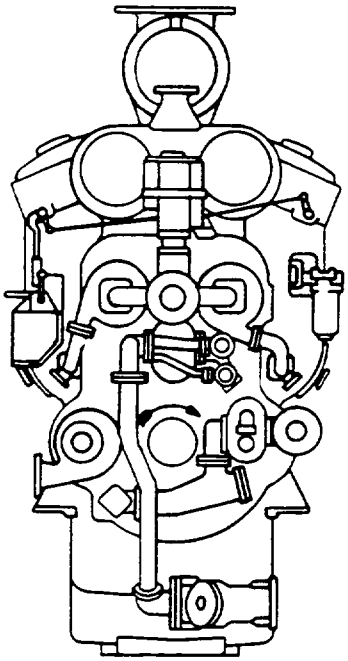
P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Marine Engine Equipped and Crankcase & Oil Pan Assembly Reference Chart
(Continued)

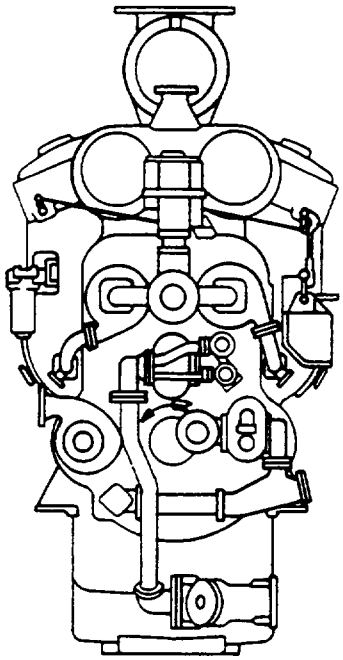
Original Engine Equipped		Replacement Engine Equipped		Application	Crankcase and Oil Pan Asm.
Part Number	Designation	Part Number	Designation		
8431526	RL 12-645E7	8444985	L12-645E7	GM,GMB & PMC 12E7	
8444985	LL 12-645E7				
8444986	RR 12-645E7	8465178	R12-645E7		
8465178	LR 12-645E7				
9512885	L 12-645E7B			GM & GMB 12E7B	8372547
9512886	R 12-645E7B				
9546801	L12-645E7C			GM & GMB12E7C	
9546803	R12-645E7C				
9511317	L12-645E9B			MG12E7B	
8374225	RL 16-645E2	8374224	L16-645E2	GM & GMB 16E2	8379797
8374224	LL 16-645E2				
8374226	RR 16-645E2	8374227	R16-645E2		
8374227	LR 16-645E2				
8365296	RL 16-645E5	8365293	L16-645E5	GM & GMB 16E5	8372546
8365293	LL 16-645E5				
8365295	RR 16-645E5	8365294	R16-645E5		
8365294	LR 16-645E5				
8430999	RL 16-645E6			GM,GMB 16E6 RL, MG16E6	8379797
8422593	LL 16-645E6			GM,GMB 16E6 LL, MG16E6	
8456506	L 16-645E6			GM & GMB 16E6	
8430998	R 16-645E6				
8427613	RL 16-645E7	8430667	L16-645E7	GM & GMB 16E7	
8430667	LL 16-645E7				
8430668	RR 16-645E7	8427614	R16-645E7		
8427614	LR 16-645E7				
9512883	L 16-645E7B			GM & GMB 16E7B	8372546
9512884	R 16-645E7B				
9546555	L 16-645E7C			GM 16E7CA	
9546561	R 16-645E7C				
9511281	L 16-645E9B			MG16E7B	
8374874	RL 20-645E5	8374873	L20-645E5	GM,GMB & MG 20E5	
8374873	LL 20-645E5				
8374875	RR 20-645E5	8374876	R20-645E5		
8374876	LR 20-645E5				
8424618	RL 20-645E7	8424617	L20-645E7	GM,GMB,PMA,PMB, PMC, & MG 20E7	8392600
8424617	LL 20-645E7				
8424619	RR 20-645E7	8424620	R20-645E7		
8424620	LR 20-645E7				
9512336	L 20-645E7B			GM,GMB 20-645E7B	
9510691	R 20-645E7B				
9547699	L 20-645E7C			GM 20E7CA	
9547701	R 20-645E7C				
9509698	L 20-645E9B			MG 20E7B	

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY



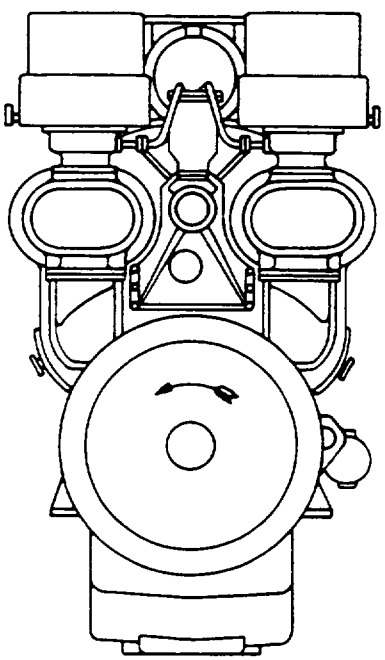
LL ENGINE

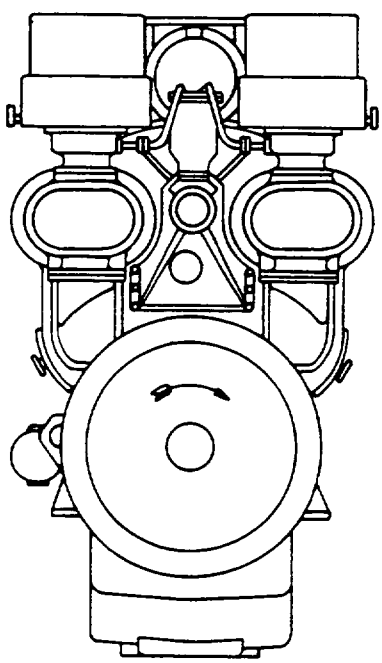
LEFT HAND CONSTRUCTION
LEFT HAND ROTATION



RR ENGINES

RIGHT HAND CONSTRUCTION
RIGHT HAND ROTATION



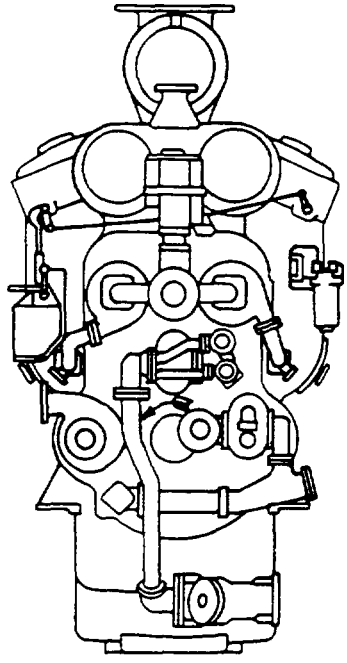


Previous Engines With Specific Construction and Rotation

PLATE A01-1

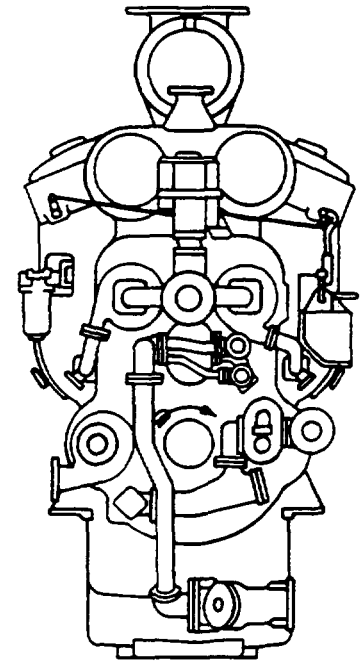
P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY



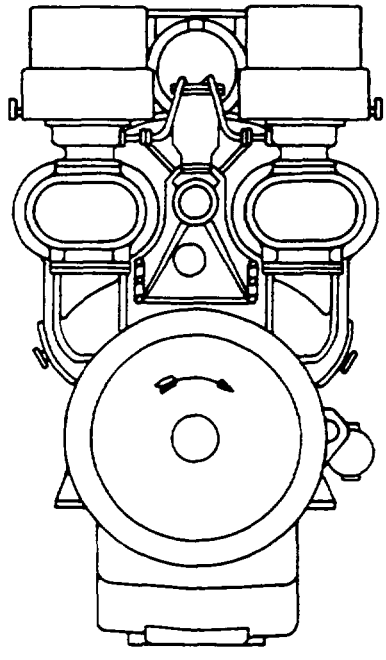
LR ENGINE

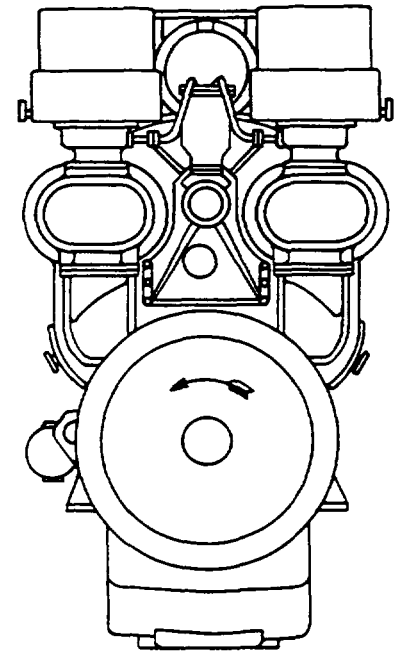
LEFT HAND CONSTRUCTION
RIGHT HAND ROTATION



RL ENGINE

RIGHT HAND CONSTRUCTION
LEFT HAND ROTATION



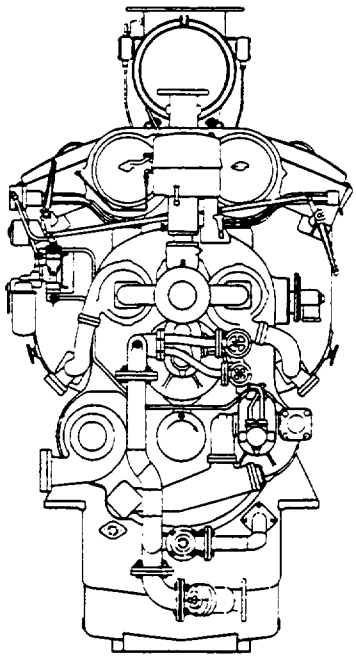


Previous Engines With Specific Construction and Rotation

PLATE A01-2

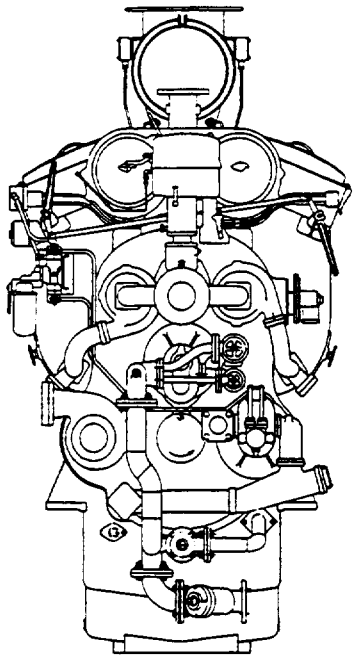
P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY



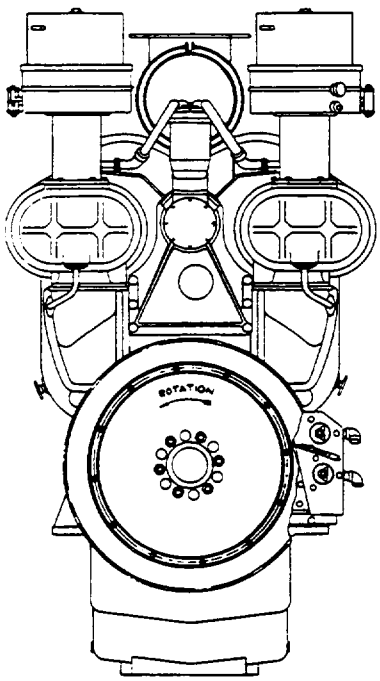
L ENGINE

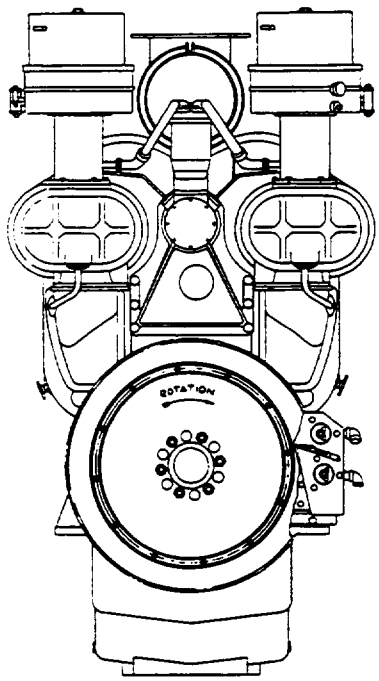
LEFT HAND ROTATION



R ENGINE

RIGHT HAND ROTATION



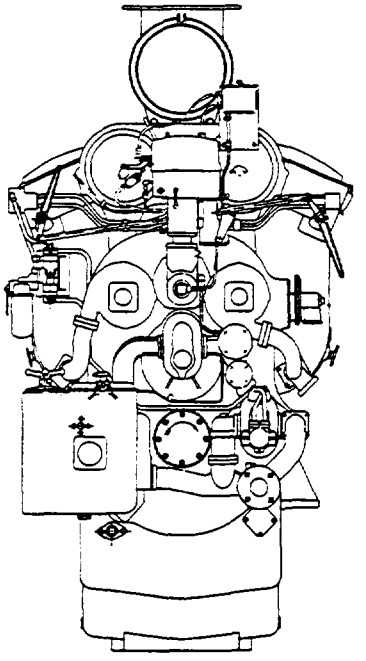


Current Engines With Standardized Construction and Rotation

PLATE A01-3

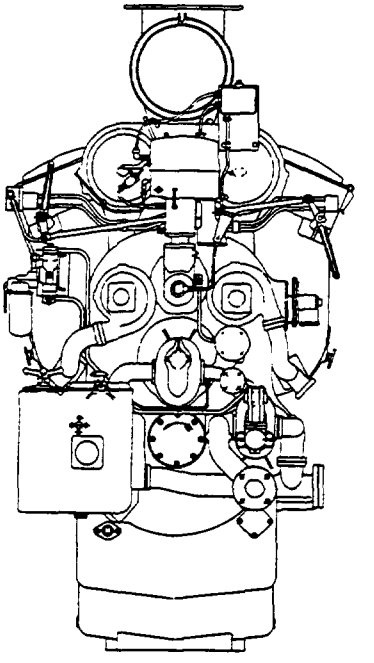
P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY



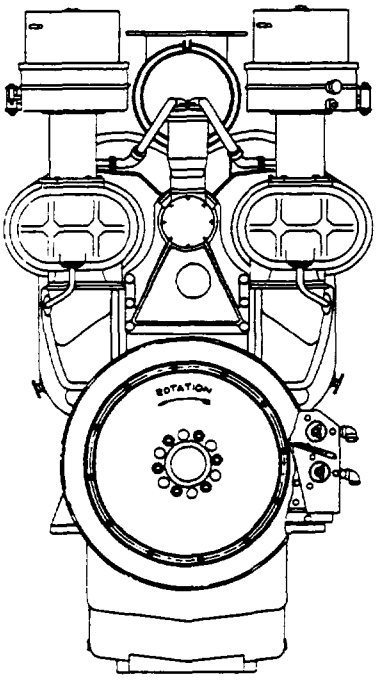
L ENGINE

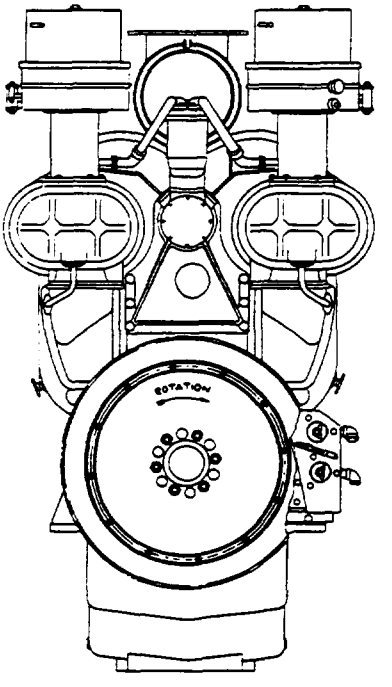
LEFT HAND ROTATION



R ENGINE

RIGHT HAND ROTATION





Current Engines With Standardized Construction and Rotation

PLATE A01-4

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Industrial Engine Equipped and Crankcase & Oil Pan Assembly Reference Chart

8-645E1,E8.12-645E1,E8, and 16-645E1,E8 Normally Aspirated Industrial Engines
8-645E4,E4B,12-645E4,E4B,E9,E9B,16-645E4,E4B,E9,E9B,E10B and 20-645E4,E4B,
E9,E9B,E10B Turbocharged Industrial Engines

Normally Aspirated Industrial Engine Equipped includes complete engine with flywheel, ring gear, blower, air intake filters, lube oil level switch (if applicable), exhaust chambers, starter motors, and engine governor.

Turbocharged Industrial Engine Equipped includes complete engine with flywheel, ring gear, starter motors, turbocharger, after coolers, exhaust chambers, lube oil level switch (if applicable), and engine governor.

Note: Engine Ramps are no longer provided as basic equipment on S, SG, HG, MP, and SR Model Engines Equipped. They are available only as "Ship Loose" option.

Engine Equipped Part Number		Crankcase & Oil Pan Asm. Part Number		Description/Application
New	Unit Exch.	New	Unit Exch.	
STATIONARY GENERATING UNIT APPLICATION				
LEFT HAND ROTATION ENGINES				
8376100	9540512	/9320383	/- - - -	8-645E1 - Normally Aspirated/Models S8E1, S8E1G,SG8E1, & LD8E1
8479927	- - - -	/- - - -	/- - - -	8-645E4 - Turbocharged/Model S8E4
9510711	- - - -	/- - - -	/- - - -	8-645E4B - Turbocharged/Model SG8E4B
8383313	- - - -	8384861	8481692	12-645E1 - Normally Aspirated/Models S12E1,S12E1G,SG12E1,S12E1GW, & LD12E1
8396440	- - - -	- - - -	- - - -	12-645E4 - Turbocharged/Models S12E4, S12E4G,SG12E4, & S12E4GW
9510655	- - - -	- - - -	- - - -	12-645E4B - Turbocharged/Models S12E4B, SG12E4B, & LD12E4B
8380834	- - - -	8366130	8379662	16-645E1 - Normally Aspirated/Models S16E1, S16E1G, & S16E1GW
8381208	- - - -	8384863	- - - -	16-645E4 - Turbocharged/Models S16E4 S16E4G,S16E4GW, & Modified S36G
9510654	- - - -	# 8384863	- - - -	16-645E4B - Turbocharged/Models S16E4B & SG16E4B
9508752	- - - -	- - - -	- - - -	16-645E10B - Turbocharged/Model SG16E10B
8393791	- - - -	8405115	- - - -	20-645E4 - Turbocharged/Models S20E4, S20E4G, & S20E4GW
9510705	- - - -	# 8405115	- - - -	20-645E4B - Turbocharged/Models S20E4B & SG20E4B
9333655	- - - -	- - - -	- - - -	20-645E10B - Turbocharged/Model S20E10B

/ When replacing an 8 cylinder crankcase manufactured before January 1976, Accessory Kit 9319605 is also required.
 # Indicates standard capacity oil pan. Part number for Crankcase & Oil Pan with increased capacity Oil Pan will be provided upon request.

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Industrial Engine Equipped and Crankcase & Oil Pan Assembly Reference Chart
(Continued)

Engine Equipped Part Number		Crankcase & Oil Pan Asm. Part Number		Description/Application
New	Unit Exch.	New	Unit Exch.	
STATIONARY GENERATING UNIT APPLICATION				
RIGHT HAND ROTATION ENGINES				
9092887	- - - -	- - - -	- - - -	12-645E4 - Turbocharged/Model S12E4
8460923	- - - -	- - - -	- - - -	16-645E4 - Turbocharged/Model S16E4
9511098	- - - -	- - - -	- - - -	16-645E4B - Turbocharged/Models S16E4B & SG16E4B
9083673	- - - -	- - - -	- - - -	20-645E4 - Turbocharged/Model S20E4
9511296	- - - -	- - - -	- - - -	20-645E4B - Turbocharged/Models SG20E4B
HOUSED & SKID MOUNTED GENERATOR UNIT APPLICATION				
8367340	8442043	8372462	- - - -	16-645E4 - Turbocharged/Model MP36
8366230	8406423	8373074	8481855	20-645E4 - Turbocharged/Model MP45
8409731	- - - -	- - - -	- - - -	20-645E4 - Turbocharged/Model 999-20
9336295	- - - -	- - - -	- - - -	20-645E4 - Turbocharged/Model MP45M
9514240	- - - -	- - - -	- - - -	20-645E4B - Turbocharged/Models MP45B & HG20E4B
9514241	- - - -	- - - -	- - - -	20-645E4B - Turbocharged/Model HG20E4B
DRILL RIG APPLICATION				
8396345	- - - -	/9320383	/- - - -	8-645E1 - Normally Aspirated/Model SR11E1A
8396211	- - - -	/9320383	/- - - -	8-645E1 - Normally Aspirated/Model SR11E1W
8380016	8481900	8384861	8481692	12-645E1 - Normally Aspirated/Models SR12E1W, SR12E1G, & 3-12E-W7M
8365764	8403287	8366130	8379662	16-645E1 - Normally Aspirated/Models SR16E1G,SR16E1GW, & 2-16E-7M
MARINE DRILL RIG APPLICATION				
8476592	- - - -	/9320385	/- - - -	8-645E8 - Normally Aspirated/Model MD8E8
8468479	- - - -	8379796	8486627	12-645E8 - Normally Aspirated/Model MD12E8
8476433	- - - -	8372547	- - - -	12-645E9 - Turbocharged/Model MD12E9
9511317	- - - -	8372547	- - - -	12-645E9B - Turbocharged/Model MD12E9B
8468481	8497187	8379797	- - - -	16-645E8 - Normally Aspirated/Model MD16E8
8471824	- - - -	8372546	- - - -	16-645E9 - Turbocharged/Model MD16E9
9511281	- - - -	8372546	- - - -	16-645E9B - Trubocharged/Model MD16E9B
8470401	- - - -	8392600	- - - -	20-645E9 - Turbocharged/Model MD20E9
9509698	- - - -	8392600	- - - -	20-645E9B - Turbocharged/Model MD20E9B

/ *When replacing an 8 cylinder crankcase manufactured before January, 1976, Accessory Kit 9319605 is also required.*

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY
Crankcase and Oil Pan Assembly
PLATES B01-5 and 6

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 engine
		-	B	-	-	12-645 engine
		-	-	C	-	16-645 engine
		-	-	-	D	20-645 engine

CRANKCASE ASSEMBLY .. Engine - Includes Oil Pan

It is essential that the crankcase and oil pan be maintained the same length to assure proper assembly of end housing parts. Therefore, it is recommended that the crankcase be ordered as an assembly of crankcase and oil pan. Refer to Parts List 54 for applicable cylinder head cover frames. Engines delivered after February 1972 have a reduced diameter hardened insert for the water manifold supports located at the crankcase camshaft drive end. This crankcase will only accept the current water manifolds with the reduced diameter flange having an O.D. of 3.370 inches. Therefore, it is recommended that new water manifolds be ordered with the crankcase and oil pan. Refer to Parts List 44 for applicable water manifolds.

Ref. No.	Part Number	Quantity Required				Description
1	- - - -	1	1	1	1	CRANKCASE ASSEMBLY .. Engine - Includes oil pan - See reference charts on Pages 1,2,7 and 8
ϕ 2	8344365	2	2	2	2	BASE .. Anchor shackle
ϕ*2	9311575	1	1	1	1	BASE .. Anchor shackle - Optional on turbocharged engines only, camshaft drive end
ϕ 3	9096428	-	-	-	-	BOLT .. Base mounting - 1-14 x 2 Type C flanged 12 point - Formerly 272580 and 9436877 Qty. 8 required with 2-8344365 base Qty. 4 required with 1-8344365 base
ϕ*3	9096320	4	4	4	4	BOLT .. Base mounting - 1-14 x 4-1/2 Type C flanged 12 point - Applied with 9311575 base
∤ 4	8271449	20	28	36	44	STUD .. Main bearing - 1-1/4-12 x 15-11/16 in. long

∤ *For Gauging Purposes, optional Ground Surface Stud 8473541 is available for application to center main bearings only.*

5	8089200	10	14	20	24	NUT .. Spline - 3/8-24 - Cylinder head bracket bolt
6	9085894	20	28	40	48	BOLT .. Cyl. head crab - 1-3/4-12 x 15-5/8 - Replaces 8347885
7	8348556	10	14	20	24	BOLT .. Bracket - 3/8-24 x 3 in. long
8	8133575	10	14	20	24	BRACKET .. Crab bolt
9	8213064	20	28	36	44	NUT .. Main bearing stud - 1-1/4-12 slotted head - Upper
10	8213347	-	-	2	2	RETAINER .. Main bearing stud - Center mains only
# 11	8408684	20	28	36	44	NUT .. Main bearing stud - 1-1/4-12 hex. lower - Replaces 8028725
# 12	8412532	20	28	36	44	WASHER .. Hardened - Lower main bearing stud nut

Engines produced after May, 1968 apply a hardened washer 8412532 and main bearing nut 8408684 to prevent gouging by the nut. The hardened washer should only be used with the new nut 8408684. The present nut is 1/4 in. shorter and will accommodate the application of the washer. The washer must not be applied with the former castellated nut 8028725 because the nut will extend beyond the end of the stud and not allow engagement of the socket wrench when torqueing in the area of the oil pan suction pipe. The hardened washer should not be applied to a main bearing cap that has been gouged by a nut unless these gouges have been milled from the surface of the main bearing cap. Contact our Service Department for machining tolerances.

13	186266	-	-	4	4	BOLT .. 1/4-20 x 3-1/4 hex. head - Center mains only
13	179808	20	28	32	40	BOLT .. 1/4-20 x 2-3/4 hex. head
14	8035130	20	28	36	44	NUT .. Lock - 1/4-20 hex.
15	8268641	8	12	16	20	INSERT .. Lower liner 9088530 .. .060 O.S.
16	8344765	8	12	16	20	ELBOW .. Exhaust

BRACKET .. Manifold - Piston Cooling

Contact our Service Department for information on repairing and/or replacing damaged piston cooling manifolds.

ϕ17	8140865	8	12	16	20	BRACKET .. Manifold - Piston cooling - Undrilled
ϕ18	8445780	8	12	16	20	BRACKET .. Manifold - Piston cooling - Two piece, machined and tapped - NOTE: *For installation instructions, see W.S. 10556*

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 Engine
		-	B	-	-	12-645 Engine
		-	-	C	-	16-645 Engine
		-	-	-	D	20-645 Engine
	- - - -	1	1	1	1	CRANKCASE ASSEMBLY .. Engine - Includes oil pan
19	8032691	2	-	-	-	TUBE .. Piston cooling - Manifold
19	8032682	-	2	-	-	TUBE .. Piston cooling - Manifold
19	8032693	-	-	2	-	TUBE .. Piston cooling - Manifold
19	8360715	-	-	-	2	TUBE .. Piston cooling - Manifold
20	8159029	5	7	10	12	TUBE .. Oil lubricating
21	8346155	4	4	4	4	TUBE .. Breather
21A	- - - -	5	7	10	12	CAP .. Main bearing - See Parts List B18
* 22	8433263	2	2	2	2	SLEEVE .. Water manifold - Camshaft drive end - 3.38 I.D. x 3.63 O.D. x 1-5/16 wide
23	- - - -	1	1	1	1	PLATE .. Name - Injector timing 8307797 - R8-645E2,E6 8293393 - L8-645E1,E2,E6,E8 8429477 - R8-645E5,E7,E7B,E7C 8407737 - L8-645E4,E4B,E5,E7,E7B,E7C 8307794 - R12-645E2,E6 8293392 - L12-645E1,E2,E6,E8 8376252 - R12-645E4,E5,E7,E7B,E7C - Formerly 8367252 8376251 - L12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B - Formerly 8367251 8307791 - R16-645E2,E6 8293391 - L16-645E1,E2,E6,E8 - Formerly 8393391 8297931 - R16-645E4,E4B,E5,E7,E7B,E7C 8290819 - L16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B 8377148 - R20-645E4,E4B,E5,E7,E7B,E7C 8360895 - L20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B
* 24	8227168	1	1	1	1	PLATE .. Name - Model and serial no. - Formerly 8363465
* 25	8319849	1	1	1	1	PLATE .. Name - Serial No., B.H.P., and R.P.M.
* 26	3320362	As Required				PLATE .. Name - Reads *"Warning: Do not under any circumstances remove engine oil pan cover, top deck covers or open top deck for at least (2) hours following an emergency engine shutdown."* — Marine and Marine drill rig engines only
27	193933	As Required				RIVET .. Plate mounting - 3/32 x 1/2

OIL PAN ASSEMBLY .. Engine

ϕ 28	- - - -	1	1	1	1	OIL PAN ASSEMBLY .. Engine - Except marine and marine drill rig
29	8081234	21	21	21	21	NUT .. Spline - 1/2-20
30	103870	2	1	-	-	PLUG .. Pipe - 1 M.P.T. - Square head
* 30	8173319	2	-	-	-	PLUG .. Pipe - 1 M.P.T. - Dry seal - Headless - Countersunk
* 31	103879	1	1	1	-	PLUG .. Pipe - 3/8 M.P.T.
32	106643	-	As Req'd.			PLUG .. Pipe - 1-1/2 M.P.T. - Square head
* 33	8348620	-	-	1	1	PLUG .. Pipe - 1/2 M.P.T. - Square socket - Increased capacity oil pan
34	8480694	1	-	-	-	PIPE .. Suction - Formerly 8179200
34	8480356	-	1	-	-	PIPE .. Suction - Formerly 8159729 - Standard capacity oil pan
34	8443781	-	1	-	-	TUBE .. Suction - Increased capacity oil pan
34	8477713	-	-	1	-	PIPE .. Suction - Formerly 8173171 - Standard capacity oil pan
34	8443779	-	-	1	-	TUBE .. Suction - Incrased capacity oil pan
34	8480357	-	-	-	1	PIPE .. Suction - Standard capacity oil pan - Models S20E4,S20E4B, and SG20E4B
34	8434172	-	-	-	1	TUBE .. Suction - Increased capacity oil pan
35	9315262	1	1	1	1	TUBE .. Drain - Air box - Replaces 8356135

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 Engine
		-	B	-	-	12-645 Engine
		-	-	C	-	16-645 Engine
		-	-	-	D	20-645 Engines
	- - - -	1	1	1	1	CRANKCASE ASSEMBLY .. Engine - Includes oil pan
	- - - -	1	1	1	1	OIL PAN ASSEMBLY .. Engine - Except marine and marine drill rig - Continued
36	9315261	1	-	-	-	TUBE .. Drain - Air box - Replaces 8356134
36	9544313	-	1	1	1	TUBE .. Drain - Air box - Formerly 9315261
* 37	8411101	1	1	1	1	PIPE ASSEMBLY .. Filter siphon - Except 12 & 16-645E1 engines and engines with increased capacity oil pans
* 38	8480810	1	1	1	1	TUBE .. Oil gauge - Standard capacity oil pan
* 38	8480811	-	2	2	2	TUBE .. Oil gauge - Increased capacity oil pan
ϕ 39	- - - -	1	1	1	1	OIL PAN ASSEMBLY .. Engine - Marine and marine drill rig only
40	8081234	27	27	27	27	NUT .. Spline - 1/2-20
41	103870	2	2	2	2	PLUG .. Pipe - 1 M.P.T. - Square head
42	8348620	4	4	4	5	PLUG .. Pipe - 1/2 M.P.T. - Square socket
43	106642	3	3	3	3	PLUG .. Pipe - 1-1/4 M.P.T. - Square head
44	8488714	1	-	-	-	TUBE .. Oil suction
44	8488713	-	1	-	-	TUBE .. Oil suction
44	8488712	-	-	1	-	TUBE .. Oil suction
44	8488616	-	-	-	1	TUBE .. Oil suction
* 44A	8481570	2	-	-	-	TUBE .. Oil gauge
* 44A	8480809	-	2	2	2	TUBE .. Oil gauge
45	272511	18	26	36	44	BOLT .. Crankcase to oil pan - 1-14 x 2-3/4 hex. head
46	272512	4	4	4	4	BOLT .. Crankcase to oil pan - 1-14 x 9 hex. head
47	8032724	22	30	40	48	NUT .. Lock - 1-1/4 hex.
48	131019	22	30	40	48	WASHER .. Plain - 1-1/16 I.D. x 2 O.D.
49	8054189	4	4	4	4	DOWEL .. Tapered - 1/2-20 x 2 8126991 .. 010 O.S. 8126992 .. .030 O.S.
50	103343	4	4	4	4	WASHER .. Plain - 1/2
51	8032719	4	4	4	4	NUT .. Lock - 1/2-20 hex.

Marine oil pans manufactured prior to December, 1967 had a flat type rail and require a flat gasket, Reference Number 52. Marine oil pans manufactured after December, 1967 and all industrial oil pans have a grooved rail and require a round silicon rubber seal, Reference Number 53 and air box drain "O" rings, Reference Number 54.

GASKET .. Crankcase to Marine Oil Pan - Previous Design Pan with Flat Rail

52	8247633	2	-	-	-	GASKET .. Rubber asbestos - Crankcase to oil pan
52	8243305	-	2	-	-	GASKET .. Rubber asbestos - Crankcase to oil pan
52	8242613	-	-	2	-	GASKET .. Rubber asbestos - Crankcase to oil pan
52	8375248	-	-	-	2	GASKET .. Rubber asbestos - Crankcase to oil pan

SEAL .. Crankcase to Oil Pan - Current Design with Grooved Rail

53	8187007	2	-	-	-	SEAL .. Silicon rubber - Crankcase to oil pan
53	8187009	-	2	-	-	SEAL .. Silicon rubber - Crankcase to oil pan
53	8187010	-	-	2	-	SEAL .. Silicon rubber - Crankcase to oil pan
53	8360920	-	-	-	2	SEAL .. Silicon rubber - Crankcase to oil pan
54	8198078	-	-	-	-	"O" RING .. Air box drain Quantity 2 required on E1,E4,E4B, and E10B engines Quantity 4 required on E2,E5,E6,E7,E7B,E7C,E8,E9,E9B engines

PAINT .. Engine

* 55	- - - -	As Required	ENAMEL .. Engine - Suede gray - 8078289 .. Qt. 8122047 .. Gallon 8133054 .. 5 gallons
* 56	8228726	As Required	PRIMER .. Buff oxide - 1 gallon

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE AND OIL PAN ASSEMBLY

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 Engine
		-	B	-	-	12-645 Engine
		-	-	C	-	16-645 Engine
		-	-	-	D	20-645 Engine

FLANGE .. Drain - Air Box

+ 57	8364299	1	1	1	1	FLANGE .. Drain - Air box	Not applicable to marine and marine drill rig
+ 58	8356239	1	1	1	1	GASKET .. Flange mounting	
+ 59	181429	4	4	4	4	BOLT .. Flange mounting - 1/2-20 x 1-1/4 hex. head	
+ 60	6101229	4	4	4	4	WASHER .. Plain - 1/2	

FLANGE .. Blind - Piston Cooling Tube

+*61	8159199	2	2	2	2	FLANGE .. Blind - Piston cooling tube - Camshaft drive end
+*62	8159200	2	2	2	2	GASKET .. Flange mounting
+*63	8028314	4	4	4	4	BOLT .. Flange mounting - 3/8-24 x 7/8 hex. head - Drilled
+*64	8116738	As Required				WIRE .. Lock - 3/64 dia. - Available 500 ft. length

ENGINE MOUNTING HARDWARE

/*65	- - - -	8	8	8	8	BOLT .. Engine mounting 271549 - 1-8 x 2-1/2 hex. head 271702 - 1-8 x 3 hex. head
* 66	8137697	8	8	8	8	WASHER .. Lock - 1
/*67	- - - -	4	4	4	4	DOWEL .. Pin - Engine mounting 8022474 - 1 in. x 3-1/4 in. long - 1-8 threaded end 8341940 - 1 in. x 3-3/4 in. long - 1-8 threaded end
* 68	218445	4	4	4	4	NUT .. 1-8 hex.

/ *Applicable part dependent upon specific installation requirement.*

GAUGE .. Oil Level

* 69	- - - -	1	1	1	1	GAUGE .. Oil level - Dipstick- See chart below
* 70	8071849	1	1	1	1	SEAL .. Felt - Oil level gauge
* 71	188002	As Required				PLUG .. Button - Oil dipstick hole

Oil Level Gauge Part Number	Engine Model Application
8195723	8-645E1,E4,E4B,12,16-645E1
8325439	12,16-645E4,E4B (Standard Capacity Pan) except MP36
8378325	20-645E4,E4B (Standard Capacity Pan) except MP45 & 999-20
8367720	12,20-645E4,E4B (Increased Capacity Pan) includes MP45 & 999-20
8333323	16-645E4,E4B (Increased Capacity Pan) and 20-645E10B
8290105	16-645E4 (MP36)
9508969	16-645E10B
8335941	8-645E2,E5,E6,E7,E7B,E7C,E8
8335969	12-645E2,E5,E6,E7,E7B,E7C,E8,E9,E9B,16-645E2,E5,E6, E7,E7B,E7C,E8,E9,E9B
8374643	20-645E5,E7,E7B,E7C,E9,E9B

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Industrial

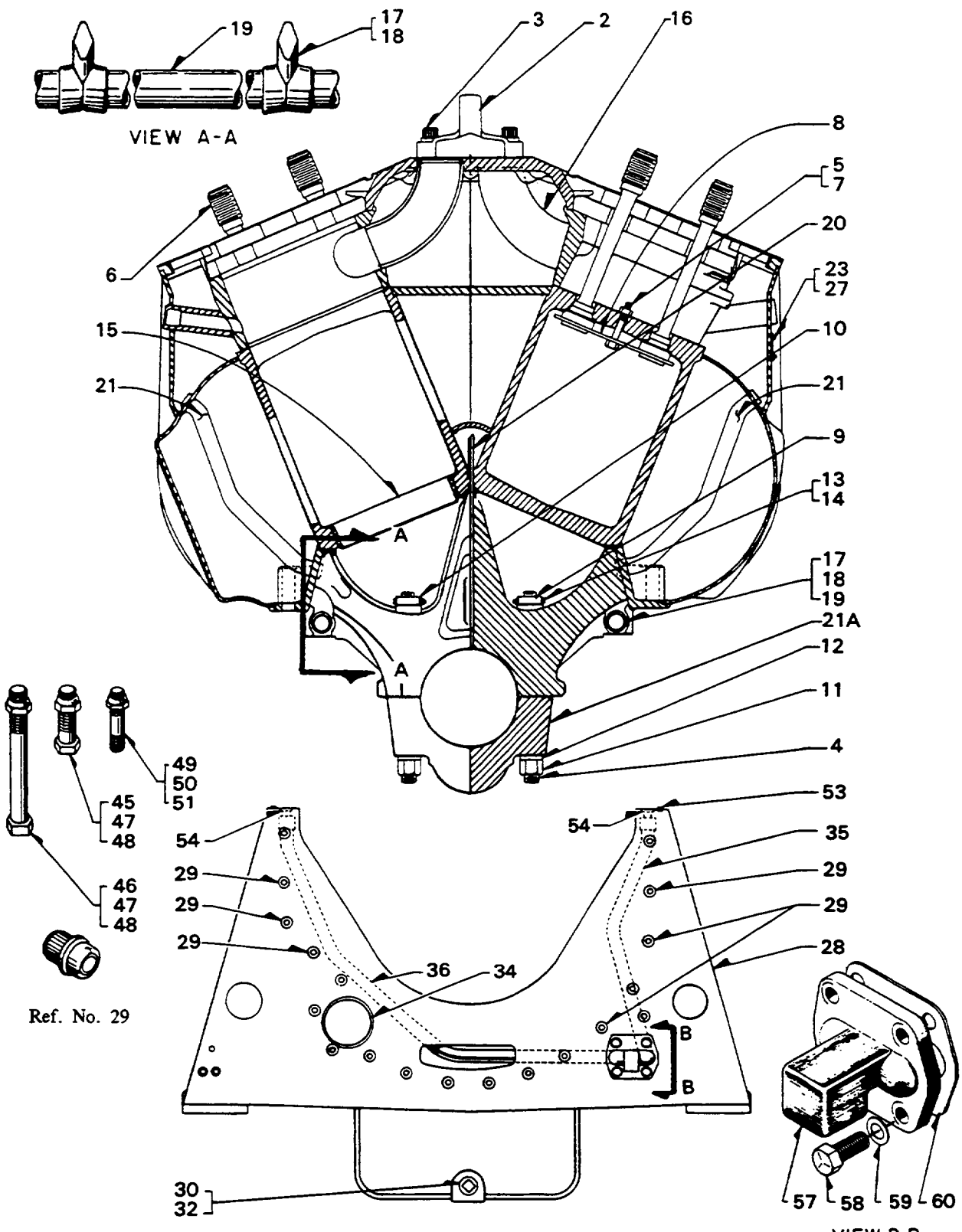
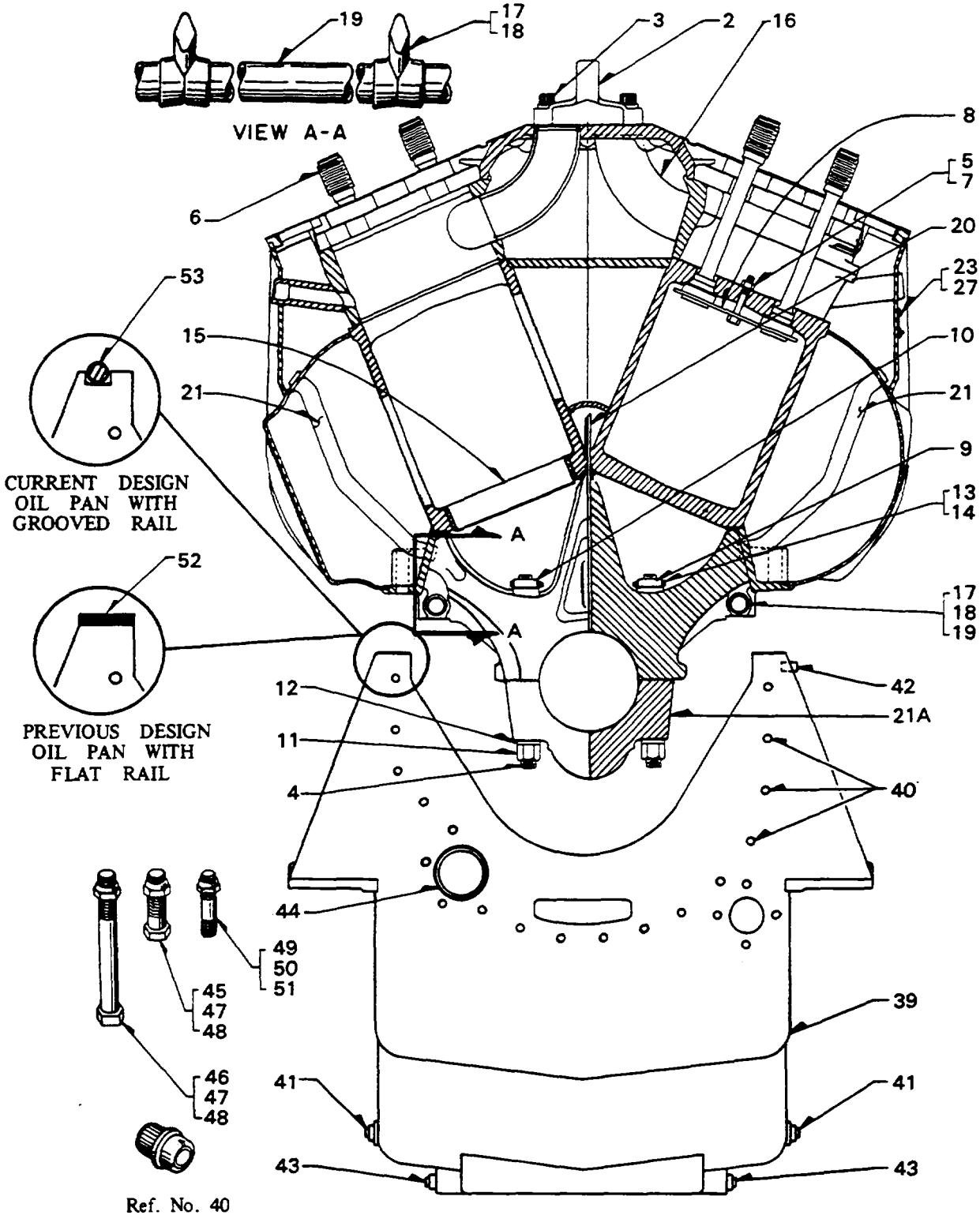


PLATE B01-5

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Marine and Marine Drill Rig



Ref. No. 1

PLATE B01-6

P.L. No. B01

ENGINE EQUIPPED AND CRANKCASE & OIL PAN ASSEMBLY

Lube Oil Level Switch

8-645E2,E5,E6,E7,E7B,E7C,E8,12-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B,
16-645E2,E4B,E5,E6,E7,E7B,E8,E9,E9B, and 20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B Engines

Items Listed Below Apply Only to Oil Pan Assemblies with Provisions for Lube Oil Level Switches

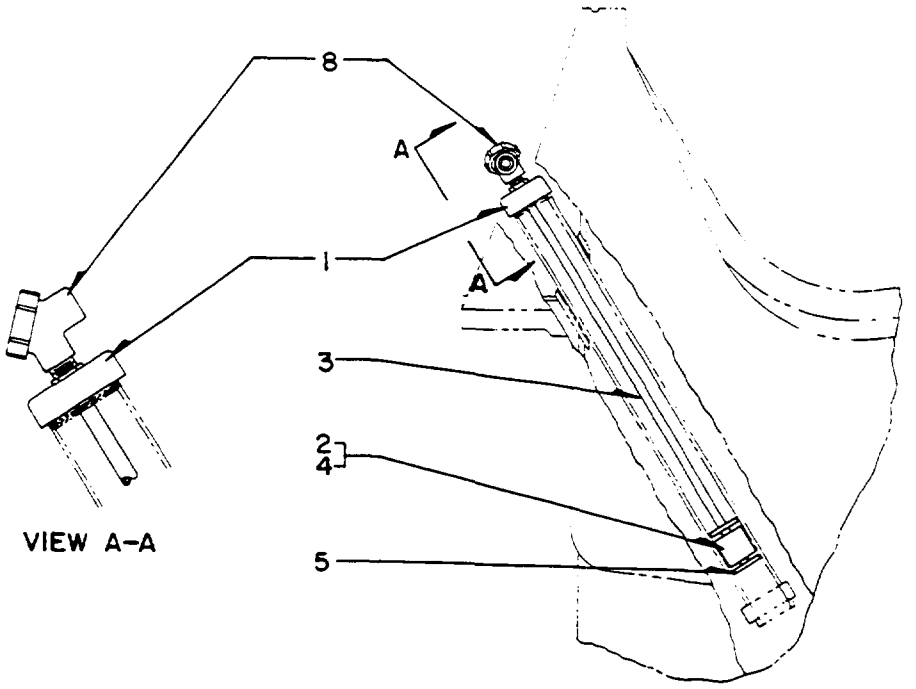


PLATE A01-7

Ref. No.	Part Number	Qty. Req.			Description
1	8445672	1	-	-	SWITCH ASM. .. Lube oil level - Normally closed - Dry - 27-3/8 in. long - 8-645E2, E5,E6,12-645E1,E4,E4B,E5,E6,E7,16-645E2,E4B,E5,E6,E7,20-645E4,E4B,E5, E7 engines
1	8469107	-	1	-	SWITCH ASM. .. Lube oil level - 1 normally closed, 1 normally open - Wet - 23-3/4 in. long - 8-645E2 engine
1	8464151	-	-	1	SWITCH ASM. .. Lube oil level - Normally open - Dry - 27-3/8 in. long - 8-645E2,E5,E6,E7B,E7C,E8,12-645E1,E2,E4,E5,E6,E7,E7B,E7C,E8,E9,E9B, 16-645E2,E5,E6,E7,E7B,E8,E9,E9B, and 20-645E5,E7,E7B,E7C,E9,E9B engines
2	8452592	1	-	-	SWITCH ASM. .. Lube oil level
2	9552513	-	1	-	SWITCH ASM. .. Lube oil level
2	9552609	-	-	1	SWITCH ASM. .. Lube oil level
*2A	8445673	1	-	-	CASING .. Level switch
3		1	-	-	STEM ASM. .. Switch - Includes cap
3		-	1	-	STEM ASM. .. Switch - Includes cap
3		-	-	1	STEM ASM. .. Switch - Includes cap
4	9331638	1	-	-	FLOAT ASM. .. Switch
4	9552597	-	1	-	FLOAT ASM. .. Switch
4	9552598	-	-	1	FLOAT ASM. .. Switch
5		1	-	1	SPACER .. Switch float
5		-	2	-	SPACER .. Switch float
6		2	5	2	COLLAR .. Spacer
7		2	5	2	SCREW .. Set - Spacer
* ϕ 8	8260167	1	1	-	ELBOW .. Switch pulling
ϕ 8	8446535	1	-	1	ELBOW .. 1/2 capped
* 9	8271857	1	1	-	COVER ASSEMBLY .. Switch
* 10	8271869	1	1	-	GASKET .. Cover mounting
* 11	122159	2	2	-	SCREW .. No. 8-32 x 1/4 round head - Slotted

Parts List No. B03

ENGINE RAMPS

Hinged Engine Ramps

8,12,16-645E1 and 8,12,16,20-645E4 Engines

PLATES B03-1 and B03-2

Ref. No.	Part Number	Quantity Required										Description
		A	-	-	-	-	-	-	-	-	-	8-645E1,E4 engines - Models S8E1,G,S8E4, SR11E1A,E1W,SK11EPA,LD8E1G
		-	B	-	-	-	-	-	-	-	-	12E645E1,E4 engines - Models S12E1,G, GW,S12E4,BG,G,GW,SR12E1W,G,3-12E-W7M, LD12E1G,E1P,LD12E4BG
		-	-	C	-	-	-	-	-	-	-	12-645E1 engines - Models S12E1G,GW
		-	-	-	D	-	-	-	-	-	-	12-645E4 R.H. & L.H. rotating engines with redundant starters - Model S12E4
		-	-	-	-	E	-	-	-	-	-	16-645E1,E4 engines - Models S16E1,G,GW, S16E4,G,GW,SR16E1GW,2-16E-7M,S16E4,G,GW, and modified S36G
		-	-	-	-	-	F	-	-	-	-	16-645E1,E4 engines - Models S16E1GW,S16E4BG
		-	-	-	-	-	-	G	-	-	-	16-645E4 R.H. rotating engine - Model S16E4
		-	-	-	-	-	-	-	H	-	-	20-645E4 engine - Models S20E4,BG,G,
		-	-	-	-	-	-	-	-	J	-	20-645E4 engine - Model SG20E4B
		-	-	-	-	-	-	-	-	-	K	20-645E4 R.H. rotating engine - Model S20E4 - with redundant starters
1	8399908	1	-	-	-	-	-	-	-	-	-	RAMP ASM. .. Engine - Right bank - Formerly 8214592 and 8214593
* 2	8084603	3	-	-	-	-	-	-	-	-	-	LEG .. Ramp
* 3	424267	3	-	-	-	-	-	-	-	-	-	PIN .. 1/2 x 2-3/4 in. long
* 4	8084794	3	-	-	-	-	-	-	-	-	-	HINGE .. Ramp leg
5	8399910	1	-	-	-	-	-	-	-	-	-	RAMP ASM. .. Engine - Left bank - Formerly 8214594
* 6	8084603	3	-	-	-	-	-	-	-	-	-	LEG .. Ramp
* 7	424267	3	-	-	-	-	-	-	-	-	-	PIN .. 1/2 x 2-3/4 in. long
8	8084794	3	-	-	-	-	-	-	-	-	-	HINGE .. Ramp leg
9	8398245	-	1	-	1	-	-	-	-	-	-	RAMP ASM. .. Engine - Right bank - Formerly 8215023 and 8207916
10	8398594	-	-	1	-	-	-	-	-	-	-	RAMP ASM. .. Engine - Right bank
* 11	8398360	1	4	4	4	-	-	-	-	-	-	LEG .. Ramp
* 12	424267	-	4	4	4	-	-	-	-	-	-	PIN .. 1/2 x 2-3/4 in. long
* 13	8084794	-	4	4	4	-	-	-	-	-	-	HINGE .. Ramp leg
/ 14	8398434	-	1	1	-	-	-	-	-	-	-	RAMP ASM. .. Engine - Left bank - Formerly 8188633
14	9094897	-	-	-	1	-	-	-	-	-	-	RAMP ASM. .. Engine - Left bank
* 15	8398360	-	4	4	4	-	-	-	-	-	-	LEG .. Ramp
* 16	424267	-	4	4	4	-	-	-	-	-	-	PIN .. 1/2 x 2-3/4 in. long
* 17	8084794	-	4	4	4	-	-	-	-	-	-	HINGE .. Ramp leg
18	8399795	-	-	-	-	1	-	1	-	-	-	RAMP ASM. .. Engine - Right bank rear - Formerly 8215233 and 8215234
19	8418813	-	-	-	-	-	1	-	-	-	-	RAMP ASM. .. Engine - Right bank rear
* 20	8398360	-	-	-	-	3	3	3	-	-	-	LEG .. Ramp
* 21	424267	-	-	-	-	3	3	3	-	-	-	PIN .. Ramp - 1/2 x 2-3/4 in. long
* 22	8084794	-	-	-	-	3	3	3	-	-	-	HINGE .. Ramp leg
23	8399794	-	-	-	-	3	3	2	-	-	-	RAMP ASM. .. Engine - Right and left bank front and for column E only left bank rear
* 24	8398360	-	-	-	-	9	9	6	-	-	-	LEG .. Ramp
* 25	424267	-	-	-	-	9	9	6	-	-	-	PIN .. 1/2 x 2-3/4 in. long
* 26	8084794	-	-	-	-	9	9	6	-	-	-	HINGE .. Ramp
27	8464086	-	-	-	-	-	-	1	-	-	-	RAMP ASM. .. Engine - Left bank rear
* 28	8398360	-	-	-	-	-	-	3	-	-	-	LEG .. Ramp
* 29	424267	-	-	-	-	-	-	3	-	-	-	PIN .. 1/2 x 2-3/4 in. long
* 30	8084794	-	-	-	-	-	-	3	-	-	-	HINGE .. Ramp leg
31	8398740	-	-	-	-	-	-	-	1	1	1	RAMP ASM. .. Engine - Right bank rear
* 32	8398360	-	-	-	-	-	-	-	3	3	3	LEG .. Ramp
* 33	424267	-	-	-	-	-	-	-	3	3	3	PIN .. 1/2 x 2-3/4 in. long
* 34	8084794	-	-	-	-	-	-	-	3	3	3	HINGE .. Ramp leg

/ *Use 8496351 ramp on those units with lube oil level switches. The serviceable components of 8398434 and 8496351 are identical.*

P.L. No. B03

ENGINE RAMPS

Ref. No.	Part Number	Quantity Required										Description
		A	-	-	-	-	-	-	-	-	-	8-645E1,E4 engines - Models S8E1,G,S8E4, SR11E1A,E1W,SK11EPA,LD8E1G
		-	B	-	-	-	-	-	-	-	-	12-645E1,E4 engines - Models S12E1,G, GW,S12E4,BG,G,GW,SR12E1W,G,3-12E-W7M, LD12E1G,E1P,LD12E4BG
		-	-	C	-	-	-	-	-	-	-	12-645E1 engines - Models S12E1G,GW
		-	-	-	D	-	-	-	-	-	-	12-645E4 R.H. & L.H. rotating engines with redundant starters - Model S12E4
		-	-	-	-	E	-	-	-	-	-	16-645E1,E4 engines - Models S16E1,G,GW, S16E4,G,GW,SR16E1GW,2-16E-7M,S16E4,G,GW, and modified S36G
		-	-	-	-	-	F	-	-	-	-	16-645E1,E4 engines - Models S16E1GW,S16E4BG
		-	-	-	-	-	-	G	-	-	-	16-645E4 R.H. rotating engine - Model S16E4
		-	-	-	-	-	-	-	H	-	-	20-645E4 engine - Models S20E4,BG,G,
		-	-	-	-	-	-	-	-	J	-	20-645E4 engine - Model SG20E4B
		-	-	-	-	-	-	-	-	-	K	20-645E4 R.H. rotating engine - Model S20E4 - with redundant starters
35	8365919	-	-	-	-	-	-	-	3	2	2	RAMP ASM. .. Engine - Right and left bank front and for column H only left bank rear
36	8398360	-	-	-	-	-	-	-	9	6	6	LEG .. Ramp
37	424267	-	-	-	-	-	-	-	9	6	6	PIN .. 1/2 x 2-3/4 in. long
38	8084794	-	-	-	-	-	-	-	9	6	6	HINGE .. Ramp leg
39	9519170	-	-	-	-	-	-	-	-	1	-	RAMP ASM. .. Engine - Left bank rear
40	8409970	-	-	-	-	-	-	-	-	-	1	RAMP ASM. .. Engine - Left bank rear
* 41	8398360	-	-	-	-	-	-	-	-	3	3	LEG .. Ramp
* 42	424267	-	-	-	-	-	-	-	-	3	3	PIN .. 1/2 x 2-3/4 in. long
43	8084794	-	-	-	-	-	-	-	-	3	3	HINGE .. Ramp leg
44	8192353	4	5	5	5	8	8	8	8	8	8	BRACKET .. Ramp mtg. - Lower - 5 -1/16 in. long
* 45	8192618	-	3	3	3	-	-	-	-	-	-	BRACKET .. Ramp mtg. - Lower - 9-1/16 in. long
46	8192351	2	4	4	4	4	4	4	4	4	4	BRACKET .. Ramp lock - Upper
47	181427	12	24	24	24	24	24	24	24	24	24	BOLT .. Bracket to oil pan - 1/2-20 x 1 in. long
48	103343	18	36	36	36	36	36	36	36	36	36	WASHER .. Plain - 1/2
49	8177613	2	4	4	4	4	4	4	4	4	4	ROD .. Eye - Handwheel - 1/2-13 x 3-1/8 in. long
50	8085073	2	4	4	4	4	4	4	4	4	4	HANDWHEEL .. Ramp lock
51	8032918	6	12	12	12	12	12	12	12	12	12	PIN .. Hinge
52	108630	6	12	12	12	12	12	12	12	12	12	PIN .. Cotter - 1/8 x 7/8 in. long

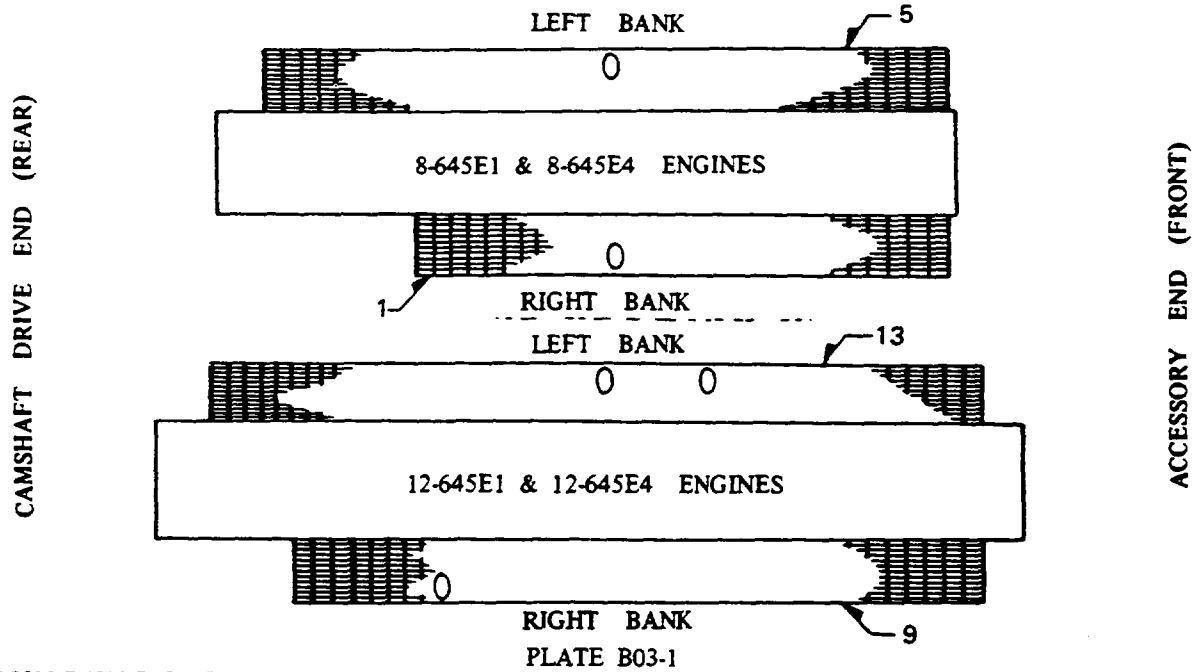
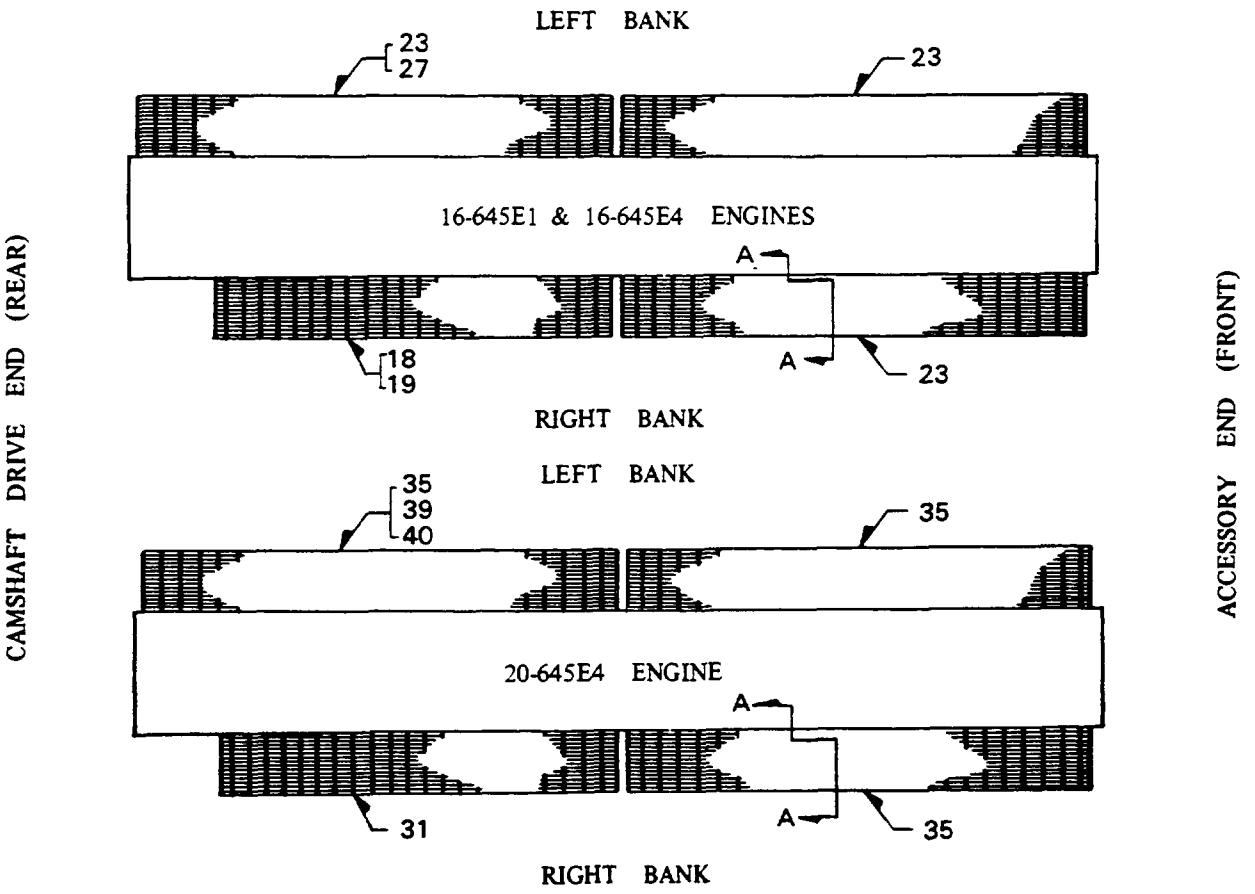
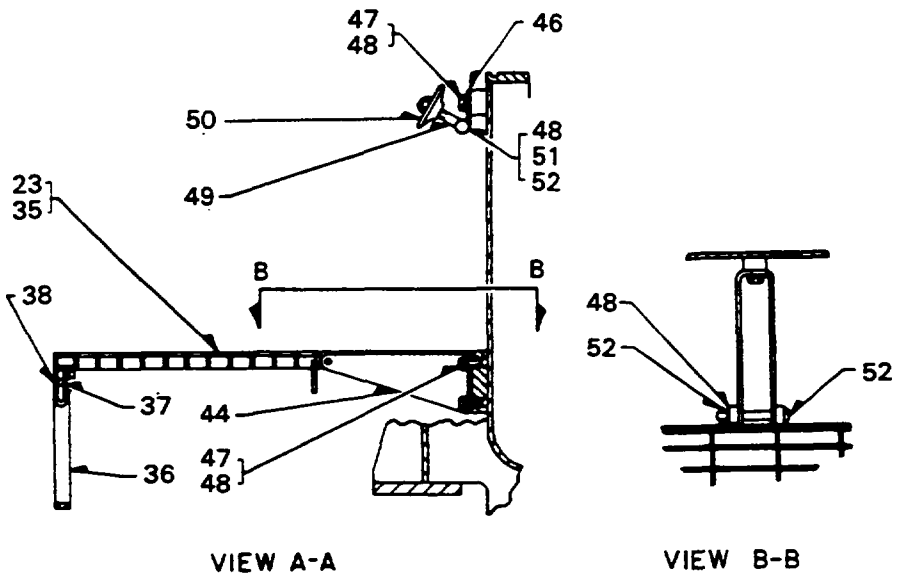


PLATE B03-1

P7532,P7538,P7545,P7547,P7548,P7778
P8865,P8918,P8999,P9122,P9202

ENGINE RAMPS





Engine Ramp Application
PLATE B03-2

P.L. No. B03

ENGINE RAMPS

Stationary Engine Ramps

12 and 20-645E4 Engines

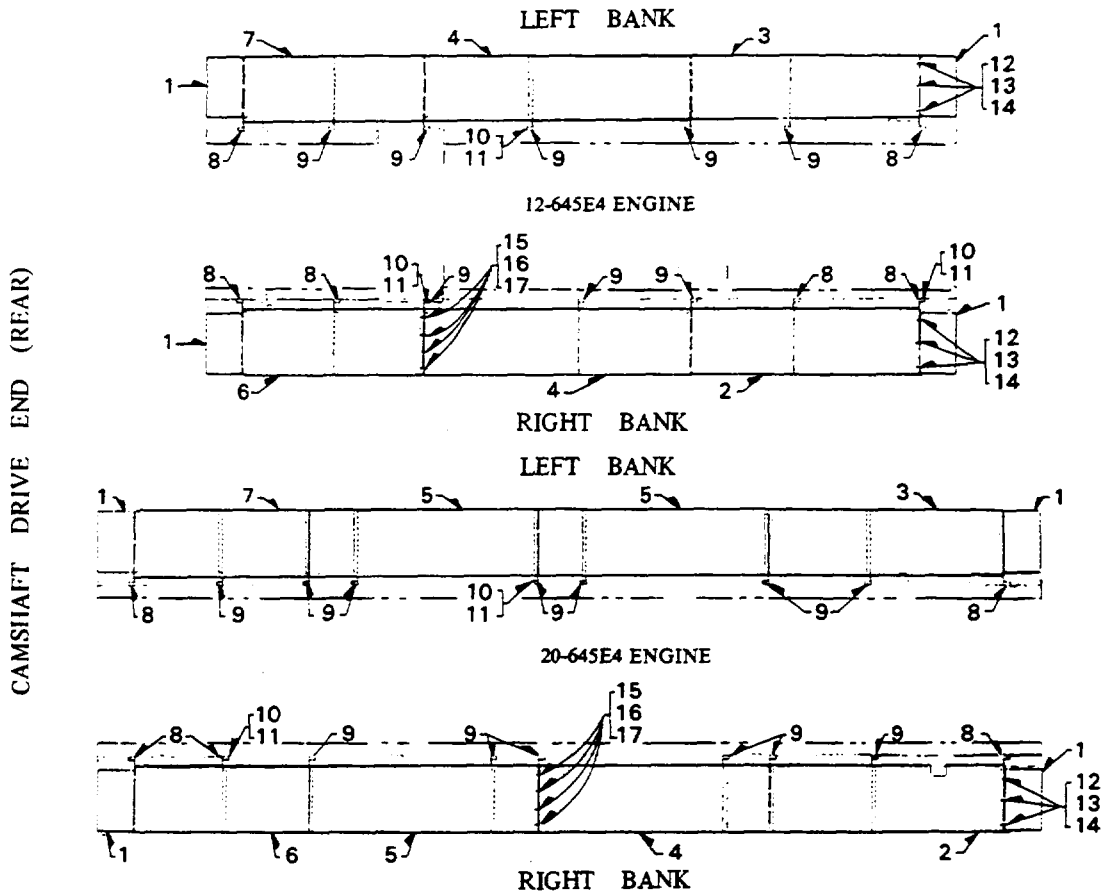


PLATE B03-3

Ref. No.	Part Number	Qty. Req.		Description
		A	-	12-645E4 engine - Model S12E4GA
		-	B	20-645E4 engine - Models S20E4G,S20E4GA
1	8342597	4	4	STEP ASM. .. Engine ramp
2	9085718	1	-	RAMP ASM. .. Engine - Right bank front
2	9081016	-	1	RAMP ASM. .. Engine - Right bank front
3	9081018	1	1	RAMP ASM. .. Engine - Left bank front
4	9085717	2	-	RAMP ASM. .. Engine - Right and left bank intermediate
4	9081015	-	1	RAMP ASM. .. Engine - Right bank intermediate
5	9081014	-	3	RAMP ASM. .. Engine - Right and left bank intermediate
6	9081013	1	1	RAMP ASM. .. Engine - Right bank rear
7	9085719	1	-	RAMP ASM. .. Engine - Left bank rear
7	9081017	-	1	RAMP ASM. .. Engine - Left bank rear
8	8215152	6	5	PAD .. Tapping - Welded
9	9081024	8	13	PAD .. Tapping - Welded
10	271605	34	26	BOLT .. Support bracket to base - 3/4-10 x 1-1/4 hex. head
11	103326	34	26	WASHER .. Lock - 3/4
12	179883	12	12	BOLT .. Step to ramp - 1/2-13 x 1-1/4 hex. head
13	103323	12	12	WASHER .. Lock - 1/2
14	102637	12	12	NUT .. 1/2-13 hex.
15	179839	16	24	BOLT .. Ramp to ramp - 3/8-16 x 1 hex. head
16	103321	16	24	WASHER .. Lock - 3/8
17	102635	16	24	NUT .. 3/8-16 - Hex.

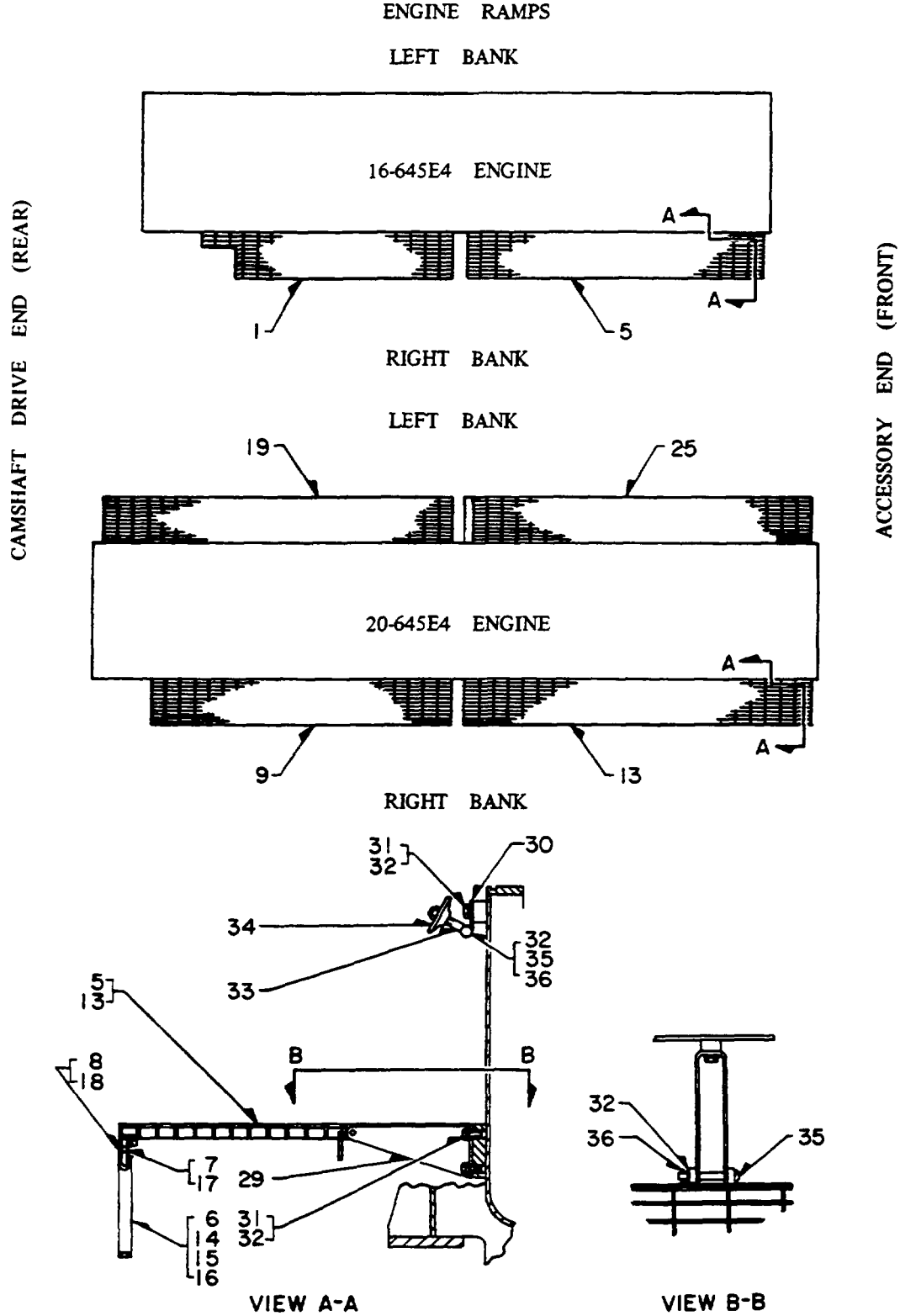
P7080,P6856

ENGINE RAMPS
Hinged Engine Ramps
16 and 20-645E4 Engines
PLATE A03-4

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	16-645E4 engine - Model MP36
		-	B	-	20-645E4 engine - Model MP45 (Ramps are not applied in units with raised battery boxes)
		-	-	C	20-645E4 engine - Model 999-20
1	8215234	1	-	-	RAMP ASSEMBLY .. Engine - Right bank rear
* 2	8084603	2	-	-	LEG .. Ramp - 8-9/16 in. long
* 3	424267	2	-	-	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
* 4	8084794	2	-	-	HINGE .. Ramp leg
5	8177615	1	-	-	RAMP ASSEMBLY .. Engine - Right bank front
6	8084603	3	-	-	LEG .. Ramp - 8-9/16 in. long
7	424267	3	-	-	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
8	8084794	3	-	-	HINGE .. Ramp leg
9	8365916	-	1	-	RAMP ASSEMBLY .. Engine - Right bank rear
9	8398740	-	-	1	RAMP ASSEMBLY .. Engine - Right bank rear
*10	8398360	-	3	3	LEG .. Ramp - 9-3/8 in. long - Formerly 8365915
*11	424267	-	3	3	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
*12	8084794	-	3	3	HINGE .. Ramp leg
13	8365920	-	1	-	RAMP ASSEMBLY .. Engine - Right bank front
13	8365919	-	-	1	RAMP ASSEMBLY .. Engine - Right bank front
14	8365915	-	1	-	LEG .. Ramp - 7-1/16 in. long
15	8084603	-	2	-	LEG .. Ramp - 8-9/16 in. long
16	8398360	-	-	3	LEG .. Ramp - 9-3/8 in. long - Formerly 8084603
17	424267	-	3	3	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
18	8084794	-	3	3	HINGE .. Ramp leg
19	8365918	-	1	-	RAMP ASSEMBLY .. Engine - Left bank rear
19	8409970	-	-	1	RAMP ASSEMBLY .. Engine - Left bank rear
*20	8365915	-	2	-	LEG .. Ramp - 7-1/16 in. long
*21	8084603	-	1	-	LEG .. Ramp - 8-9/16 in. long
*22	8398360	-	-	3	LEG .. Ramp - 9-3/8 in. long
*23	424267	-	3	3	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
*24	8084794	-	3	3	HINGE .. Ramp leg
25	8365919	-	1	1	RAMP ASSEMBLY .. Engine - Left bank front
*26	8398360	-	3	3	LEG .. Ramp - 9-3/8 in. long - Formerly 8084603
*27	424267	-	3	3	PIN .. Ramp leg - 1/2 x 2-3/4 in. long
*28	8084794	-	3	3	HINGE .. Ramp leg
29	8192353	4	8	8	BRACKET .. Ramp mounting - Lower
30	8192351	2	4	4	BRACKET .. Ramp lock - Upper
31	181427	12	24	24	BOLT .. Bracket to oil pan - 1/2-20 x 1 in. long
32	103343	18	36	36	WASHER .. Plain - 1/2
33	8177613	2	4	4	ROD .. Eye - Handwheel - 1/2-13 x 3-1/8 in. long
34	8085073	2	4	4	HANDWHEEL .. Ramp lock
35	8032918	6	12	12	PIN .. Hinge
36	108630	6	12	12	PIN .. Cotter - 1/8 x 7/8 in. long

P.L. No. B03

ENGINE RAMPS



Engine Ramp Application

PLATE A03-4

Parts List No. B04

HANDHOLE COVER AND CYLINDER TEST VALVE

Safety Handhole Cover Assembly

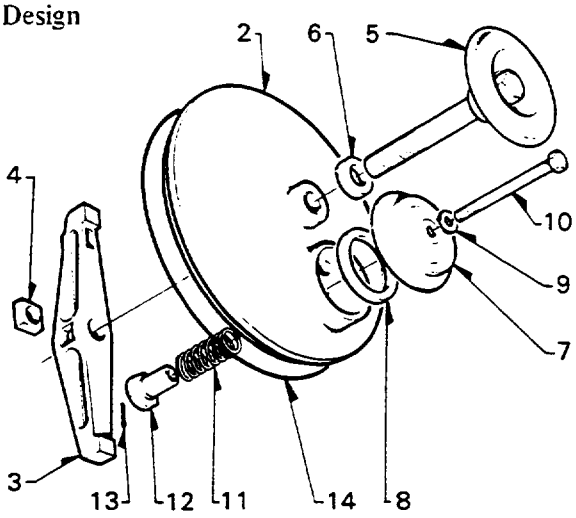
Marine and Marine Drill Rig Engines

COVER ASSEMBLY .. Handhole - Safety - Previous Design

Ref. No.	Part Number	Qty. Req.	Description
≠ 1	8381095	1	COVER ASM. .. Handhole - Safety - Replaces 3325014
2	8381094	1	COVER .. Handhole
3	3343838	1	BAR .. Clamping
4	3329128	1	NUT .. Square
5	3343830	1	HANDWHEEL ASM. .. Incl. stem
6	8388028	1	GASKET .. Handwheel
7	8381093	4	DEFLECTOR .. Safety cover
8	8384197	4	GASKET .. Deflector
9	8390167	4	WASHER .. Seal
10	8381128	4	BOLT .. Deflector
11	8384182	4	SPRING .. Safety cover
12	8388029	4	NUT .. Special - Safety cover
13	103373	4	PIN .. Cotter - 3/32 x 3/4 long
14	8291349	1	GASKET .. Handhole cover to oil pan

≠ *See Page 2, Ref. No. 1 for current design safety handhole cover assembly.*

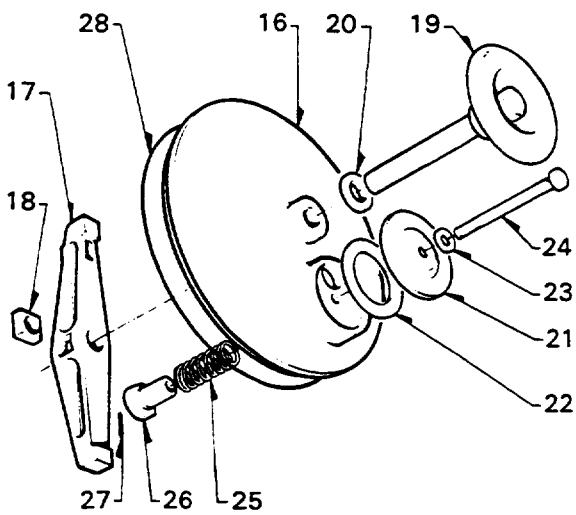
2 req. per 8 cyl. engine *4 req. per 16 cyl. engine*
3 req. per 12 cyl. engine *5 req. per 20 cyl. engine*



Ref. No. 1
PLATE B04-1

COVER ASSEMBLY .. Handhole - Safety

15	3325014	1	COVER ASM. .. Handhole - Safety - Repl. by 8381095
16	3343485	1	COVER .. Handhole
17	3343838	1	BAR .. Clamping
*18	3329128	1	NUT .. Square
19	3343830	1	HANDWHEEL ASM. .. Incl. stem
20	3329170	1	GASKET .. Handwheel
21	3239656	4	COVER .. Safety
22	3388571	4	GASKET .. Safety cover
23	3322234	4	WASHER .. Safety cover
24	3341225	4	BOLT .. Safety cover
25	3239716	4	SPRING .. Safety cover
26	3341227	4	NUT .. Special - Safety cover
27	103373	4	PIN .. Cotter - 3/32 x 3/4 in. long
28	8291349	1	GASKET .. Handhole cover to oil pan



Ref. No. 15
PLATE B04-2

P.L. No. B04

HANDHOLE COVER AND CYLINDER TEST VALVE

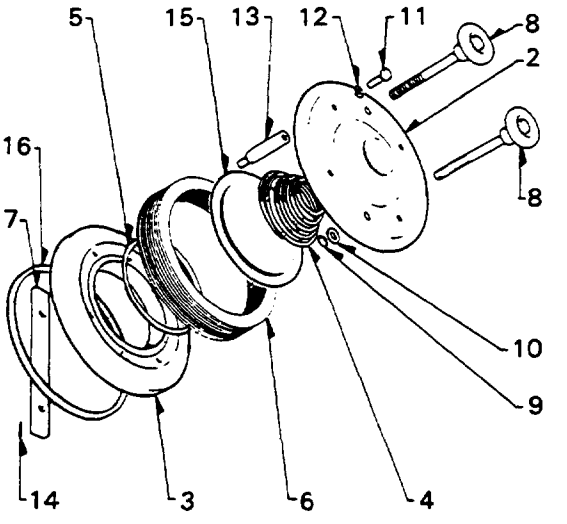
Handhole Cover Assembly

Marine and Marine Drill Rig Engines
Optional - Stationary Power Generation Engines

Ref. No.	Part Number	Qty. Req.	Description
COVER ASSEMBLY .. Handhole - Safety - Current Design Marine and Marine Drill Rig Engines Optional - Stationary Power Generation Engines			
†1	8499419	1	COVER ASM. .. Handhole - Safety
2	9558965	1	COVER ASM. .. Handhole
3	9558966	1	SEAT .. Handhole cover valve
4	9558967	1	SPRING .. Handhole cover
5	9095844	1	O-RING .. Seal - Valve seat
6	9080829	1	FLAME ARRESTOR .. Handhole Cover
7	9558968	1	BAR .. Clamping
8	9558969	2	HANDWHEEL ASM. .. Includes bolt
9	9095821	2	O-RING .. Seal - Handwheel
10	40010899	2	WASHER
11	40010898	4	SCREW .. Hex. head
12	40010897	4	WASHER .. Lock
13	40010896	4	GUIDE BOLT
14	40010895	2	PIN .. Cotter
15	40010894	1	PLATE .. Valve
16	8291349	1	GASKET .. Handhole cover to oil pan

† Previous and current design handhole covers are not to be intermixed on the same engine. Application of the new 8499419 safety handhole cover requires that all existing safety covers be replaced with the 8499419 cover.

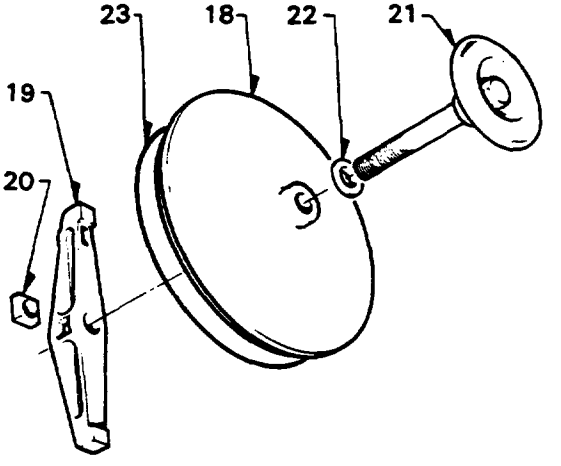
2 req. per 8 cyl. engine *4 req. per 16 cyl. engine*
3 req. per 12 cyl. engine *5 req. per 20 cyl. engine*



Ref. No. 1
PLATE B04-3

Ref. No.	Part Number	Qty. Req.	Description
COVER ASSEMBLY .. Handhole - Plain - Previous Design - Early Marine Engines Only			
††17	3325015	1	COVER ASM. .. Handhole plain
18	3343484	1	COVER .. Handhole
19	3343838	1	BAR .. Clamping
20	3329128	1	NUT .. Square
21	3343830	1	HANDWHEEL ASM. .. Includes stem
22	3329170	1	GASKET .. Handwheel
23	8291349	1	GASKET .. Handhole cover to crankcase or oil pan

†† See Page 3 for later design handhole covers.

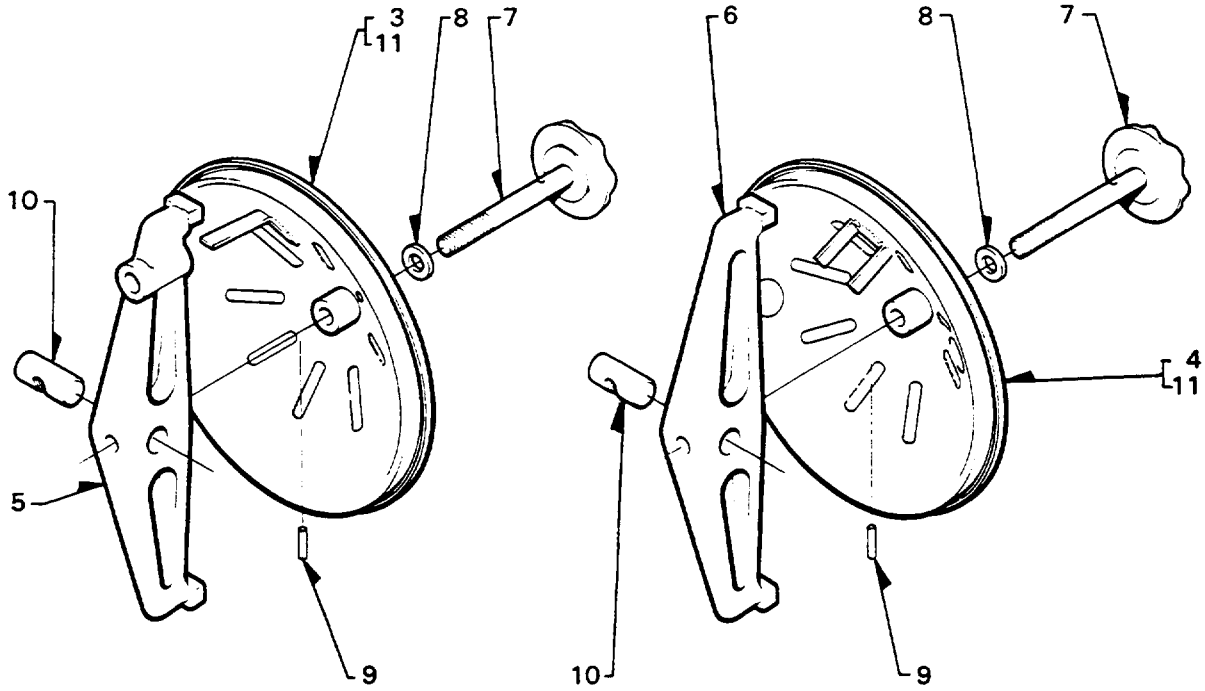


Ref. No. 17
PLATE B04-4

P9866, P9802, P9531

HANDHOLE COVER AND CYLINDER TEST VALVE

Handhole Cover Assembly
All 8,12,16, and 20-645 Engines



Reference No. 1 Reference No. 2

PLATE B04-5

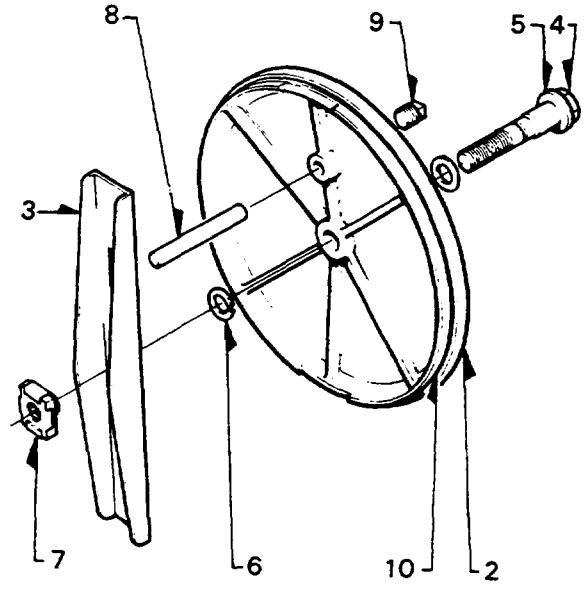
Ref. No.	Part Number	Qty. Req.		Description
COVER ASSEMBLY .. Handhole - Plain				
1	8335840	1	-	COVER ASM. .. Handhole - Except 8,12,16, and 20-645E7C engines - Formerly 3325015 - Replaced by 9314870
2	9314870	-	1	COVER ASM. .. Handhole - All 8,12,16, and 20-645 engines - Replaces 8335840
3	8274750	1	-	COVER .. Handhole - No longer furnished - Use 9314870 handhole cover assembly for replacement
4	9314871	-	1	COVER .. Handhole
5	8335841	1	-	CROSSBAR ASM. .. Cover - Replaced by 9314872
6	9314872	-	1	CROSSBAR ASM. .. Cover - Replaces 8335841
7	8262322	1	1	HANDWHEEL ASM. .. Cover - Includes stem
8	8247063	1	1	GASKET .. Handwheel - Nylon
9	273337	1	1	PIN .. Retaining - 1/8 dia. x 5/8 in. long - Formerly 455734
10	8262316	1	1	PIN .. Crossbar to handwheel stem
11	8291349	1	1	GASKET .. Handhole cover to crankcase or oil pan

P.L. No. B04

HANDHOLE COVER AND CYLINDER TEST VALVE

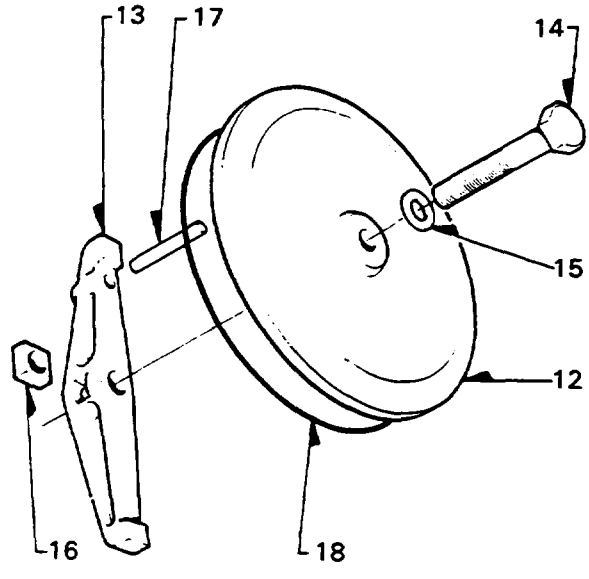
Handhole Covers at Starter Motor Location
Previous Design
8,12,16-645E1 and 12,16,20-645E4 Engines

Ref. No.	Part Number	Qty. Req.	Description
1	8212122	1	COVER ASSEMBLY .. Handhole
2	8211975	1	COVER .. Handhole
3	8141999	1	CROSSBAR .. Cover
4	8211983	1	STUD .. Cover - 1/2 - 20 x 3 hex. head
5	8152423	1	GASKET .. Stud
6	8173805	1	RING .. Stud retaining
7	8159727	1	NUT .. Special - 1/2 - 20 square - Includes retainer
8	456885	1	PIN .. Locating - 1/4 x 1-5/8
9	103877	1	PLUG .. Pipe - 1/8
10	8291349	1	GASKET .. Handhole cover



Ref. No. 1

11	3325030	1	COVER ASSEMBLY .. Handhole
12	3343483	1	COVER .. Handhole
13	3343838	1	CROSSBAR .. Cover
14	3343870	1	BOLT .. Cover retaining - 5/8 - 18 x 4-1/4 hex. head
15	3329170	1	GASKET .. Cover retaining bolt
16	3329128	1	NUT .. Cover retaining bolt - 5/8 - 18 square
17	272513	1	PIN .. Locating
18	8291349	1	GASKET .. Handhole cover to oil pan



Ref. No. 11

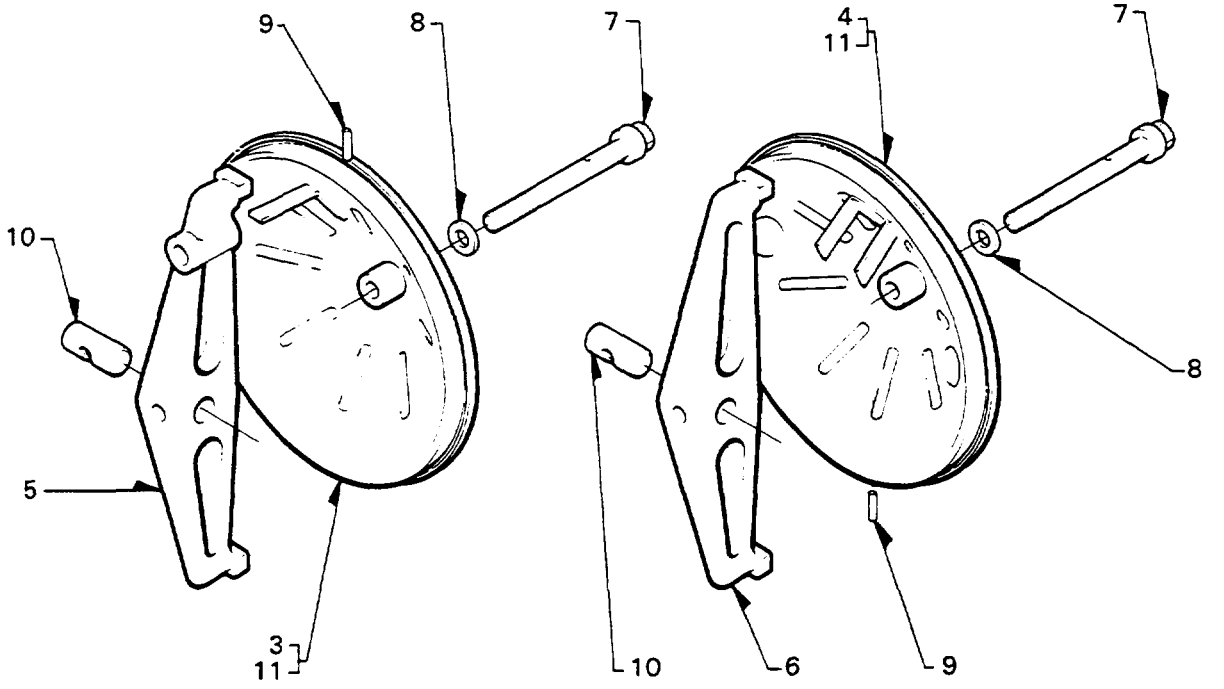
See Page 5 for current design handhole covers at starter motor location.

PLATE B04-6

P.L. No. B04

HANDHOLE COVER AND CYLINDER TEST VALVE

Handhole Covers at Starter Motor Location
Current Design
8,12,16-645E1,16,20-645E4, and 16,20-645E4B Engines



Ref. No. 1 Ref. No. 2

PLATE B04-7

Ref. No.	Part Number	Qty. Req.		Description
1	8391430	1	-	COVER ASSEMBLY .. Handhole - Replaced by 9314869
2	9314869	-	1	COVER ASSEMBLY .. Handhole - Replaces 8391430
3	8274750	1	-	COVER .. Handhole - No longer furnished - Use 9314869 handhole cover assembly for replacement
4	9314871	-	1	COVER .. Handhole
5	8335841	1	-	CROSSBAR ASM. .. Cover - Replaced by 9314872
6	9314872	-	1	CROSSBAR ASM. .. Cover - Replaces 8335841
7	8391429	1	1	BOLT ASSEMBLY .. Includes washer
8	8247063	1	1	GASKET .. Bolt - Nylon
9	273337	1	1	PIN .. Retaining - 1/8 dia. x 5/8 in. long - Formerly 455734
10	8262316	1	1	PIN .. Crossbar to bolt assembly
11	8291349	1	1	GASKET .. Handhole cover to oil pan

P.L. No. B04

HANDHOLE COVER AND CYLINDER TEST VALVE

Cylinder Test Valve
All 8,12,16 and 20-645 Engines

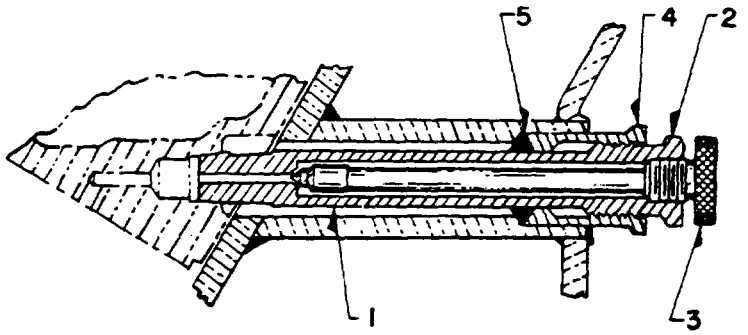


PLATE B04-8

Ref. No.	Part Number	Qty. Req.	Description

Quantities listed are for one assembly. Quantity 1 required per engine cylinder.

VALVE ASSEMBLY .. Cylinder Test

1	8048880	1	VALVE ASSEMBLY .. Cylinder test

BODY .. Test Valve

2	8048883	1	BODY .. Test valve

VALVE .. Needle

3	8024846	1	VALVE .. Needle

NUT .. Packing

4	8048884	1	NUT .. Packing

SEAL .. Test Valve

5	9581769	1	SEAL .. Test valve - Replaces 8328687

Parts List No. A05

POWER ASSEMBLIES AND ASSOCIATED COMPONENTS

Locating Reference

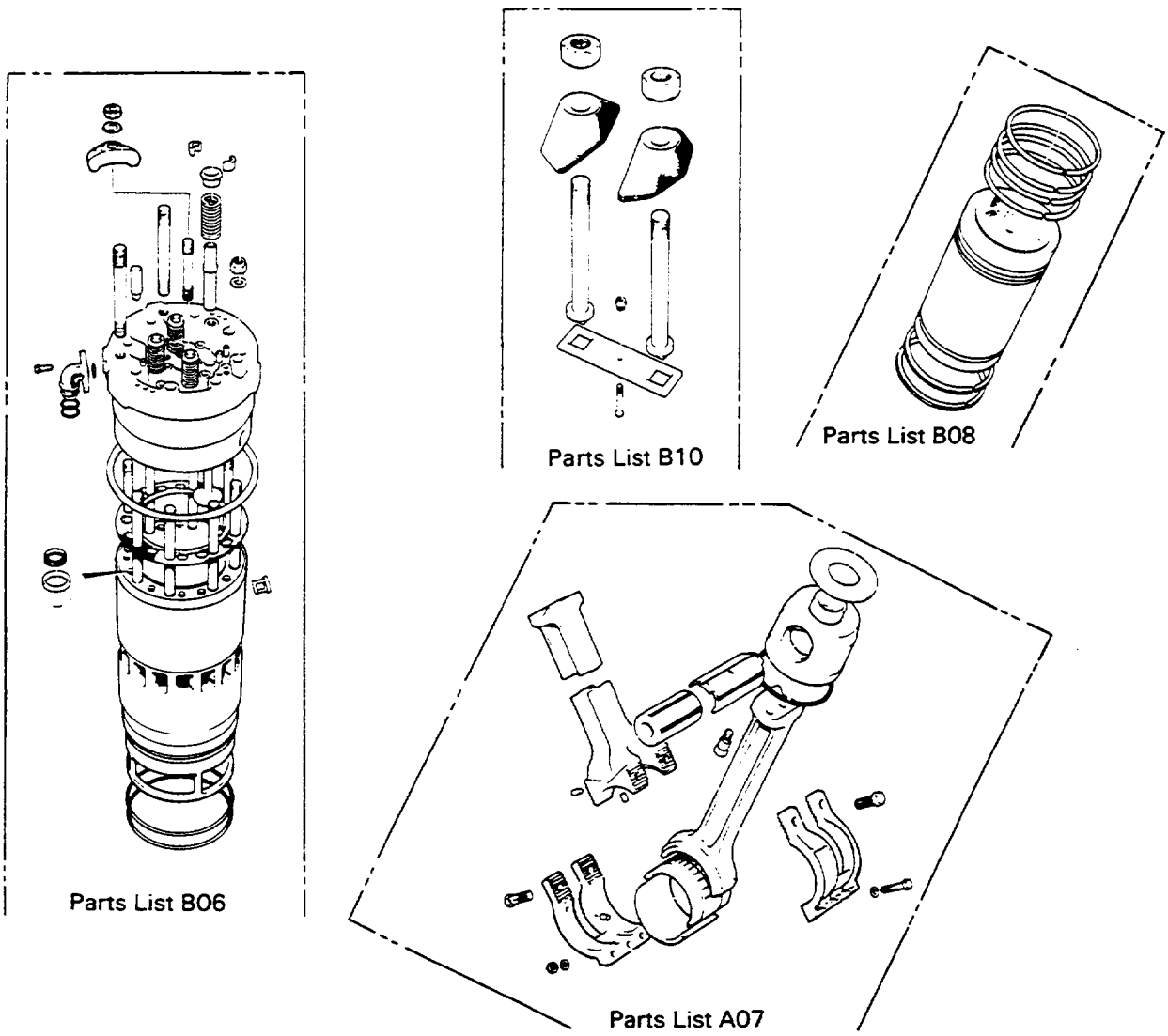


PLATE A05-1

Parts List No.	Parts List Description
B06	CYLINDER HEAD AND LINER Includes Seals, Gaskets, Elbows, And Exhaust Valves
A07	CONNECTING ROD, CARRIER, AND PISTON PIN Includes Thrust Washer, Bearings, And Dowels
B08	PISTONS AND RINGS Includes Ring Sets And Oversize Components
A09	POWER PACK ASSEMBLIES Includes Unit Exchange (UTEX) Cross Reference
B10	CYLINDER HEAD CRABS Includes Bolts, Nuts, And Brackets

Parts List No. B06

CYLINDER HEAD AND LINER

8,12,16,20-645 Engines

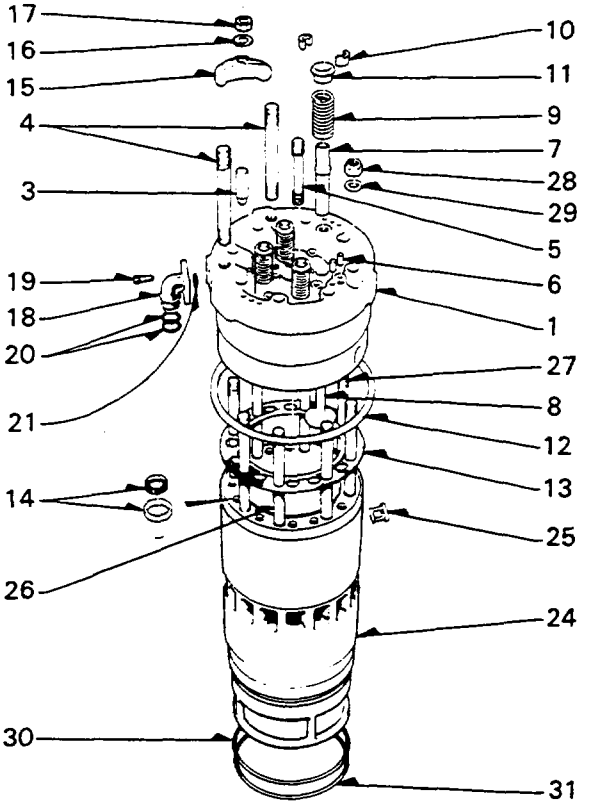


PLATE B06-1

Ref. No.	Part Number	Qty. Req.	Description
			Quantities listed are for one cylinder head and one cylinder liner.
1	9319736	1	HEAD ASM. .. Cylinder - With 9319735 valves - Replaces 9319456 and 8424464
*2	9319455	1	HEAD ASM. .. Cylinder - Without valves - Replaces 8424450
			Current design changed flow heavy flanged heads can be identified by a number four (4) cast 3/4 inch high and raised in a diamond shaped border (◇4◇). Previous change flow design heads had the numbers 3, 4, 5 or 6 enclosed in an 1-1/8 inch diameter recessed circle (③, ④, ⑤, ⑥) or ◇3◇. This identification is found on the top face of the flange at the 7 o'clock position.
3	8028097	1	SUPPORT .. Injector crab
4	8035930	2	STUD .. Rocker arm shaft - 1 - 8 x 1 - 14 x 7-3/4 long 8079922 .. .002 O.S. 8079924 .. .015 O.S. 8115243 .. .019 O.S. 8079923 .. .004 O.S. 8115242 .. .017 O.S.
5	8028701	1	STUD .. Injector crab 5/8 - 11 x 5/8 - 18 x 4-15/16 long 8115143 .. .002 O.S. 8115145 .. .015 O.S. 8115147 .. .019 O.S. 8115144 .. .004 O.S. 8115146 .. .017 O.S.
6	8028366	4	PIN .. Dowel - Replaces 8485334
7	8310840	4	GUIDE .. Exhaust valve 8327002 .. .0015 O.S. 8338304 .. .015 O.S.
8	9319735	4	VALVE .. Exhaust - Heavy head - Inconel - Replaces 8279487
9	8068791	4	SPRING .. Exhaust valve
10	8383293	8	LOCK .. Valve seat - One half - Single groove
11	8081795	4	SEAT .. Spring

P.L. No. B06

CYLINDER HEAD AND LINER

Ref. No.	Part Number	Qty. Req.	Description
ϕ12	9581924	1	RING .. Seat - Cylinder head - Viton
ϕ12	9509180	1	RING .. Seat - Cylinder head .192 thickness - Replaces 8419438 9516094 .. .018 O.S. 9509803 .. .038 O.S.
ϕ13	8442936	1	GASKET .. Head to liner - Replaces 8410829
ϕ*13	8476400	1	GASKET .. Head to liner - With integrated grommet seals
14	8392118	1	KIT .. Seal - Water - Consists of (12) heat dam insulators and (12) grommet type seals - NOTE: Seal and insulator must be applied as an assembly - Not required with 8476400 gasket
15	9092979	1	CRAB .. Fuel injector - Formerly 8028455
16	8044832	1	WASHER .. Spherical - Injector crab
17	103030	1	NUT .. Spherical - 5/8 - 18
18	8414444	1	ELBOW .. Water outlet - Double groove - Formerly 8141612 single groove - *It is strongly recommended to convert from single groove elbows to double groove elbows because of the substantial increase in sealing qualities.*
19	217911	2	SCREW .. Soc. hd. 3/8 - 16 x 7/8 - Elbow mounting
20	9317972	2	SEAL .. O-ring - Water outlet elbow to crankcase - Replaces 8413892
21	8305815	1	SEAL .. O-ring - Elbow to head
*22	----	A.R.	GREASE .. Silicon - Applied to Ref. Nos. 14,20, and 21 8425724 .. 8 oz. tube 8425725 .. 2 lb. can
ϕ*23	8427111	1	KIT .. Gasket - Cylinder head - With gasket 8442936 - See Parts List 99
ϕ*23	8479836	1	KIT .. Gasket - Cylinder head - With gasket 8476400 - See Parts List 99

CYLINDER LINER ASSEMBLY

ϕ24	8415993	1	LINER ASM. .. Cylinder - Cast iron liner bore - 18 port fabricated 645E1,E2,E4,E5,E6,E7,E8,E9 engines
ϕ24	9318831	1	LINER ASM. .. Cylinder - Cast iron liner bore - Laser hardened port relief (Mae West) - 18 port fabricated - 645E4,E4B, E5,E7,E7B,E9,E9B engines
ϕ24	9318833	1	LINER ASM. .. Cylinder - Cast iron liner bore - Laser hardened port relief and upper bore (hub) - 18 port fabricated - 645E4B,E7B,E7C,E9B engines
ϕ24	9090233	1	LINER ASM. .. Cylinder - Chrome plated liner bore - 18 port fabricated - 645E1,E2,E4,E5,E6,E7,E7B,E7C,E8,E9,E9B, E10B engines

Ref. Nos. 25 through 36 are applicable to all the above cylinder liner assemblies.

25	8348964	1	DEFLECTOR .. Water inlet - Brass
26	8411641	7	STUD .. Liner - 3/4 - 10 x 3/4 - 16 x 10-3/4 in. long 8411642 .. .002 O.S. 8413916 .. .015 O.S. 8413918 .. .019 O.S. 8411643 .. .004 O.S. 8413917 .. .017 O.S.
27	8411644	1	STUD .. Liner - Locating - 3/4 - 10 x 3/4 - 16 x 10-3/4 in. long 8411645 .. .002 O.S. 8413919 .. .015 O.S. 8413921 .. .019 O.S. 8411646 .. .004 O.S. 8413920 .. .017 O.S.
28	8060089	8	NUT .. Hex. - 3/4 - 16 - Liner to head
29	8140912	8	WASHER .. Hardened and ground - 3/4
ϕ30	8228554	1	SEAL .. Liner - Top groove - Polyacrylic rubber - Except 645E4C,E7C,F4B,F7B engines
ϕ30	9316850	1	SEAL .. Liner - Top groove - Vinton - 645E4C,E7C,F4B,F7B engines
ϕ31	9316850	1	SEAL .. Liner - Lower groove - Viton - Turbocharged engines
ϕ31	8228554	1	SEAL .. Liner - Lower groove - Polyacrylic rubber - Roots blown engines
*32	8305815	1	SEAL .. Water jumper line to liner
+*33	8025988	1	GASKET .. Piston cooling tube to manifold - See Parts List 34
+*34	8142354	1	GASKET .. Jumper line to water manifold - See Parts List 44
ϕ*35	9320844	1	KIT .. Liner - Replaces 8284873 - Except E4C,E7C,F4B, and F7B engines } See
ϕ*35	9525089	1	KIT .. Liner - E4C,E7C,F4B, and F7B engines } P.L. 99
*36	8494711	A.R.	COMPOUND .. Thread sealing - Liner stud - 250 cc bottle

CYLINDER HEAD AND LINER

Cylinder Head Assembly
16,20-645F4B,F7B Engines
(See Plate B06-1, Page 1 For Illustration)

Ref. No.	Part Number	Qty. Req.	Description
Quantities listed are for one cylinder head assembly.			
1	9556060	1	HEAD ASM. .. Cylinder - With 9319735 valves
*2	9556059	1	HEAD ASM. .. Cylinder - Without valves
3	802809[illegible]	1	SUPPORT .. Injector crab
4	8035930	2	STUD .. Rocker arm shaft - 1 - 8 x 1 - 14 x 7-3/4 long 8079922 .. .002 O.S. 8079924 .. .015 O.S. 8115243 .. .019 O.S. 8079923 .. .004 O.S. 8115242 .. .017 O.S.
5	8028701	1	STUD .. Injector crab - 5/8-11 x 5/8-18 x 4-15/16 long 8115143 .. .002 O.S. 8115145 .. .015 O.S. 8115147 .. .019 O.S. 8115144 .. .004 O.S. 8115146 .. .017 O.S.
6	8028366	4	PIN .. Dowel - Replaces 8485334
7	8310840	4	GUIDE .. Exhaust valve 8327002 .. .0015 O.S. 8338304 .. .015 O.S.
8	9319735	4	VALVE .. Exhaust - Heavy head - Inconel
9	8068791	4	SPRING .. Exhaust valve
10	8383293	8	LOCK .. Valve seat - One half - Single groove
11	8081795	4	SEAT .. Spring
12	9509180	1	RING .. Seat - Cylinder head - .192 thickness - Replaces 8419438 9516094 .. .018 O.S. 9509803 .. .038 O.S.
ϕ13	9556032	1	GASKET .. Head to liner - Stainless steel/nickel clad
ϕ13	9561067	1	GASKET .. Head to liner - Stainless steel/nickel clad - With integrated grommet seals
14	8392118	1	KIT .. Seal - Water - Consists of (12) heat dam insulators and (12) grommet type seals - Note: Seal and insulator must be applied as an assembly - Not required with 9561067 gasket
15	9092979	1	CRAB .. Fuel injector
16	8044832	1	WASHER .. Spherical - Injector crab
17	103030	1	NUT .. Spherical - 5/8-18
18	8414444	1	ELBOW .. Water outlet - Double groove
19	217911	2	SCREW .. Socket head - 3/8-16 x 7/8 - Elbow mounting
20	9317972	2	SEAL .. O-Ring - Water outlet elbow to crankcase
21	8305815	1	SEAL .. O-Ring - Elbow to head
*22	----	A.R.	GREASE .. Silicon - Applied to Ref. Nos. 14, 20, and 21 8425724 .. 8 oz. tube 8425725 .. 2 lb. can
ϕ*23	9561069	1 -	KIT .. Gasket - Cylinder head - With 9556032 head gasket
ϕ*23	9561068	- 1	KIT .. Gasket - Cylinder head - With 9561067 integral head gasket
*24	9556032	1 -	GASKET .. Head to liner - Stainless steel/nickel clad
*24	9561067	- 1	GASKET .. Head to liner - Stainless steel/nickel clad - With integrated grommet seals
*25	8392118	1 -	KIT .. Seal - Water
*26	8328687	1 1	SEAL .. Cylinder test valve
*27	8305815	1 1	SEAL .. Water outlet elbow to head
*28	9317972	2 2	SEAL .. Water outlet elbow to crankcase

Parts List No. A07

CONNECTING ROD, BEARINGS, CARRIER, AND PISTON PIN

645E1,E2,E4,E5,E6,E7,E8,E9 Engines

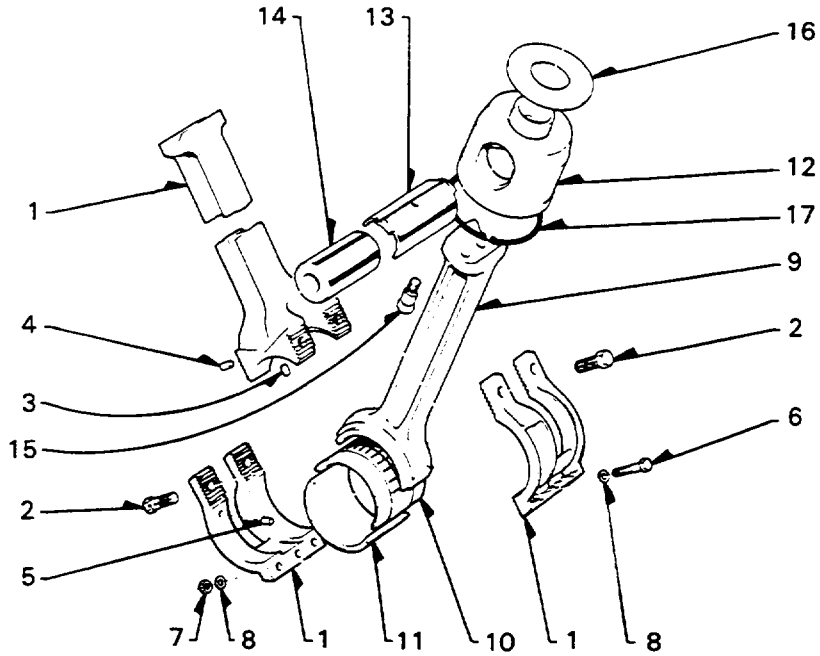


PLATE A07-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E1,E2,E4,E5,E6,E7,E8, engines
		-	B	-	-	12-645E1,E2,E4,E5,E6,E7,E8,E9 engines
		-	-	C	-	16-645E1,E2,E4,E5,E6,E7,E8,E9 engines
		-	-	-	D	20-645E4,E5,E7,E9 engines
		-				
1	8159354	4	6	8	10	ROD ASM. .. Connecting - Fork - Trunnion type - Includes basket
†2	8127868	16	24	32	40	BOLT ASM. .. Hex. head 5/8-18 x 1-3/4 - Includes washer
3	8025990	8	12	16	20	DOWEL .. Upper bearing .5000 dia. x 3/4 long 8188833 - .001 oversize 8430709 - .008 oversize 8188834 - .002 oversize 8188835 - .010 oversize 8430707 - .004 oversize 8385374 - .020 oversize 8430708 - .006 oversize 8385375 - .030 oversize
4	8031947	4	6	8	10	DOWEL .. Basket to rod .3125 dia. x 13/16 long
5	8029147	4	6	8	10	DOWEL .. Bearing locating .3125 dia. x 9/16 long
†6	8259128	12	18	24	30	BOLT .. Hex. head 1/2-20 x 2-3/4
†7	8487883	12	18	24	30	NUT .. Lock 1/2-20 hex.
†8	8260114	24	36	48	60	WASHER .. Special
9	9544257	4	6	8	10	ROD .. Connecting - Blade - Replaces 8159138
10	8354118	4	6	8	10	BEARING .. Upper - Connecting rod 8354119 - .031 undersize 8354120 - .062 undersize
11	8136114	4	6	8	10	BEARING .. Lower - Connecting rod 8137807 - .031 undersize 8137808 - .062 undersize
12	8367800	8	12	16	20	CARRIER .. Piston
13	8341192	8	12	16	-	BEARING .. Insert - Carrier - Bronze lined - 645E1,E2,E6,E8 engines
13	8361565	8	12	16	20	BEARING .. Insert - Carrier - Silver plated - 645E4,E5,E7,E9 engines
13	8463786	-	-	-	20	BEARING .. Insert - Carrier - Silver plated with thick lead overlay - Applicable to MP-45 (20-645E4 engine)
14	8269842	8	12	16	20	PIN .. Piston
15	8159340	16	24	32	40	BOLT ASM. .. Piston pin - Includes spacer
16	8135330	8	12	16	20	WASHER .. Thrust
17	8059699	8	12	16	20	RING .. Snap

†*See Parts List A09 for Connecting Rod Hardware Kit 8409745.*

P.L. No. A07

CONNECTING ROD, BEARINGS, CARRIER, AND PISTON PIN

645E4B,E7B,E7C,E9B,E10B Engines

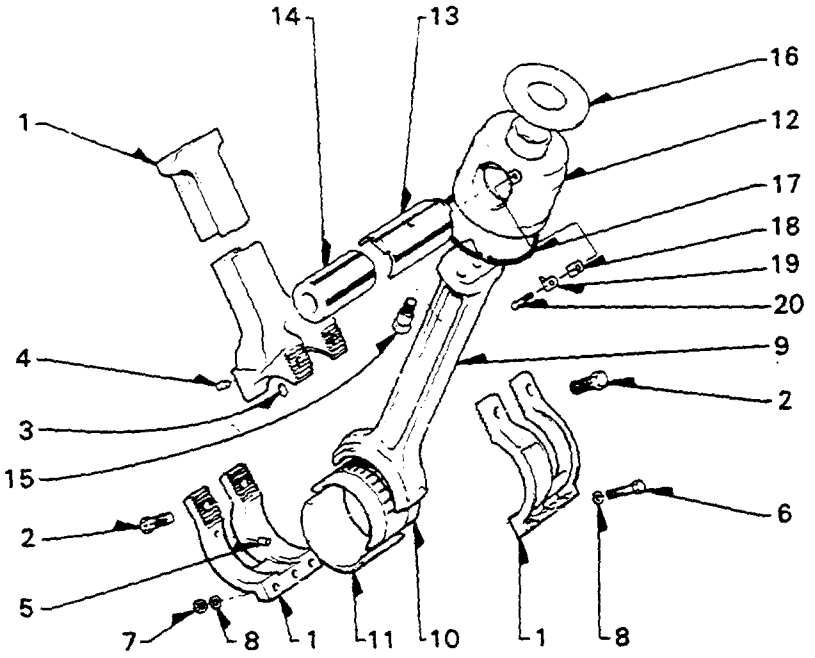


PLATE A07-2

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E4B,E7B,E7C engines
		-	B	-	-	12-645E4B,E7B,E7C,E9B engines
		-	-	C	-	16-645E4B,E7B,E7C,E9B,E10B engines
		-	-	-	D	20-645E4B,E7B,E7C,E9B,E10B engines
1	8159354	4	6	8	10	ROD ASM. .. Connecting - Fork - Trunion type - Includes basket
††2	8127868	16	24	32	40	BOLT ASM. .. Hex. head 5/8-18 x 1-3/4 - Includes washer
3	8025990	8	12	16	20	DOWEL .. Upper bearing .5000 dia. x 3/4 long
						8188833 - .001 oversize 8430709 - .008 oversize
						8188834 - .002 oversize 8188835 - .010 oversize
						8430707 - .004 oversize 8385374 - .020 oversize
						8430708 - .006 oversize 8385375 - .040 oversize
4	8031947	4	6	8	10	DOWEL .. Basket to rod .3125 dia. x 13/16 long
5	8029147	4	6	8	10	DOWEL .. Bearing locating .3125 dia. x 9/16 long
††6	8259128	12	18	24	30	BOLT .. Hex. head 1/2-20 x 2-3/4
††7	8487883	12	18	24	30	NUT .. Lock 1/2 - 20 hex.
††8	8260114	24	36	48	60	WASHER .. Special
9	9544257	4	6	8	10	ROD .. Connecting - Blade - Replaces 8159138
10	8354118	4	6	8	10	BEARING .. Upper - Connecting rod
						8354119 - .031 undersize 8354120 - .062 undersize
11	8136114	4	6	8	10	BEARING .. Lower - Connecting rod
						8137807 - .031 undersize 8137808 - .062 undersize
12	8442120	8	12	16	20	CARRIER .. Piston
13	8442226	8	12	16	20	BEARING .. Insert - Carrier - Bronze lined
14	9518958	8	12	16	20	PIN .. Piston - Rocking - Replaces 8417645
15	8159340	16	24	32	40	BOLT ASM. .. Piston pin - Includes spacer
16	8135330	8	12	16	20	WASHER .. Thrust
17	8059699	8	12	16	20	RING .. Snap
†18	9548905	16	24	32	40	RETAINER .. Bearing - Replaces 8430093
†19	9536664	16	24	32	40	CLIP .. Bolt - With locking tab - Replaces 8430094
†20	9547667	16	24	32	40	BOLT .. Hex. head 1/4-20 x 1/2 - Special locking - Formerly 454812

†See Pointers article dated November 22, 1982 for detailed information on these items.

††See Parts List A09 for Connecting Rod Hardware Kit 8409745.

Parts List No. B08

PISTONS AND RINGS

Piston Assembly Reference Chart

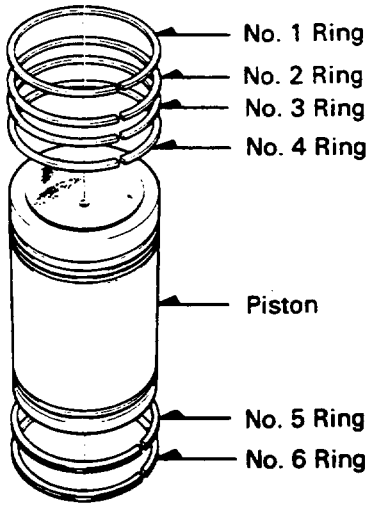


PLATE B08-1

Engine Application	No. 1 Ring Type	†	Liner Bore	Page
645E1,E2,E6,E8	Stainless Steel - Chrome Face	X	Cast Iron	2-3
645E1,E2,E6,E8	Ductile Iron - Barrel Face	X	Chrome	4
645E1,E2,E6,E8	Ductile Iron - Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove	X	Chrome	5
645E4,E5,E7,E9	Prestressed Stainless Steel With Flash Chrome Sides		Cast Iron	6
645E4,E5,E7,E9	Ductile Iron - Barrel Face		Chrome	7
645E4,E5,E7,E9	Ductile Iron - Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove		Chrome	8
645E4,E4B,E5,E7,E7B,E9,E9B	Prestressed Stainless Steel With Flash Chrome Sides		Cast Iron	9
645E4B,E7B,E9B	Prestressed Stainless Steel With Flash Chrome Sides	X	Cast Iron	10
645E4B,E7B,E9B	Ductile Iron - Barrel Face	X	Chrome	10
645E4,E4B,E5,E7,E7B,E9,E9B,E10B	Ductile Iron - Barrel Face With Thick Chrome Plated Sides An Interrupted Witness Groove		Chrome	11
645E4B,E7B,E9B,E10B	Ductile Iron - Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove	X	Chrome	12
645E4C,E7C,F4B,F7B (16:1 Compression Ratio)	Prestressed Stainless Steel With Chrome Face And Flash Chrome Sides	X	Cast Iron	13
645E4C,E7C,F4B,F7B (16:1 Compression Ratio)	Ductile Iron - Barrel Face With Thick Chrome Plated Sides	X	Chrome	13
645E7C,F7B (16:1 Comp. Ratio)	Ductile Iron - Barrel Face	X	Chrome	14
645E4,E4B,E4C,E5,E7,E7B,E7C, E9,E9B,F4B,F7B	Oversize Width Ring Sets		Cast Iron	15

† An "X" in this column indicates fire ring pistons.

P.L. No. B08

PISTONS AND RINGS

645E1,E2,E6,E8 Engines

With Cast Iron Liner Bores - No. 1 Ring Chrome Faced
Stainless Steel With Non Flash Chrome Sides - Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	8481489	1	PISTON ASM. .. Engine - Incl. rings - Repl. 8375128, 8377844, 8449855, 8464062 8466788, 8474221 and 8474215
2	8472778	1	PISTON .. Bare - Standard - Replaces 8362280, 8377246 and 8459705
3	8474214	1	RING SET .. Piston - Replaces 8375127, 8449854, 8464059, 8466787 and 8474220
4	8470090	1	RING .. Comp. - Chrome faced - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8347088, 8427494 and 8418580
5	8418589	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and No. 3 grooves - Replaces 8347097
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. .030 O.S. Diameter			
9	8481494	1	PISTON ASM. .. Engine - Incl. rings - Repl. 8375130, 8377845, 8449857, 8464066, 8466790, 8474223 and 8474217
10	8472779	1	PISTON .. Bare - .030 O.S. - Replaces 8362296, 8377247, and 8459706
11	8474216	1	RING SET .. Piston - Replaces 8375129, 8449856, 8464060, 8466789 and 8474222
12	8470091	1	RING .. Comp. - Chrome faced - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8347089, 8427555 and 8418581
13	8418590	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves - Replaces 8347098
14	8347101	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
15	8347104	1	RING .. Oil control - Double hook scraper - No. 5 groove
16	8464954	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. .060 O.S. Diameter			
17	8481498	1	PISTON ASM. .. Engine - Incl. rings - Repl. 8375132, 8377846, 8449859, 8464067, 8466792, 8474225 and 8474219
18	8472780	1	PISTON .. Bare - .060 O.S. - Replaces 8362297, 8377248 and 8459707
19	8474218	1	RING SET .. Piston - Replaces 8375131, 8449858, 8464061, 8466791 and 8474224
20	8470092	1	RING .. Comp. - Chrome faced - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8347090, 8427556 and 8418582
21	8418591	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves - Replaces 8347099
22	8347102	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
23	8347105	1	RING .. Oil control - Double hook scraper - No. 5 groove
24	8464955	1	RING .. Oil control - No. 6 groove

PISTONS AND RINGS

645E1,E2,E6,E8 Engines

With Cast Iron Liner Bores - No. 1 Ring Chrome Faced
Stainless Steel With Non Flash Chrome Sides - Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
1	9337439	1	RING SET .. Piston - Standard diameter x 1/64 O.S. width
2	8470093	1	RING .. Compression - Chrome faced - Stainless steel - Standard diameter x 1/64 O.S. width - No. 1 groove
3	8418589	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and No. 3 grooves
4	8347100	1	RING .. Compression - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
5	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
6	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring			
7	9337440	1	RING SET .. Piston - Standard diameter x 1/32 O.S. width
8	8470096	1	RING .. Compression - Chrome faced - Stainless steel - Standard diameter x 1/32 O.S. width - No. 1 groove
9	8418589	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and No. 3 grooves
10	8347100	1	RING .. Compression - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
11	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
12	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
OVERSIZE WIDTH RINGS TOP RINGS			
13	8470093	1	RING .. Comp. - Chrome faced - Stainless steel - Std. dia. x 1/64 O.S. width - Replaces 8347091, 8427557 and 8418583
14	8470094	1	RING .. Comp. - Chrome faced - Stainless steel - .030 O.S. dia. x 1/64 O.S. width - Replaces 8347092, 8427558 and 8418584
15	8470095	1	RING .. Comp. - Chrome faced - Stainless steel - .060 O.S. dia. x 1/64 O.S. width - Replaces 8347093, 8427559 and 8418585
16	8470096	1	RING .. Comp. - Chrome faced - Stainless steel - Std. dia. x 1/32 O.S. width - Replaces 8347094, 8427560 and 8418586
17	8470097	1	RING .. Comp. - Chrome faced - Stainless steel - .030 O.S. dia. x 1/32 O.S. width - Replaces 8347095, 8427561 and 8418587
18	8470098	1	RING .. Comp. - Chrome faced - Stainless steel - .060 O.S. dia. x 1/32 O.S. width - Replaces 8347096, 8427562 and 8418588

P.L. No. B08

PISTONS AND RINGS

645E1,E2,E6,E8 Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Face Ductile Iron - Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	8481488	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 8464072 and 8466794
2	8472778	1	PISTON .. Bare - Standard - Replaces 8459705
3	8466793	1	RING SET .. Piston - Replaces 8455547
4	8455536	1	RING .. Comp. - Barrel face - Ductile iron - S.S.C. - .190 thick - No. 1 groove
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	81347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
9	8467248	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width
10	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width - No. 1 groove
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/32 O.S. width Top Ring			
15	8467249	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width
16	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width - No. 1 groove
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
OVERSIZE WIDTH TOP RINGS			
21	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width
22	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width

PISTONS AND RINGS

645E1,E2,E6,E8 Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Face Ductile Iron With Thick Chrome Plated Sides and Interrupted Witness Groove On Ring Face - Fire Ring Piston For Use with High Sulfur Fuel and on High Sidewear Applications

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	9336997	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 9336999
2	8472778	1	PISTON .. Bare - Standard - Replaces 8459705
3	9323296	1	RING SET .. Standard diameter - Replaces 9316112
4	9323293	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - S.S.C. - .190 thick - No. 1 groove - Replaces 9316323
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
9	9323297	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 9316113
10	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - No. 1 groove - Replaces 9316110
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring			
15	9323298	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 9316114
16	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - No. 1 groove - Replaces 9316111
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
OVERSIZE WIDTH TOP RINGS			
21	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - Replaces 9316110
22	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - Replaces 9316111

P.L. No. B08

PISTONS AND RINGS

645E4,E5,E7,E9 Engines

With Cast Iron Liner Bores - No. 1 Ring Prestressed Stainless Steel With Flash Chrome Sides

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	9516937	1	PISTON ASSEMBLY .. Engine - Includes rings - Repl. 8431230, 8464068 & 8467251
2	8459702	1	PISTON .. Bare - Standard
3	9516928	1	RING SET .. Piston - Replaces 8434523 and 8467250
4	9338809	1	RING .. Comp. - Prestressed - Chrome faces - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Repl. 8433002
5	8418589	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. .030 O.S. Diameter			
9	9516940	1	PISTON ASSEMBLY .. Engine - Includes rings - Repl. 8431366, 8464069 & 8467253
10	8459703	1	PISTON .. Bare
11	9516929	1	RING SET .. Piston - Replaces 8434524 and 8467252
12	9338810	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8434515
13	8418590	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
14	8347101	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
15	8347104	1	RING .. Oil control - Double hook scraper - No. 5 groove
16	8464954	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. .060 O.S. Diameter			
17	9516941	1	PISTON ASSEMBLY .. Engine - Includes rings - Repl. 8431367, 8464070 & 8467255
18	8459704	1	PISTON .. Bare - .060 O.S.
19	9516930	1	RING SET .. Piston - Replaces 8434525 and 8467254
20	9338811	1	RING .. Comp - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8434516
21	8418591	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
22	8347102	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
23	8347105	1	RING .. Oil control - Double hook scraper - No. 5 groove
24	8464955	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
† **OVERSIZE WIDTH TOP RINGS**			
25	9338812	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/64 O.S. width - Replaces 8434517
26	9338813	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/64 O.S. width - Replaces 8434518
27	9338814	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/64 O.S. width - Replaces 8434519
28	9338815	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/32 O.S. width - Replaces 8434520
29	9338816	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/32 O.S. width - Replaces 8434521
30	9338817	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/32 O.S. width - Replaces 8434522

† *For Oversize Width Ring Sets, See Page 15.*

PISTONS AND RINGS

645E4,E5,E7,E9 Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Face Ductile Iron

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	8467247	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 8455556 and 8464071
2	8459702	1	PISTON .. Bare - Standard
3	8466793	1	RING SET .. Piston - Replaces 8455547
4	8455536	1	RING .. Comp. - Barrel face - Ductile iron - S.S.C. - .190 thick - No. 1 groove
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
9	8467248	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 8455548
10	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width - No. 1 groove
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 grooves
RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring			
15	8467249	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 8455549
16	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width - No. 1 groove
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
OVERSIZE WIDTH TOP RINGS			
21	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width
22	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width

P.L. No. B08

PISTONS AND RINGS

645E4,E5,E7,E9 Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Face Ductile Iron With Thick Chrome Plated Sides and Interrupted Witness Groove on Ring Face - For Use with High Sulfur Fuel and on High Sidewear Applications

Ref. No.	Part Number	Qty. Req.	Description
	PISTON ASSEMBLY .. Standard Diameter		
1	9336998	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 9337001
2	8459702	1	PISTON .. Bare - Standard
3	9323296	1	RING SET .. Standard diameter - Replaces 9316112
4	9323293	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - S.S.C. - .190 thick - No. 1 groove - Replaces 9316323
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
	RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring		
9	9323297	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 9316113
10	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Replaces 9316110 Std. dia. x 1/64 O.S. width - No. 1 groove
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
	RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring		
15	9323298	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 9316114
16	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - No. 1 groove - Replaces 9316111
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
	OVERSIZE WIDTH TOP RINGS		
21	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - Replaces 9316110
22	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - Replaces 9316111

PISTONS AND RINGS

645E4,E4B,E5,E7,E7B,E9,E9B Engines

With Cast Iron Liner Bores - No. 1 Ring Prestressed Stainless Steel With Flash Chrome Sides

Note: Application of the following Piston assemblies require the use of 8442120 Carrier, 8442226 Insert Bearing, and 8417645 or 9518958 Piston Pin.

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	9516939	1	PISTON ASSEMBLY .. Engine - Includes rings - Repl. 8427226, 8456533, & 8486617
2	8419089	1	PISTON .. Bare - Standard
3	9516928	1	RING SET .. Piston - Formerly 8427227 - Repl. 8434523 and 8467250
4	9338809	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8433002
5	8418589	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. 030 O.S. Diameter			
9	9517815	1	PISTON ASSEMBLY .. Engine - Includes rings
10	8420522	1	PISTON .. Bare
11	9516929	1	RING SET .. Piston - Replaces 8467252
12	9338810	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8434515
13	8418590	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
14	8347101	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
15	8347104	1	RING .. Oil control - Double hook scraper - No. 5 groove
16	8464954	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
PISTON ASSEMBLY .. .060 O.S. Diameter			
17	9517816	1	PISTON ASSEMBLY .. Engine - Includes rings
18	8420523	1	PISTON .. Bare
19	9516930	1	RING SET .. Piston - Replaces 8467254
20	9338811	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Replaces 8434516
21	8418591	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
22	8347102	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
23	8347105	1	RING .. Oil control - Double hook scraper - No. 5 groove
24	8464955	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
† **OVERSIZE WIDTH RINGS - Applied To Top Ring Groove Only**			
25	9338812	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/64 O.S. width
26	9338813	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/64 O.S. width
27	9338814	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/64 O.S. width
28	9338815	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/32 O.S. width
29	9338816	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/32 O.S. width
30	9338817	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/32 O.S. width

† *For Oversize Width Ring Sets, See Page 15.*

P.L. No. B08

PISTONS AND RINGS

645E4B,E7B,E9B Engines

With Cast Iron and Chrome Plated Liner Bores
Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
			PISTON ASSEMBLY .. Standard Diameter - Laser Hardened Upper Bore Cast Iron Liner
1	9533163	1	PISTON ASM. .. Engine - Includes rings
2	9523619	1	PISTON .. Bare - Standard
3	9516928	1	RING SET .. Piston
4	9338809	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove
5	8418589	2	RING .. Comp. - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
†			**OVERSIZE WIDTH TOP RINGS - Cast Iron Liner Bore**
9	9338812	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/64 O.S. width
10	9338813	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/64 O.S. width
11	9338814	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/64 O.S. width
12	9338815	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Std. dia. x 1/32 O.S. width
13	9338816	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .030 O.S. dia. x 1/32 O.S. width
14	9338817	1	RING .. Comp. - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - .060 O.S. dia. x 1/32 O.S. width
			PISTON ASSEMBLY .. Standard Diameter - Chrome Plated Liner Bore
15	9533161	1	PISTON ASSEMBLY .. Engine - Includes rings
16	9523619	1	PISTON .. Bare - Standard
17	8466793	1	RING SET .. Piston
18	8455536	1	RING .. Comp. - Barrel face - Ductile iron - S.S.C. - .190 thick - No. 1 groove
19	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
20	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
21	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
22	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
			OVERSIZE WIDTH TOP RINGS - Chrome Plated Liner Bore
23	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width
24	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width

† *For Oversize Width Ring Sets, See Page 15.*

PISTONS AND RINGS

645E4,E4B,E5,E7,E7B,E9,E9B,E10B Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Faced Ductile Iron With Thick Chrome Plated Sides and Interrupted Witness Groove - For Use with High Sulfur Fuel and on High Sidewear Applications

Note: Application of the following piston assemblies requires the use of 8442120 carrier, 8442226 bronze lined carrier insert bearing and 8417645 or 9518958 Piston Pin.

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	9337473	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 9506210
2	8419089	1	PISTON .. Bare - Standard
3	9323296	1	RING SET .. Standard diameter - Replaces 9316112
4	9323293	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - S.S.C. - .190 thick - No. 1 groove - Replaces 9316323
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
9	9323297	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 9316113
10	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - No. 1 groove - Replaces 9316110
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring			
15	9323298	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 9316114
16	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - No. 1 groove - Replaces 9316111
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
OVERSIZE WIDTH TOP RINGS			
21	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - Replaces 9316110
22	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - Replaces 9316111

P.L. No. B08

PISTONS AND RINGS

645E4B,E7B,E9B,E10B Engines

With Chrome Plated Liner Bores - No. 1 Ring Barrel Faced Ductile Iron With Thick Chrome Plated Sides and Interrupted Witness Groove - Fire Ring Piston - For Use With High Sulfur Fuel and on High Sidewear Applications

Ref. No.	Part Number	Qty. Req.	Description
	PISTON ASSEMBLY .. Standard Diameter		
1	9533162	1	PISTON ASSEMBLY .. Engine - Includes rings - Replaces 9533166
2	9523619	1	PISTON .. Bare - Standard
3	9323296	1	RING SET .. Standard diameter - Replaces 9316112
4	9323293	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - S.S.C. - .190 thick - No. 1 groove - Replaces 9316323
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
ƒ	**RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring**		
9	9323297	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 9316113
10	9323294	1	RING .. Comp. Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - No. 1 groove - Replaces 9316110
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
ƒ	**RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring**		
15	9323298	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 9316114
16	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - No. 1 groove - Replaces 9316111
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
	OVERSIZE WIDTH TOP RINGS		
ƒ21	9323294	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/64 O.S. width - Replaces 9316110
ƒ22	9323295	1	RING .. Comp. - Barrel face - Ductile iron - Thick chrome plated sides - Std. dia. x 1/32 O.S. width - Replaces 9316111

ƒ *These Ring and Ring Sets Also Applicable to 645E7C Engines.*

PISTONS AND RINGS

645E4C,E7C,F4B, and F7B Engines

With Cast Iron and Chrome Liner Bores
and 16:1 Compression Ratio Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter - Laser Hardened Upper Bore Cast Iron Liner			
1	9550585	1	PISTON ASSEMBLY .. Engine - Includes rings
2	9572817	1	PISTON .. Bare - Standard - 16:1 compression ratio - Replaces 9545565, 9549581, and 9564583
3	9516928	1	RING SET .. Piston - Replaces 8434523 and 8467250
4	9338809	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - S.S.C. - .190 thick - No. 1 groove - Repl. 8433002
5	8418589	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Compression - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
OVERSIZE WIDTH TOP RINGS - Cast Iron Liner Bore			
†9	9338812	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Standard dia. x 1/64 O.S. width - Replaces 8434517
†10	9338815	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Standard dia. x 1/32 O.S. width - Replaces 8434520

† *See Page 15, Reference Numbers 1 and 7, for Oversize Width Ring Sets.*

PISTON ASSEMBLY .. Standard Diameter - Chrome Plated Liner Bore - For Use With High Sulfur Fuel and on High Side Wear Applications			
11	9550584	1	PISTON ASSEMBLY .. Engine - Includes rings
12	9573312	1	PISTON .. Bare - Standard - 16:1 compression ratio - Replaces 9545565, 9549581, and 9564583
13	9323296	1	RING SET .. Standard diameter - Replaces 9316112
14	9323293	1	RING .. Compression - Barrel face - Ductile iron - Thick chrome plated sides - S.S.C. - .190 thick - No. 1 groove - Replaces 9316323
15	8388418	2	RING .. Compression - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
16	8347100	1	RING .. Compression - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
17	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
18	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
OVERSIZE WIDTH TOP RINGS - Chrome Plated Liner Bore			
††19	9323294	1	RING .. Compression - Barrel face - Ductile iron - Thick chrome plated sides - Standard dia. x 1/64 O.S. width - Replaces 9316110
††20	9323295	1	RING .. Compression - Barrel face - Ductile iron - Thick chrome plated sides - Standard dia. x 1/32 O.S. width - Replaces 9316111

†† *See Page 12. Reference Numbers 9 and 15, for Oversize Width Ring Sets.*

P.L. No. B08

PISTONS AND RINGS

645E7C,F7B Engines

With Chrome Liner Bores and 16:1 Compression Ratio Fire Ring Piston

Ref. No.	Part Number	Qty. Req.	Description
PISTON ASSEMBLY .. Standard Diameter			
1	9555990	1	PISTON ASSEMBLY .. Engine - Includes rings
2	9573312	1	PISTON .. Bare - Standard - 16:1 compression ratio - Replaces 9545565, 9549581, and 9564583
3	8466793	1	RING SET .. Piston - Replaces 8455547
4	8455536	1	RING .. Comp. - Barrel face - Ductile iron - S.S.C. - .190 thick - No. 1 groove
5	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
6	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
7	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
8	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 groove
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
9	8467248	1	RING SET .. Piston - Std. dia. x 1/64 O.S. width - Replaces 8455548
10	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width - No. 1 groove
11	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
12	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
13	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
14	8464953	1	RING .. Oil control - Spring loaded - Slotted lower land - No. 6 grooves
RING SET .. Standard Diameter with 1/32 O.S. Width Top Ring			
15	8467249	1	RING SET .. Piston - Std. dia. x 1/32 O.S. width - Replaces 8455549
16	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width - No. 1 groove
17	8388418	2	RING .. Comp. - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
18	8347100	1	RING .. Comp. - Tapered faced - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
19	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
20	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove
OVERSIZE WIDTH TOP RINGS			
21	8455537	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/64 O.S. width
22	8455538	1	RING .. Comp. - Barrel face - Ductile iron - Std. dia. x 1/32 O.S. width

P.L. No. B08

PISTONS AND RINGS

645E4,E4B,E4C,E5,E7,E7B,E7C,E9,E9B,F4B, & F7B Engines

Oversize Width Ring Sets

With Cast Iron Liner Bores - No. 1 Ring Prestressed Stainless Steel With Flash Chrome Sides

Ref. No.	Part Number	Qty. Req.	Description
RING SET .. Standard Diameter with 1/64 O.S. Width Top Ring			
1	9516931	1	RING SET .. Piston - Standard diameter x 1/64 O.S. width top ring - Replaces 8475173 and 8486611
2	9338812	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Standard diameter x 1/64 O.S. width - No. 1 groove - Replaces 8434517
3	8418589	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
4	8347100	1	RING .. Compression - Tapered face - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
5	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
6	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove - Replaces 8347106
RING SET .. Piston - Standard Diameter with 1/32 O.S. Width Top Ring			
7	9516934	1	RING SET .. Piston - Standard diameter x 1/32 O.S. width top ring - Replaces 8475174 and 8479805
8	9338815	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides - Stainless steel - Standard diameter x 1/32 O.S. width - No. 1 groove - Replaces 8434520
9	8418589	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
10	8347100	1	RING .. Compression - Tapered face - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
11	8347103	1	RING .. Oil control - Double hook scraper - No. 5 groove
12	8464953	1	RING .. Oil control - Spring loaded - No. 6 groove - Replaces 8347106
RING SET .. Piston - .030 O.S. Diameter with 1/64 O.S. Width Top Ring			
13	9516932	1	RING SET .. Piston - .030 O.S. diameter x 1/64 O.S. width top ring - Replaces 8480631 and 8486613
14	9338813	1	RING .. Compression - Prestressed - Chrome faced - Flash chrome sides stainless steel - .030 O.S. diameter x 1/64 O.S. width - No. 1 groove - Replaces 8434518
15	8418590	2	RING .. Compression - Chrome faced - Ductile iron - I.S.C. - .186 thick - No. 2 and 3 grooves
16	8347101	1	RING .. Compression - Tapered face - Ferrox filled - Ductile iron - I.S.C. - .186 thick - No. 4 groove
17	8347104	1	RING .. Oil control - Double hook scraper - No. 5 groove
18	8464954	1	RING .. Oil control - Spring loaded - No. 6 groove - Replaces 8347107

Parts List No. A09

POWER PACK ASSEMBLIES

Complete, Mini, And Partial Power Pack Assemblies
Not Illustrated

COMPLETE POWER PACK ASSEMBLIES

The complete power pack assembly consists of the cylinder head assembly, cylinder liner, piston assembly, carrier assembly, connecting rod assembly, and all necessary gaskets and seals. All components are pre-assembled and packaged in an expendable or storage container. The cylinder head seat ring (see P.L. B06) and connecting rod bearings (see P.L. A07) are not included in the power pack assembly.

Ref. No.	Conn. Rod Type	NewPower Pack Container Type Storage	NewPower Pack Container Type Expend.	Unit Exchange Power Pack	Application
MARINE AND INDUSTRIAL - With Cast Iron Liner Bore					
1	†Fork	8449869	9514327	8467605	645E1,E2,E6,E8 - No. 1 Ring Stainless Steel
2	Blade	8449871	9088370	8467606	With Chrome Face
3	†Fork	----	9518135	9544883	645E1,E2, E6,E8 - No. 1 Ring Stainless Steel With
4	Blade	----	9518136	9544884	Chrome Face - Laser Hardened Port Relief Liner
5	†Fork	8467559	8467560	8467607	645E4 (Except MP45), E5,E7,E9 - No. 1 Ring Prestressed
6	Blade	8467561	8467562	8467608	Stainless Steel With Chrome Face And Sides
7	†Fork	9517595	9503109	9523262	645E4 (Except MP45), E5,E7,E9 - No. 1 Ring Prestressed
8	Blade	9517596	9503111	9523263	Stainless Steel With Chrome Face And Sides - Laser Hardened Port Relief Liner
9	†Fork	----	8470863	8470865	645E4 (MP45) - No. 1 Ring Prestressed Stainless Steel
10	Blade	----	8470864	8470866	Chrome Face And Sides - Thick Overlay Insert Bearing
11	†Fork	----	9517871	9524090	645E4 (MP45) - No. 1 Ring Prestressed Stainless Steel
12	Blade	----	9517872	9524091	Chrome Face And Sides - Thick Overlay Insert Bearings - Laser Hardened Port Relief Liner
13	†Fork	9517869	9327318	9529788	645E4B,E7B,E9B - No. 1 Ring Prestressed Stainless Steel
14	Blade	9517870	9327319	9529789	Chrome Face And Sides - Laser Hardened Port Relief Liner
15	†Fork	9527312	9527313	9541019	645E4B,E7B,E9B - Fire Ring Piston - No. 1 Ring
16	Blade	9527314	9527315	9541020	Prestressed Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief And Upper Bore Liner
17	†Fork	9549816	9549817	9551463	645E7C - 16:1 Piston - No. 1 Ring Prestressed
18	Blade	9549818	9549819	9551462	Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief And Upper Bore Liner
MARINE - With Chrome Plated Liner Bore					
19	†Fork	----	9094328	9090766	645E2,E6 - No. 1 Ring Ductile Iron Barrel Face -
20	Blade	----	9094330	9090767	Bronze Lined Carrier Insert Bearing
21	†Fork	----	9094324	9090764	645E5,E7 - No. 1 Ring Ductile Iron Barrel Face
22	Blade	----	9094326	9090765	
23	†Fork	----	9518561	----	645E7B - No. 1 Ring Ductile Iron Barrel Face
24	Blade	----	9518562	----	
25	†Fork	9546242	9527322	----	645E7B - Fire Ring Piston - No. 1 Ring Ductile
26	Blade	9546243	9527323	----	Iron Barrel Face
27	†Fork	9550603	9550604	----	645E7C - 16:1 Piston - No. 1 Ring Ductile Iron
28	Blade	9550601	9550602	----	Barrell Face

† *One (1) Connecting Rod Hardware Kit (8409745) is included with each Fork Rod Power Pack Assembly. It includes 4 - 8127868 Bolt, 3 - 8259128 Bolt, 6 - 8216114 Washer and 3 - 8487883 Nut.*

P.L. No. A09

POWER PACK ASSEMBLIES

COMPLETE POWER PACK ASSEMBLIES

Ref. No.	Conn. Rod Type	New Power Pack Container Type Storage	New Power Pack Container Type Expend.	Unit Exchange Power Pack	Application
MARINE AND INDUSTRIAL - With Chrome Plated Liner Bore - For Use With High Sulfur Fuel					
29 30	†Fork Blade	9332672 9332674	9332673 9332675	9339405 9339406	645E1,E2,E6,E8 - No. 1 Ring Ductile Iron Barrell Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
31 32	†Fork Blade	9328183 9328185	9328184 9328186	9339407 9339408	645E4 (Except MP45), E5,E7,E9 - No. 1 Ring Ductile Iron Barrell Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Standard Carrier Insert Bearing
33 34	†Fork Blade	9337485 9337486	9337483 9337484	9521963 9521964	645E4 (MP45) - No. 1 Ring Ductile Iron Barrell Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Thick Overlay Carrier Insert Bearing
35 36	†Fork Blade	9332676 9332678	9332677 9332679	---- ----	645E4,E4B,E5,E7,E7B,E9,E9B,E10B - No. 1 Ring Ductile Iron Barrell Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
37 38	†Fork Blade	9527316 9527318	9527317 9527319	9546357 9546358	645E4B,E7B,E9B,E10B - Fire Ring Piston - No. 1 Ring Ductile Iron Barrell Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
39 40	†Fork Blade	9551207 9551208	9550606 9550605	---- ----	645E7C - 16:1 Piston - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
NAVY - With Cast Iron Liner Bore And Mil. Spec. Insert Bearings					
41 42	†Fork Blade	8449869 8449871	9514327 9088370	8467605 8467606	645E2 - No. 1 Ring Stainless Steel Chrome Face
43 44	†Fork Blade	8439264 8439265	---- ----	9086221 9086222	645E5 - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides
45 46	†Fork Blade	9523611 9523612	---- ----	---- ----	645E5 - No. 1 Ring Prestressed Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief Liner

† One (1) Connecting Rod Hardware Kit (8409745) is included with each Fork Rod Power Pack Assembly.

POWER PACK ASSEMBLIES

MINI AND PARTIAL POWER PACK ASSEMBLIES

A Mini Power Pack is the same as a Complete Power Pack less the connecting rod.

A Partial Power Pack is the same as a Mini Power Pack less the carrier, insert bearing, piston pin and bolt assembly, thrust washer, and snap ring.

Mini and Partial Power Packs are not offered on a unit exchange basis.

Ref. No.	Power Pack Type	Part Number Container Type Storage	Part Number Container Type Expend.	Application
MARINE AND INDUSTRIAL - With Cast Iron Liner Bore				
1 2	Mini Partial	---- ----	9319972 9332388	645E1,E2,E6,E8, - No. 1 Ring Stainless Steel Chrome Face - Bronze Lined Carrier Insert Bearing
3	Mini	9556097	9319973	645E4 (Except MP45), E5,E7,E9 - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides
4	Partial	----	9326099	645E4,E5,E7,E9 - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides
5	Mini	----	9519207	645E4 (Except MP45), E5,E7,E9, - No. 1 Ring Prestressed Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief Liner
6	Partial	----	9518041	645E4,E5,E7,E9 - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides - Laser Hardened Port Relief Liner
7 8	Mini Partial	---- ----	9337991 9517819	645E4B,E7B,E9B - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides - Laser Hardened Port Relief Liner
9 10	Mini Partial	---- ----	9527320 9527321	645E4B,E7B,E9B - Fire Ring Piston - No. 1 Ring Prestressed Stainless Steel With Chrome Face And Sides - Laser Hardened Port Relief And Upper Bore Liner
11 12	Mini Partial	---- ----	9550599 9550600	645E7C - 16:1 Piston - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
MARINE AND INDUSTRIAL - With Chrome Plated Liner Bore - For Use With High Sulfur Fuel				
13 14	Mini Partial	9332684 9332670	9332685 9332671	645E1,E2,E6,E8 - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
15	Mini	9332682	9332683	645E4 (Except MP45), E5,E7,E9 - No. 1 Ring Ductile Iron Barrel Face With Thich Chrome Plated Sides And Interrupted Witness Groove
16	Partial	----	9331782	645E4,E5,E7,E9 - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove
17 18	Mini Partial	9332686 9519209	9332687 9519208	645E4,E4B,E5,E7,E7B,E9,E9B,E10B - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
19 20	Mini Partial	9527326 9527324	9527327 9527325	645E4B,E7B,E9B,E10B - Fire Ring Piston - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing
21 22	Mini Partial	---- ----	9550608 9550607	645E7C - 16:1 Piston - Ductile Iron Barrel Face With Thick Chrome Sides And Interrupted Witness Groove - Bronze Lined Carrier Insert Bearing

P.L. No. A09

POWER PACK ASSEMBLIES

Complete, Mini, And Partial Power Pack Assemblies
16,20-645F4B,F7B Engines

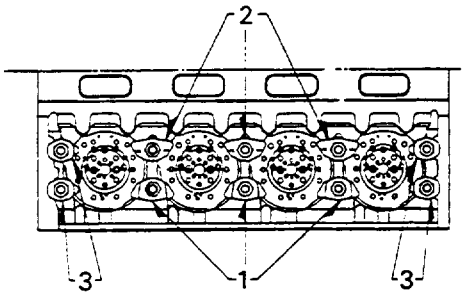
Ref. No.	Conn. Rod Type	New Power Pack Container Type		Unit Exchange Power Pack	Application
		Storage	Expend.		
Complete Power Pack Assemblies - With Cast Iron Liner Bore					
1	†Fork	9559296	9559297	9561589	645F4B,F7B - 16:1 Piston - 9556060
2	Blade	9559294	9559295	9561588	Cylinder Head - No. 1 Ring Prestressed Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief And Upper Bore Liner - Stainless Steel/Nickel Clad Head Gasket
Complete Power Pack Assemblies - With Chrome Plated Liner Bore - For Use With High Sulfur Fuel					
3	†Fork	9561804	9561150	----	645F4B,F7B - 16:1 Piston - 9556060 Cylinder
4	Blade	9561803	9561148	----	Head - No. 1 Ring Ductile Iron Barrel Face With Thick Chrome Plated Sides And Interrupted Witness Groove - Chrome Plated Liner - Stainless Steel/Nickel Clad Head Gasket
Mini And Partial Power Pack Assemblies - With Cast Iron Liner Bore					
5	Mini	----	9559298	----	645F4B,F7B - 16:1 Piston - 9556060 Cylinder
6	Partial	----	9559299	----	Head - No. 1 Ring Prestressed Stainless Steel Chrome Face And Sides - Laser Hardened Port Relief And Upper Bore Liner - Stainless Steel/Nickel Clad Head Gasket

† One (1) Connecting Rod Hardware Kit (8409745) is included with each Fork Rod Power Pack Assembly.

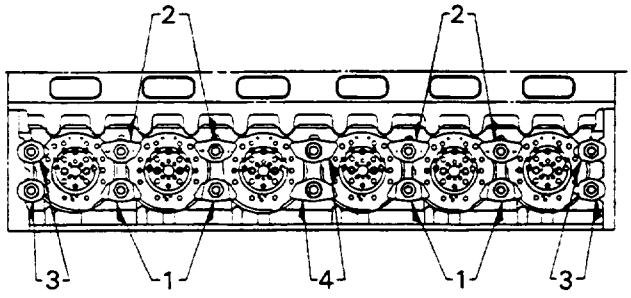
Parts List No. B10

CYLINDER HEAD CRABS

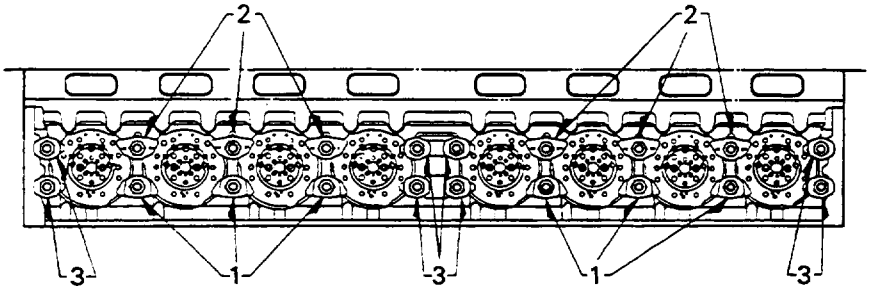
Original Design Crabs
645E1,E2,E4,E4B,E5,E6,E7,E7B,
E8,E9,E9B,E10B Engines



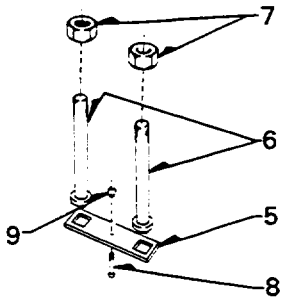
8 Cyl. Engine

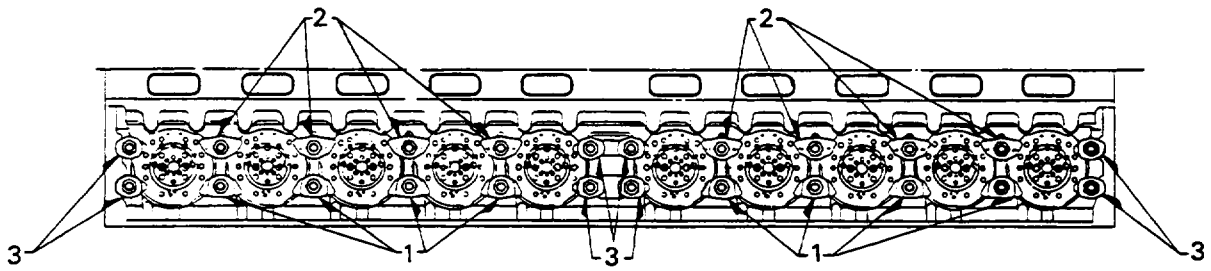


12 Cyl. Engine



16 Cyl. Engine





20 Cyl. Engine

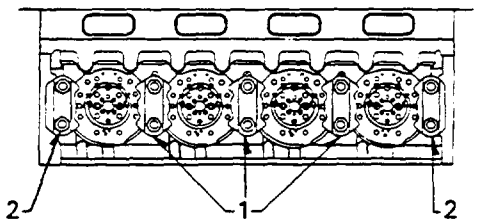
PLATE B10-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8 cylinder engines } *Quantities Shown Are For*
		-	B	-	-	12 cylinder engines } *One Engine Assembly*
		-	-	C	-	16 cylinder engines }
		-	-	-	D	20 cylinder engines }
1	8133941	6	8	12	16	CRAB .. Cylinder head - Intermediate - Outboard
2	9324690	6	8	12	16	CRAB .. Cylinder head - Intermediate - Inboard - Formerly 8133941
3	8133939	8	8	16	16	CRAB .. Cylinder head - End - Center on 16 and 20 cyl. only
4	8174620	-	4	-	-	CRAB .. Cylinder head - Center - 12 cyl. only
5	8133575	10	14	20	24	BRACKET .. Crab bolt
6	9085894	20	28	40	48	BOLT .. Crab - 1-3/4 - 12 x 15-5/8 long - Replaces 8422387 and 8347885
7	8155104	20	28	40	48	NUT .. Crab - 1-3/4 - 12 hex. - Spherical seat
8	8348556	10	14	20	24	BOLT .. Hex. head 3/8 - 24 x 3 - Bracket mounting
9	8089200	10	14	20	24	NUT .. Spline - 3/8 - 24

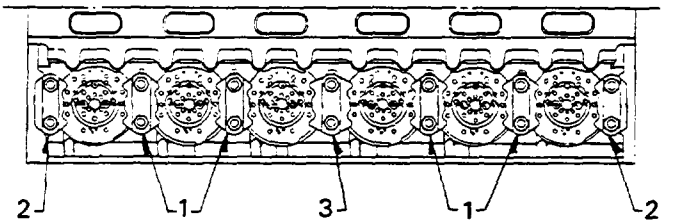
See Page 2 for Plate Crabs and Plate Crab Kits.

P.L. No. B10

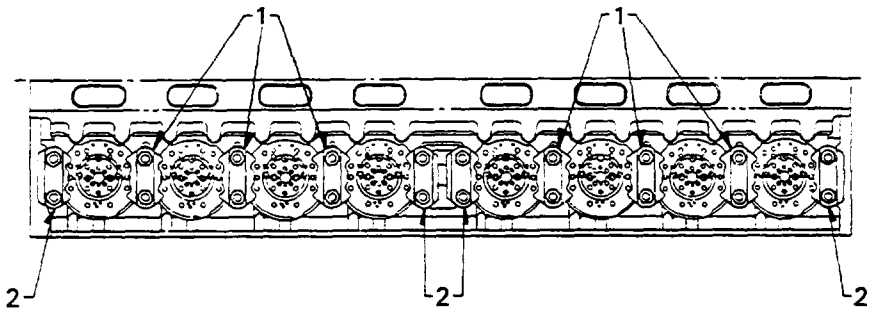
CYLINDER HEAD CRABS
Plate-Type Crabs
645E4B,E7B,E7C,E9B,E10B Engines



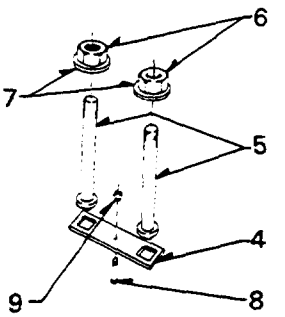
8 Cyl. Engine

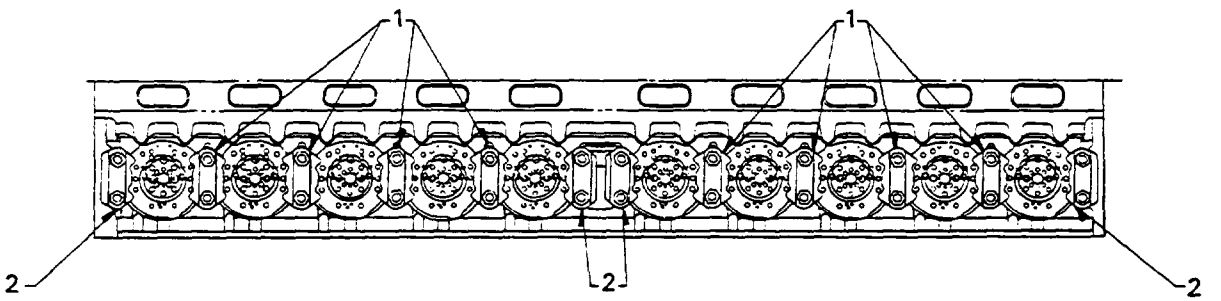


12 Cyl. Engine



16 Cyl. Engine





20 Cyl. Engine

PLATE B10-2

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E4B,E7B,E7C engines } *Quantities shown are for one engine assembly*
		-	B	-	-	12-645E4B,E7B,E7C,E9B engines
		-	-	C	-	16-645E4B,E7B,E7C,E9B,E10B engines
		-	-	-	D	20-645E4B,E7B,E7C,E9B,E10B engines
1	9319170	6	8	12	16	CRAB .. Cylinder head - Intermediate
2	9523067	4	4	8	8	CRAB .. Cylinder head - End - Center on 16 and 20 cyl. only
3	9332871	-	2	-	-	CRAB .. Cylinder head - Center on 12 cyl. only
4	8133575	10	14	20	24	BRACKET .. Crab bolt
5	9085894	20	28	40	48	BOLT .. Crab
6	8040808	20	28	40	48	NUT .. Crab bolt
7	9319172	20	28	40	48	WASHER .. Special - Hardened and ground
8	8348556	10	14	20	24	BOLT .. Hex. head 3/8 - 24 x 3 - Bracket mounting
9	8089200	10	14	20	24	NUT .. Spline 3/8 - 24
†10	9558451	1	-	-	-	KIT .. Crab - Service } Each kit contains Ref. Nos. 1,2,3 (for 12 cyl. engines), 5,6, and 7 in the quantities shown for each engine assembly.
†11	9558545	-	1	-	-	KIT .. Crab - Service
†12	9552014	-	-	1	-	KIT .. Crab - Service
†13	9335056	-	-	-	1	KIT .. Crab - Service

†*Note: Plate Crab Kits can be applied to all turbocharged engines.*

Parts List No. A11

FUEL INJECTOR

All 645 Engines

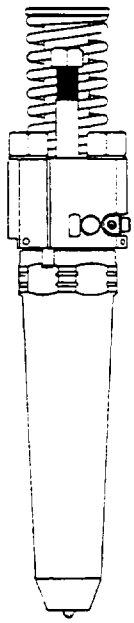


PLATE A11-1

Fuel Injector Reference Chart

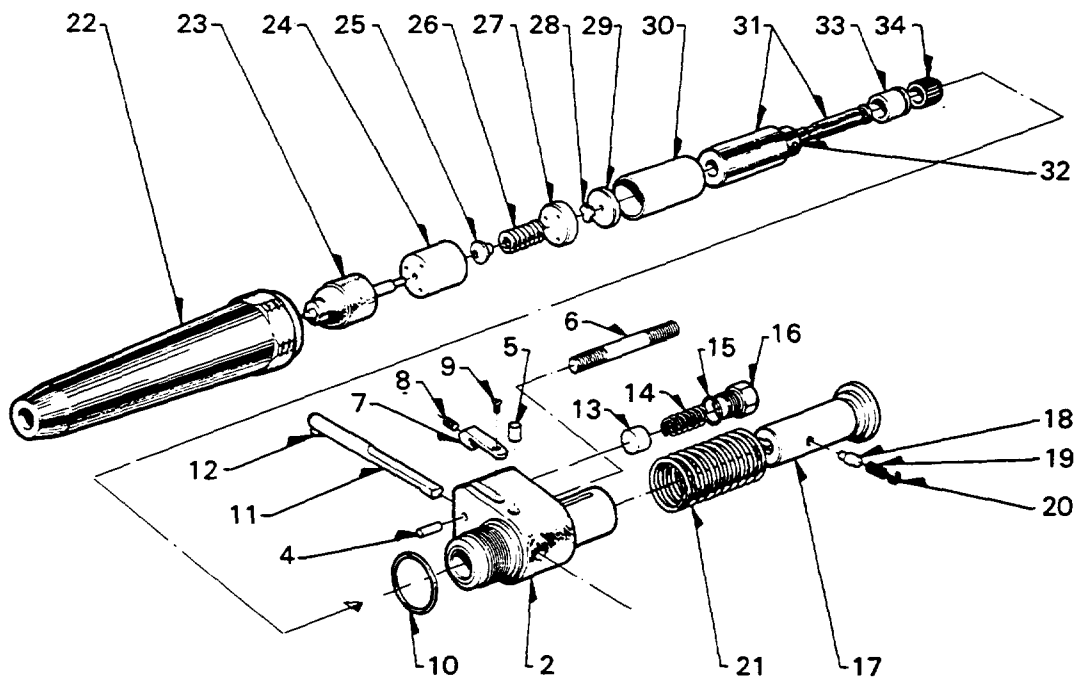
Ref. No.	Injector Part No.	Replaces	Replaced By	UTEX Part No.	Application
1	5228830	----	5229200	8478045	8,12,16-645E1,E2,E6
†2	5229200	5228830	----	8478045	8,12,16-645E1,E2,E6,E8
3	5228895	----	5229250	8478046	12,16,20-645E4,E5,E7; 8-645E5
†4	5229250	5228895	----	8478046	8,12,16,20-645E4; 8-645,E7; 12,16,20-645E7,E9; 16-645E5 (12-645E4B - With 18:1 turbo only)
5	5228970	----	5229315	8478052	12,16,20-645E4 - 750 R.P.M. or less
†6	5229315	5228970	----	8478052	12,16,20-645E4 - 750 R.P.M. or less
7	5229015	----	5229325	8478054	16,20-645E4 - 750 R.P.M. or less
†8	5229325	5229015	----	8478054	12-645E4B; 12,16,20-645E4; 20-645E7,E4B - 750 R.P.M. or less
†9	5229320	----	----	8478053	8-645E4B,E7B; 20-645E4B,E4C,E7B,E7C,E9B,E10B;16-645F7B
†10	5229335	----	----	8478055	8,12,16-645E7C; 12-645E4B,E4C,E7B,E9B; 16-645E4B,E4C,E7B,E9B,E10B - Form. used on 20-645E7C

† All replacement and current injector assemblies are low smoke with Low-Sac spray tips. Components of the current and previous design injector differ only in spray tips. All replacement spray tips for the former injectors will be of the current Low-Sac design.

For Replacement Parts, See Page 2.
For Service Kits, See Page 4.
For Injectors and Service Kits for 645F4B,F7B Engines, See Page 5.

P.L. No. A11

FUEL INJECTOR
645 Engines



Ref. No. 1
PLATE A11-2

Ref. No.	Part Number	Quantity Required						Description
		A	B	C	D	E	F	
1	5228830	1	-	-	-	-	-	INJECTOR ASM. .. Fuel - Replaced by 5229200
1	5229200	1	-	-	-	-	-	INJECTOR ASM. .. Fuel
1	5228895	-	1	-	-	-	-	INJECTOR ASM. .. Fuel - Replaced by 5229250
1	5229250	-	1	-	-	-	-	INJECTOR ASM. .. Fuel
1	5228970	-	-	1	-	-	-	INJECTOR ASM. .. Fuel - Replaced by 5229315
1	5229315	-	-	1	-	-	-	INJECTOR ASM. .. Fuel
1	5229015	-	-	-	1	-	-	INJECTOR ASM. .. Fuel - Replaced by 5229325
1	5229325	-	-	-	1	-	-	INJECTOR ASM. .. Fuel
1	5229320	-	-	-	-	1	-	INJECTOR ASM. .. Fuel
1	5229335	-	-	-	-	-	1	INJECTOR ASM. .. Fuel
2	5228798	1	-	-	-	-	-	BODY ASM. .. Injector - Replaces 5229761
2	5228888	-	1	1	-	-	-	BODY ASM. .. Injector - Replaces 5228887
2	5229039	-	-	-	1	1	1	BODY ASM. .. Injector - Replaces 5229037
*3	5226912	2	-	-	-	-	-	PLUG .. Injector body
*3	5228462	-	2	2	2	2	2	PLUG .. Injector body
4	5226482	1	1	1	1	1	1	DOWEL .. Injector
5	5226727	1	1	1	1	1	1	PIN .. Rack guide
6	5226484	1	1	1	1	1	1	STUD .. Fuel connection
7	5228745	1	1	1	1	1	1	ADAPTER .. Calibration slide
8	5228758	1	1	1	1	1	1	SCREW .. Set - No. 8 - 32 x .220 Nylock
9	9421614	1	1	1	1	1	1	SCREW .. Socket head cap - No. 8 - 32 x 3/8
10	5226571	1	1	1	1	1	1	SEAL .. Body to nut
11	5226496	1	-	-	-	-	-	RACK ASM. .. Injector
11	5228890	-	1	1	-	-	-	RACK ASM. .. Injector
11	5229045	-	-	-	1	1	1	RACK ASM. .. Injector
12	5227401	1	1	1	1	1	1	PIN .. Rack

P.L. No. A11

FUEL INJECTOR

Ref. No.	Part Number	Quantity Required						Description
		A	B	C	D	E	F	
								INJECTOR ASM. .. Fuel
13	5228013	2	2	2	2	2	2	ELEMENT .. Filter - Stainless steel mesh
14	5226415	2	2	2	2	2	2	SPRING .. Filter
15	5226186	2	2	2	2	2	2	GASKET .. Cap
16	5226512	2	2	2	2	2	2	CAP .. Fuel filter
17	5228139	1	1	1	1	1	1	FOLLOWER .. Injector
18	5227914	1	1	1	1	1	1	PIN .. Stop
19	5227904	1	1	1	1	1	1	SPRING .. Stop pin
20	5228184	1	1	1	1	1	1	RETAINER .. Stop pin and spring
21	5226491	1	1	1	1	1	1	SPRING .. Plunger
22	5228545	1	1	1	1	1	1	NUT .. Injector
23	5229195	1	-	-	-	-	-	TIP ASM. .. 5 hole - Low-Sac - Includes needle valve
23	5229230	-	1	-	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
23	5229235	-	-	1	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
23	5229270	-	-	-	1	-	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
23	5229265	-	-	-	-	1	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
23	5229275	-	-	-	-	-	1	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
24	5228538	1	1	1	1	1	1	CAGE .. Needle valve spring
25	5228541	1	1	1	1	1	1	SEAT .. Needle valve spring
26	5228539	1	1	1	1	1	1	SPRING .. Needle valve
27	5228571	1	1	1	1	1	1	CAGE .. Check valve
28	5226950	1	1	1	1	1	1	VALVE .. Check
29	5228572	1	1	1	1	1	1	SPACER .. Check valve
30	5226574	1	1	1	1	1	1	DEFLECTOR .. Injector spill
31	5228236	1	-	-	-	-	-	PLUNGER ASM. .. Includes bushing
31	5228894	-	1	1	-	-	-	PLUNGER ASM. .. Includes bushing
31	5229011	-	-	-	1	1	1	PLUNGER ASM. .. Includes bushing
32	5228343	1	-	-	-	-	-	PIN .. Guide - Bushing
32	5227923	-	1	1	1	1	1	PIN .. Guide - Bushing
33	5226499	1	-	-	-	-	-	RETAINER .. Gear
33	5228893	-	1	1	-	-	-	RETAINER .. Gear
33	5229052	-	-	-	1	1	1	RETAINER .. Gear
34	5226498	1	-	-	-	-	-	GEAR .. Rack
34	5228892	-	1	1	-	-	-	GEAR .. Rack
34	5228408	-	-	-	1	1	1	GEAR .. Rack
*34	5226714	2	2	2	2	2	2	CAP .. Protective - Used on Ref. 16 for shipping and storage
+*35	8032718	1	1	1	1	1	1	NUT .. Lock - Fuel line to injector - See P.L. 48

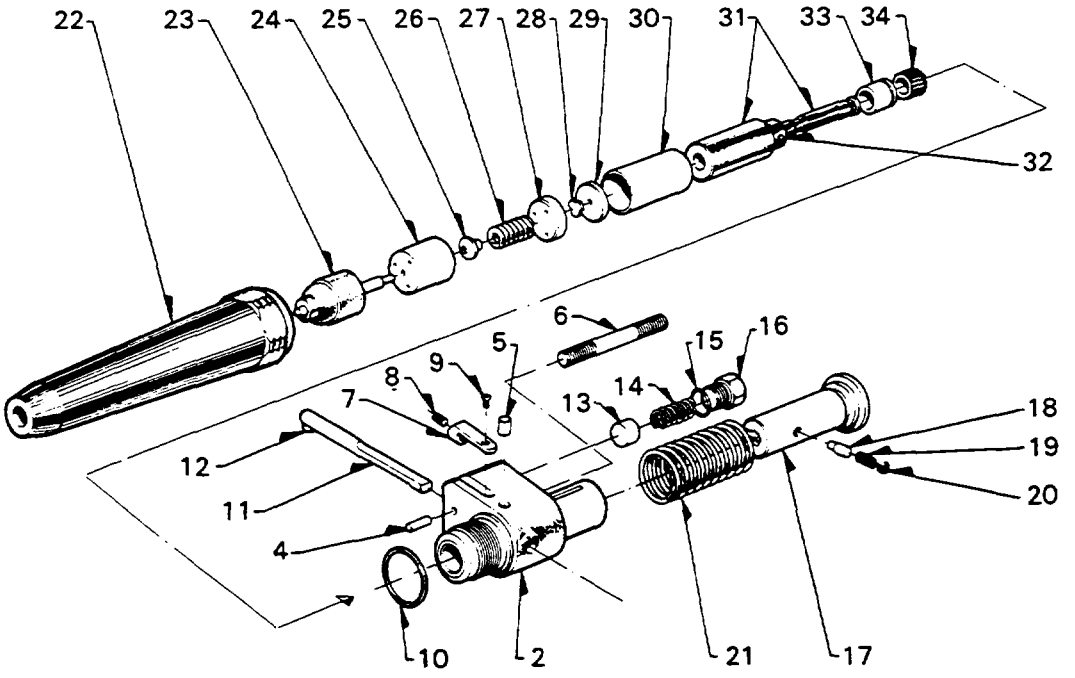
For Injector Repair Kits - See Page 4.

P.L. No. A11

FUEL INJECTOR
Repair Kits
Not Illustrated

Ref. No.	Part Number	Quantity Required						Description
		A	B	C	D	E	F	5228830 and 5229200 fuel injectors 5228895 and 5229250 fuel injectors 5228970 and 5229315 fuel injectors 5229015 and 5229325 fuel injectors 5229320 fuel injector 5229335 fuel injector
1	5228836	1	1	1	1	1	1	KIT .. Basic injector repair
2	5226571	1	1	1	1	1	1	SEAL .. Injector nut to body
3	5228539	1	1	1	1	1	1	SPRING .. Needle valve
4	5226186	2	2	2	2	2	2	GASKET .. Filter cap to body
5	5228013	2	2	2	2	2	2	ELEMENT .. Filter - Stainless steel mesh
6	5229238	1	-	-	-	-	-	KIT .. Basic injector repair - With Low-Sac tip asm.
6	5229258	-	1	-	-	-	-	KIT .. Basic injector repair - With Low-Sac tip asm.
6	5229288	-	-	1	-	-	-	KIT .. Basic injector repair - With Low-Sac tip asm.
6	5229326	-	-	-	1	-	-	KIT .. Basic injector repair - With Low-Sac tip asm.
6	5229321	-	-	-	-	1	-	KIT .. Basic injector repair - With Low-Sac tip asm.
6	5229336	-	-	-	-	-	1	KIT .. Basic injector repair - With Low-Sac tip asm.
7	5229195	1	-	-	-	-	-	TIP ASM. .. 5 hole - Low-Sac - Includes needle valve
7	5229230	-	1	-	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
7	5229235	-	-	1	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
7	5229270	-	-	-	1	-	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
7	5229265	-	-	-	-	1	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
7	5229275	-	-	-	-	-	1	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
8	5226571	1	1	1	1	1	1	SEAL .. Injector nut to body
9	5228539	1	1	1	1	1	1	SPRING .. Needle valve
10	5226186	2	2	2	2	2	2	GASKET .. Filter cap to body
11	5228013	2	2	2	2	2	2	ELEMENT .. Filter - Stainless steel mesh
12	5229239	1	-	-	-	-	-	KIT .. Injector repair - Includes plunger and bushing asm.
12	5229259	-	1	-	-	-	-	KIT .. Injector repair - Includes plunger and bushing asm.
12	5229843	-	-	-	-	1	-	KIT .. Injector repair - Includes plunger and bushing asm.
12	5229945	-	-	-	-	-	1	KIT .. Injector repair - Includes plunger and bushing asm.
13	5228236	1	-	-	-	-	-	PLUNGER ASM. .. Includes bushing
13	5228894	-	1	-	-	-	-	PLUNGER ASM. .. Includes bushing
13	5229011	-	-	-	-	1	1	PLUNGER ASM. .. Includes bushing
14	5226186	2	2	-	-	2	2	GASKET .. Filter cap
15	5228013	2	2	-	-	2	2	ELEMENT .. Fuel filter
16	5229195	1	-	-	-	-	-	TIP ASM. .. 5 hole - Low-Sac - Includes needle valve
16	5229230	-	1	-	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
16	5229265	-	-	-	-	1	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
16	5229275	-	-	-	-	-	1	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
17	5226571	1	1	-	-	1	1	SEAL .. Body to nut
18	5228572	1	1	-	-	1	1	SPACER .. Check valve
19	5226950	1	1	-	-	1	1	VALVE .. Check
20	5228539	1	1	-	-	1	1	SPRING .. Needle valve
21	5228541	1	1	-	-	1	1	SEAT .. Spring
22	5228571	1	1	-	-	1	1	CAGE .. Check valve
23	5228538	1	1	-	-	1	1	CAGE .. Needle valve spring
24	5229248	-	-	1	-	-	-	KIT .. Injector repir
25	5229235	-	-	1	-	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
26	5228572	-	-	1	-	-	-	SPACER .. Check valve
27	5226950	-	-	1	-	-	-	VALVE .. Check
28	5228571	-	-	1	-	-	-	CAGE .. Check valve
29	5228538	-	-	1	-	-	-	CAGE .. Needle valve spring
30	5228539	-	-	1	-	-	-	SPRING .. Needle valve
31	5228541	-	-	1	-	-	-	SEAT .. Needle valve spring

FUEL INJECTOR
16,20-645F4B,F7B Engines



Ref. No. 1
PLATE A11-3

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	16-645F4B,F7B Engines
		-	B	-	20-645F4B,F7B Engines
		-	-	C	20-645F4B Engine - 750 R.P.M.
1	5226210	1	-	-	INJECTOR ASM .. Fuel
1	5226430	-	1	-	INJECTOR ASM .. Fuel
1	5226160	-	-	1	INJECTOR ASM. .. Fuel
2	5229709	1	1	1	BODY ASM. .. Injector
*3	5228462	2	2	2	PLUG .. Injector body
4	5226482	1	1	1	DOWEL .. Injector
5	5226727	1	1	1	PIN .. Rack guide
6	5226484	1	1	1	STUD .. Fuel connection
7	5228745	1	1	1	ADAPTER .. Calibration slide
8	5228758	1	1	1	SCREW .. Set - No. 8-32 x .220 Nylock
9	9421614	1	1	1	SCREW .. Socket head cap - No. 8-32 x 3/8
10	5226571	1	1	1	SEAL .. Body to nut
11	5229045	1	1	1	RACK ASM. .. Injector
12	5227401	1	1	1	PIN .. Rack
13	5228013	2	2	2	ELEMENT .. Filter - Stainless steel mesh
14	5226415	2	2	2	SPRING .. Filter
15	5226186	2	2	2	GASKET .. Filter cap
16	5226512	2	2	2	CAP .. Fuel filter
17	5228139	1	1	1	FOLLOWER .. Injector
18	5227914	1	1	1	PIN .. Stop
19	5227904	1	1	1	SPRING .. Stop pin
20	5228184	1	1	1	RETAINER .. Stop pin and spring
21	5226491	1	1	1	SPRING .. Plunger
22	5228545	1	1	1	NUT .. Injector

P.L. No. A11

FUEL INJECTOR

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		1	1	1	INJECTOR ASM. .. Fuel
23	5229275	1	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
23	5229265	-	1	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
23	5229270	-	-	1	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
24	5228538	1	1	1	CAGE .. Needle valve spring
25	5228541	1	1	1	SEAT .. Needle valve spring
26	5228539	1	1	1	SPRING .. Needle valve
27	5228571	1	1	1	CAGE .. Check valve
28	5226950	1	1	1	VALVE .. Check
29	5228572	1	1	1	SPACER .. Check valve
30	5226574	1	1	1	DEFLECTOR .. Injector spill
31	5226464	1	1	-	PLUNGER ASM. .. Includes bushing
31	5229705	-	-	1	PLUNGER ASM. .. Includes bushing
32	5227923	1	1	1	PIN .. Guide - Bushing
33	5229052	1	1	1	RETAINER .. Gear
33	5228408	1	1	1	GEAR .. Rack
*34	5226714	2	2	2	CAP .. Protective - Used on Ref. No. 16 for shipping and storage
*35	8032718	1	1	1	NUT .. Lock - Fuel line to injector - See P.L. 48
*36	5228836	1	1	1	KIT .. Basic injector repair
*37	5226571	1	1	1	SEAL .. Injector nut to body
*38	5228539	1	1	1	SPRING .. Needle valve
*39	5228186	2	2	2	GASKET .. Filter cap to body
*40	5228013	2	2	2	ELEMENT .. Filter - Stainless steel mesh
*37	5229336	1	-	-	KIT .. Basic injector repair - With Low-Sac Tip Asm.
*37	5229321	-	1	-	KIT .. Basic injector repair - With Low-Sac Tip Asm.
*37	5229326	-	-	1	KIT .. Basic injector repair - With Low-Sac Tip Asm.
*38	5229275	1	-	-	TIP ASM. .. 6 hole - Low-Sac - Includes needle valve
*38	5229265	-	1	-	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
*38	5229270	-	-	1	TIP ASM. .. 7 hole - Low-Sac - Includes needle valve
*39	5226571	1	1	1	SEAL .. Injector nut to body
*40	5228539	1	1	1	SPRING .. Needle valve
*41	5226186	2	2	2	GASKET .. Filter cap to body
*42	5228013	2	2	2	ELEMENT .. Filter - Stainless steel mesh

Parts List No. A13

EXHAUST VALVE BRIDGE, ROCKER ARMS, AND OIL LINES

All 645 Engines

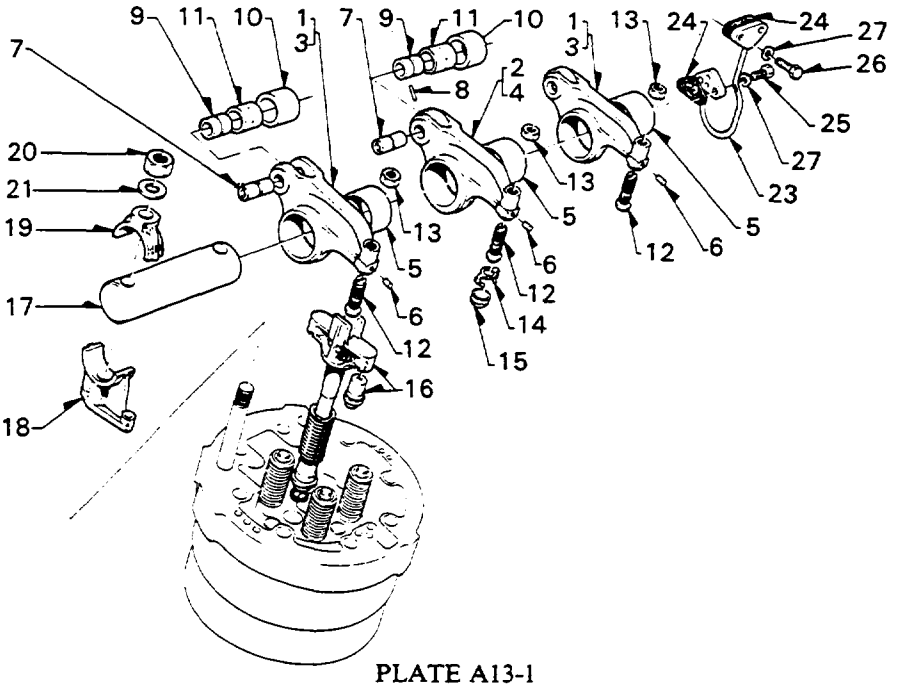


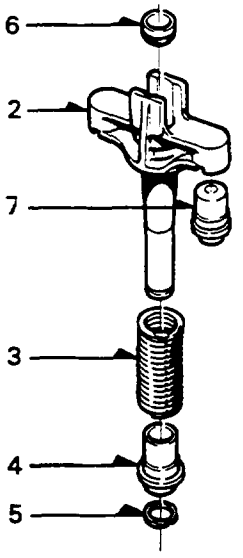
PLATE A13-1

Ref. No.	Part Number	Quantity Required A		Quantity Required B		Description
		A		B		645E1,E2,E6,E8 engines / 645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines — *Quantities Shown Are For One Cylinder Head Asm.*
1	8328694	2	-	-	-	ARM ASM. .. Rocker - Exhaust valve - Form. applied to 645E4,E5,E7,E9 engs.
1	9319505	-	-	2	-	ARM ASM. .. Rocker - Exhaust valve
2	8456128	-	1	-	-	ARM ASM. .. Rocker - Injector - Form. applied to 645E4,E5,E7,E9 engs.
2	9319504	-	-	-	1	ARM ASM. .. Rocker - Injector
3	8328695	2	-	2	-	ARM .. Rocker - Exhaust valve
4	8456127	-	1	-	1	ARM .. Rocker - Injector
5	8055322	2	1	2	1	BUSHING .. Rocker arm
6	141126	2	1	2	1	PIN .. Dowel 5/32 x 1/4 in. long
7	8146111	2	1	2	1	PIN .. Cam follower
8	442919	2	1	2	1	PIN .. Groove 1/8 x 7/8 in. long
9	8135970	2	1	2	1	RACE .. Inner
10	8051006	2	1	-	-	ROLLER .. Cam follower - Form. applied to 645E4,E5,E7,E9 engs.
10	9319503	-	-	2	1	ROLLER .. Cam follower - Crowned
11	8135971	2	1	2	1	BUSHING .. Floating
12	8052327	2	1	2	1	SCREW .. Adjusting
13	8028723	2	1	2	1	NUT .. Lock 5/8 - 18
14	8031925	-	1	-	1	SPRING .. Button retaining
15	8052307	-	1	-	1	BUTTON .. Injector
16	8085260	2		2		BRIDGE .. Exhaust valve - See Page 2
17	8028460	1		1		SHAFT .. Rocker arm
†18	9090607	2		2		SUPPORT .. Rocker arm shaft — Formerly 8028459
†19	9090608	2		2		CAP .. Support - Replaces 8405773 — Formerly 8028459
20	8487866	2		2		NUT .. Hex 1 - 14
21	8421965	2		2		WASHER .. Hardened - Special — See Ref. No. 22
*22	8307731	A.R.		A.R.		LUBRICANT .. Thread - Applied to Ref. Nos. 20 and 21 - For more information, see Pointers of September 17, 1973.
23	8039842	1		1		LINE ASM. .. Lube oil - Rocker arm shaft
24	8029167	2		2		GASKET .. Lube oil line to camshaft block
25	181311	2		2		BOLT .. Hex head 1/4 - 28 x 5/8 - Oil line to rocker arm shaft
26	179795	2		2		BOLT .. Hex head 1/4 - 20 x 3/4 - Oil line to camshaft bearing block
27	103319	4		4		WASHER .. Lock - 1/4

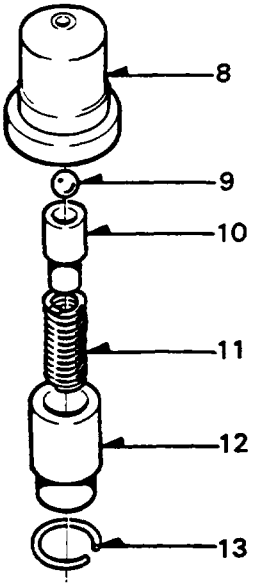
† *Illustration shows former style Support and Cap Asm. - 8028459.*

P.L. No. A13

EXHAUST VALVE BRIDGE, ROCKER ARMS, AND OIL LINES
Exhaust Valve Bridge And Lash Adjuster



Ref. No. 1



Ref. No. 7

PLATE A13-2

Ref. No.	Part Number	Qty. Req.	Description
1	8085260	1	BRIDGE ASM. .. Exhaust valve
2	8054088	1	BRIDGE .. Exhaust valve
3	8068791	1	SPRING .. Bridge
4	8028126	1	SEAT .. Spring
5	8028136	1	RING .. Locking
6	8052307	1	BUTTON .. Bridge
7	8085254	2	ADJUSTER ASM. .. Lash - UTEX Part No. 8326078
8	8081806	2	BODY .. Lash adjuster
9	145636	2	BALL .. Check
10	8052331	2	RETAINER .. Ball
11	8052319	2	SPRING .. Lash adjuster
12	8081808	2	PLUNGER .. Lash adjuster
13	8052320	2	RING .. Locking

Parts List No. A15

INJECTOR CONTROL LINKAGE

Control Shaft, Support Bracket, And Bearings
All 645 Engines

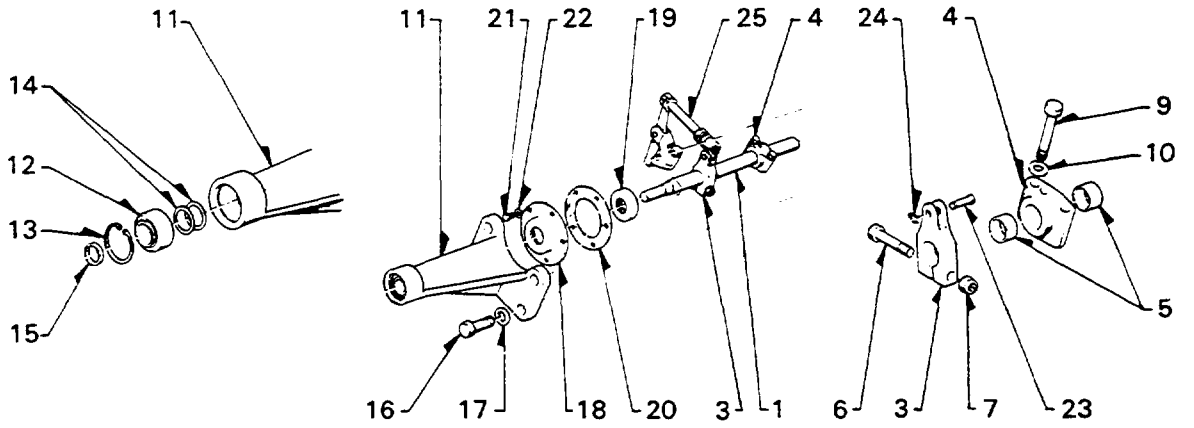


PLATE A15-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 engines } *Quantities Shown Are For One Engine Assembly*
		-	B	-	-	12-645 engines
		-	-	C	-	16-645 engines
		-	-	-	D	20-645 engines
1	8196851	1	-	-	-	SHAFT ASM. .. Injector control - Left bank
1	8196853	-	1	-	-	SHAFT ASM. .. Injector control - Left bank
1	8196855	-	-	1	-	SHAFT ASM. .. Injector control - Left bank } *See Page 2 For Optional Two-Piece Service Kits*
1	8360853	-	-	-	1	SHAFT ASM. .. Injector control - Left bank
*2	8196852	1	-	-	-	SHAFT ASM. .. Injector control - Right bank
*2	8196854	-	1	-	-	SHAFT ASM. .. Injector control - Right bank
*2	8196856	-	-	1	-	SHAFT ASM. .. Injector control - Right bank } *See Page 2 For Optional Two-Piece Service Kits*
*2	8360850	-	-	-	1	SHAFT ASM. .. Injector control - Right bank
3	8360051	8	12	16	20	LEVER .. Injector control shaft
4	8443643	8	12	16	20	BEARING AND SUPPORT ASM. .. Replaces 8360052
5	8443644	16	24	32	40	BUSHING .. Support
6	181379	8	12	16	20	BOLT .. Hex. head 3/8 - 24 x 2 - Lever mounting
7	8032717	8	12	16	20	NUT .. Lock 3/8 - 24 hex.
*8	9411615	8	12	16	20	PIN .. Spring - 7/32 x 1-1/2 in. long - Lever to shaft
ϕ9	181379	16	24	32	40	BOLT .. Hex. head 3/8 - 24 x 2 - Applied to former bearing 8360052 only
ϕ9	181381	16	24	32	40	BOLT .. Hex. head 3/8 - 24 x 2-1/2 - Applied to current bearing 8443643 only
10	6101225	16	24	32	40	WASHER .. Flat - 1/4
11	8451755	2	2	2	2	BRACKET ASM. .. Support - Formerly 8069712
12	908085	2	2	2	2	BEARING .. Ball - Formerly 954157
13	8054053	2	2	2	2	RING .. Snap - Bearing retaining
*13A	8487996	2	2	2	2	SHIM .. Support bracket - .014 in. thick - Applied with 8069712 support bracket on shortened crankcases
14	8061581	As Required				SHIM .. Bearing to bracket - .015 thick
15	8054047	2	2	2	2	SPACER .. Control lever - 5/32
ϕ15	8457384	1	1	1	1	SPACER .. Control lever - 21/32 - See Page 10
ϕ16	181428	8	8	8	8	BOLT .. Hex. head 1/2 - 20 x 1-1/8
ϕ16	181429	8	8	8	8	BOLT .. Hex. head 1/2 - 20 x 1-1/4
17	6101229	8	8	8	8	WASHER .. Aircraft type - 1/2
18	8070619	2	2	2	2	RETAINER ASM. .. Oil seal
19	8028752	2	2	2	2	SEAL .. Oil
20	8070521	2	2	2	2	GASKET .. Retainer
21	181313	10	10	10	10	BOLT .. Hex. head - 1/4 - 28 x 3/4 - Retainer mounting
22	9414320	10	10	10	10	WASHER .. Flat - 1/4
23	8028103	8	12	16	20	PIN .. Clevis - Control lever to adjusting link
24	148147	8	12	16	20	RETAINER .. Clevis pin - Spring type
25	----	-	-	-	-	LINK ASM. .. Adjusting - See Pages 3 and 4

P.L. No. A15

INJECTOR CONTROL LINKAGE
Two-Piece Control Shaft Kits
For 16 and 20-645 Engines

Not Illustrated

As a service option to the one-piece injector control shafts shown on Page 1, two-piece control shaft kits are available for 16 and 20-cylinder engines. These kits eliminate the need for removal of the cylinder head cover support frames when replacement is required.

Ref. No.	Part Number	Qty. Req.		Description
		A	-	16-645 engines
		-	B	20-645 engines
1	9084412	1	-	KIT .. Control shaft - Left bank - Service option for 8196855
1	9084402	-	1	KIT .. Control shaft - Left bank - Service option for 8360853
†2	9084413	1	-	SHAFT ASM. .. Left bank - Rear
†2	9084404	-	1	SHAFT ASM. .. Left bank - Rear
†3	9084414	1	-	SHAFT ASM. .. Left bank - Front
†3	9084403	-	1	SHAFT ASM. .. Left bank - Front
4	181379	2	2	BOLT .. Hex. head - 3/8 - 24 x 2 - Front shaft to rear shaft connecting
5	8032717	2	2	NUT .. Lock - 3/8 - 24 hex.
6	9084409	1	-	KIT .. Control shaft - Right bank - Service option for 8196856
6	9084399	-	1	KIT .. Control sahft - Right bank - Service option for 8360850
†7	9084410	1	-	SHAFT ASM. .. Right bank - Rear
†7	9084400	-	1	SHAFT ASM. .. Right bank - Rear
†8	9084411	1	-	SHAFT ASM. .. Right bank - Front
†8	9084401	-	1	SHAFT ASM. .. Right bank - Front
9	181379	2	2	BOLT .. Hex. head - 3/8 - 24 x 2 - Front shaft to rear shaft connecting
10	8032717	2	2	NUT .. Lock - 3/8 - 24 hex.

† Each shaft assembly includes the following components in the quantities indicated.

11	8360051	4	4	LEVER .. Injector control shaft
12	8443643	4	4	BEARING AND SUPPORT ASM. .. Includes bushings
13	181379	4	4	BOLT .. Hex. head - Lever mounting - 3/8 - 24 x 2
14	8032717	4	4	NUT .. Lock - 3/8 - 24 hex.
15	9411615	4	4	PIN .. Spring - 7/32 x 1-1/2 in. long - Lever to shaft

P.L. No. A15

INJECTOR CONTROL LINKAGE
Spring-Loaded Adjusting Link

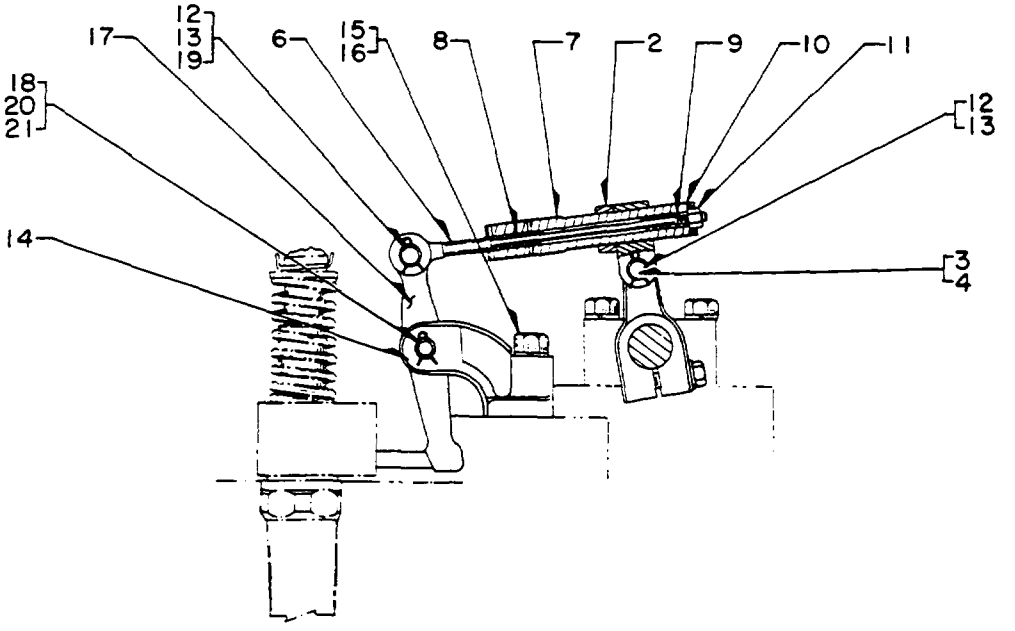


PLATE A15-2

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 E1,E2,E5,E6,E7,E7B,E7C Engines
		-	B	-	-	12-645 E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9B Engines
		-	-	C	-	16-645 E2,E4,E4B,E5,E6,E7,E7B,E7C,E8 Engines
		-	-	-	D	20-645 E4,E4B,E5,E7,E7B,E7C Engines
						Quantities listed are for one engine.
* 1	8305892	8	12	16	20	LINK ASSEMBLY .. Adjusting - Injector control - Spring loaded
2	8034846	8	12	16	20	NUT .. 5/8-24 hex.
3	8359417	8	12	16	20	LINK .. Adjusting
4	148401	8	12	16	20	BEARING .. Needle
* 5	3328369	8	12	16	20	SLIP JOINT ASSEMBLY .. Injector control
6	3328360	8	12	16	20	ROD .. Clevis
7	3328361	8	12	16	20	SLEEVE .. Slip joint
8	3250496	8	12	16	20	SPRING .. Tension
9	3247166	16	24	32	40	COLLAR .. Spring holding
10	3345099	16	24	32	40	RING .. Snap
11	3328504	8	12	16	20	NUT .. Special
12	8028103	16	24	32	40	PIN .. Clevis - Link attaching - 1/4 x 1-1/8
13	148147	16	24	32	40	RETAINER .. Spring - Clevis pin - 3/16 dia. groove
14	9541016	8	12	16	20	BRACKET .. Control lever - Formerly 8418278
15	179890	8	12	16	20	BOLT .. Bracket mounting - 1/2-13 x 2-1/4 hex. head
16	6101229	8	12	16	20	WASHER .. Plain - 1/2
17	9522625	8	12	16	20	LEVER ASSEMBLY .. Injector control - Formerly 8215506
18	148402	8	12	16	20	BEARING .. Needle
19	148401	8	12	16	20	BEARING .. Needle
20	8028098	8	12	16	20	PIN .. Clevis - Lever to bracket - 1/2 x 1-1/16
21	148151	8	12	16	20	RETAINER .. Spring - Clevis pin - 7/16 dia. groove

P5200, P3656

P.L. No. A15

INJECTOR CONTROL LINKAGE
Standard Type Adjusting Link

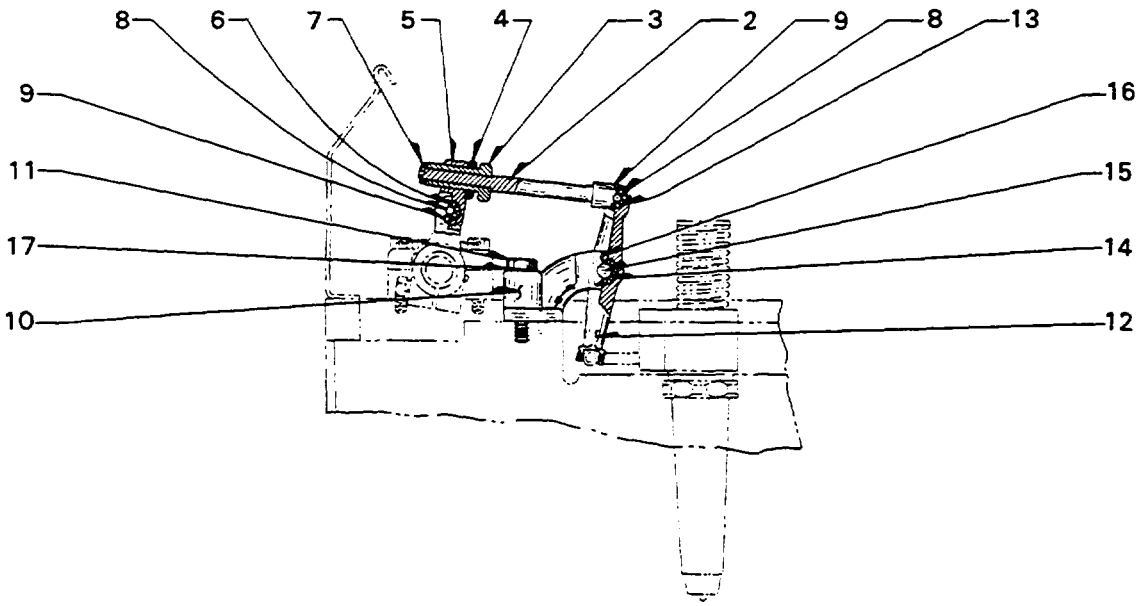


PLATE A15-3

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 E1,E4,E4B,E8 Engines
		-	B	-	-	12-645 E1,E4,E4B,E8,E9,E9B Engines
		-	-	C	-	16-645 E1,E4,E4B,E8,E9,E9B,E10B Engines
		-	-	-	D	20-645 E4,E4B,E7B,E9,E9B,E10B Engines
Quantities listed are for one engine.						
* 1	8070027	8	12	16	20	LINK ASSEMBLY .. Adjusting - Standard type
2	8069697	8	12	16	20	SHAFT .. Link
3	8034849	8	12	16	20	COLLAR .. Shaft
4	8034846	8	12	16	20	NUT .. Collar - 5/8-24 hex.
5	8359417	8	12	16	20	LINK .. Adjusting
6	148401	8	12	16	20	BEARING .. Needle
7	8034847	8	12	16	20	WASHER .. Peened to shaft
8	8028103	16	24	32	40	PIN .. Clevis - 1/4 x 1-1/8 in. long
9	148147	16	24	32	40	RETAINER .. Spring - 3/16 dia. groove
10	9541016	8	12	16	20	BRACKET .. Control lever - Formerly 8418278
11	179890	8	12	16	20	BOLT .. 1/2-13 x 2-1/4 hex. head
12	9522625	8	12	16	20	LEVER ASSEMBLY .. Injector control - Formerly 8215506
13	148401	8	12	16	20	BEARING .. Needle
14	148402	8	12	16	20	BEARING .. Needle
15	8028098	8	12	16	20	PIN .. Clevis - 1/2 x 1-3/32 in. long
16	148151	8	12	16	20	RETAINER .. Spring - 7/16 dia. groove
17	6101229	8	12	16	20	WASHER .. Flat - 1/2 - Formerly 103323 lockwasher

P.L. No. A15

INJECTOR CONTROL LINKAGE

EGB Governor Lever and Control Rod With
Layshaft Hand Control Lever On Left Bank
8-645E1,E4,E8;12-645E4;16-645E4,E4B;20-645E4,E4B,E7B,E9,E9B Engines

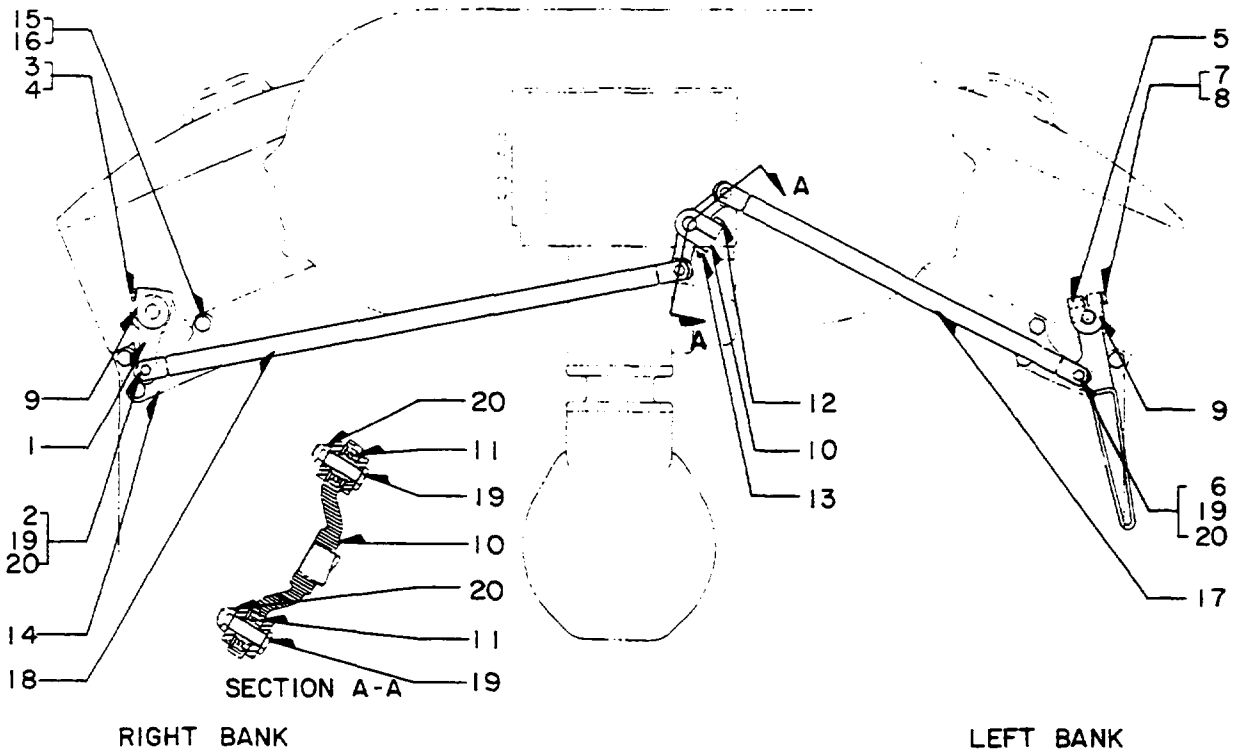


PLATE A15-4

Ref. No.	Part Number	Qty. Req.	Description
1	8451787	1	LEVER ASM. .. Manual control - Injector control shaft - Right bank
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451808	1	LEVER ASM. .. Hand control - Injector control shaft - Left bank
6	954285	1	BEARING .. Ball
7	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8451824	1	LEVER ASSEMBLY .. Governor to control rod
11	954285	2	BEARING .. Ball
12	181347	1	BOLT .. Control rod lever - 5/16-24 x 2 hex. head
13	8032716	1	NUT .. Lock - 5/16-24 hex.
14	8451755	2	BRACKET ASSEMBLY .. Support - Outer end bearing - See Page 1
15	181429	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/4 hex. head
16	6101229	8	WASHER .. Plain - 1/2
17	8253399	1	LINK ASSEMBLY .. Control rod - Left bank
18	8253398	1	LINK ASSEMBLY .. Control rod - Right bank
19	8080078	4	BOLT .. Link mounting - 5/16-24 x 1-17/32 hex. head
20	8032716	4	NUT .. Lock - 5/16-24 hex.
*21	8054047	2	SPACER .. Control lever to support bracket

P4101, P4032, P5609, P6953, P7218, P3363, P4599, P5518, P3712, P4673, P5754, P4680, P5879, P3656, 8366100F, 8335515F, 8461032

P.L. No. A15

INJECTOR CONTROL LINKAGE

EGB Governor Lever and Control Rod Applied
With Two Layshaft Hand Control Levers
12-645E1,E4,E4B,E8; 16-645E4,E8,E9,E9B Engines

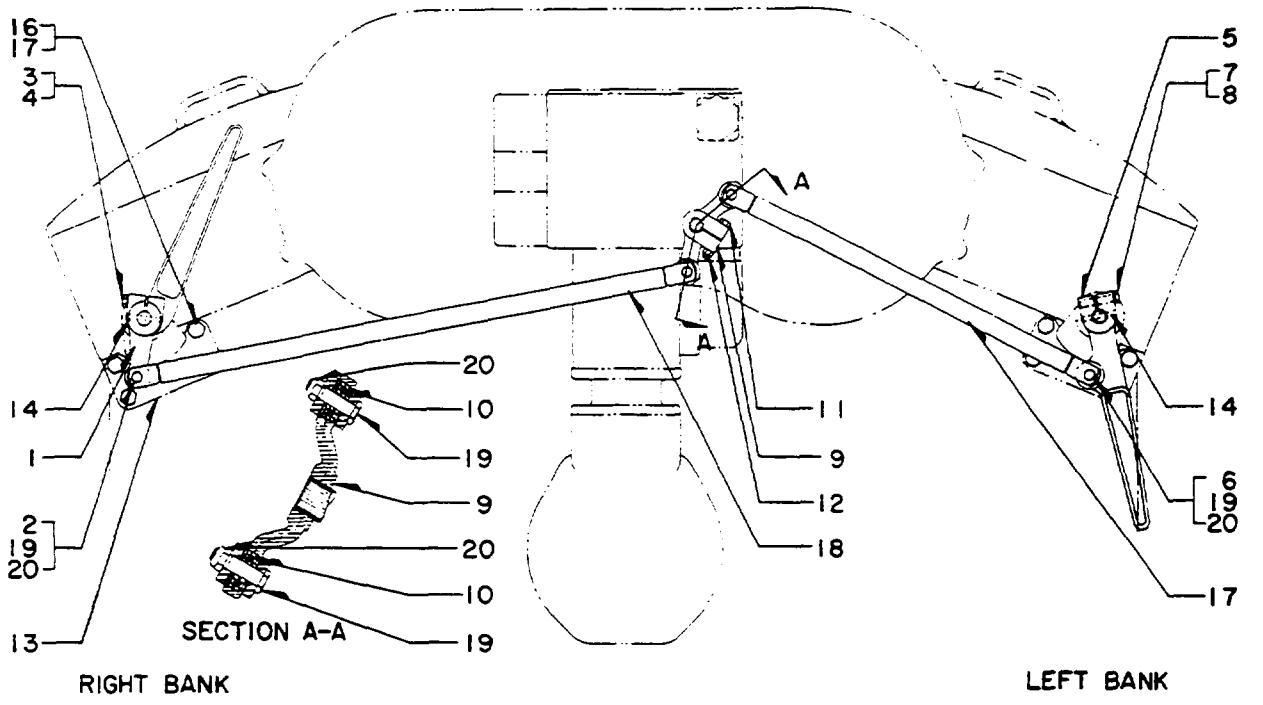


PLATE A15-5

Ref. No.	Part Number	Qty. Req.	Description
1	8451827	1	LEVER ASM. .. Hand control - Injector control shaft - Right bank
2	954285	1	BEARING .. Ball
3	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451808	1	LEVER ASM. .. Hand control - Injector control shaft - Left bank
6	954285	1	BEARING .. Ball
7	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
8	6101225	1	WASHER .. plain - 3/8
9	8451824	1	LEVER ASM. .. Governor to control rod
10	954285	2	BEARING .. Ball
11	181347	1	BOLT .. Control rod lever - 5/16-24 x 2 hex. head
12	8032716	1	NUT .. Lock - 5/16-24 hex.
13	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
14	103608	2	PIN .. Taper - No. 4 x 2 in. long
15	181429	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/4 hex. head
16	6101229	8	WASHER .. Plain - 1/2
17	8253399	1	LINK ASSEMBLY .. Control rod - Left bank
18	8253398	1	LINK ASSEMBLY .. Control rod - Right bank
19	8080078	4	BOLT .. Link mounting - 5/16-24 x 1-17/32 hex. head
20	8032716	4	NUT .. Lock - 5/16-24 hex.
*21	8054047	2	SPACER .. Control lever to support bracket

P5103, P5718, P6806, P5143, P6083, P7177, P5715, P6223, 8462040B, 8461041B

INJECTOR CONTROL LINKAGE

Previous PGA Governor Lever and Control Rod Applied
With Quadrant Layshaft Hand Control Lever on Right Bank
8,12,16-645E2 and 12,16,20-645E5 Engines

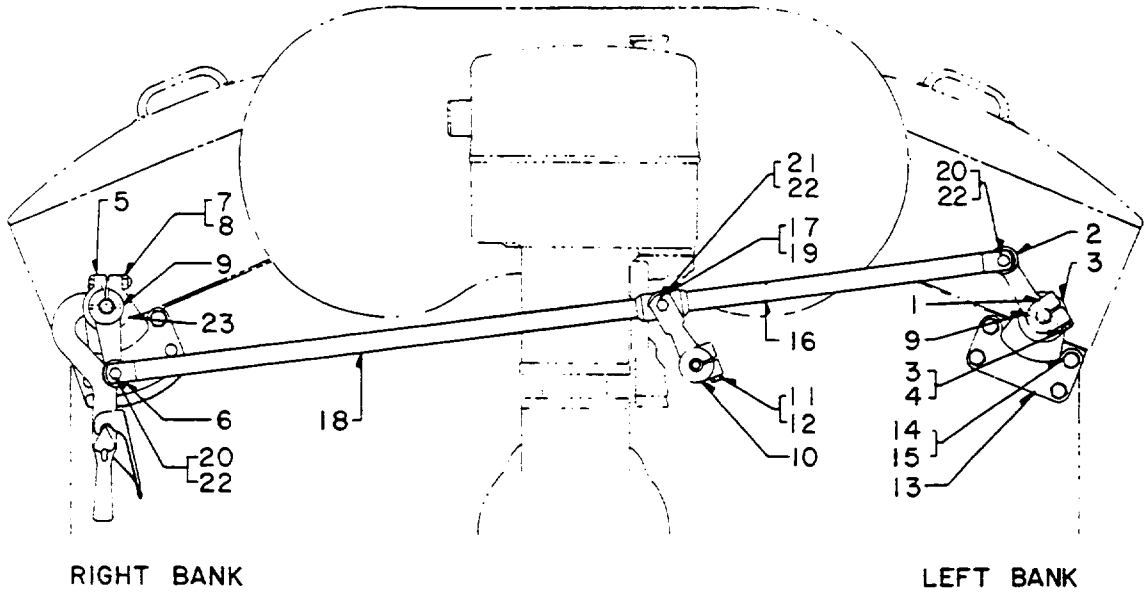


PLATE A15-6

Ref. No.	Part Number	Qty. Req.	Description
1	8453890	1	LEVER ASM. .. Manual control - Injector control shaft - Left bank - Formerly 8242222
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451749	1	LEVER ASM. .. Manual control - Injector control shaft - Right bank - Formerly 8194652
6	954285	1	BEARING .. Ball
7	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8215509	1	LEVER .. Governor to control rod
11	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
12	6101225	1	WASHER .. Plain - 3/8
13	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
14	181428	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/8 hex. head
15	6101229	8	WASHER .. Plain - 1/2
16	8451757	1	LINK ASM. .. Control - Left bank - Formerly 8329598
17	954285	1	BEARING .. Ball
18	8451756	1	LINK ASM. .. Control - Right bank - Formerly 8194649
19	954285	1	BEARING .. Ball
20	8080078	2	BOLT .. 5/16-24 x 1-17/32 hex. head
21	8194650	1	BOLT .. 5/16-24 x 2 hex. head
22	8032716	3	NUT .. Lock - 5/16-24 hex.
23	8054047	2	SPACER .. Control lever

8331269B

P.L. No. A15

INJECTOR CONTROL LINKAGE

Previous PGA Governor Lever and Control Rod Applied
With Single Layshaft Hand Control Lever on Right Bank
8-645E1,E2,E5,E6,12-645E2,E5,E7,16-645E2,E5,E6,E7,
and 20-645E5,E7 Engines

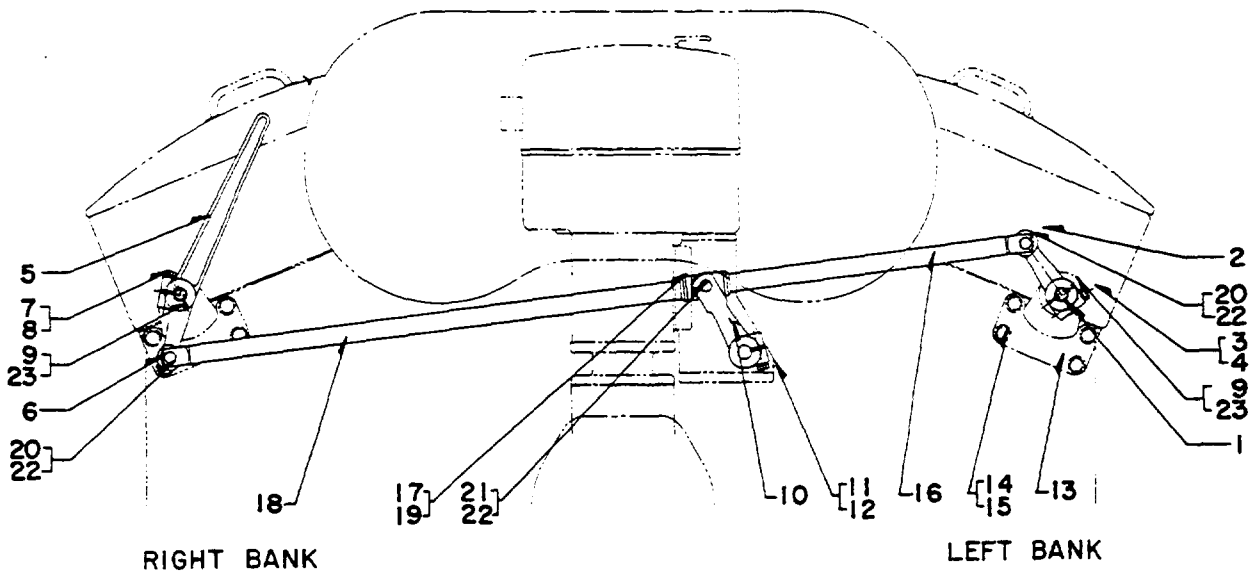


PLATE A15-7

Ref. No.	Part Number	Qty. Req.	Description
1	8451749	1	LEVER ASM. .. Manual control - Injector control shaft - Left bank
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain -3/8
5	8451739	1	LEVER ASM. .. Hand control - Injector control shaft - Right bank
6	954285	1	BEARING .. Ball
7	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8215509	1	LEVER .. Governor to control rod
11	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
12	6101225	1	WASHER .. Plain - 3/8
13	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
14	181428	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/8 hex. head
15	6101229	8	WASHER .. Plain - 1/2
16	8451757	1	LINK ASM. .. Control - Left bank
17	954285	1	BEARING .. Ball
18	8451756	1	LINK ASM. .. Control - Right bank
19	954285	1	BEARING .. Ball
20	8080078	2	BOLT .. 5/16-24 x 17/32 hex. head
21	8194650	1	BOLT .. 5/16-24 x 2 hex. head
22	8032716	3	NUT .. Lock - 5/16-24 hex.
23	8054047	2	SPACER .. Control lever

8449006A

P.L. No. A15

INJECTOR CONTROL LINKAGE

Current PG,PGA,PGR Governor Lever and Control Rod Applied with
Single Layshaft Hand Control Lever on Left Bank
8,12,16-645E1,E2,E5,E6;12,16,20-645E7;16,20-645E4B;16-645E8;20-645E5

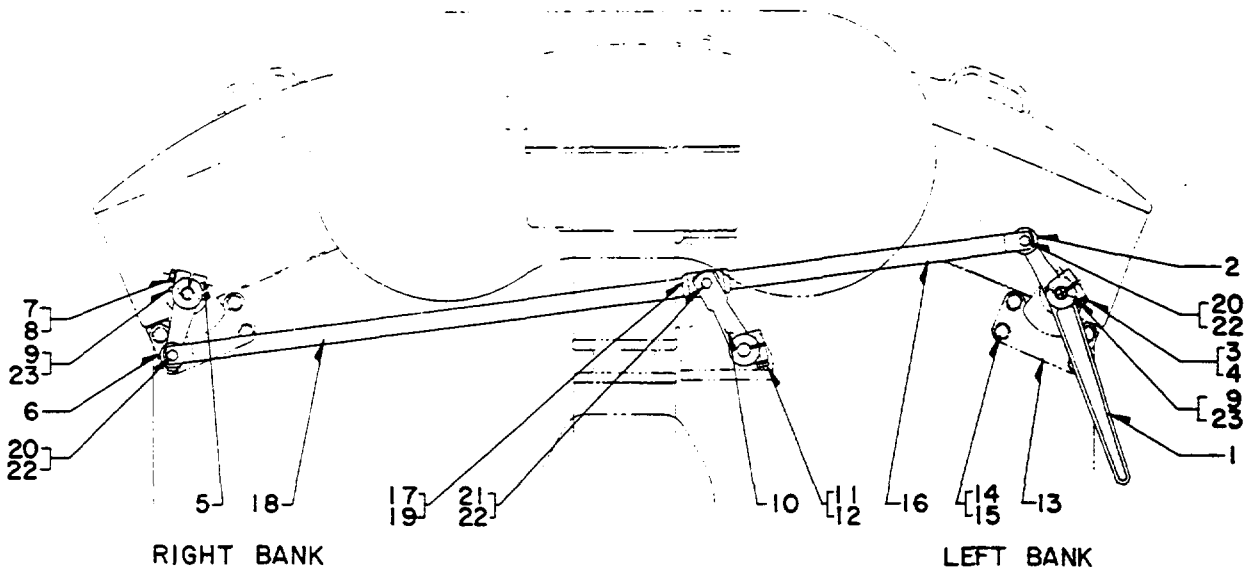


PLATE A15-8

Ref. No.	Part Number	Qty. Req.	Description
1	8451739	1	LEVER ASM. .. Hand control - Injector control shaft - Left bank
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451749	1	LEVER ASM. .. Manual control - Injector control shaft - Right bank
6	954285	1	BEARING .. Ball
7	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8215509	1	LEVER .. Governor to control rod
11	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
12	6101225	1	WASHER .. Plain - 3/8
13	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
14	181428	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/8 hex. head
15	6101229	8	WASHER .. Plain - 1/2
16	8451757	1	LINK ASM. .. Control - Left bank
17	954285	1	BEARING .. Ball
18	8451756	1	LINK ASM. .. Control - Right bank
19	954285	1	BEARING .. Ball
20	8080078	2	BOLT .. 5/16-24 x 17/32 hex. head
21	8194650	1	BOLT .. 5/16-24 x 2 hex. head
22	8032716	3	NUT .. Lock - 5/16-24 hex.
23	8054047	2	SPACER .. Control lever

8194881G, P5563, 8216110B, 8450827A, 8194882G, 8194970G

P.L. No. A15

INJECTOR CONTROL LINKAGE

Current PGA Governor Lever and Control Rod Applied
With Two Layshaft Hand Control Levers
8-645E1;8,12,16-645E2,E6;8,12,16-20-645E5,E7,E7B,E7C Engines

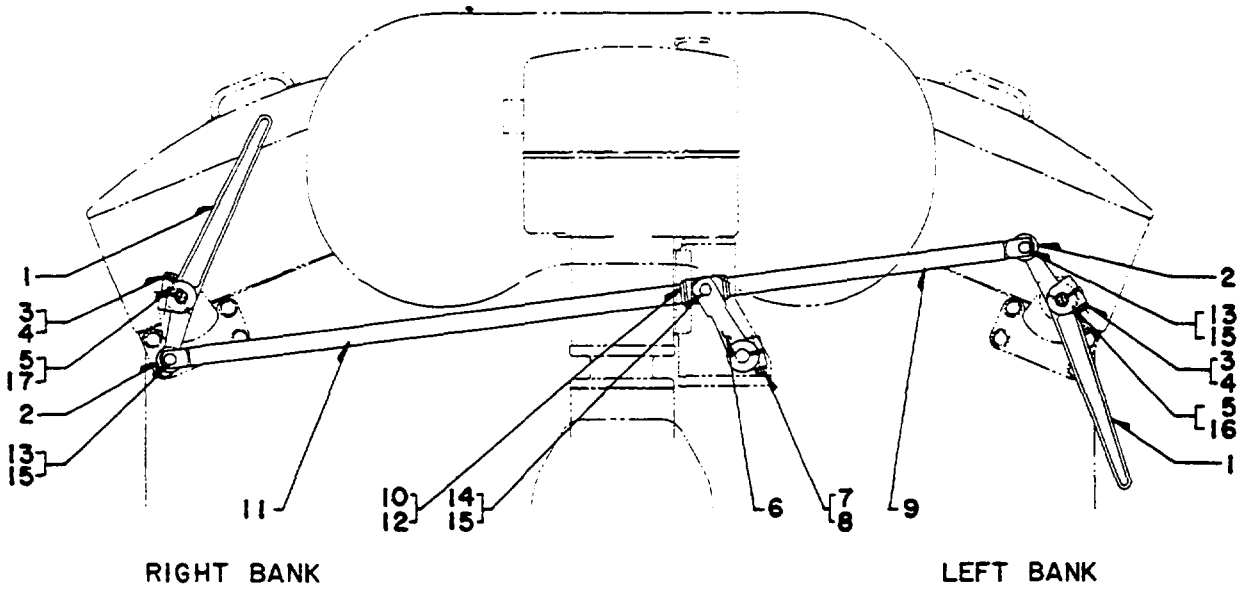


PLATE A15-9

Ref. No.	Part Number	Qty. Req.	Description
1	8451739	2	LEVER ASM. .. Hand control - Injector control shaft - Left and right bank
2	954285	2	BEARING .. Ball
3	181377	2	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	2	WASHER .. Plain - 3/8
5	103608	2	PIN .. Taper - No. 4 x 2 in. long
6	8215509	1	LEVER .. Governor to control rod
7	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	8451757	1	LINK ASM. .. Control - Left Bank
10	954285	1	BEARING .. Ball
11	8451756	1	LINK ASM. .. Control - Right bank
12	954285	1	BEARING .. Ball
13	8080078	2	BOLT .. 5/16-24 x 1-17/32 hex. head
14	8194650	1	BOLT .. 5/16-24 x 2 hex. head
15	8032716	3	NUT .. Lock - 5/16-24 hex.
16	8054047	1	SPACER .. Control lever
17	8457384	1	SPACER .. Control lever

8456457

P.L. No. A15

INJECTOR CONTROL LINKAGE

UG8 Governor Lever and Control Rod with
Layshaft Hand Control Lever on Left Bank
8,12,16-645E1,E8;8,12,16,20-645E4,E4B;8-645E6;12,16,20-645E9,E9B;16,20-645E10B;20-645E7

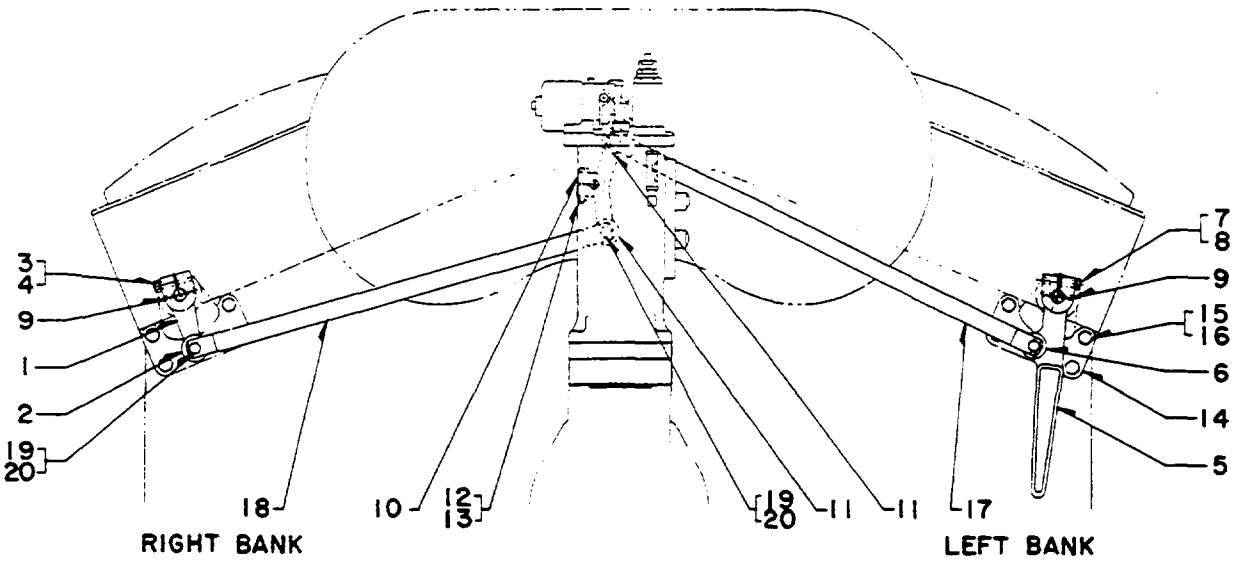


PLATE A15-10

Ref. No.	Part Number	Qty. Req.	Description
1	8451787	1	LEVER ASM. .. Manual control - Injector control shaft - Right bank
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	2	WASHER .. Plain - 3/8
5	8451808	1	LEVER ASM. .. Hand control - Injector control shaft - Left bank
6	954285	1	BEARING .. Ball
7	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8451861	1	LEVER ASM. .. Governor to control rod - Formerly 8451681
11	954285	2	BEARING .. Ball
12	181345	1	BOLT .. Lever clamping - 5/16-24 x 1-3/4 hex. head
13	8032716	1	NUT .. Lock - 5/16-24 hex.
14	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
15	----	8	BOLT .. Bracket to crankcase ϕ181428 .. 1/2-20 x 1-1/8 hex. head ϕ181429 .. 1/2-20 x 1-1/4 hex. head
16	6101229	8	WASHER .. Plain - 1/2
17	8212699	1	LINK ASM. .. Control - Left bank
18	8212700	1	LINK ASM. .. Control - Right bank
19	8080078	4	BOLT .. Link mounting - 5/16-24 x 1-17/32 hex. head
20	8032716	4	NUT .. Lock - 5/16-24 hex.
*21	8054047	2	SPACER .. Control lever to support bracket

8336253C, 8396053D, 8409682D, 8394009G, 8399779F, 8451125B

P.L. No. A15

INJECTOR CONTROL LINKAGE

UG8 Governor Lever and Control Rod with
Layshaft Hand Control Lever on Right Bank
8,12,16-645E1,E2,E6;16-645E4;20-645E7

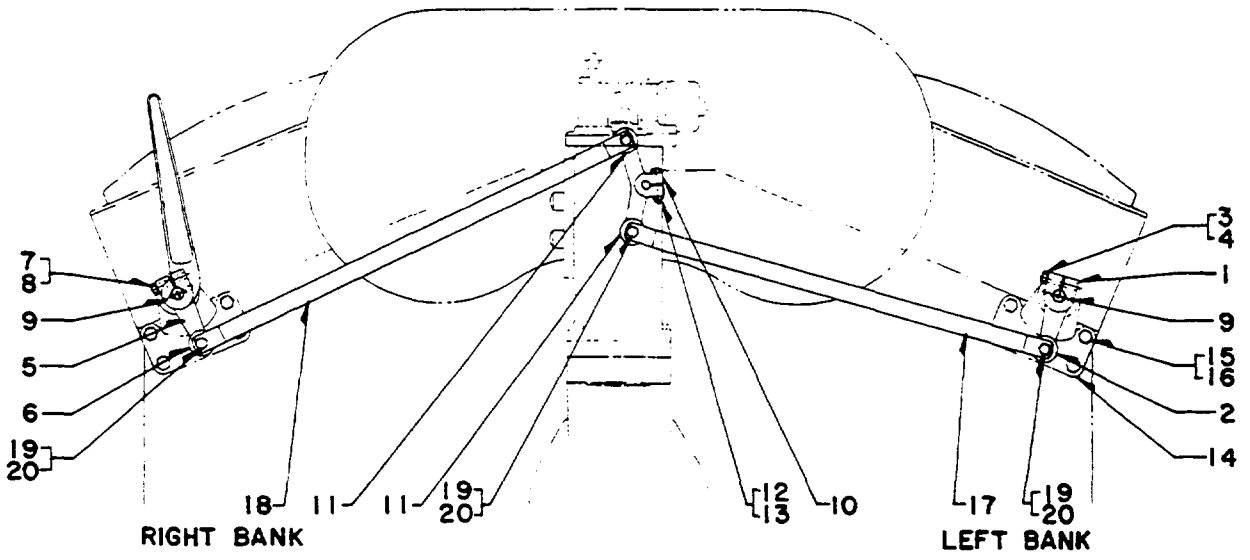


PLATE A15-11

Ref. No.	Part Number	Qty. Req.	Description
1	8451787	1	LEVER ASM. .. Manual control - Injector control shaft - Left bank Formerly 8064657
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451827	1	LEVER ASM. .. Hand control - Injector control shaft - Right bank - Formerly 8077321
6	954285	1	BEARING .. Ball
7	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	103608	2	PIN .. Taper - No. 4 x 2 in. long
10	8451861	1	LEVER ASM. .. Governor to control rod - Formerly 8212626
11	954285	2	BEARING .. Ball
12	181345	1	BOLT .. Lever clamping - 5/16-24 x 1-3/4 hex. head
13	8032716	1	NUT .. Lock - 5/16-24 hex.
14	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
15	----	8	BOLT .. Bracket to crankcase ϕ181428 .. 1/2-20 x 1-1/8 hex. head ϕ181429 .. 1/2-20 x 1-1/4 hex. head
16	6101229	8	WASHER .. Plain - 1/2
17	8212700	1	LINK ASM. .. Control - Left bank
18	8212699	1	LINK ASM. .. Control - Right bank
19	8080078	4	BOLT .. Link mounting - 5/16-24 x 1-17/32 hex. head
20	8032716	4	NUT .. Lock 5-16/24 hex.
*21	8054047	2	SPACER .. Control lever to support bracket

8215028F, P2304, 8215029F, 8335960D, 8212647G, 8425508A

INJECTOR CONTROL LINKAGE

LSG Governor Lever and Control Rod
16-645E4 (MP36)

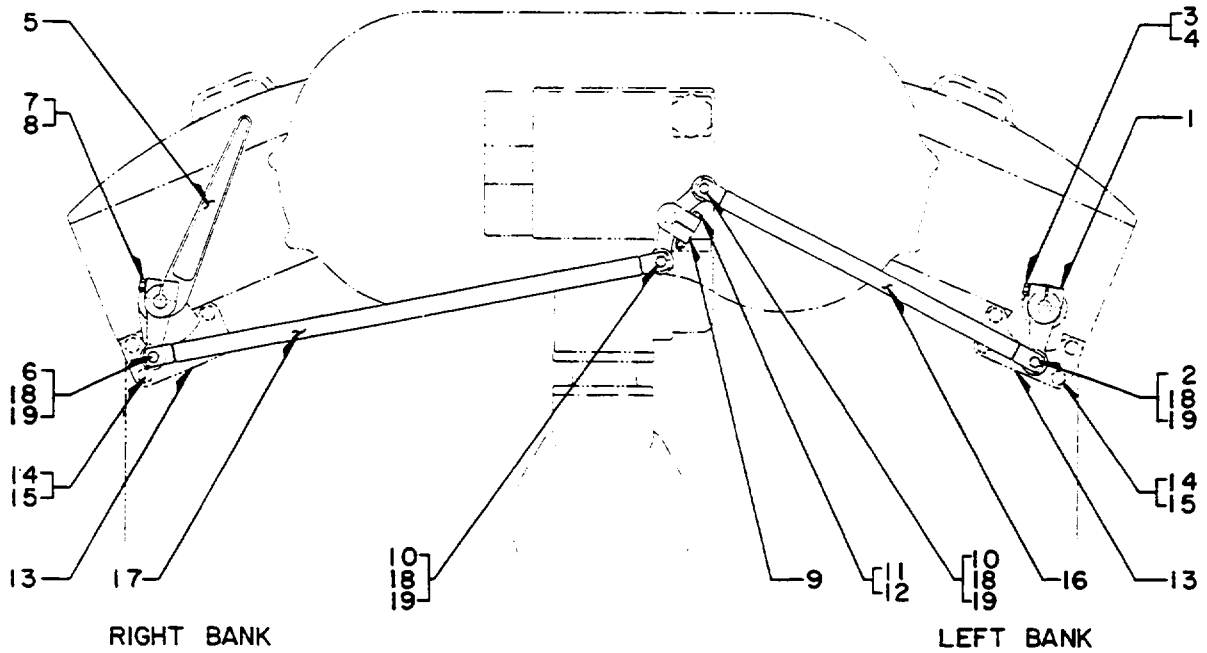


PLATE A15-12

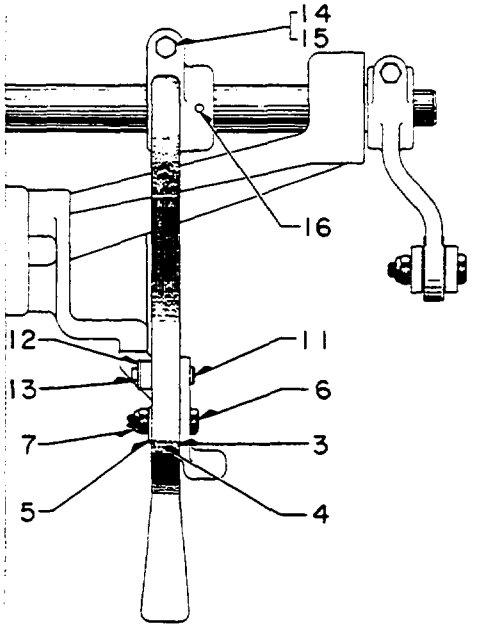
Ref. No.	Part Number	Qty. Req.	Description
1	8451787	1	LEVER ASM. .. Manual control - Injector control shaft - Left bank
2	954285	1	BEARING .. Ball
3	181377	1	BOLT .. Lever clamping - 3/8-24 x 1-3/4 hex. head
4	6101225	1	WASHER .. Plain - 3/8
5	8451827	1	LEVER ASM. .. Hand control - Injector control shaft - Right bank -
6	954285	1	BEARING .. Ball
7	179845	1	BOLT .. Lever clamping - 3/8-16 x 1-3/4 hex. head
8	6101225	1	WASHER .. Plain - 3/8
9	8451824	1	LEVER ASSEMBLY .. Governor to control rod
10	954285	2	BEARING .. Ball
11	181347	1	BOLT .. Lever clamping - 5/16-24 x 2 hex. head
12	8032716	1	NUT .. Lock - 5/16-24 hex.
13	8451755	2	BRACKET ASM. .. Support - Outer end bearing - See Page 1
14	181429	8	BOLT .. Bracket to crankcase - 1/2-20 x 1-1/4 hex. head
15	6101229	8	WASHER .. Plain - 1/2
16	8253399	1	LINK ASM. .. Control rod - Left bank
17	8253398	1	LINK ASM. .. Control rod - Right bank
18	8080078	4	BOLT .. Link mounting - 5/16-24 x 1-17/32 hex. head
19	8032716	4	NUT .. Lock 5-16/24 hex.
*20	103608	2	PIN .. Taper - No. 4 x 2 in. long

8260329F

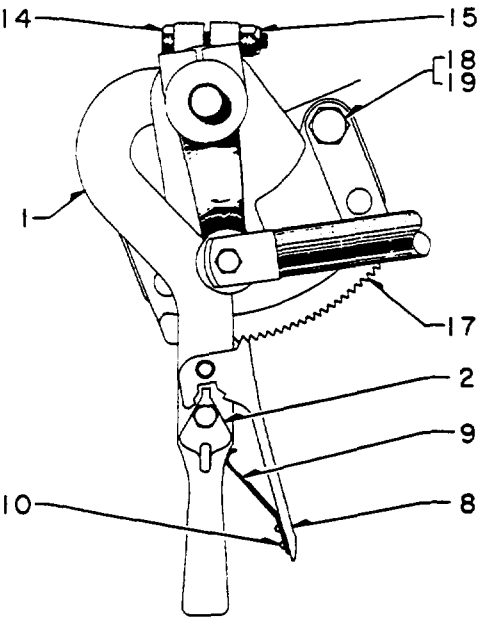
P.L. No. A15

INJECTOR CONTROL LINKAGE

Quadrant Layshaft Hand Control Lever
8,12,16-645E2 and 12,16,20-645E5 Marine Engines



SIDE VIEW



END VIEW

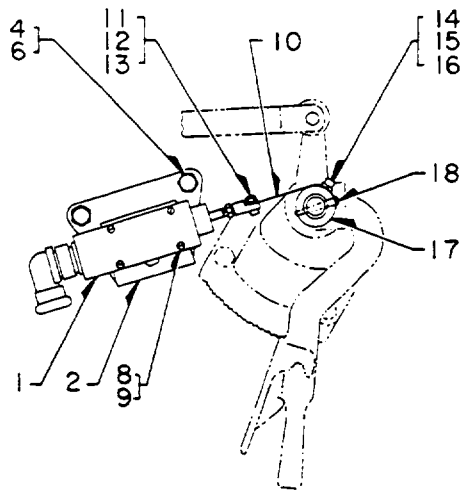
PLATE A15-13

Ref. No.	Part Number	Qty. Req.	Description
1	3324787	1	LEVER .. Hand control - Injector
2	3324770	1	LOCK .. Latch - Hand control lever
3	104918	1	BALL .. Latch lock
4	3306518	1	SPRING .. Ball
5	3324773	1	RETAINER .. Spring - Ball
6	181319	1	BOLT .. Retainer and lock mounting - 1/4-28 x 1-1/2 hex. head
7	8032715	1	NUT .. Lock - 1/2-28 hex.
8	3324789	1	LATCH ASSEMBLY .. Hand control lever - LL and LR engines
* 8	3325046	1	LATCH ASSEMBLY .. Hand control lever - RR and RL engines
9	3267563	2	SPRING SET .. Lever latch
10	216336	4	RIVET .. Spring mounting - 1/8 x 7/16
11	3324772	1	PIN .. Latch - Fulcrum
12	103339	1	WASHER .. Plain - 1/4
13	103361	1	PIN .. Cotter - 1/16 x 1/2
14	181379	1	BOLT .. Lever mounting - 3/8-24 x 2 hex. head
15	8032717	1	NUT .. Lock - 3/8-24 hex.
16	103608	1	PIN .. Taper - Lever mounting - No. 4 x 2
17	3324785	1	QUADRANT .. Hand control lever
18	181435	4	BOLT .. Quadrant - 1/2-20 x 2 hex. head
19	6101229	4	WASHER .. Plain - 1/2

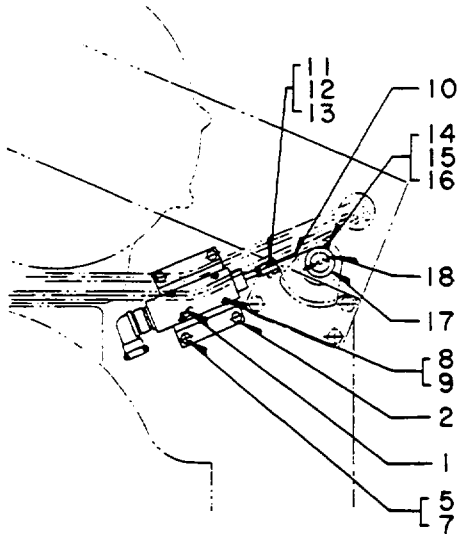
8318088A, 8318089A

INJECTOR CONTROL LINKAGE

Throttle Position Indicator Application
12,16,20-645E5;16-645E1,E2,E4;20-645E7



Indicator With Hand Control Lever Application



Indicator Without Hand Control Lever Application

PLATE A15-14

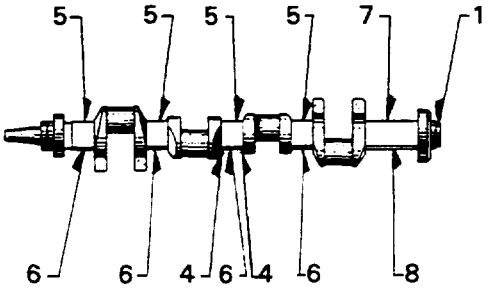
Ref. No.	Part Number	Qty. Req.		Description
		A	-	Throttle position indicator with hand control lever application on left bank accessory end
		-	B	Throttle position indicator without hand control lever application on left bank accessory end
1	8359061	1	1	TRANSDUCER .. Position indicator
2	8359052	1	-	BRACKET ASM. .. Tranducer mounting
3	8367491	-	1	BRACKET ASM. .. Tranducer mounting
4	8271149	3	-	BOLT .. 1/2-20 x 1 hex. head - Includes nylon insert
5	181333	-	4	BOLT .. 5/16-24 x 5/8 hex. head
6	6101229	3	-	WASHER .. Plain - 1/2
7	103320	-	4	WASHER .. Lock - 5/16
8	117278	4	4	SCREW .. No. 10-24 x 2-1/2 fil. head slotted
9	8032814	4	4	NUT .. Lock - No. 10-24 hex.
10	8359046	1	1	TAPE .. Draw
11	9421616	1	1	SCREW .. No. 8-32 x 5/8 hex. socket head
12	114986	1	1	WASHER .. Plain - No. 8
13	8032811	1	1	NUT .. Lock - No. 8-32 hex.
14	442036	1	1	SCREW .. No. 8-32 x 1/2 hex. socket head
15	106496	1	1	WASHER .. Lock - No. 8
16	8364335	1	1	WASHER .. Special - 1/2 square - 3/16 I.D. x 11 gauge
17	8359053	1	1	COLLAR .. Draw tape
18	103607	1	1	PIN .. Taper - No. 4 x 1-3/4 in. long

8359045B, P2308, 8367561, P3766

Parts List No. B18

CRANKSHAFT, MAIN BEARINGS, AND MAIN BEARING CAPS

Crankshaft and Main Bearings - 8-645 Engines



Accessory Drive End — Camshaft Drive End

PLATE B18-1

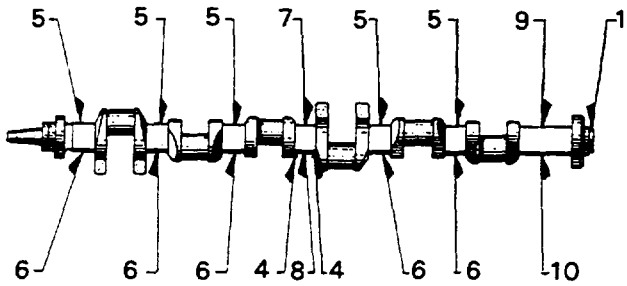
Ref. No.	Part Number	Qty. Req.	Description
1	9546459	1	CRANKSHAFT .. Engine - Standard - Replaces 8235623, 8235793, or 8434197
ϕ1	8440183	1	CRANKSHAFT .. Engine - A.B.S. approved - Replaces 8440206
ϕ1	8440184	1	CRANKSHAFT .. Engine - Lloyd's approved - Replaces 8440207
†ϕ1	9522073	1	CRANKSHAFT .. Engine - Stubless (male pilot) - Formerly 9522074
*2	426318	4	PLUG .. Pipe - 3/8 - Hex. socket
*3	8348618	1	PLUG .. Pipe - 1/4 - Square socket
4	8028006	2	COLLAR .. Thrust - Standard thickness - Consists of two halves 8081195 .. .015 O.S. 8141702 .. .030 O.S.
5	8455862	4	BEARING .. Main - Front and intermediate - Upper - Standard I.D. 8455863 .. .031 U.S. 8455865 .. .093 U.S. 8455864 .. .062 U.S. 8455866 .. .125 U.S.
6	8455666	4	BEARING .. Main - Front and intermediate - Lower - Standard I.D. 8455683 .. .031 U.S. 8455685 .. .093 U.S. 8455684 .. .062 U.S. 8455686 .. .125 U.S.
7	8455844	1	BEARING .. Main - Rear - Upper - Standard I.D. 8455845 .. .031 U.S. 8455847 .. .093 U.S. 8455846 .. .062 U.S. 8455848 .. .125 U.S.
8	8455665	1	BEARING .. Main - Rear - Lower - Standard I.D. 8455679 .. .031 U.S. 8455681 .. .093 U.S. 8455680 .. .062 U.S. 8455682 .. .125 U.S.
*9	8491160	1	KIT .. Upper main bearing - Standard I.D. - Consists of all the upper main bearings (Ref. Nos. 5 and 7) in the quantities listed above
*10	8491161	1	KIT .. Lower main bearing - Standard I.D. - Consists of all the lower main bearings (Ref. Nos. 6 and 8) in the quantities listed above

† For applicable stubshaft, see Parts List 22.

P.L. No. B18

CRANKSHAFT, MAIN BEARINGS, AND MAIN BEARING CAPS

Crankshaft and Main Bearings - 12-645 Engines



Accessory Drive End — Camshaft Drive End

PLATE B18-2

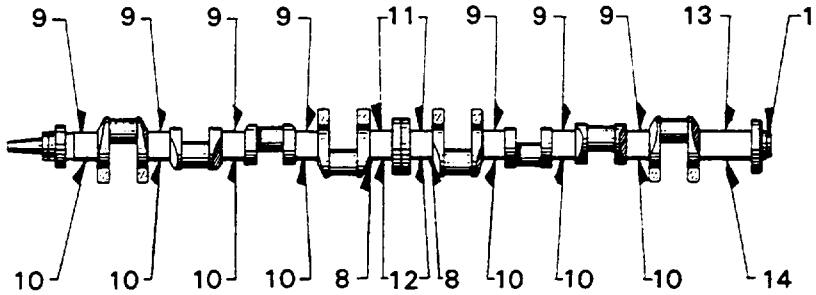
Ref. No.	Part Number	Qty. Req.	Description
1	9547357	1	CRANKSHAFT .. Engine - Standard - Replaces 8034709 or 8434198
ø1	8440167	1	CRANKSHAFT .. Engine - A.B.S. approved - Replaces 8440177
ø1	8440168	1	CRANKSHAFT .. Engine - Lloyd's approved - Replaces 8440178
†ø1	8482866	1	CRANKSHAFT .. Engine - Stubless (male pilot) - Formerly 8482867
*2	426318	6	PLUG .. Pipe - 3/8 - Hex. socket
*3	8348618	1	PLUG .. Pipe - 1/4 - Square Socket
4	8028419	2	COLLAR .. Thrust - Standard thickness - Consists of two halves 8081194 .. .015 oversize 8146108 .. .030 oversize
5	8455862	5	BEARING .. Main - Front and intermediate - Upper - Standard I.D. 8455863 .. .031 U.S. 8455865 .. .093 U.S. 8455864 .. .062 U.S. 8455866 .. .125 U.S.
6	8455666	5	BEARING .. Main - Front and intermediate - Lower - Standard I.D. 8455683 .. .031 U.S. 8455685 .. .093 U.S. 8455684 .. .062 U.S. 8455686 .. .125 U.S.
7	8455850	1	BEARING .. Main - Center - Upper - Standard I.D. 8455851 .. .031 U.S. 8455853 .. .093 U.S. 8455852 .. .062 U.S. 8455854 .. .125 U.S.
8	8455667	1	BEARING .. Main - Center - Lower - Standard I.D. 8455687 .. .031 U.S. 8455689 .. .093 U.S. 8455688 .. .062 U.S. 8455690 .. .125 U.S.
9	8455844	1	BEARING .. Main - Rear - Upper - Standard I.D. 8455845 .. .031 U.S. 8455847 .. .093 U.S. 8455846 .. .062 U.S. 8455848 .. .125 U.S.
10	8455665	1	BEARING .. Main - Rear - Lower - Standard I.D. 8455679 .. .031 U.S. 8455681 .. .093 U.S. 8455680 .. .062 U.S. 8455682 .. .125 U.S.
*11	8455081	1	KIT .. Upper main bearing - Standard I.D. - Contains all the upper main bearings (Ref. Nos. 5,7, and 9) in the quantities listed above
*12	8455083	1	KIT .. Lower main bearing - Standard I.D. - Contains all the lower main bearings (Ref. Nos. 6,8, and 10) in the quantities listed above

† *For applicable stubshaft, See Parts List 22.*

P.L. No. B18

CRANKSHAFT, MAIN BEARINGS AND MAIN BEARING CAPS

Crankshaft and Main Bearings - 16-645 Engines



Accessory Drive End — Camshaft Drive End

PLATE A18-3

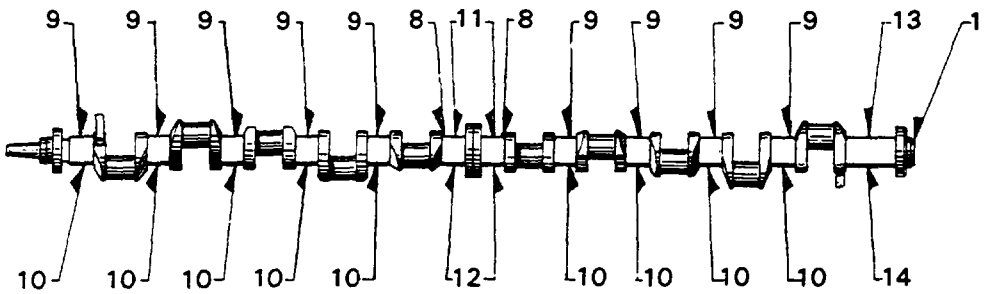
Ref. No.	Part Number	Qty. Req.	Description
1	8034708	1	CRANKSHAFT .. Engine - Standard - Replaces 8375901
ϕ1	8440023	1	CRANKSHAFT .. Engine - A.B.S. approved - Replaces 8440037
ϕ1	8386713	1	CRANKSHAFT .. Engine - Lloyd's approved - Replaces 8386711
†ϕ1	9310758	1	CRANKSHAFT .. Engine - Stubless (male pilot) - A.B.S. approved - Formerly 9310844
*2	426318	8	PLUG .. Pipe - 3/8 - Hex. socket
*3	8365851	6	PLATE .. Lock
*4	223784	6	BOLT .. Hex. head 1 - 14 x 2-3/4 - Crankshaft connecting
*5	8028398	3	DOWEL .. Tapered - With 1-1/2 - 12 threaded end - 1.800 end dia. 8148445 .. .015 O.S. 8148444 .. .030 O.S. 8167261 .. .020 O.S. 8298210 .. .040 O.S. 8298209 .. .025 O.S. 8298211 .. .050 O.S.
*6	8028399	3	NUT .. Hex. 1-1/2 - 12
*7	8348618	1	PLUG .. Pipe - 1/4 - Square socket
8	8028006	2	COLLAR .. Thrust - Standard thickness - Consists of two halves 8081195 .. .015 O.S. 8141702 .. .030 O.S.
9	8455862	7	BEARING .. Main - Front and intermediate - Upper - Standard I.D. 8455863 .. .031 U.S. 8455865 .. .093 U.S. 8455864 .. .062 U.S. 8455866 .. .125 U.S.
10	8455666	7	BEARING .. Main - Front and intermediate - Lower - Standard I.D. 8455683 .. .031 U.S. 8455685 .. .093 U.S. 8455684 .. .062 U.S. 8455686 .. .125 U.S.
11	8455856	2	BEARING .. Main - Center - Upper - Standard I.D. 8455857 .. .031 U.S. 8455859 .. .093 U.S. 8455858 .. .062 U.S. 8455860 .. .125 U.S.
12	8455668	2	BEARING .. Main - Center - Lower - Standard I.D. 8455691 .. .031 U.S. 8455693 .. .093 U.S. 8455692 .. .062 U.S. 8455694 .. .125 U.S.
13	8455844	1	BEARING .. Main - Repair - Upper - Standard I.D. 8455845 .. .031 U.S. 8455847 .. .093 U.S. 8455846 .. .062 U.S. 8455848 .. .125 U.S.
14	8455665	1	BEARING .. Main - Rear - Lower - Standard I.D. 8455679 .. .031 U.S. 8455681 .. .093 U.S. 8455680 .. .062 U.S. 8455682 .. .125 U.S.
*15	8452186	1	KIT .. Upper main bearing - Standard I.D. - Contains all the upper main bearings (Ref. Nos. 9,11, and 13) in the quantities listed above
*16	8452210	1	KIT .. Lower main bearing - Standard I.D. - Contains all the lower main bearings (Ref. Nos. 10,12, and 14) in the quantities listed above

† For applicable stubshaft, see Parts List 22.

P.L. No. B18

CRANKSHAFT,MAIN BEARINGS, AND MAIN BEARING CAPS

Crankshaft and Main Bearings - 20-645 Engines



Accessory Drive End — Camshaft Drive End

PLATE A18-4

Ref. No.	Part Number	Qty. Req.	Description
1	8360783	1	CRANKSHAFT .. Engine - Standard - Replaces 8376124
ϕ1	8439963	1	CRANKSHAFT .. Engine - A.B.S. approved - Replaces 8439974
ϕ1	9330925	1	CRANKSHAFT .. Engine - Lloyd's approved - Replaces 9330924
*2	426318	10	PLUG .. Pipe - 3/8 - Hex. socket
3	8365851	6	PLATE .. Lock
4	223784	6	BOLT .. Hex. head 1 - 14 x 2-3/4 - Crankshaft connecting
5	8028398	3	DOWEL .. Tapered - With 1-1/2 - 12 threaded end - 1.800 end dia. 8148445 .. .015 O.S. 8148444 .. .030 O.S. 8167261 .. .020 O.S. 8298210 .. .040 O.S. 8298209 .. .025 O.S. 8298211 .. .050 O.S.
6	8028399	3	NUT .. Hex. 1-1/2 - 12
7	8348618	1	PLUG .. Pipe - 1/4 - Square socket
8	8028006	2	COLLAR .. Thrust - Standard thickness 8081195 .. .015 O.S. 8141702 .. .030 O.S.
9	8455862	9	BEARING .. Main - Front and intermediate - Upper - Standard I.D. 8455863 .. .031 U.S. 8455865 .. .093 U.S. 8455864 .. .062 U.S. 8455866 .. .125 U.S.
10	8455666	9	BEARING .. Main - Front and intermediate - Lower - Standard I.D. 8455683 .. .031 U.S. 8455685 .. .093 U.S. 8455684 .. .062 U.S. 8455686 .. .125 U.S.
11	8455856	2	BEARING .. Main - Center - Upper - Standard I.D. 8455857 .. .031 U.S. 8455859 .. .093 U.S. 8455858 .. .062 U.S. 8455860 .. .125 U.S.
12	8455668	2	BEARING .. Main - Center - Lower - Standard I.D. 8455691 .. .031 U.S. 8455693 .. .093 U.S. 8455692 .. .062 U.S. 8455694 .. .125 U.S.
13	8455844	1	BEARING .. Main - Rear - Upper - Standard I.D. 8455845 .. .031 U.S. 8455847 .. .093 U.S. 8455846 .. .062 U.S. 8455848 .. .125 U.S.
14	8455665	1	BEARING .. Main - Rear - Lower - Standard I.D. 8455679 .. .031 U.S. 8455681 .. .093 U.S. 8455680 .. .062 U.S. 8455682 .. .125 U.S.
*15	9536454	1	KIT .. Upper main bearing - Standard I.D. - Contains all the upper main bearings (Ref. Nos. 9,11, and 13) in the quantities listed above
*16	8459837	1	KIT .. Lower main bearing - Standard I.D. - Contains all the lower main bearings (Ref. Nos. 10,12, and 14) in the quantities listed above

CRANKSHAFT, MAIN BEARINGS, AND MAIN BEARING CAPS

Main Bearing Caps - 645 Engines

8-645 Engines

12-645 Engines

16-645 Engines

20-645 Engines

Accessory Drive End — Camshaft Drive End

PLATE A18-5

NOTE: Bearing caps have a rough bore and must be line-bored at assembly.

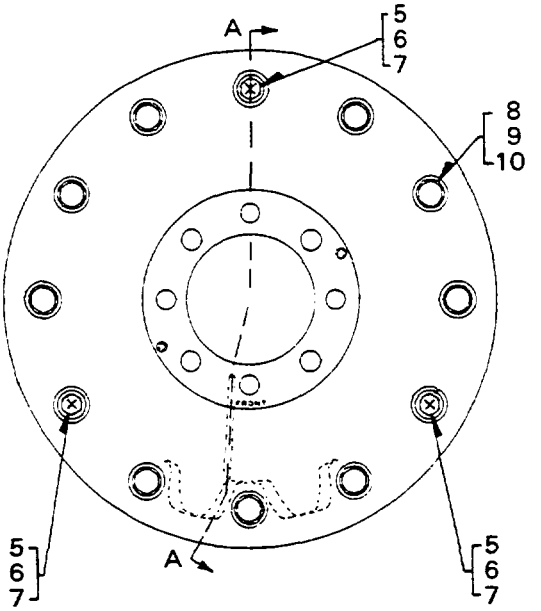
Main Bearing Journal Location	Main Bearing Cap Part Number			
	8-645 Engines	12-645 Engines	16-645 Engines	20-645 Engines
1	8476509	8476509	8476509	8476509
2	8476509	8476509	8476509	8476509
3	8476511	8476509	8476509	8476509
4	8476509	8476508	8476509	8476509
5	8476510	8476509	8476507	8476509
6	–	8476509	8476507	8476507
7	–	8476510	8476509	8476507
8	–	–	8476509	8476509
9	–	–	8476509	8476509
10	–	–	8476510	8476509
11	–	–	–	8476509
12	–	–	–	8476510

For main bearing cap studs, nuts and washers, see Parts List 01.

Parts List No.B20

HARMONIC BALANCER AND GEAR DAMPER ASSEMBLIES

Gear Damper
645E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B, and E10B Engines



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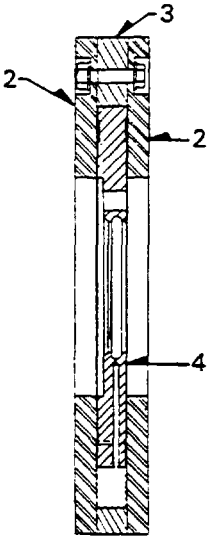


Section A-A

PLATE B20-1

Ref. No.	Part Number	Qty. Req.	Description
1	9323945	1	DAMPER ASM. .. Gear - Replaces 8452042 and 8404560 viscous dampers
2	9323944	2	RING .. Outer
3	9323943	1	RING .. Intermediate
4	9323942	1	SPIDER .. Gear damper
5	9338722	3	BOLT .. Hex. head 5/8 - 11 x 2.938
6	9319830	6	WASHER .. Flat - 5/8
7	102639	3	NUT .. Hex. - 5/8 - 11
8	271615	9	BOLT .. Hex. head - 3/4 - 10 x 3
9	9319829	18	WASHER .. Flat - 3/4
10	220081	9	NUT .. Hex. - 3/4 - 10
*11	8168822	AR	COATING .. 1 qt. - Used on all internal rubbing surfaces

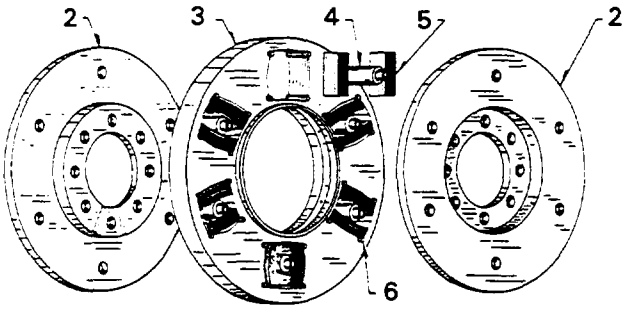
GEAR DAMPER MOUNTING

		A	-	Previous Design - Crankshafts with Four Dowel Holes and Four Tapped Holes
		-	B	Current Design - Crankshafts with Eight Tapped Holes
*12	8028241	1	-	RETAINER .. Dowel
*13	8028307	4	-	DOWEL .. 1.000 dia. x 2-1/4 in. long 8082449 .. .005 O.S. 8082447 .. .015 O.S. 8158468 .. .030 O.S. 8082450 .. .010 O.S. 8158467 .. .020 O.S.
*14	8028318	4	-	BOLT .. Hex. head - 1/2 - 20 x 7/8 - Dowel retainer mounting
*15	8028317	4	-	BOLT .. Hex. head - 7/8 - 14 x 2-1/2 - Drilled head
*16	8438865	-	8	BOLT .. Hex. head - 7/8 - 14 x 2-1/2 - Crankshafts with integral stubshaft
*16	223771	-	8	BOLT .. Hex. head - 7/8 - 14 x 3 - 1/4 - Crankshafts with bolt-on stubshaft
*17	8174659	4	8	WASHER .. Flat - 7/8
*18	8116738	AR	-	WIRE .. Lock - 3/64 dia. x 500 ft.

P.L. No. B20

HARMONIC BALANCER AND GEAR DAMPER ASSEMBLIES

Harmonic Balancer
8,12,16-645E1 Engines



Ref. No. 1

PLATE B20-2

Ref. No.	Part Number	Qty. Req.	Description
†1	8194330	1	BALANCER ASM. .. Harmonic - "Six Pack" type - Formerly 8340877 - See note below
2	8251608	2	COUPLING .. Balancer
3	8251607	1	HOUSING .. Spring
4	8028240	6	PIN .. Push - 1.500 dia. x 1.003 dia. x 3-19/32 long 8373928 .. .005 O.S. (1.008)
5	8028783	1008	SPRING .. Drive - 2.375 x 4 x .020
6	8194085	24	PIN .. Spring - .5015 dia. x 2.385 long 8247359 .. .0025 O.S. 8437104 .. .0075 O.S. 8194086 .. .0050 O.S. 8194087 .. .0100 O.S.

HARMONIC BALANCER MOUNTING

		A	-	Previous Design - Crankshafts with Four Dowel Holes and Four Tapped Holes
		-	B	Current Design - Crankshafts with Eight Taped Holes
*7	8028241	1	-	RETAINER .. Dowel
*8	8028307	4	-	DOWEL .. 1.000 dia. x 2-1/4 in. long 8082449 .. .005 O.S. 8082447 .. .015 O.S. 8158468 .. .030 O.S. 8082450 .. .010 O.S. 8158467 .. .020 O.S.
*9	8028318	4	-	BOLT .. Hex. head - 1/2 - 20 x 7/8 - Dowel retainer mounting
*10	8028317	4	-	BOLT .. Hex. head - 7/8 - 14 x 2-1/2 - Drilled head
*11	8438865	-	8	BOLT .. Hex. head - 7/8 - 14 x 2-1/2 - Crankshafts with integral stubshaft
*11	223771	-	8	BOLT .. Hex. head - 7/8 - 14 x 3-1/4 - Crankshafts with bolt-on stubshaft
*12	8174659	4	8	WASHER .. Flat - 7/8
*13	8116738	AR	-	WIRE .. Lock - 3/64 dia. x 500 ft.

† When repair or replacement is required of a "Three-Pack" type balancer, it is recommended to convert to the "Six-Pack" type - 8194330 balancer.

Parts List No. B22

ACCESSORY DRIVE GEAR ASSEMBLY

Accessory Drive Gear Assembly Applied to Crankshafts with Integral Stubshafts
Four-Spring Type Gear
8,12,16-645E1,E2,E6,E8; 8,12-645E4,E4B,E5,E7,E7B,E7C; 12-645E9,E9B Engines

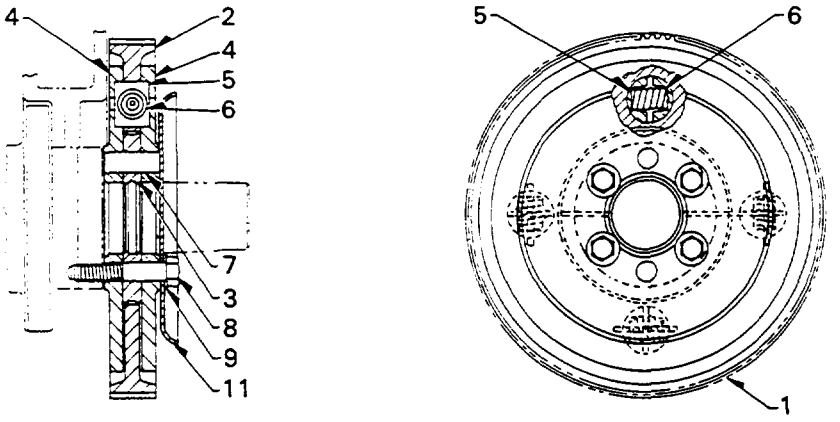


PLATE B22-1

Ref. No.	Part Number	Qty. Req.	Description
1	8250286	1	GEAR ASM. .. Accessory drive - Four-spring type
2	8141909	1	GEAR .. Drive - Spur
3	8141907	1	HUB .. Drive gear
4	8141908	2	DISC .. Front and rear - Rear replaces 8240518
5	9091462	8	SEGMENT .. Spring - Replaces 8141910
6	8158783	4	SPRING .. Coil
7	8031883	2	DOWEL .. Alignment - .876 dia. x 2-7/16 in. long
			8082445 .. .005 O.S.
			8082446 .. .010 O.S.
			8052996 .. .015 O.S.
8	223759	4	BOLT .. Hex. head - 3/4 - 16 x 3-3/4 - Formerly 8031884 drilled head
9	8140912	4	WASHER .. Hardened - 3/4
*10	218197	4	NUT .. Hex. - 3/4 - 16 - Used to keep assembly together during shipping
11	8084763	1	SLINGER .. Oil

P.L. No. B22

ACCESSORY DRIVE GEAR ASSEMBLY

Accessory Drive Gear Assembly Applied to Crankshafts with Integral Stubshafts
Eight-Spring Type Gear
16-645E4,E4B,E5,E6.E7,E7B,E7C,E9,E9B,E10B
20-645E4,E4B,E5,E6,E7,E7B,E7C,E9,E9B,E10B Engines

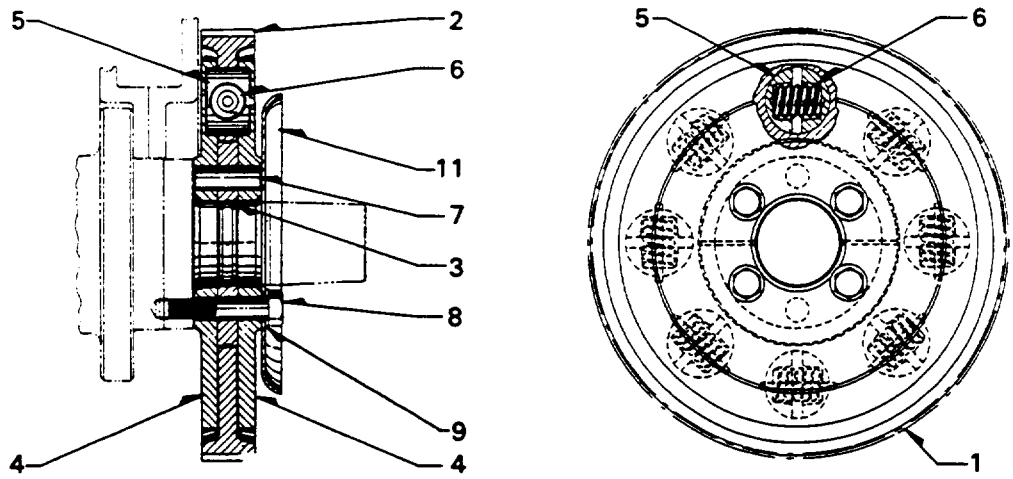


PLATE B22-2

Ref. No.	Part Number	Qty. Req.	Description
1	8365300	1	GEAR ASM. .. Accessory drive - Eight-spring type
2	8360839	1	GEAR .. Drive - Spur
3	8141907	1	HUB .. Drive gear
4	8360838	2	DISC .. Front and rear - Rear replaces 8360835
5	9091463	16	SEGMENT .. Spring
6	8360837	8	SPRING .. Coil
7	8031883	2	DOWEL .. Alignment - .876 dia. x 2-7/16 in. long
			8082445 .. .005 O.S.
			8082446 .. .010 O.S.
			8052996 .. .015 O.S.
8	223759	4	BOLT .. Hex. head 3/4 - 16 x 3-3/4 - Formerly 8031884 drilled head
9	8140912	4	WASHER .. Hardened - 3/4
*10	218197	4	NUT .. Hex. - 3/4 - 16 - Used to keep assembly together during shipping
11	8084763	1	SLINGER .. Oil

ACCESSORY DRIVE GEAR ASSEMBLY
Accessory Drive Gear Assembly Applied to Crankshafts with Bolt-On Stubshafts
8-645E6,E7C; 12-645E6,E7; 16-645E6,E7 Engines

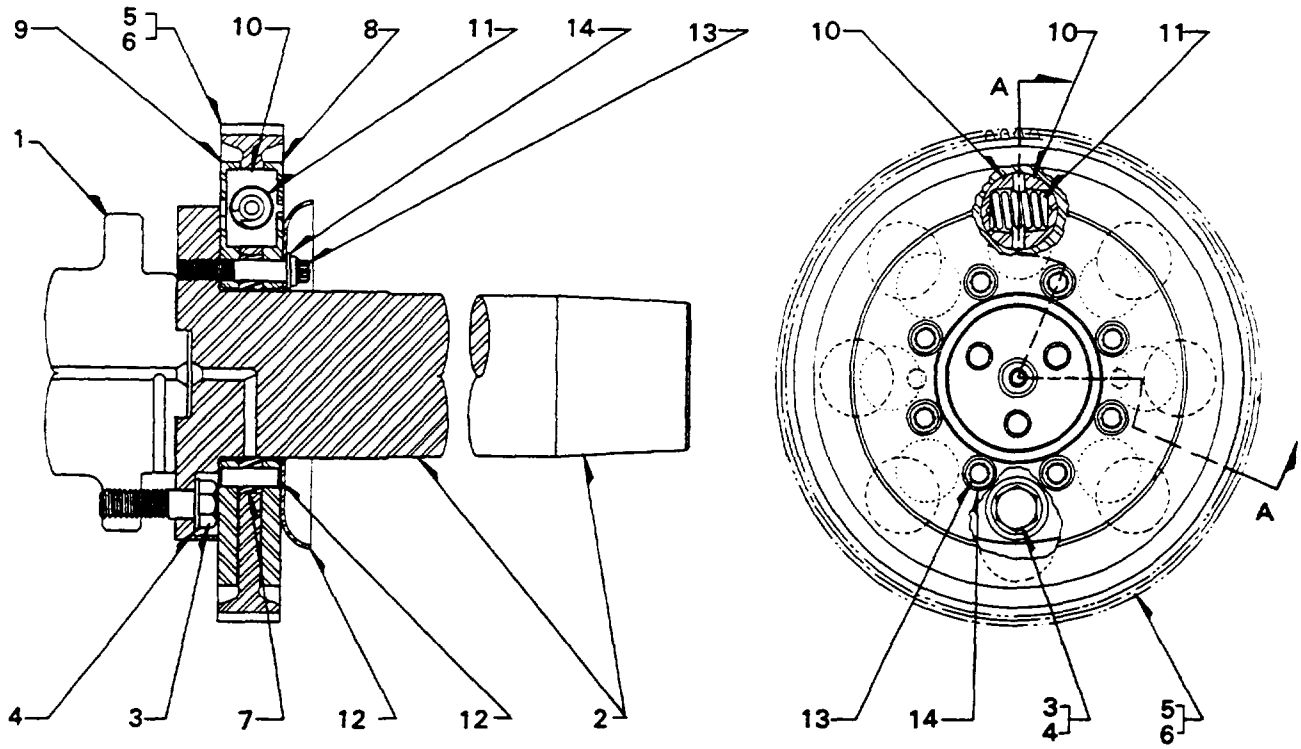


PLATE B22-3

Ref. No.	Part Number	Qty. Req.	Description
+1	----	1	CRANKSHAFT .. Engine - Stubless with male pilot - See P.L. 18
2	8482954	1	STUBSHAFT .. Tapered - 27 - 3/8 in. long
3	223771	8	BOLT .. Hex. head - 7/8 - 14 x 3-1/4 - Stubshaft to crankshaft
4	8174659	8	WASHER .. Hardened - 7/8
5	9320634	1	GEAR ASSEMBLY .. Accessory drive
6	8360839	1	GEAR .. Drive - Spur
7	8483064	1	HUB .. Drive gear
8	8483014	1	DISC .. Front
9	8483014	1	DISC .. Rear - Formerly 8483015
10	9091463	16	SEGMENT .. Spring - Formerly 9094163
11	8360837	8	SPRING .. Coil
12	8483097	2	DOWEL .. Alignment - .626 dia. x 1-15/16 in. long
			8483098 .. .005 O.S.
			8483099 .. .010 O.S.
			8483100 .. .015 O.S.
13	9434253	8	BOLT .. Spline head - Twelve point 5/8 - 11 x 3-1/4
14	8483090	8	WASHER .. Hardened - 5/8
*15	102639	8	NUT .. Hex. - 5/8 - 11 - Used to hold assembly together during shipping
16	8483087	1	SLINGER .. Oil

M1509, P9062, P9065
P9262, 8492278

CRANKSHAFT COUPLINGS

Engine Coupling Disc And Flywheel Application
All 645 Engines

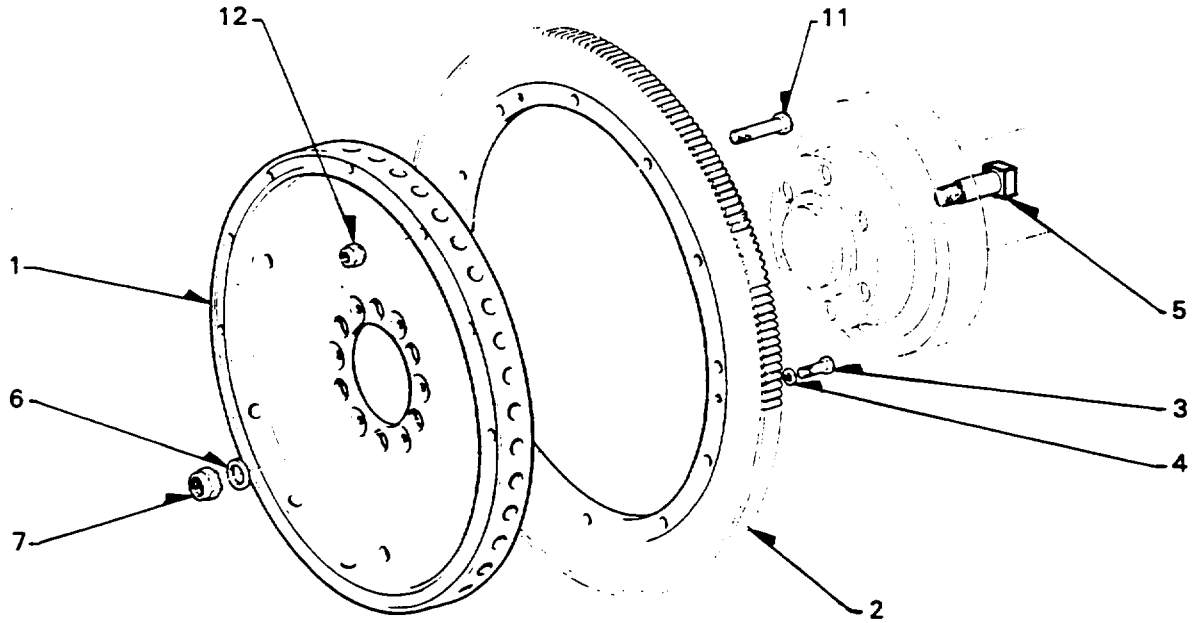


PLATE B24-1

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
		A		8,12,16-645 engines
			B	20-645 engines
1	----	1	1	DISC .. Engine coupling - See Pages 2 and 3
2	8356275	1	1	GEAR .. Ring - Starter motor - 265 Teeth - Replaces 8242166
3	181370	3	3	BOLT .. Hex. head 3/8 - 24 x 1-1/4 - Ring gear to disc
4	103321	3	3	WASHER .. Lock - 3/8
5	8245294	6	-	BOLT .. Special square head 1-1/2 - 12 x 4-9/16 - Disc to crankshaft
5	8360844	-	12	BOLT .. Special square head 1-1/4 - 12 x 4-13/32 - Disc to crankshaft
6	8336210	6	-	WASHER .. Special - 1-1/2
6	8360846	-	12	WASHER .. Special - 1-1/4
7	8334366	6	-	NUT .. Lock 1-1/2 - 12 hex.
7	8360845	-	12	NUT .. Lock 1-1/4 - 12 hex.
*ϕ8	----	1	1	FLYWHEEL .. Coupling disc mounted - See pages 2 and 3
*ϕ9	9421686	12	12	SCREW .. Cap - Hex. socket 3/4 - 16 x 4 - Flywheel mounting
*ϕ9	9421689	12	12	SCREW .. Cap - Hex. socket 3/4 - 16 x 6 - Flywheel mounting
*ϕ10	8133335	12	12	WASHER .. Lock - 3/4
ϕ11	273023	12	12	BOLT .. Hex. head 3/4 - 16 x 5-1/4
ϕ11	272874	12	12	BOLT .. Hex. head 3/4 - 16 x 5-1/2
ϕ11	9424825	12	12	BOLT .. Hex. head 3/4 - 16 x 6-1/4
ϕ11	273027	12	12	BOLT .. Hex. head 3/4 - 16 x 6-1/2
ϕ11	273028	12	12	BOLT .. Hex. head 3/4 - 16 x 6-3/4
ϕ11	272422	12	12	BOLT .. Hex. head 3/4 - 16 x 7
ϕ12	8060089	12	12	NUT .. Lock 3/4 - 16 hex.

† *Engine Coupling Disc To Driven Equipment*

† *For continuation of equipment see Parts List 3327 and 3600 in Catalog 361 for marine applications; or Pages 10, 11, 12 and P.L. 3327 in Catalog 381 for power and industrial applications.*

P.L. No. B24

CRANKSHAFT COUPLINGS

Engine Coupling Discs and Flywheels
PLATE B24-2

Timing Mark/Engines Construction Reference Chart

Timing Mark Location	Engine Rotation	Starter Motor Location	Engine Designation	
			Previous	Current
57°	Right Hand	Right Bank	LR	R
102°	Left Hand	Left Bank	RL	L
258°	Right Hand	Left Bank	RR	R
303°	Left Hand	Right Bank	LL	L

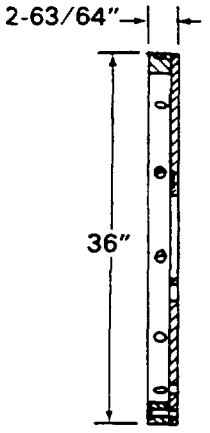
ENGINE COUPLING DISCS

Ref. No.	Part Number	Mounting Pilot	Timing Mark Stamp	Timing Mark Location	Engine Application
1	8325543	Serrated	- B	57°	8,12-645E2,E5,E6,E7; 12-645E4,E7B,E7C
2	8325542	Serrated	- B	102°	8-645E2,E5,E6
3	8325541	Serrated	- B	258°	8-645E2,E5
4	8211680	Serrated	- B	303°	8,12-645E1,E2,E5,E6,E7,E7B,E7C,E8
5	8366016	Serrated	- OB	57°	16-645E2,E4,E4B,E5,E6,E7,E7B,E7C
6	8366018	Serrated	- OB	102°	16-645E2,E5,E6,E7
7	8366017	Serrated	- OB	258°	16-645E2,E5,E6,E7
8	8365588	Serrated	- OB	303°	16-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8
9	8369123	Serrated	- B	57°	8-645E6,E7B; 12-645E2,E5,E6,E7,E7C; 16-645E2,E7
10	8375744	Serrated	- OB	57°	16-645E5
11	8481035	Square	- B	57°	8,12-645E6
12	8369121	Serrated	- B	102°	8-645E2,E6; 12-645E2,E5,E7; 16-645E7B
13	8375742	Serrated	- OB	102°	16-645E5
14	8369122	Serrated	- B	258°	12-645E2,E5,E7; 16-645E2
15	8236772	Serrated	- B	303°	8-645E1,E6,E7B; 12-645E1,E2,E5,E6,E7,E7B,E7C;16-645E4B,E6,E7,E7B,E7C
16	8470939	Square	- B	303°	8-645E2,E6; 12-645E6,E7C; 16-645E4B
17	8464348	Serrated	- B	57°	20-645E4,E5,E7
18	9314726	Serrated	- B	258°	20-645E7
19	8360898	Serrated	- B	303°	8-645E1,E4,E4B,E6,E8; 12-645E1,E4,E4B,E6,E7B,E8,E9,E9B; 16-645E1,E4,E4B,E8,E9,E9B,E10B;20-645E4,E4B,E5,E7,E7B,E9,E9B,E10B
20	8242291	Square	- B	57°	8-645E2,E6
21	8242261	Square	- B	258°	8-645E2,E5
22	8242418	Square	- B	303°	8-645E2,E5; 12-645E2
23	8383474	Serrated	- B	57°	20-645E5,E7
24	8383472	Serrated	- B	102°	20-645E5,E7
25	8383473	Serrated	- B	258°	20-645E5,E7
26	8383442	Serrated	- B	303°	20-645E4B,E5,E7,E7B,E7C
27	8473501	Square	- B	303°	20-645E4B
28	9085708	Serrated	- B	57°	20-645E4B,E5,E7
29	8497636	Serrated	- B	303°	20-645E4B,E5,E7,E7B
30	9084260	Square	- B	303°	12-645E4B; 20-645E5
31	9525652	Square	- B	57°	8-645E6; 12-645E6,E7B; 16-645E6
32	9525651	Square	- B	303°	8-645E4B,E6; 12-645E4B,E6,E7B; 16-645E6
33	9539372	Square	- B	303°	20-645E4B,E7B

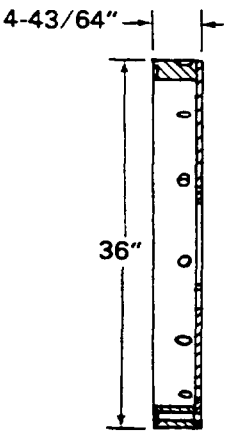
BOLT-ON FLYWHEELS

Ref. No.	Part Number	Description
34	8370850	FLYWHEEL .. Engine - Marine type
35	8236773	FLYWHEEL .. Engine - Industrial type

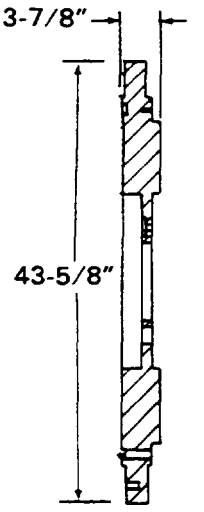
CRANKSHAFT COUPLINGS
Coupling Discs and Flywheels
Dimensional Reference Chart



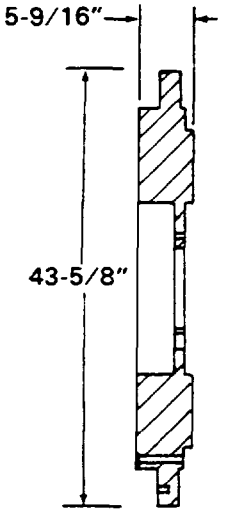
Ref. Nos. 1,2,3,4,5,6,7,8
20,21,22



Ref. Nos. 17,18,19,31,
32,33



Ref. Nos. 9,10,11,12,13,14,15,
16,23,24,25,26,27



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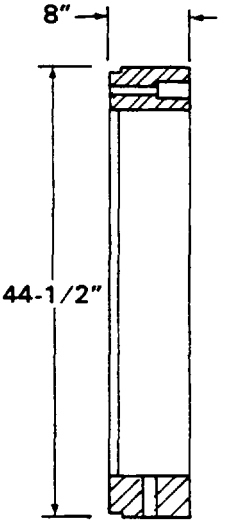
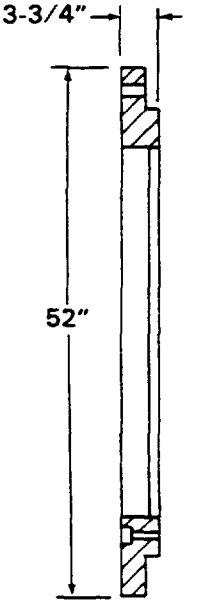


Ref. No. 34
PLATE B24-2



Ref. No. 35

P.L. No. B24

CRANKSHAFT COUPLINGS
Front End Accessory Drive
12-645E1; 8,12,16,20-645 E4,E4B Engines

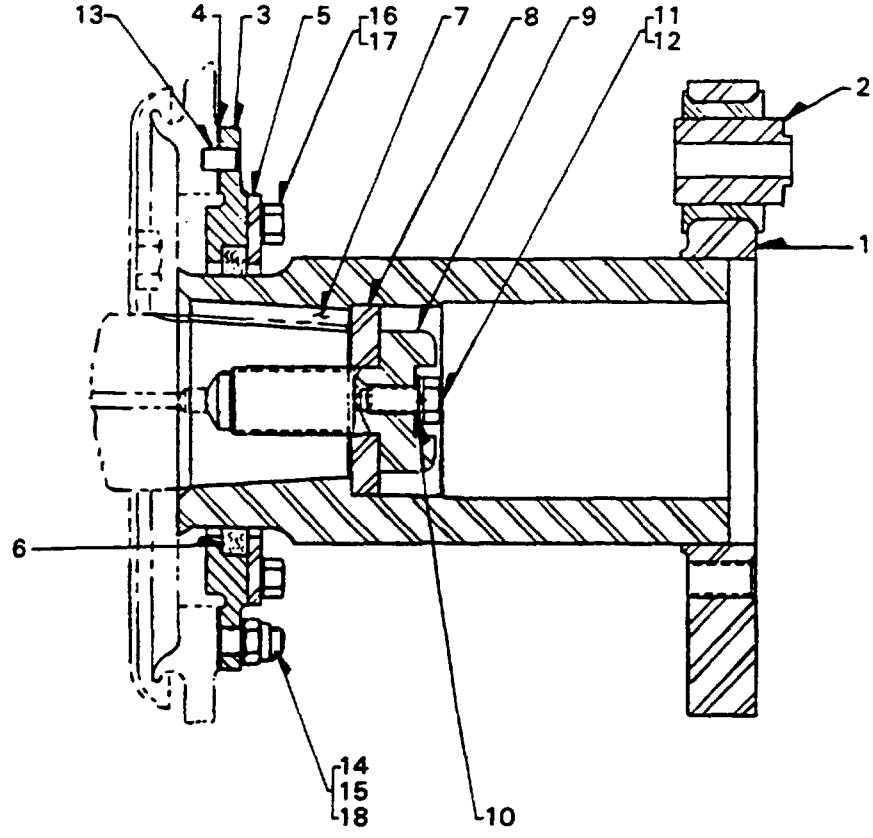


PLATE B24-3

Ref. No.	Part Number	Qty. Req.		Description
ϕ1	8323180	1		COUPLING ASM. .. Accessory drive - 10 coupling joints
ϕ1	8345709		1	COUPLING ASM. .. Accessory drive - 5 coupling joints
2	8234958	10	5	JOINT .. Center bonded - Rubber bushing
3	8041658	1		COVER .. Accessory drive
4	8028763	1		GASKET .. Cover
5	8041657	1		RETAINER .. Oil seal
6	8055158	1		SEAL .. Oil - 4-1/2 I.D. x 5-1/2 O.D. x 1/2 Felt
7	8029538	1		KEY .. Coupling - .390 x .626 x 2-1/2 - Was 3 in. long
8	8029555	1		WASHER .. Retaining
9	8029567	1		BOLT .. Special hex. head - 1-1/4 - 12 x 2-3/4
10	8029569	1		SPRING .. Lock
11	181427	1		BOLT .. Hex. head - 1/2 - 20 x 1
12	103323	1		WASHER .. Lock
13	8049954	2		DOWEL .. Cover alignment
14	8032719	8		NUT .. Lock 1/2 - 20 hex.
15	6101229	8		WASHER .. Flat 1/2
16	179839	6		BOLT .. Hex. head 3/8 - 16 x 1
17	103321	6		WASHER .. Lock - 3/8
18	8084871	8		STUD .. Cover mounting - Part of Accessory Drive Housing - See Parts List 58

8427055

CRANKSHAFT COUPLINGS

Front End Accessory Drive
12,16,20-645E7 Engines

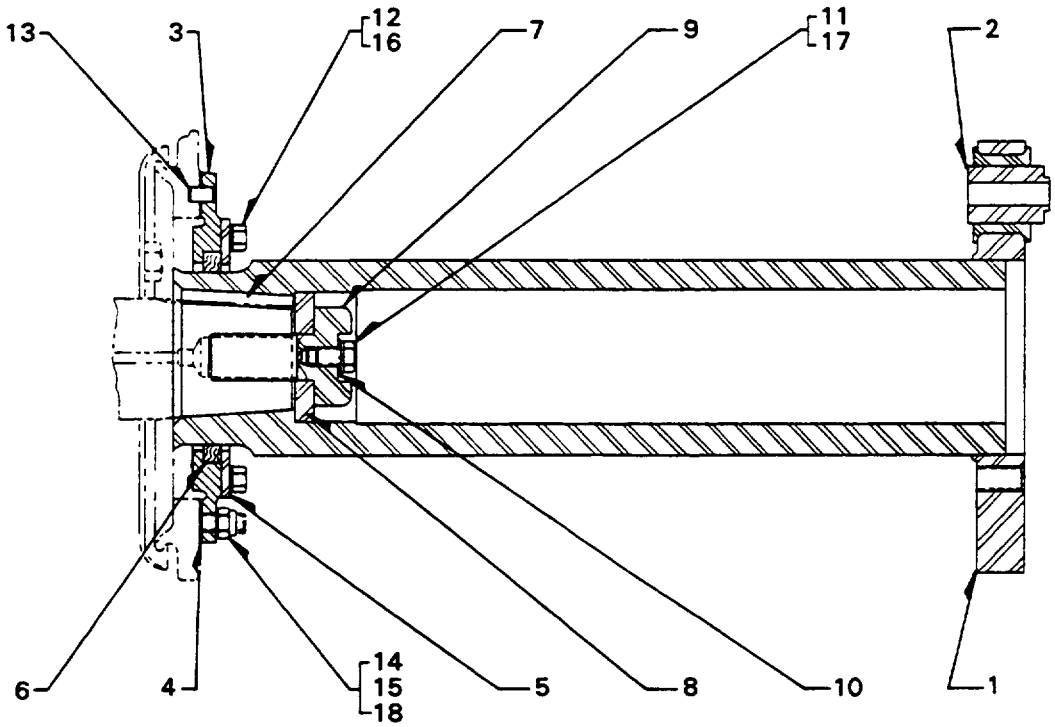


PLATE B24-4

Ref. No.	Part Number	Qty. Req.	Description
1	8430000	1	COUPLING ASM. .. Accessory drive
2	8234958	5	JOINT .. Center bonded - Rubber bushing
3	8041658	1	COVER .. Accessory drive
4	8028763	1	GASKET .. Cover
5	8041657	1	RETAINER .. Oil seal
6	8055158	1	SEAL .. Oil - 4-1/2 I.D. x 5-1/2 O.D. x 1/2 Felt
7	8029538	1	KEY .. Coupling - .390 x .626 x 2-1/2 - Was 3 in. long
8	8029555	1	WASHER .. Retaining
9	8029567	1	BOLT .. Special hex. head 1-1/4 - 12 x 2-3/4
10	8029569	1	SPRING .. Lock
11	181425	1	BOLT .. Hex. head 1/2 - 20 x 3/4
12	6101225	6	WASHER .. Flat - 3/8
13	8049954	2	DOWEL .. Alignment
14	8032719	8	NUT .. Lock 1/2 - 20 hex.
15	6101229	8	WASHER .. Flat
16	179839	6	BOLT .. Hex. head 3/8 - 16 x 1
17	103323	1	WASHER .. Lock - 1/2
+18	8084871	8	STUD .. Cover mounting - Part of Accessory Drive Housing - See Parts List 58

8429999

P.L. No. B24

CRANKSHAFT COUPLINGS

Front End Accessory Drive
8-645E6,E7,E7B,E7C; 12-645E1,E6,E7,E7B,E7C
16-645E6,E7,E7B,E7C; 20-645E4,E7,E7B,E7C Engines

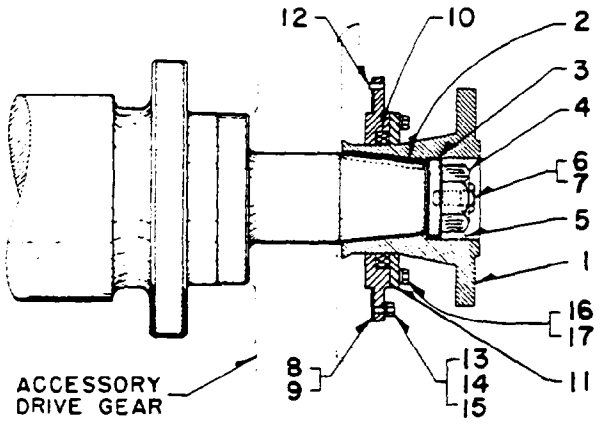


PLATE B24-5

Ref. No.	Part Number	Qty. Req.	Description
COUPLING ASSEMBLY .. Accessory Drive			
1	8115196	1	FLANGE .. Auxiliary drive - Tapered - 8-3/8 dia. flange - 12 holes 21/32 dia.
2	8029538	1	KEY .. Drive flange - .390 x .626 x 2-1/2 in. long
3	8029555	1	WASHER .. Flange retaining - 1-9/32 I.D. x 3-11/32 O.D.
4	8029567	1	BOLT .. Flange retaining - 1-1/4 - 12 x 2-3/4 hex. head
5	8029569	1	SPRING .. Lock
6	181427	1	BOLT .. Flange to crankshaft - 1/2 - 20 x 1 hex. head
7	103323	1	WASHER .. Lock - 1/2
8	8041658	1	COVER .. Accessory drive
9	8028763	1	GASKET .. Cover
10	8055158	1	SEAL .. Oil - Accessory drive
11	8041657	1	RETAINER .. Oil seal
12	8049954	2	DOWEL .. Alignment
+13	8084871	8	STUD .. Cover retaining - Part of the Accessory Drive Housing - See Parts List 58
14	8032719	8	NUT .. 1/2 - 20 hex.
15	6101229	8	WASHER .. Plain - 1/2
16	179839	6	BOLT .. Retainer - 3/8 - 16 x 1 hex. head
17	103321	6	WASHER .. Lock - 3/8

9091100

CRANKSHAFT COUPLINGS

Front End Accessory Drive
Crankshafts with Bolt-On Stubshaft
8-645E6,E7C; 12-645E6,E7; 16-645E6,E7 Engines

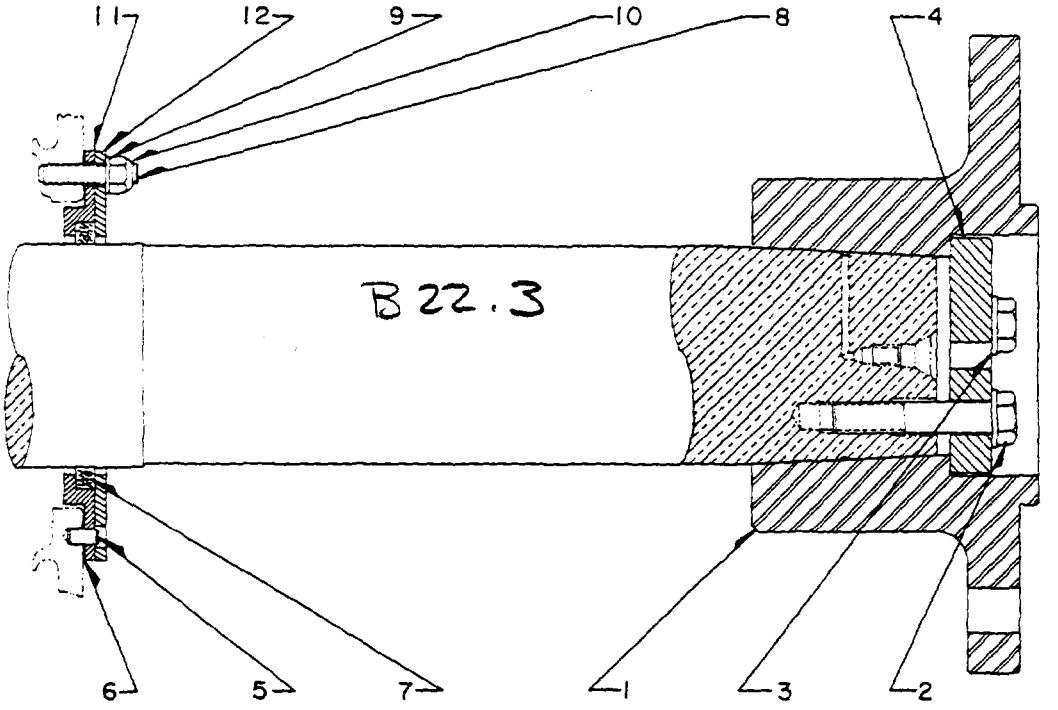


PLATE B24-6

Ref. No.	Part Number	Qty. Req.	Description
1	8482982	1	FLANGE .. Accessory drive
2	223458	3	BOLT .. Flange mounting - 3/4 - 10 x 4 hex. head
3	8140912	3	WASHER .. 3/4 hardened
4	8483013	1	RETAINER .. Flange mounting
5	8049954	2	DOWEL .. Accessory drive cover alignment
6	8028763	1	GASKET .. Accessory drive cover
7	8483088	1	SEAL .. Accessory drive cover - 5-1/4 I.D. x 6-1/4 O.D. x 1/2 Felt
+8	8084871	8	STUD .. 1/2 - 13 - 20 x 2-7/16 in. long - Part of the Accessory Drive Housing - See Parts List 58
9	6101229	8	WASHER .. 1/2 plain
10	8032719	8	NUT .. Lock - 1/2 - 20 hex.
ϕ11	9317888	1	COVER .. Accessory drive - Recessed mounting
*ϕ11	8483089	1	COVER .. Accessory drive - Flush mounting
ϕ12	9317889	1	RETAINER .. Seal - Used with 9317888 over only
*ϕ12	8483091	1	RETAINER .. Seal - Used with 8483089 cover only

P6018, P7505, 8483150
P7506, P7508, 9317887

P.L. No. B24

CRANKSHAFT COUPLINGS
Blind Cover Application
All 645 Engines Without Front End Power Take-Off

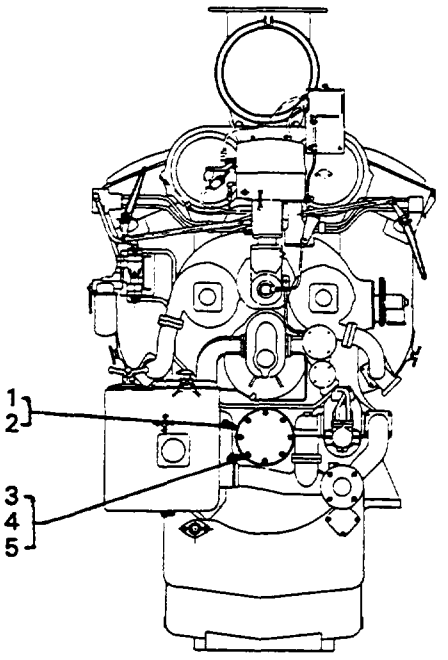


PLATE B24-7

Ref. No.	Part Number	Qty. Req.	Description
1	8084863	1	COVER .. Blind
2	8028763	1	GASKET .. Blind cover
3	8032719	8	NUT .. Lock 1/2 - 20 hex.
4	6101229	8	WASHER .. Flat - 1/2
+5	8084871	8	STUD .. Cover mounting - Part of the Accessory Drive Housing - See Parts List 58

CRANKSHAFT COUPLINGS

Engine Turning Jack Assembly
8,12,16-645E1; 8,12,16,20-645E4,E4B Engines

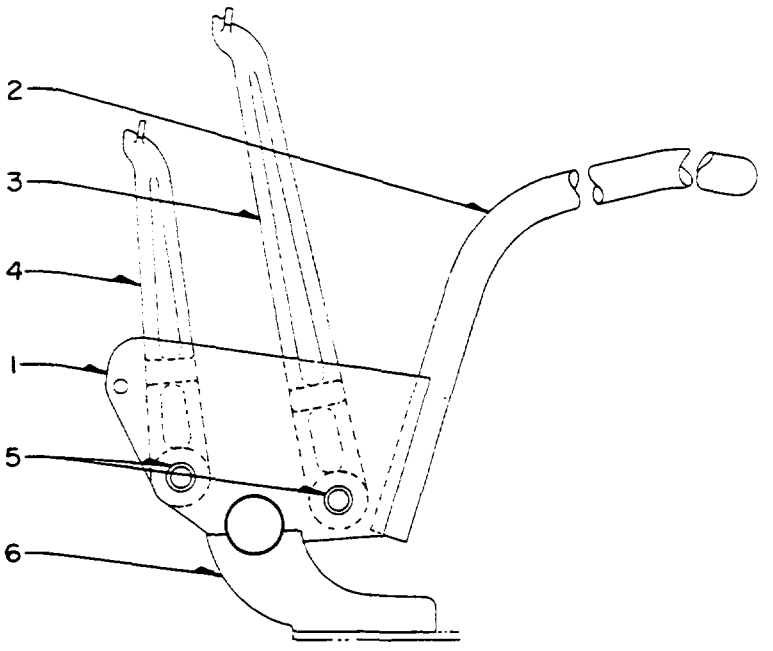


PLATE B24-8

Ref. No.	Part Number	Qty. Req.	Description
1	8320802	1	JACK ASM. .. Engine turning
2	8320803	1	HANDLE ASM. .. Jack
3	8084761	1	PAWL .. Long
4	8084759	1	PAWL .. Short
5	8194542	2	PIN .. Pawl mounting
6	8084760	1	BASE .. Engine turning jack mounting
*7	8176112	1	BOX ASM. .. Jack mounting
*8	8361027	1	BRACKET .. Jack handle clip
*9	8176086	1	CLIP .. Jack handle
*10	179791	2	BOLT .. Clip mounting - 1/4 - 20 x 1/2 hex. head
*11	103319	2	WASHER .. Lock - 1/4

8371299
8465369A

P.L. No. B24

CRANKSHAFT COUPLINGS

Drill Rig Coupling Arrangement
8,12-645E1 Engines

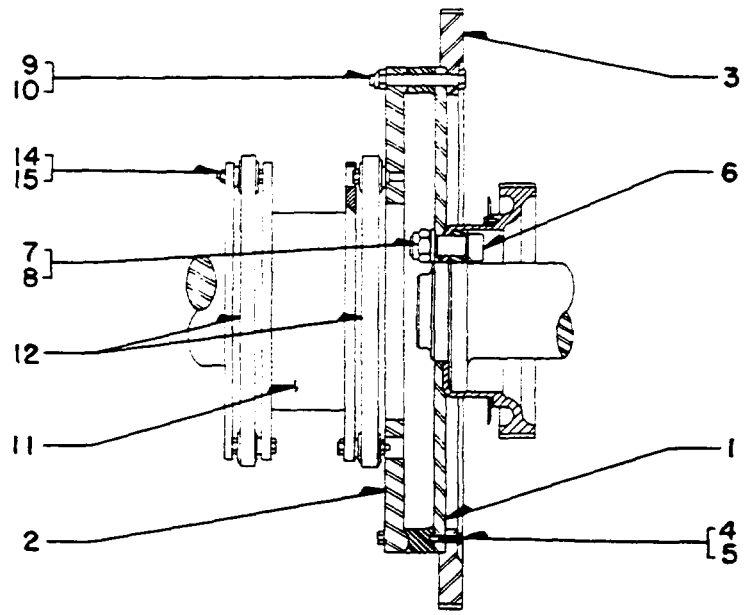


PLATE B24-9

Ref. No.	Part Number	Qty. Req.	Description
1	8211680	1	DISC .. Coupling - Serrated - Engine
2	8265399	1	DISC .. Coupling - Serrated - Generator
3	8356275	1	GEAR .. Ring
4	181370	3	BOLT .. Ring gear to disc - 3/8 - 24 x 1-1/4 hex. head
5	103321	3	WASHER .. Lock - 3/8
6	8245294	6	BOLT .. Coupling disc to crankshaft - 1-1/2 - 12 x 4-9/16 in. long - 1.735 in. shoulder - Square head - 45° chamfer on one side
7	8336210	6	WASHER .. Plain - 2-7/16 O.D. x 1-17/32 I.D.
8	8334366	6	NUT .. Lock - 1-1/2 - 12 hex.
9	273028	12	BOLT .. 3/4 - 16 x 6-3/4 hex. head
10	8032722	12	NUT .. Lock - 3/4 - 16 hex.
11	8324991	1	ADAPTER ASM. .. Coupling
12	8265762	2	RING ASM. .. Coupling
*13	8234958	48	JOINT .. Center bonded
14	181465	48	BOLT .. Ring to disc - 9/16 - 18 x 3-1/2 hex. head
15	9416519	36	NUT .. Lock - 9/16 - 18 hex. - Replaces 443328

NOTE: For continuation of equipment, See P.L. 1257 in Catalog 381.

8325368H

CRANKSHAFT COUPLING

Gear Box Drive Coupling
8-645E1 Engine - Industrial Drill Rig

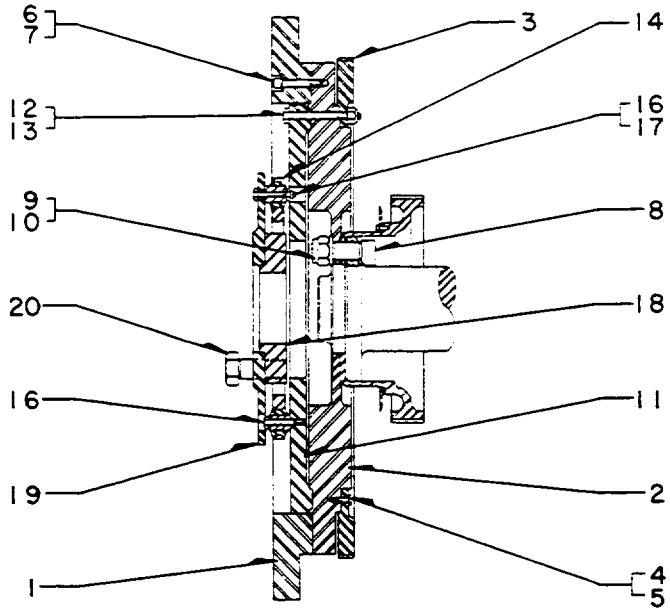


PLATE B24-10

Ref. No.	Part Number	Qty. Req.	Description
1	8236773	1	FLYWHEEL .. Engine
2	8236772	1	DISC .. Coupling - Serrated
3	8356275	1	GEAR .. Ring
4	181370	3	BOLT .. Ring gear to disc - 3/8 - 24 x 1-1/4 hex. head
5	103321	3	WASHER .. Lock - 3/8
6	9421686	12	BOLT .. 3/4 - 16 x 4 hex. socket head
7	8133335	12	WASHER .. Lock - 3/4
8	8245294	6	BOLT .. Coupling disc to crankshaft - 1-1/2 - 12 x 4-9/16 in. long 1.735 in. shoulder - Square head - 45° chamfer on one side
9	8336210	6	WASHER .. Plain - 2-7/16 O.D. x 1-17/32 I.D.
10	8334366	6	NUT .. Lock - 1-1/2 - 12 hex.
11	8265399	1	DISC .. Drive coupling to engine flywheel
12	273028	12	BOLT .. Disc mounting - 3/4 - 16 x 6-3/4 hex. head
13	8060089	12	NUT .. Lock - 3/4 - 16 hex.
14	8265762	1	RING ASM. .. Coupling
*15	8234958	24	JOINT .. Center bonded
16	181465	24	BOLT .. Ring to disc - 9/16 - 18 x 3-1/2 hex. head
17	9416519	12	NUT .. Lock - 9/16 - 18 hex. - Replaces 443328
18	8265766	1	RING .. Spacer
19	8265396	1	DISC .. Coupling - Generator end
20	8252713	6	BOLT .. Disc to ring - 1-1/2 - 12 x 4-1/16 hex. head drilled

8265400

P.L. No. B24

CRANKSHAFT COUPLINGS

Bonded Coupling Arrangement
8,12-645E1 Engines

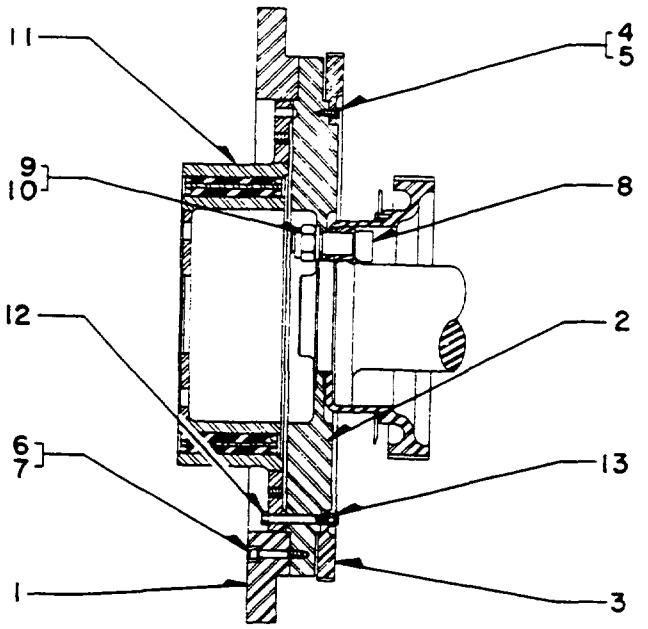


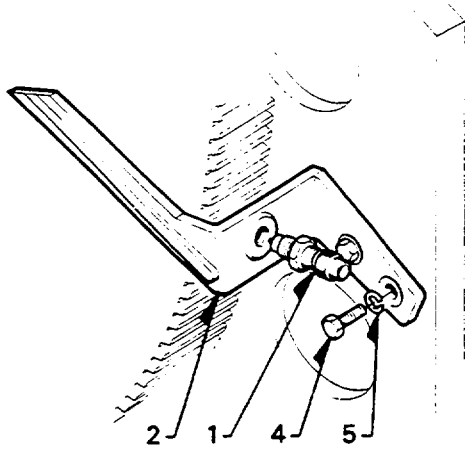
PLATE B24-11

Ref. No.	Part Number	Qty. Req.	Description
1	8236773	1	FLYWHEEL .. Engine
2	8236772	1	DISC .. Coupling - Serrated
3	8356275	1	GEAR .. Ring
4	181370	3	BOLT .. Ring gear to disc - 3/8 - 24 x 1-1/4 hex. head
5	103321	3	WASHER .. Lock - 3/8
6	9421686	12	BOLT .. 3/4 - 16 x 4 hex. socket head
7	8133335	12	WASHER .. Lock - 3/4
8	8245294	6	BOLT .. Coupling disc to crankshaft - 1-1/2 - 12 x 4-9/16 in. long - 1.735 in. shoulder - Square head - 45° chamfer on one side
9	8336210	6	WASHER .. Plain - 2-7/16 O.D. x 1-17/32 I.D.
10	8334366	6	NUT .. Lock - 1-1/2 - 12 hex.
11	8367507	1	COUPLING .. Drive - Bonded
12	9424825	12	BOLT .. 3/4 - 16 x 6-1/4 hex. head
13	8032722	12	NUT .. Lock - 3/4 - 16 hex.

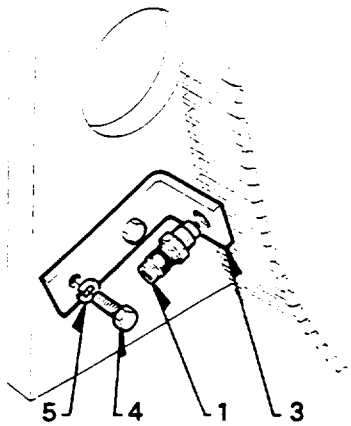
Parts List No. B25

STARTER MOTOR AND MOUNTING

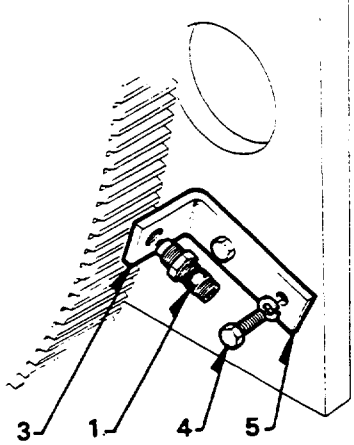
Magnetic Pick-Up Application
All 645 Engines



Column A

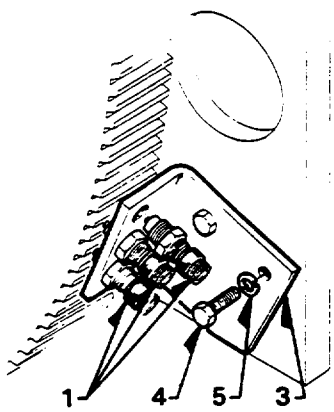


Column C



Column B

PLATE B25-1



Column D

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	Flywheel Indicator Applied Design
		-	B	-	-	Current Design Application - Right Bank Mounted
		-	-	C	-	Current Design Application - Left Bank Mounted
		-	-	-	D	Special 3 Pick-up Design Application - R.B. Mounted
1	8270383	1	1	1	3	PICKUP .. Magnetic - 2 pole female
2	8477119	1	-	-	-	INDICATOR .. Flywheel - With magnetic pickup mounting hole
3	9509589	-	1	1	-	BRACKET .. Mounting
3	9527484	-	-	-	1	BRACKET .. Mounting
4	179793	2	-	-	-	BOLT .. Mounting 1/4-20 x 5/8 hex. head
4	179818	-	2	2	2	BOLT .. Mounting 5/16-18 x 1 hex. head
5	103319	2	-	-	-	WASHER .. Lock 1/4
5	103320	-	2	2	2	WASHER .. Lock 5/16
ϕ* 6	8471617	1	1	1	3	CABLE ASM. .. Approximately 10 ft. long
ϕ* 6	9511607	1	1	1	3	CABLE ASM. .. Approximately 40 ft. long
* 7	8270133	1	1	1	3	PLUG .. 2 pole male
* 8	8175600	1	1	1	3	CLAMP .. Cable

P5810,9509592
9509593,9527485

P.L. No. B25

STARTER MOTOR AND MOUNTING
Dual Air Start Motor Mounting
Left Bank

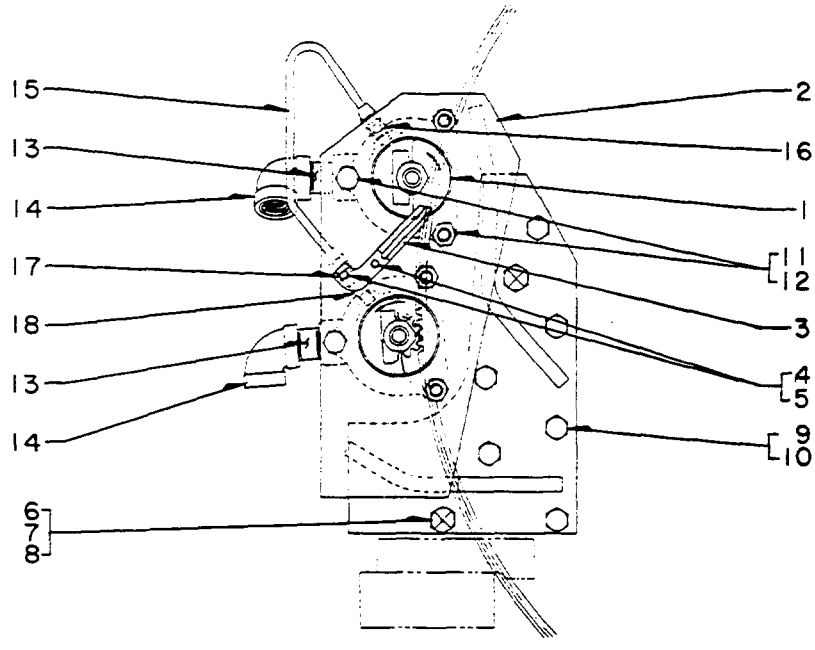


PLATE B25-2

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	20-645E5,E7 - R.H. rotation
		-	B	-	-	-	16-645E7B - L.H. rotation
		-	-	C	-	-	12-645E4;16-645E4,E4B;20-645E4 (999-20) - L.H. Rotation
		-	-	-	D	-	12,16-645E6 - L.H. rotation
		-	-	-	-	E	16-645E4B,E6 - R.H. rotation
1	8377435	2	-	-	-	2	MOTOR ASM. .. Air start } See Page 20
1	8367694	-	2	2	2	-	MOTOR ASM. .. Air start }
2	8377467	1	1	1	1	1	BRACKET ASM. .. Motor mounting
3	8377432	1	1	-	-	-	INDICATOR .. Flywheel - Engine timing } See Page 9
3	8394909	-	-	-	1	1	INDICATOR .. Flywheel - Engine timing }
4	179793	2	2	-	2	2	BOLT .. Hex. head 1/4-20 x 5/8
5	103319	2	2	-	2	2	WASHER .. Lock - 1/4
6	8249889	2	2	2	2	2	BOLT .. Shoulder 3/4-16 x 2-7/8 hex. head
7	8140912	2	2	2	2	2	WASHER .. Hardened and ground - 3/4
8	8060089	2	2	2	2	2	NUT .. Lock 3/4-16 hex.
9	271585	6	6	6	6	6	BOLT .. Hex. head 5/8-18 x 1-3/4 bracket mounting
10	103325	6	6	6	6	6	WASHER .. Lock - 5/8
11	271588	6	6	6	6	6	BOLT .. Hex. head 5/8-18 x 2-1/4 motor mounting
12	8032721	6	6	6	6	6	NUT .. Lock - 5/8-18 hex.
13	8060976	2	2	2	2	2	NIPPLE .. Short 1-1/4 N.P.T.
14	8042828	2	2	2	2	2	ELBOW .. 90° 1-1/4 N.P.T.
15	8378357	1	1	1	1	1	TUBE ASM. .. Air - Includes fittings
16	118750	1	1	1	1	1	CONNECTOR .. 3/8 tube x 1/4 F.P.T. - Formerly 8040312 - 3/8 x 1/8
17	121323	1	1	1	1	1	CONNECTOR .. 3/8 tube x 1/4 M.P.T. - Formerly 8040329 - 3/8 x 1/8
18	8060971	1	1	1	1	1	NIPPLE .. Short 1/4 M.P.T. - Formerly 8060970 1/8 M.P.T.
* 19	- - - -	-	-	-	-	-	PICKUP .. Magnetic - See Page 1

8377262,8377261,8410224
8413295,8413296

P.L. No. B25

STARTER MOTOR AND MOUNTING
Dual Air Start Motor Mounting
Right Bank

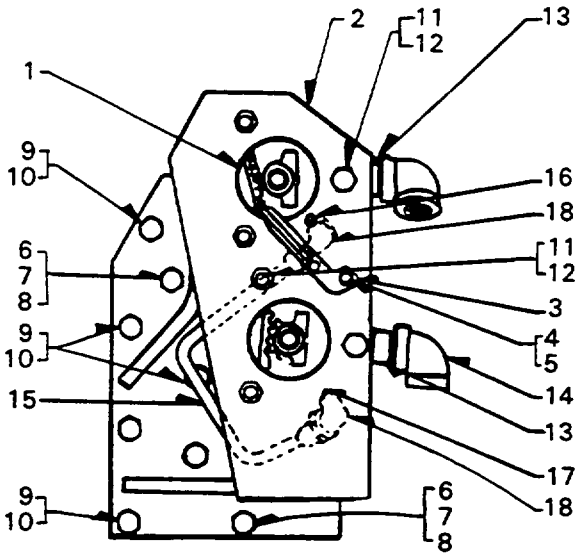


PLATE B25-3

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8,12-645E7,E7B;12-645E1 - L.H. rotation
		-	B	-	-	8,12,16-645E7,E7B;12-645E6 - R.H. rotation
		-	-	C	-	12-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B;16-645E1,E2,E4,E4B, E5,E6,E7,E7B,E7C,E8,E9,E9B;20-645E4,E4B,E5,E7,E7B,E7C, E9,E9B - L.H. rotation
		-	-	-	D	12-645E2,E4,E5,E6,E7,E7B,E7C;16-645E2,E4,E4B,E5,E6,E7,E7B; 20-645E4,E4B,E5,E7,E7B,E7C - R.H. rotation
1	8367694	2	-	2	-	MOTOR ASM. .. Air start } See Page 20
1	8377435	-	2	-	2	MOTOR ASM. .. Air start }
2	8358874	1	1	1	1	BRACKET ASM. .. Motor Mounting - Replaces 9509590
3	8377431	1	1	-	-	INDICATOR .. Flywheel - Engine timing } See Page 9
3	8354872	-	-	1	1	INDICATOR .. Flywheel - Engine timing }
4	179793	2	2	2	2	BOLT .. Hex. head 1/4-20 x 5/8
5	103319	2	2	2	2	WASHER .. Lock - 1/4
6	8249889	2	2	2	2	BOLT .. Shoulder 3/4-16 x 2-7/8 hex. head
7	8140912	2	2	2	2	WASHER .. Hardened and ground 3/4
8	8060089	2	2	2	2	NUT .. Lock 3/4-16 hex.
9	271585	6	6	6	6	BOLT .. Hex. head 5/8-18 x 1-3/4 bracket mounting
10	103325	6	6	6	6	WASHER .. Lock - 5/8
11	271588	6	6	6	6	BOLT .. Hex. head 5/8-18 x 2-1/4 motor mounting
12	8032721	6	6	6	6	NUT .. Lock 5/8-18 hex.
13	8060976	2	2	2	2	NIPPLE .. Short 1-1/4 N.P.T.
14	8042828	2	2	2	2	ELBOW .. 90° 1-1/4 N.P.T.
15	8378350	1	1	1	1	TUBE ASM. .. Air - Includes fittings
16	8060967	1	1	1	1	NIPPLE .. Close 1/4 M.P.T.
17	8060971	1	1	1	1	NIPPLE .. Short 1/4 M.P.T.
18	118576	2	2	2	2	ELBOW .. 90° 3/8 tube
* 19	- - - -	-	-	-	-	PICKUP .. Magnetic - See Page 1

8377260,8377263
8413294,8413297

P.L. No. B25

STARTER MOTOR AND MOUNTING
Single Air Motor Application on 8-645 Engines

PLATE B25-4

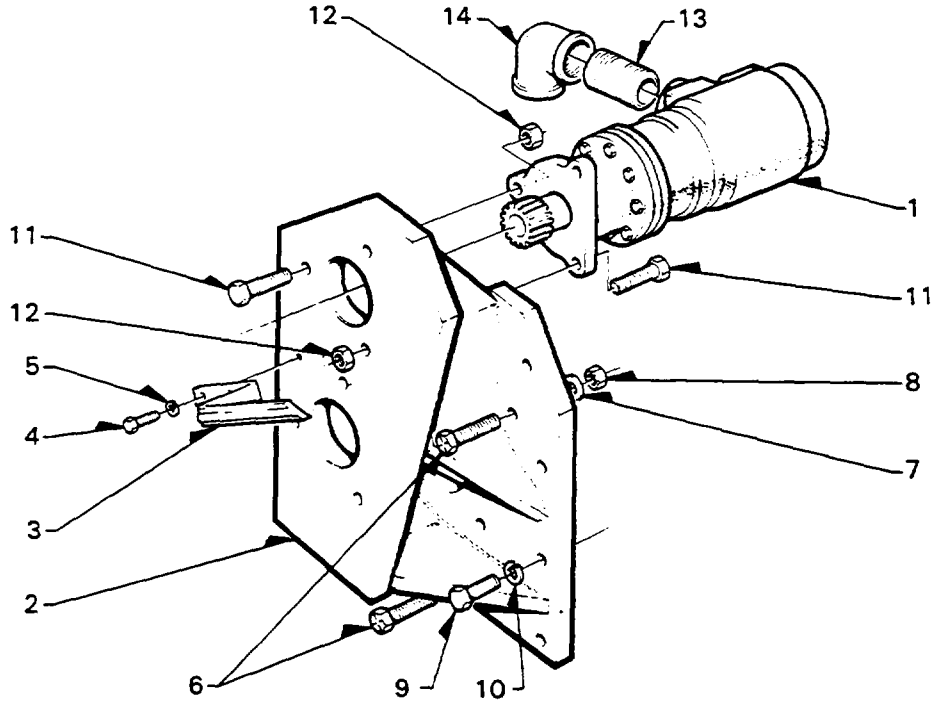
Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	RR8-645E2,E5
		-	B	-	-	-	-	LL8-645E2,E5 and L8-645E1,E4,E4B,E5,E7,E7B,E7C,E8
		-	-	C	-	-	-	RL8-645E2,E5,E6
		-	-	-	D	-	-	LR8-645E2,E5 and R8-645E5,E7,E7B
		-	-	-	-	E	-	R8-645E2,E6
		-	-	-	-	-	F	L8-645E2,E6
1	8377435	1	-	-	1	1	-	MOTOR ASM. .. Air start - Right hand rotation engines
1	8367694	-	1	1	-	-	1	MOTOR ASM. .. Air start - Left hand rotation engines
2	8377467	1	-	1	-	-	-	BRACKET ASM. .. Motor mounting - Left bank mounted
2	8358874	-	1	-	1	1	1	BRACKET ASM. .. Motor mounting - Right bank mounted
3	8394909	1	-	1	-	-	-	INDICATOR .. Flywheel - Engine timing
3	8354872	-	1	-	1	-	-	INDICATOR .. Flywheel - Engine timing
3	8377431	-	-	-	-	1	1	INDICATOR .. Flywheel - Engine timing
4	179793	2	2	2	2	2	2	BOLT .. Hex. head 1/4-20 x 5/8
5	103319	2	2	2	2	2	2	WASHER .. Lock - 1/4
6	8249889	2	2	2	2	2	2	BOLT .. Shoulder 3/4-16 x 2-7/8 hex. head
7	8140912	2	2	2	2	2	2	WASHER .. Hardened and ground - 3/4
8	8060089	2	2	2	2	2	2	NUT .. Lock 3/4-16 hex.
9	271585	6	6	6	6	6	6	BOLT .. Hex. head 5/8-18 x 1-3/4 bracket mounting
10	103325	6	6	6	6	6	6	WASHER .. Lock - 5/8
11	271588	3	3	3	3	3	3	BOLT .. Hex. head 5/8-18 x 2-1/4 motor mounting
12	8032721	3	3	3	3	3	3	NUT .. Lock 5/8-18 hex.
13	8060976	1	1	1	1	1	1	NIPPLE .. Short 1-1/4 N.P.T.
14	137971	1	1	1	1	1	1	ELBOW .. 90° 1-1/4 N.P.T.
* 15	- - - -	-	-	-	-	-	-	PICKUP .. Magnetic - See Page 1
* 16	40009631	1	1	1	1	1	1	PLATE .. Cover
* 17	271585	3	3	3	3	3	3	BOLT .. Hex head 5/8-18 x 1-3/4
* 18	8032721	3	3	3	3	3	3	NUT .. Lock 5/8-18

See Page 20

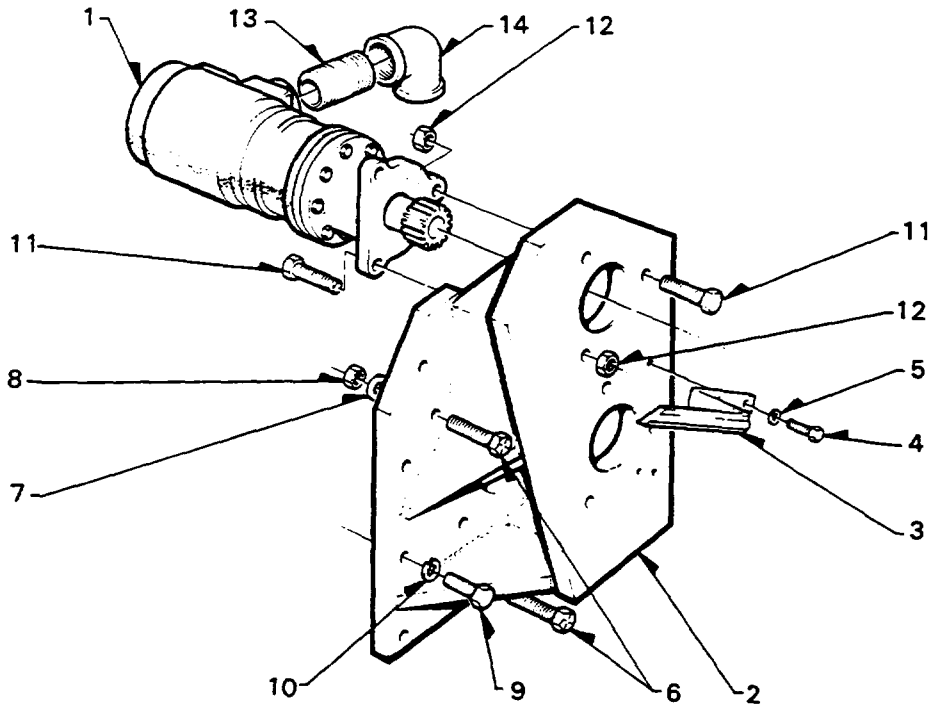
See Page 9

8391935,8391933,8489637

STARTER MOTOR AND MOUNTING
Single Air Motor Application on 8-645 Engines



RIGHT BANK MOUNTED



LEFT BANK MOUNTED

PLATE B25-4

P.L. No. B25

STARTER MOTOR AND MOUNTING
Low Pressure Air Start Motor Application

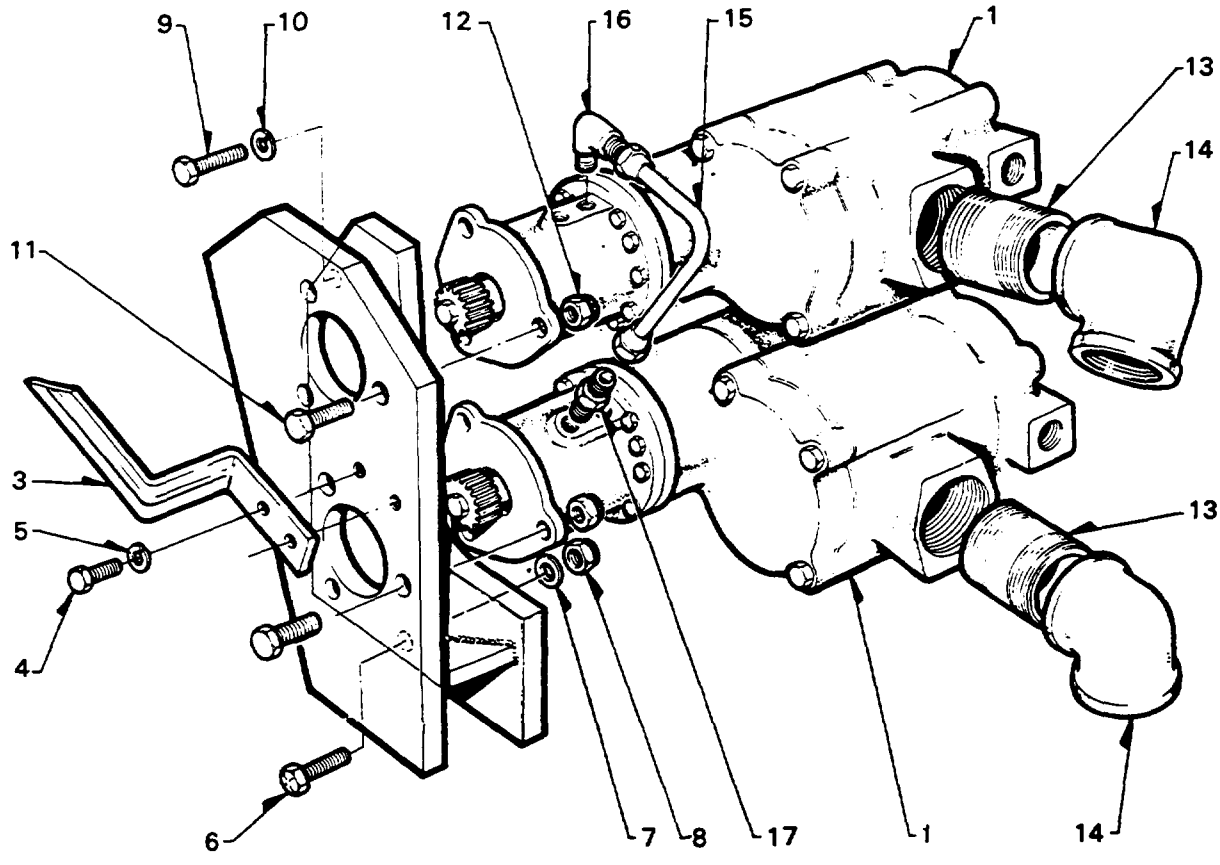


PLATE B25-5

Ref. No.	Part Number	Qty. Req.	Description
		-	Low air pressure start system on 12,16-645E8, and 16-645E9B engines
1	9542965	2	MOTOR ASM. .. Air start - See Page 22
2	8358874	1	BRACKET ASM. .. Motor mounting
3	8354872	1	INDICATOR .. Flywheel - See Page 9
4	179793	1	BOLT .. Hex. head 1/4-20 x 5/8
5	103319	2	WASHER .. Lock 1/4
6	8249889	2	BOLT .. Shoulder 3/4-16 x 2-7/8 hex. head
7	8140912	2	WASHER .. Hardened and ground - 3/4
8	8060089	2	NUT .. Lock 3/4-16 hex.
9	271585	6	BOLT .. Hex. head 5/8-18 x 1-3/4 bracket mounting
10	103325	6	WASHER .. Lock - 5/8
11	271588	6	BOLT .. Hex. head 5/8-18 x 2-1/4 motor mounting
12	8032721	6	NUT .. Lock 5/8-18 hex.
13	8060979	2	NIPPLE .. Short 2-1/2 in. N.P.T.
14	191034	2	ELBOW .. 90° - 2-1/2 in. N.P.T.
15	9543464	1	TUBE ASM. .. Air - Includes fittings
16	118755	1	ELBOW .. 90° 3/8 tube x 1/4 N.P.T.
* 17	118750	1	CONNECTOR .. 3/8 tube x 1/4 N.P.T.
* 18	- - - -	-	PICKUP .. Magnetic - See Page 1

9543471

P.L. No. B25

STARTER MOTOR AND MOUNTING

Electric Starter Motor and Mounting
8,12,16-645E1;16-645E4,E4B;20-645E4,E4B

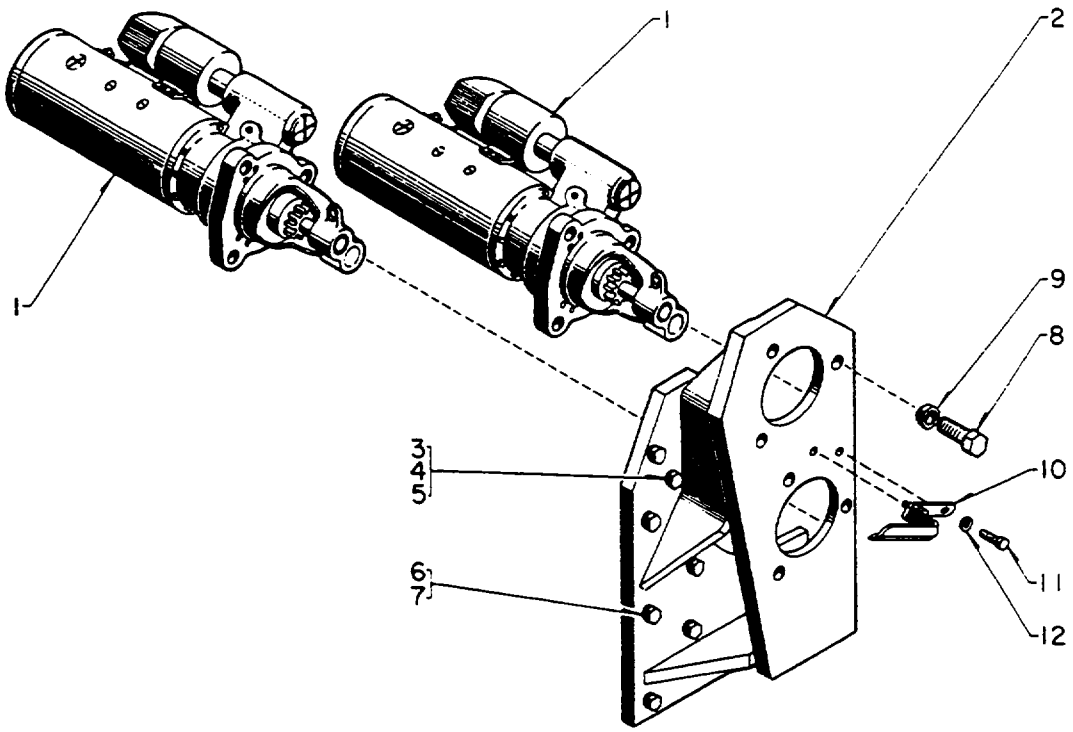


PLATE B25-6

Ref. No.	Part Number	Qty. Req.	Description
1	1109283	2	MOTOR ASSEMBLY .. Electric starter - See Page 10 - Replaces 1109758
2	8358874	1	BRACKET ASSEMBLY .. Starter motor
3	8249889	2	BOLT .. Bracket to oil pan - 3/4-16 x 2-5/8 hex. head
4	8140912	2	WASHER .. Plain - 3/4
5	8060089	2	NUT .. Lock - 3/4-16 hex.
6	271585	6	BOLT .. Bracket to oil pan - 5/8-18 x 1-3/4 hex. head
7	103325	6	WASHER .. Lock - 5/8
8	271589	6	BOLT .. Bracket to motor - 5/8-18 x 2-1/2 hex. head
9	8032721	6	NUT .. Lock - 5/8-18 hex.
10	8354872	1	INDICATOR .. Flywheel - See Page 9
11	179793	2	BOLT .. Indicator mounting - 1/4-20 x 5/8 hex. head
12	103319	2	WASHER .. Lock - 1/4
ϕ+*13	8391430	1	COVER ASSEMBLY .. Handhole - See Parts List 04 - Replaced by 9314869
ϕ+*14	8212122	1	COVER ASSEMBLY .. Handhole - See Parts List 04
ϕ+*15	9314869	1	COVER ASSEMBLY .. Handhole - See Parts List 04 - Replaces 8391430

8366283E

P.L. No. B25

STARTER MOTOR AND MOUNTING

Air Starter Motor Mounting
12-645E2,E5 and 16-645E2,E5 Marine Engines
12 and 16-645E1 Industrial Engines - Models SR12E1 and SR16E1

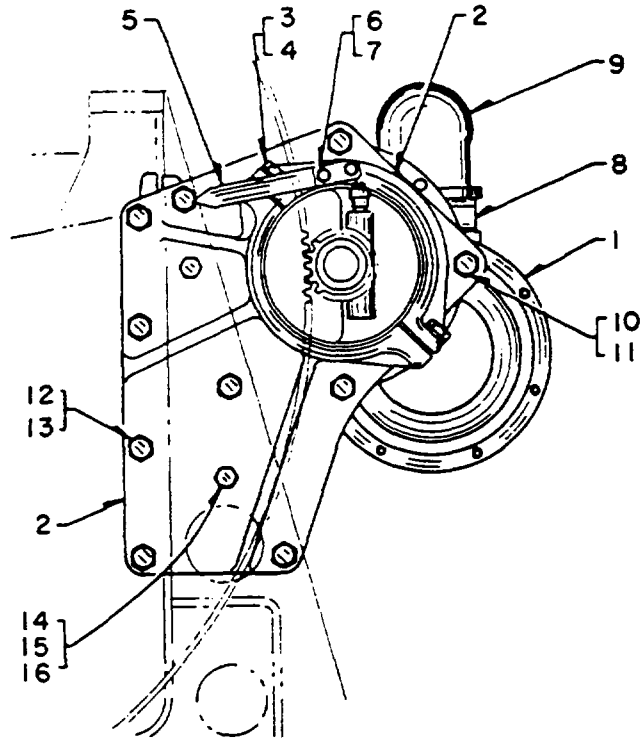
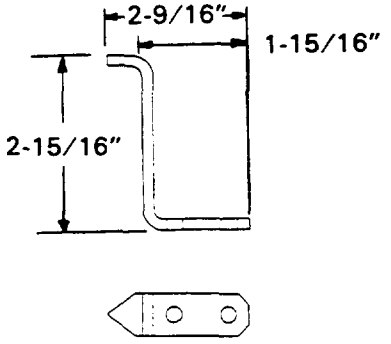


PLATE B25-7

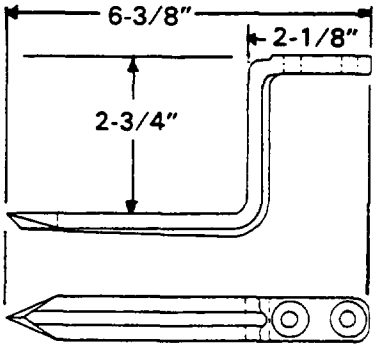
Ref. No.	Part Number	Qty. Req.	Description
1	- - - -	1	MOTOR ASSEMBLY .. Air starter - See Pages 14 and 17
ϕ 2	8379324	1	BRACKET ASY. .. Motor mounting - Includes clamp - L.H. construction marine engines and 12 and 16-645E1 industrial engines
ϕ 2	8382054	1	BRACKET ASY. .. Motor mounting - Includes clamp - R.H. construction marine engines only
3	179885	-	BOLT .. Clamp to bracket - 1/2-13 x 1-1/2 hex. head - Qty. 4 req'd. per bracket
4	103323	-	WASHER .. Lock - 1/2 - Qty. 4 req'd. per bracket
ϕ 5	8226031	1	INDICATOR .. Flywheel - Engine timing - 12-645E1,E2,E5 engines - Formerly 8266031
ϕ 5	8292922	1	INDICATOR .. Flywheel - Engine timing - 16-645E1,E2,E5 engines
ϕ 6	186630	2	BOLT .. Indicator mounting - 1/4-20 x 5/8 hex. head - 12-645E1 engine only
ϕ 6	443603	2	BOLT .. Indicator mounting - 1/4-20 x 3/4 hex. head - 12-645E2,E5,16-645E1,E2, and E5 engines
7	103319	2	WASHER .. Lock - 1/4
8	8060978	2	NIPPLE .. Short pipe - 2 M.P.T.
9	189777	2	ELBOW .. Pipe - 2 F.P.T. x 90°
10	271563	3	BOLT .. Motor to bracket - 5/8-11 x 2-1/4 hex. head
11	9416520	3	NUT .. Lock - 5/8-11 hex.
12	271585	4	BOLT .. Bracket to crankcase - 5/8-11 x 1-3/4 hex. head
13	103325	4	WASHER .. Lock - 5/8
14	8249889	4	BOLT .. Bracket to crankcase - 3/4-16 x 3-1/4 hex. head
15	8140912	4	WASHER .. Plain - 3/4
16	8060089	4	NUT .. Lock - 3/4-16 hex.

8369434 8369435 8240502C 8214087G
8369437 8258293B 8240523C
8369436 8240522D 8226032E

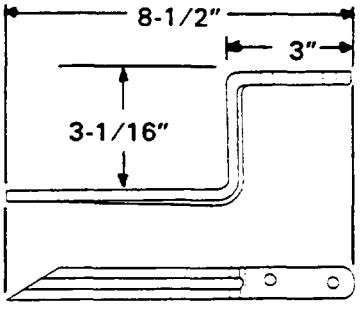
STARTER MOTORS AND MOUNTING
Flywheel Indicators



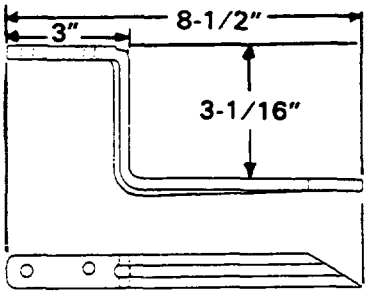
Part No. 8226031



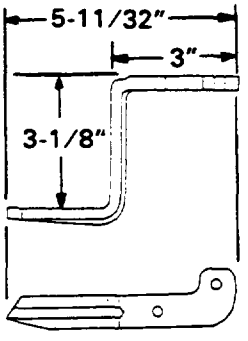
Part No. 8292922



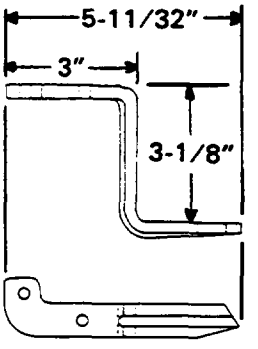
Part No. 8354872



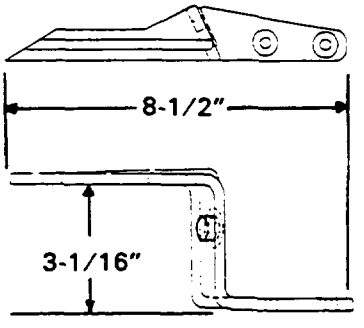
Part No. 8394909



Part No. 8377431



Part No. 8377432



Part No. 8477119

PLATE B25-8

P.L. No. B25

STARTING MOTOR AND MOUNTING
Service Parts for Electric Starter Motors

PLATES B25-9 and -10

Ref. No.	Part Number	Qty. Req.	Description
1	1109758	1	MOTOR ASM. .. Electric start - 64V - Replaced by 1109283
1	1109283	1	MOTOR ASM. .. Electric start - 64V - Replaces 1109758
2	1967349	1	ARMATURE ASM. .. Starter motor
3	1970247	1	COIL ASM. .. Field - Includes 6 coils
4	1950561	1	STUD .. Terminal
5	9414418	2	NUT .. Terminal stud
6	9421427	1	WASHER .. Lock
7	1914647	1	WASHER .. Plain - Replaces 811912
8	1922457	2	WASHER .. Insulating
9	1967356	1	INSULATOR .. Square - Terminal stud
10	1965472	1	BUSHING .. Insulating
* 11	1945356	3	PLUG .. Inspection
* 12	1964857	3	GASKET .. Plug
13	1955989	1	INSULATOR .. Field coil - C.E. - Replaces 1967357,1945897
14	1869747	6	SHOE .. Pole
15	1968396	12	SCREW .. Pole shoe - Replaces 1913960
16	1967355	2	INSULATOR .. Field coil C.E.
* 16	1914873	2	INSULATOR .. Field coil D.E.
17	1953237	1	WASHER .. Thrust
18	1945848	1	FRAME ASM. .. C.E. - Replaces 1945847
†19	1894638	1	BUSHING .. Frame - Replaces 1869755
20	1972977	1	WICK .. Oil - 1916439 formerly applied
21	1978756	1	PLUG .. Oil reservoir
* 22	9427882	1	PLUG .. Pipe - Replaces 1945847 and 453465
23	1916272	1	SEAL .. O-Ring - Replaces 1945860
24	181568	6	SCREW .. C.E. frame - Replaces 1914869
25	120380	6	WASHER .. Lock - Replaces 9421423
26	1967354	1	PLATE ASM. .. Brush - Does not include brushes
27	1945851	1	PLATE .. Brush - Includes stud
28	1945850	1	PLATE .. Insulating
29	1861785	12	SPRING .. Brush
30	1905043	6	HOLDER .. Brush
31	1965093	3	INSULATION .. Plate
32	1979839	3	PLATE .. Spacer - Insulation - Replaces 1865925
33	1979388	3	PLATE .. Spacer - Ground - Replaces 1861781
34	1962047	3	PIN .. Brush holder - Long - Insulating - Replaces 1904982
35	1984212	3	SCREW ASM. .. Brush holder - Insulating - Replaces 1914580,1968656
36	1962048	3	PIN .. Brush holder - Short - Grounded - Replaces 1928500,1861787
37	1984213	3	SCREW ASM. .. Brush holder - Grounded - Replaces 1968656,1914580
38	453435	6	WASHER .. Lock - Formerly 12 req.
39	1913080	12	BUSHING .. Washer
40	1869760	1	PLATE .. Support
* 41	1964516	1	INSULATOR .. Brush plate - .015 glass cloth
42	1906989	12	BRUSH ASM. .. Includes leads
43	121749	12	SCREW .. Brush - Replaces 453418
44	1847807	3	SCREW AND WASHER ASM. .. Formerly 9417096 - Screw and 453844 washer
45	1861791	2	WASHER .. Insulating - Terminal stud
* 46	1851632	1	KIT .. Terminal insulator
47	1913027	1	INSULATOR .. Terminal stud - Formerly 1918687
48	1851603	1	BUSHING .. Insulating
* 49	1851604	1	BUSHING .. Rubber
* 50	1918689	1	WASHER .. Rubber
51	1979451	1	NUT AND WASHER ASM. .. Formerly 9414418 Nut & 811912 Washer - Field term.
52	1971025	1	HOUSING ASM. .. Drive - Formerly 1957847
†53	1894635	1	BUSHING .. Drive housing
54	1978754	1	WICK .. Oil - Formerly 1916439
55	1978756	1	PLUG .. Pipe - Oil reservoir

† Bushings must be press fitted and line reamed.

P.L. No. B25

STARTER MOTORS AND MOUNTING
Service Parts For Electric Starter Motors

Ref. No.	Part Number	Qty. Req.	Description
	1109758	-	MOTOR ASM. .. Electric start
	1109283	1	MOTOR ASM. .. Electric start
56	1948536	5	SCREW .. Drive housing - Long
57	1948537	1	SCREW .. Drive housing - Short
58	1894211	1	DRIVE ASM. .. Motor - Use with 1109758 only - Replaces 800066
58	1976884	1	DRIVE ASM. .. Motor - Use with 1109283 only
59	1945476	1	GASKET .. Drive housing
60	1936466	1	WASHER .. Spacer
61	1979870	1	HOUSING ASM. .. Lever - Replaces 1945857
62	1894637	1	BUSHING .. Housing - Replaces 1923484
63	1978754	1	WICK .. Oil - Formerly 1916439
64	1978756	1	PLUG .. Oil reservoir - Replaces 9417501
65	1964402	1	PLUG .. Housing - Formerly 453465
66	1918047	1	SEAL .. Oil
67	1911644	1	WASHER .. Brake
68	1916272	1	SEAL .. O-Ring - Replaces 1945860
69	181568	7	SCREW .. Housing mounting - Replaces 1914869
70	120380	1	WASHER .. Lock - Replaces 9421243
71	1945356	1	PLUG .. Lever housing
72	1964857	1	GASKET .. Plug
73	1945484	1	LEVER ASM. .. Shift
74	1948529	1	SHAFT .. Lever - Replaces 1945472
75	1894642	1	SEAL .. O-Ring 15/64 dia. - Replaces 1914373
76	1894643	1	SEAL .. O-Ring 1/2 dia. - Replaces 1921805
77	9415235	2	RING .. Snap
78	1115568	1	SWITCH ASM. .. Solenoid - Replaces 1115538 - See Page 24
79	1948522	1	PLUNGER ASM. .. Solenoid switch - Replaces 1945480
80	1948519	1	WASHER .. Boot
81	801077	1	BOOT .. Plunger
82	1948520	1	RETAINER .. Spring - Large hole
83	1948526	1	RETAINER .. Spring - Small hole
84	1948521	1	SPRING .. Shift lever
85	9412305	1	NUT .. Adjusting
86	1930611	4	SCREW ASM. .. Includes lockwasher
87	1945470	1	LEAD .. Terminal - Use with 1109758 only
87	1979600	1	LEAD .. Terminal - Use with 1109283 only
* 88	1970188	1	INSULATOR .. Field coil D.E.

P.L. No. B25

STARTER MOTOR AND MOUNTING

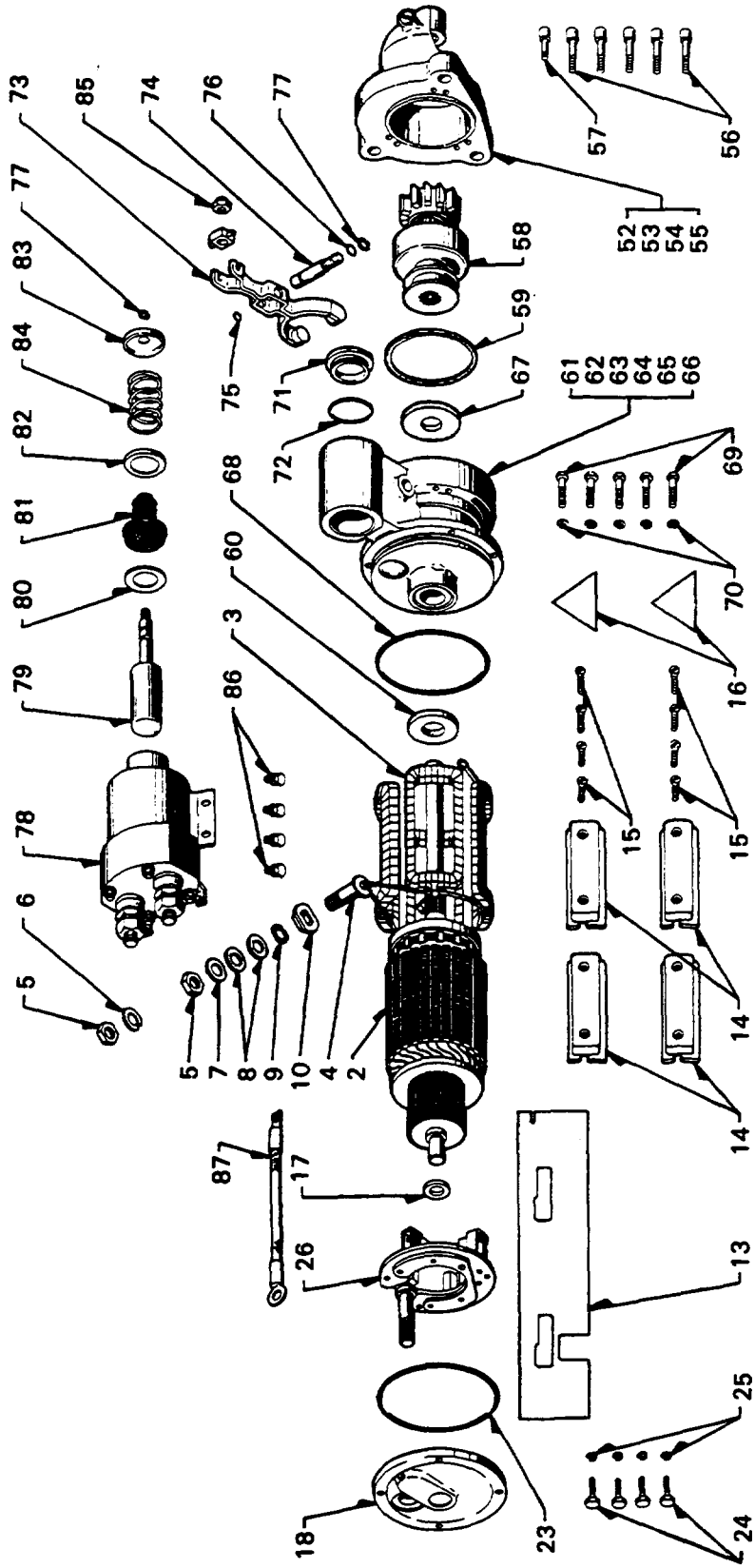


PLATE B25-9

P.L. No. B25

STARTER MOTOR AND MOUNTING

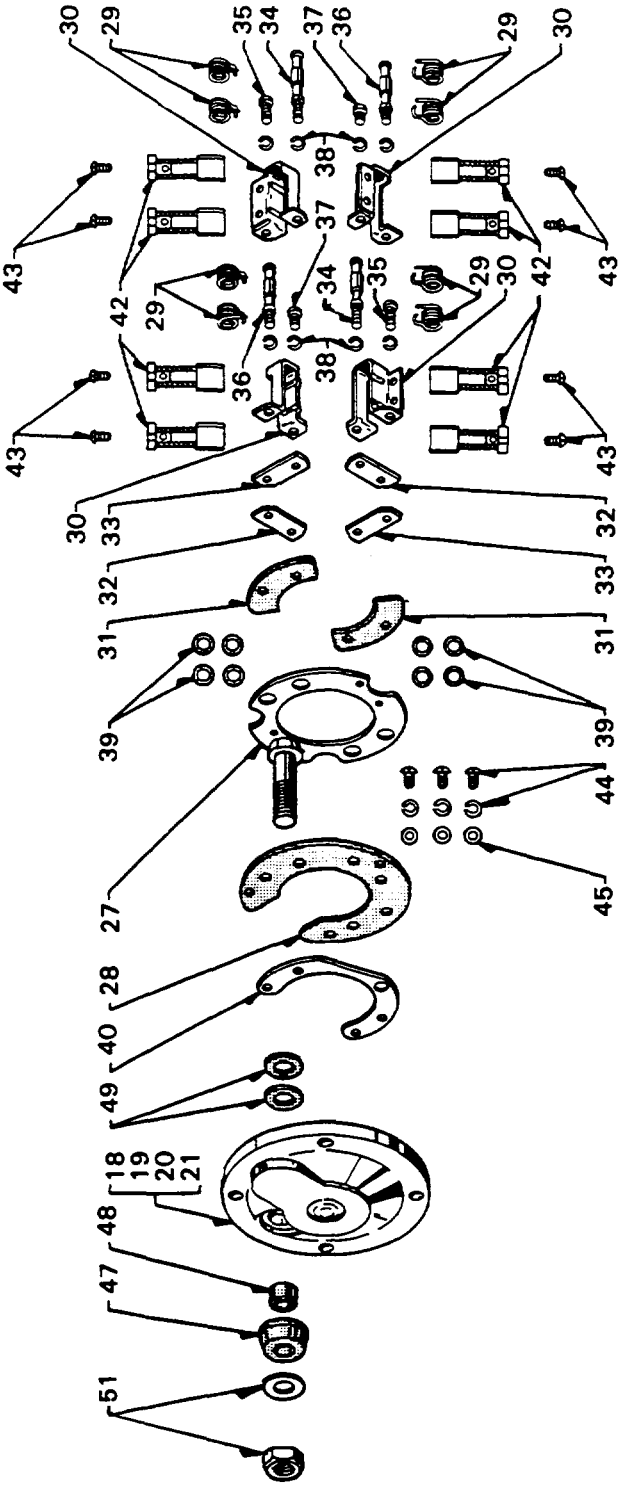


PLATE B25-10

P.L. No. B25

STARTER MOTOR AND MOUNTING

Air Starting Motor Assembly
PLATE B25-11

Ref. No.	Part Number	Quantity Required				Description
1	8242223	A	-	-	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 RR marine engines - Replaced by 9323022 - See Page 17
* 2	8242224	-	B	-	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 LR marine engines - Replaced by 9323022 - See Page 17
* 3	8242225	-	-	C	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 RL marine engines - Replaced by 9323023 - See Page 17
* 4	8224953	-	-	-	D	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5,16-645E2,E5 LL marine engines and 12,16-645E1 industrial engines - Replaced by 9323023- See Page 17
5	3387685	1	1	-	-	MOTOR ASSEMBLY .. Air - Replaced by 9083215
* 5	3385836	-	-	1	1	MOTOR ASSEMBLY .. Air
6	3389624	1	1	1	1	HOUSING .. Air motor
7	3389625	1	1	1	1	ROTOR ASSEMBLY .. Air motor
8	3384352	2	2	2	2	SPACER .. Rotor bearing
9	127709	1	1	1	1	NUT .. Lock - Rotor bearing
10	127686	1	1	1	1	WASHER .. Retaining
11	8233750	1	1	1	1	RETAINER .. Pinion
12	8233749	2	2	2	2	SCREW .. Pinion retainer
13	3381157	2	2	2	2	BEARING .. Ball - Rotor
14	3384340	2	2	2	2	PLATE .. End - Cylinder
15	3384337	1	1	1	1	CYLINDER ASSEMBLY .. Air motor
16	3384357	3	3	3	3	GASKET ASSEMBLY .. Air port
17	8233752	3	3	3	3	SPRING .. Gasket retainer
18	3384355	1	1	1	1	DOWEL .. Cylinder
19	9522907	1	1	1	1	KIT .. Vane - Contains 5 vanes - Replaces (5) 3384350
20	3384359	1	1	1	1	GASKET .. Housing cover
21	3389623	1	1	1	1	COVER ASSEMBLY .. Housing
22	119512	1	1	1	1	FITTING .. Grease - 1/8 M.P.T.
23	8028752	1	1	1	1	SEAL .. Grease - Replaces 8233751
*24	103883	2	2	2	2	PLUG .. Pipe - 1/8 M.P.T. socket head
25	179840	8	8	8	8	BOLT .. Cover mounting - 3/8-16 x 1-1/8 hex. head
26	103321	8	8	8	8	WASHER .. Lock - 3/8
27	8332341	1	1	1	1	CASE ASSEMBLY .. Gear
28	119512	1	1	1	1	FITTING .. Grease - 1/8 M.P.T.
29	103878	6	6	6	6	PLUG .. Pipe - 1/4 M.P.T.
30	141539	1	1	1	1	BUSHING .. Pipe reducing - 1/4 M.P.T. x 1/8 F.P.T.
31	903206	1	1	1	1	BEARING .. Ball - Drive shaft
32	8281900	1	1	1	1	GEAR .. Drive - 55 teeth
33	8323859	1	1	1	1	KEY .. Drive gear
34	3386596	1	1	1	1	GEAR .. Rotor pinion - 16 teeth
35	8233745	1	1	1	1	SHAFT .. Drive
36	903207	1	1	1	1	BEARING .. Ball - Drive shaft
37	8233746	1	1	1	1	SPACER .. Bearing
38	8233744	1	1	1	1	COVER ASSEMBLY .. Gear case
39	8233748	1	1	1	1	SEAL .. Grease
40	179843	6	6	6	6	BOLT .. Gear case mounting - 3/8-16 x 1-1/2 hex. head
41	103321	6	6	6	6	WASHER .. Lock - 3/8
42	114503	6	6	6	6	NUT .. Lock - 3/8-16 hex.
43	179839	2	2	2	2	BOLT .. Gear housing to motor - 3/8-16 x 1 hex. head
44	103321	2	2	2	2	WASHER .. Lock - 3/8

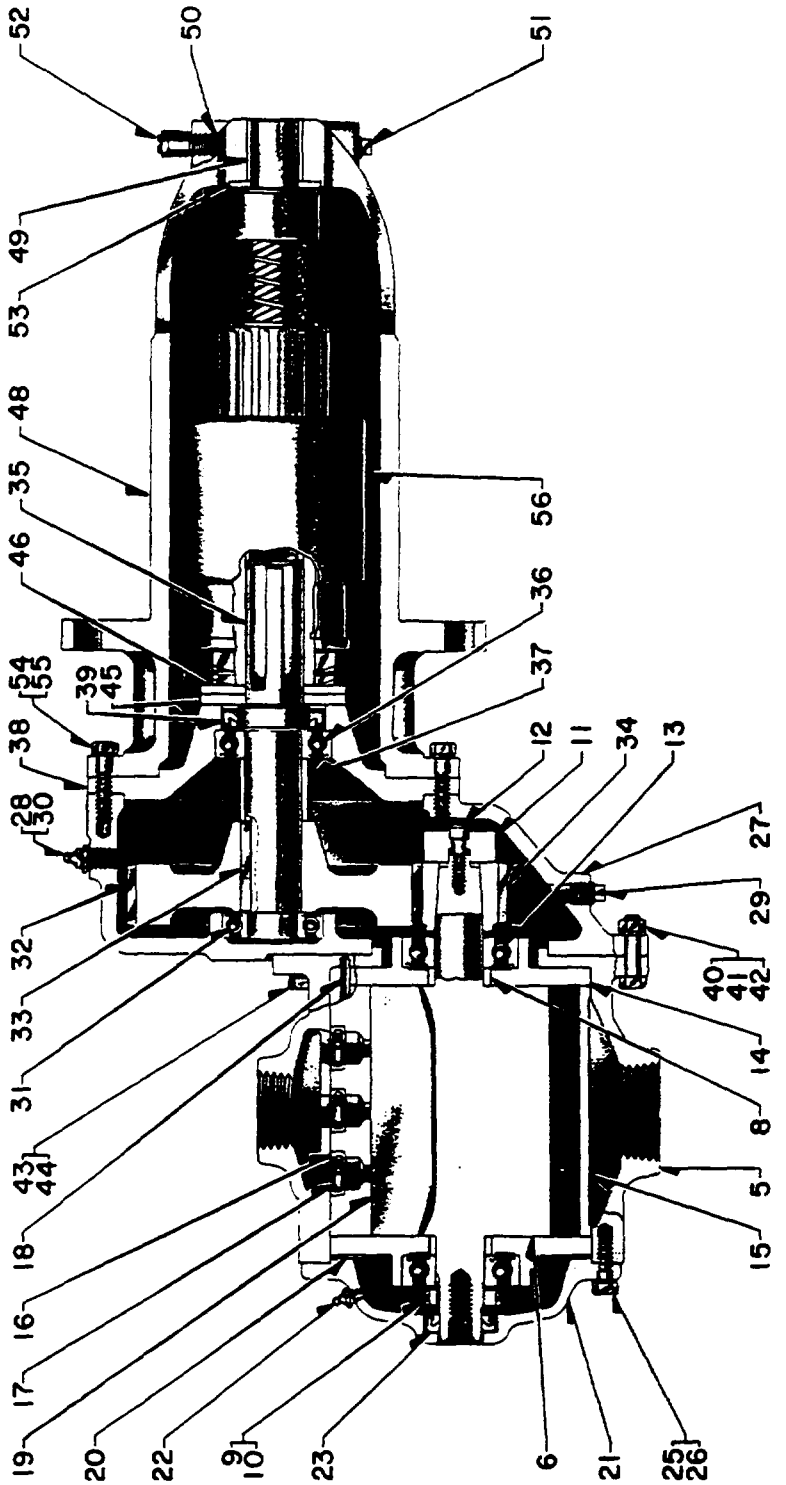
P.L. No. B25

STARTER MOTOR AND MOUNTING

Ref. No.	Part Number	Quantity Required				Description
	8242223	A	-	-	-	MOTOR ASSEMBLY .. Air starter
	8242224	-	B	-	-	MOTOR ASSEMBLY .. Air starter
	8242225	-	-	C	-	MOTOR ASSEMBLY .. Air starter
	8224953	-	-	-	D	MOTOR ASSEMBLY .. Air starter
45	8233747	1	1	1	1	WASHER .. Thrust
46	8286449	1	1	1	1	PLATE .. Thrust
*47	113991	2	2	2	2	SCREW .. Cover mounting - 1/4-20 x 3/4 flat head
48	8233755	1	1	1	1	HOUSING ASSEMBLY .. Bendix drive
49	8286448	1	1	1	1	BUSHING .. Drive housing
50	1867903	1	1	1	1	WICK .. Oiler
51	103878	1	1	1	1	PLUG .. Pipe - 1/4 M.P.T.
52	826931	1	1	1	1	CUP .. Oiler
53	8286447	1	1	1	1	WASHER .. Thrust - Drive housing
54	179842	8	8	8	8	BOLT .. Drive housing to gear housing - 3/8-16 x 1-3/8 hex. head
55	103321	8	8	8	8	WASHER .. Lock - 3/8
DRIVE .. Bendix						
56	8326877	1	1	-	-	DRIVE .. Bendix - Serviced as a complete unit only
*56	8223608	-	-	1	1	DRIVE .. Bendix - Serviced as a complete unit only

P.L. No. B25

STARTER MOTOR AND MOUNTING



REF. NO. 1

AIR STARTER MOTOR ASSEMBLY

PLATE B25-11

P.L. No. B25

STARTER MOTOR AND MOUNTING

Air Starting Motor Assembly
PLATE B25-12

Ref. No.	Part Number	Quantity Required				Description
* 1	8468252	A	-	-	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 RR marine engines - Replaces 8242223 - Replaced by 9323022
2	9323022	-	B	-	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 RR and LR marine engines - Replaces 8242223, 8242224, and 8468252
* 3	8468251	-	-	C	-	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 LL marine engines and 12,16-645E1 industrial engines - Replaces 8224953 - Replaced by 9323023
4	9323023	-	-	-	D	MOTOR ASSEMBLY .. Air starter - 12-645E2,E5 and 16-645E2,E5 LL and RL marine engines and 12,16-645E1 industrial engines - Replaces 8242225, 8224953 and 8468251
5		1	1	1	1	COVER ASSEMBLY .. Motor housing
6		1	1	1	1	PLUG .. Housing cover
7		1	1	1	1	PLUG .. Pipe - 1/8 N.P.T.
8	3384359	1	1	1	1	GASKET .. Cover - Motor housing
9	179840	8	8	8	8	SCREW .. Cap - Housing cover - 3/8-16 x 1-1/8 hex. head
10	103321	16	16	16	16	WASHER .. Lock - 3/8
11		1	-	1	-	HOUSING .. Air motor
11	9559892	-	1	-	1	HOUSING .. Air motor
11A		2	2	2	2	PLUG .. Pipe - 3/8 M.P.T.
12	9559893	1	1	1	1	CYLINDER ASSEMBLY .. Air motor
13	3384357	4	4	4	4	GASKET ASSEMBLY .. Air port
14	8233752	4	4	4	4	SPRING .. Gasket retaining
*15	3384340	2	-	2	-	PLATE .. End - Cylinder
16	9323025	-	1	-	1	PLATE .. Front end - Cylinder
17	9323026	-	1	-	1	PLATE .. Rear end - Cylinder
18		-	1	-	1	RETAINER Front rotor bearing
19	3384355	1	1	1	1	DOWEL .. Cylinder
*20		1	-	1	-	ROTOR ASSEMBLY .. Air motor
*21	3384352	2	-	2	-	SPACER .. Rotor bearing
*22	127709	1	-	1	-	NUT .. Lock - Rotor bearing
*23	127686	1	-	1	-	WASHER .. Retaining
*24	8233750	1	-	1	-	RETAINER .. Pinion
*25	8233749	2	-	2	-	SCREW .. Pinion retainer
26	9323024	-	1	-	1	ROTOR ASSEMBLY .. Air motor
27		-	1	-	1	RING .. Retaining - Rear rotor
28		-	1	-	1	RING .. Retaining - Rotor pinion
*29	3381157	2	-	2	-	BEARING .. Ball - Rotor
29	9323029	-	2	-	2	BEARING .. Ball - Rotor
30	9522907	1	1	1	1	KIT .. Vane - Contains 5 vanes - Replaces (5) 3384350
*31		1	-	1	-	WASHER .. Spring - Rear rotor bearing
32	9323027	-	2	-	2	BEARING ASSEMBLY .. Thrust - Consists of two thrust races and a thrust bearing
*33	3386596	1	-	1	-	PINION .. Rotor - 16 teeth
33	9323028	-	1	-	1	PINION .. Rotor - 16 teeth
34	8281900	1	1	1	1	GEAR .. Drive - 55 teeth
35	8323859	1	1	1	1	KEY .. Drive gear
36	8233745	1	1	1	1	SHAFT .. Drive
37	903207	1	1	1	1	BEARING .. Front - Drive shaft
38	8233746	1	1	1	1	SPACER .. Bearing - Drive shaft front
39	8233744	1	1	1	1	COVER ASSEMBLY .. Gear case
*40		-	1	-	1	SCREW .. Gear case cover
41	8233748	1	1	1	1	SEAL .. Grease - Drive shaft
42		6	-	6	-	BOLT .. Motor housing to gear case
42	179842	-	6	-	6	BOLT .. Motor housing to gear case - 3/8-16 x 1-3/8 hex. head
43	114503	6	6	6	6	NUT .. Lock - 3/8-16 hex.
44		2	2	2	2	SCREW .. Cap - Gear case
45	8233747	1	1	1	1	WASHER .. Thrust - Bronze
46	8286449	1	1	1	1	PLATE .. Thrust

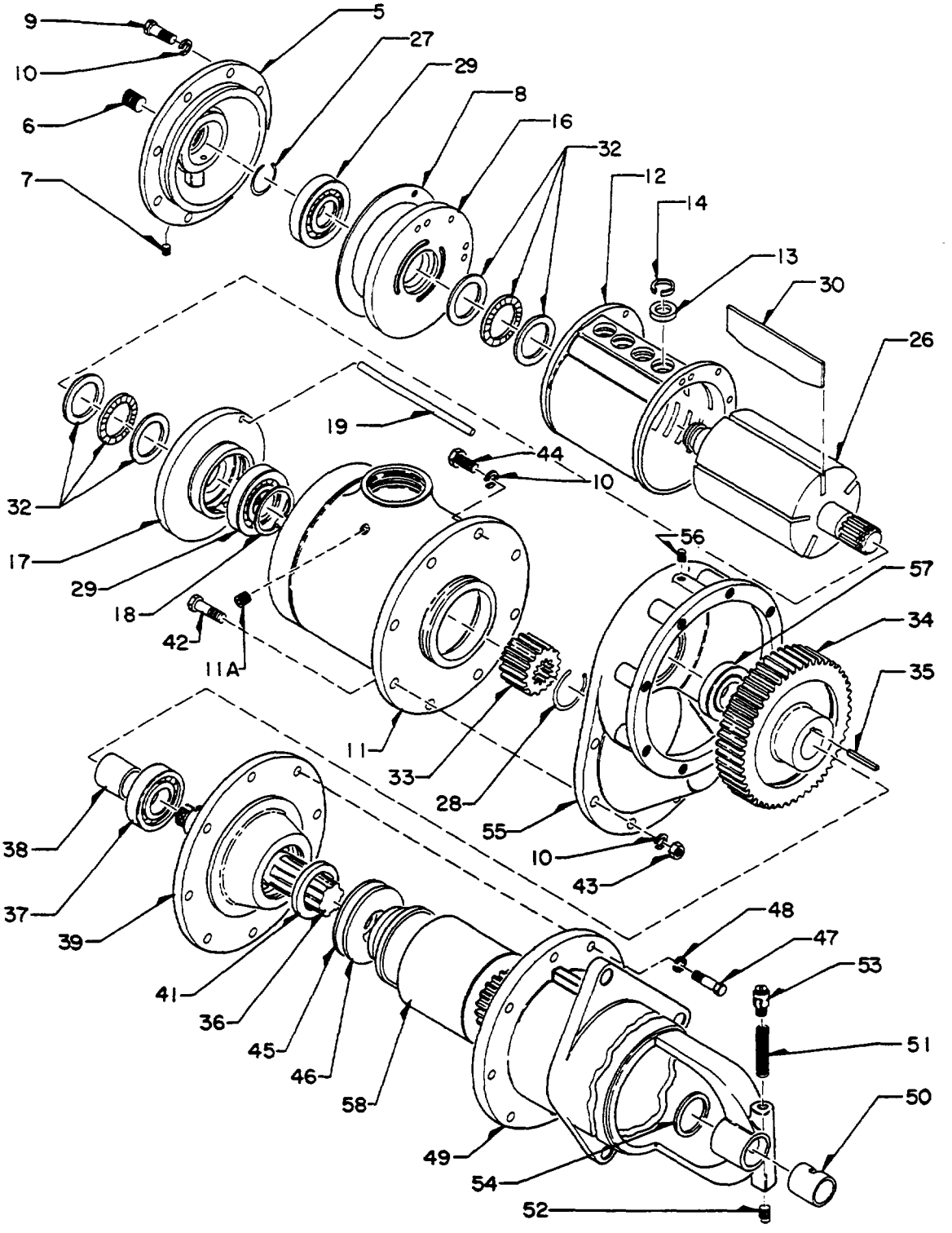
P.L. No. B25

STARTER MOTOR AND MOUNTING

Ref. No.	Part Number	Quantity Required				Description
	8468252	A	-	-	-	MOTOR ASSEMBLY .. Air starter
	9323022	-	B	-	-	MOTOR ASSEMBLY .. Air starter
	8468251	-	-	C	-	MOTOR ASSEMBLY .. Air starter
	9323023	-	-	-	D	MOTOR ASSEMBLY .. Air starter
47	179842	8	8	8	8	BOLT .. Drive housing - 3/8-16 x 1-3/8 hex. head
48	103321	8	8	8	8	WASHER .. Lock - 3/8
49	8233755	1	1	1	1	HOUSING ASSEMBLY .. Drive
50	8286448	1	1	1	1	BUSHING .. Drive housing
51	1867903	1	1	1	1	WICK .. Oiler
52	103878	1	1	1	1	PLUG .. Pipe - 1/4 M.P.T.
53	826931	1	1	1	1	CUP .. Oil
54	8286447	1	1	1	1	WASHER .. Thrust - Drive housing
55		1	1	1	1	CASE ASSEMBLY .. Gear
56		1	1	1	1	PLUG .. Pipe - 1/8
57	903206	1	1	1	1	BEARING .. Ball - Drive shaft rear
58	8326877	1	1	-	-	DRIVE .. Bendix - Serviced as a complete unit only
58	8223608	-	-	1	1	DRIVE .. Bendix - Serviced as a complete unit only

P.L. No. B25

STARTER MOTOR AND MOUNTING



Ref. Nos. 2 and 4
PLATE B25-12

P.L. No. B25

STARTER MOTOR AND MOUNTING

Air Starter Motor Assembly
PLATE B25-13

Ref. No.	Part Number	Qty. Req.		Description	Application
1	8377435	A	-	MOTOR ASY. .. Air starter - Utex Part No. 8421947	Right hand rotation engs.
2	8367694	-	B	MOTOR ASY. .. Air starter - Utex Part No. 8421946	Left hand rotation engs.
3	8391361	1	-	DRIVE .. Bendix } Serviced as a complete unit only	
4	8391362	-	1	DRIVE .. Bendix }	

The following components Ref. Nos. 5 thru 53 are applicable to Ref. Nos. 1 and 2.

5	9337288	1	HOUSING .. Air motor
6	8489614	1	ROTOR .. Air motor
7	8466053	1	SPACER .. Rotor pinion
8	8456631	1	RETAINER .. Rotor pinion
9	8466060	1	PINION .. Rotor
10	8466054	1	BEARING .. Rear - Rotor
11	8466055	1	BEARING .. Front - Rotor
12	8456632	1	RETAINER .. Bearing - Rear rotor
13	8491326	1	PLATE .. End rear - Cylinder
14	8489615	1	PLATE .. End front - Cylinder
15	8483276	1	CYLINDER .. Air motor
16	8495995	1	DOWEL .. Cylinder
17	9530063	1	KIT .. Vane - Contains five vanes - Replaces (5) 8383206
18	9337289	1	COVER ASSEMBLY .. Motor housing
19	9092184	1	PLUG .. End - Cover
20	9092184	2	PLUG .. Oil chamber
21	8353706	1	PLUG .. Oil filler
22	9507319	2	SCREW .. Adjusting - Oiler
23	9504915	2	FELT .. Oiler
24	9507321	4	SCREW .. Cover cap - Housing
25	103321	4	WASHER .. Lock - Cover cap screw
26	8383208	1	GASKET .. Cover housing
27	8466061	1	CASE .. Gear
28	8383207	1	GASKET .. Gear case
29	8466056	3	GEAR ASSEMBLY .. Planet
30	9081281	3	BEARING .. Gear - Planet
31	8460577	1	FRAME .. Gear - Planet
32	8466057	3	SHAFT .. Gear - Planet
33	8495996	1	RING .. Thrust - Planet gear frame
34	8466058	1	BEARING .. Planet gear frame
35	274693	1	RING .. Retaining - Planet gear frame
36	8466063	1	COVER ASSEMBLY .. Gear case
37	8383205	1	SEAL .. Cover
38	8383204	1	SEAL .. Piston
39	8466065	1	PISTON ASSEMBLY .. Air motor
40	8466066	1	RING .. Piston
41	8466067	1	RING .. Shift - Consists of two halves
42	9413285	1	RETAINER .. Shift ring
43	8466059	1	SPACER .. Shift ring
44	8458923	1	SPRING .. Piston return
45	8466064	1	SEAT .. Spring - Return
46	8466062	1	HOUSING ASSEMBLY .. Bendix drive
ϕ47	8463196	1	BUSHING .. Drive housing } Prior to August, 1978
48	8463197	1	BUSHING .. Oiler }
49	9507320	1	PLUG .. Bushing - Oiler }
ϕ*50	9552942	1	BEARING .. Roller - After August, 1978
51	9417957	12	SCREW .. Cap - Drive housing - 1/4-20 x 1-1/4
52	103319	12	WASHER .. Lock - Drive housing cap screw - 1/4
53	9326707	3	BUSHING .. Mounting bolt - 3/8
54	138489	3	WASHER .. Lock - Mounting bolt - 3/8

STARTER MOTOR AND MOUNTING

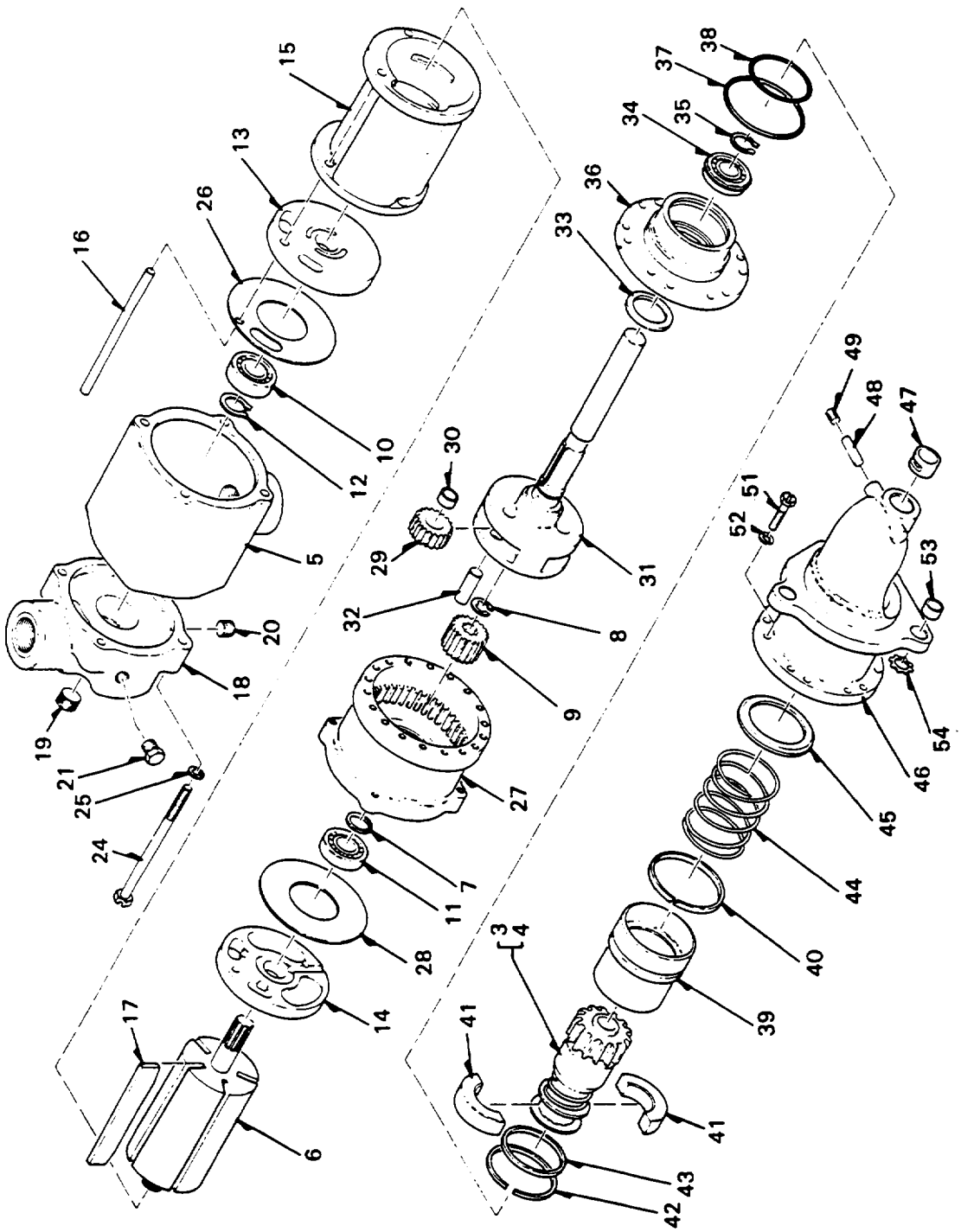


PLATE B25-13

P.L. No. B25

STARTER MOTOR AND MOUNTING
Low Pressure Air Start Motor
12,16-645E8 and 16-645E9B

PLATE B25-14

Ref. No.	Part Number	Qty. Req.	Description
1	9542965	1	MOTOR ASM. .. Air start - Low pressure - Model SS825
2		1	HOUSING .. Motor - 2-1/2 in. threaded exhaust
3		1	COVER .. Housing - 1-1/2 in. threaded inlet
4		3	PLUG .. Pipe - Housing cover
5		4	SCREW .. Cap
6		4	WASHER .. Lock
7	40013995	1	KIT .. Cylinder
8		2	PIN .. Alignment - End plate
9	9566395	1	PIN .. Alignment - Cylinder
10	9566379	4	SEAL .. O-Ring - Cylinder
11		1	PLATE .. End - Rear
12		1	BEARING .. Rotor - Rear
13	9566378	1	SEAL .. O-Ring - Rotor shaft
14	9566377	1	SEAL .. O-Ring - Rear bearing
15		1	NUT .. Clamp - Rotor
16		1	SCREW .. Clamp nut
17		1	ROTOR .. Motor
18	9522907	1	KIT .. Rotor vane - Set of 5 vanes
19		1	PLATE .. End - Front
20		1	BEARING .. Rotor - Front
21		2	WASHER .. Wave
22		1	PINION .. Rotor
23		1	SCREW .. Retaining - Pinion rotor
24	9566374	1	PINION .. Drive
25	9566375	1	SCREW .. Retaining - Drive pinion
26		1	WASHER .. Flat
27		1	SLEEVE .. Spring - Pinion
28		1	SPRING .. Pinion
29		1	SCREW .. Drive gear
30	9566373	1	SEAL .. O-Ring - Drive gear screw
31		8	SCREW .. Cap - Drive housing
32		8	WASHER .. Lock
33		1	HOUSING .. Drive
34	9566372	1	SEAL .. O-Ring - Housing
35		1	BEARING .. Front drive shaft
36	9566371	1	SEAL .. Bearing - Drive housing
37	9566396	1	RETAINER .. Bulkhead
38		1	KIT .. Bulkhead
39	9566370	1	SEAL .. Outer - Bulkhead
40	9566369	1	SEAL .. Inner - Bulkhead
41		1	RETAINER .. Cup - Clutch spring
42		1	CUP .. Spring - Clutch
43		1	SPRING .. Clutch
44		1	KIT .. Clutch jaw
45		1	BEARING .. Drive gear - Front
46		1	CUP .. Drive gear
47		1	WASHER .. Lock - Drive gear
48		1	RETAINER .. Drive shaft bearing - Large
49		1	RETAINER .. Drive shaft bearing - Small
50		1	KIT .. Piston
51	9566368	1	SEAL .. O-Ring - Piston
52	9566367	1	SEAL .. Piston
53		1	BEARING .. Drive shaft - Rear
54		1	SHAFT .. Drive
55		1	SPRING .. Piston return
56		1	SEAT .. Spring - Piston return

STARTER MOTOR AND MOUNTING

Ref. No.	Part Number	Qty. Req.	Description
-	9542965	1	MOTOR ASM. .. Air start - Low pressure - Model SS825
57		1	CASE .. Gear
58		1	BEARING .. Drive gear - Rear
59		1	RETAINER .. Bearing - Drive gear
60		1	RETAINER .. Bearing - Drive gear shaft
61		1	GEAR .. Drive
*62	9566397	1	KIT .. Repair - Contains Ref. Nos. 9,10,13,14,18,34,37,39,40,51, and 52

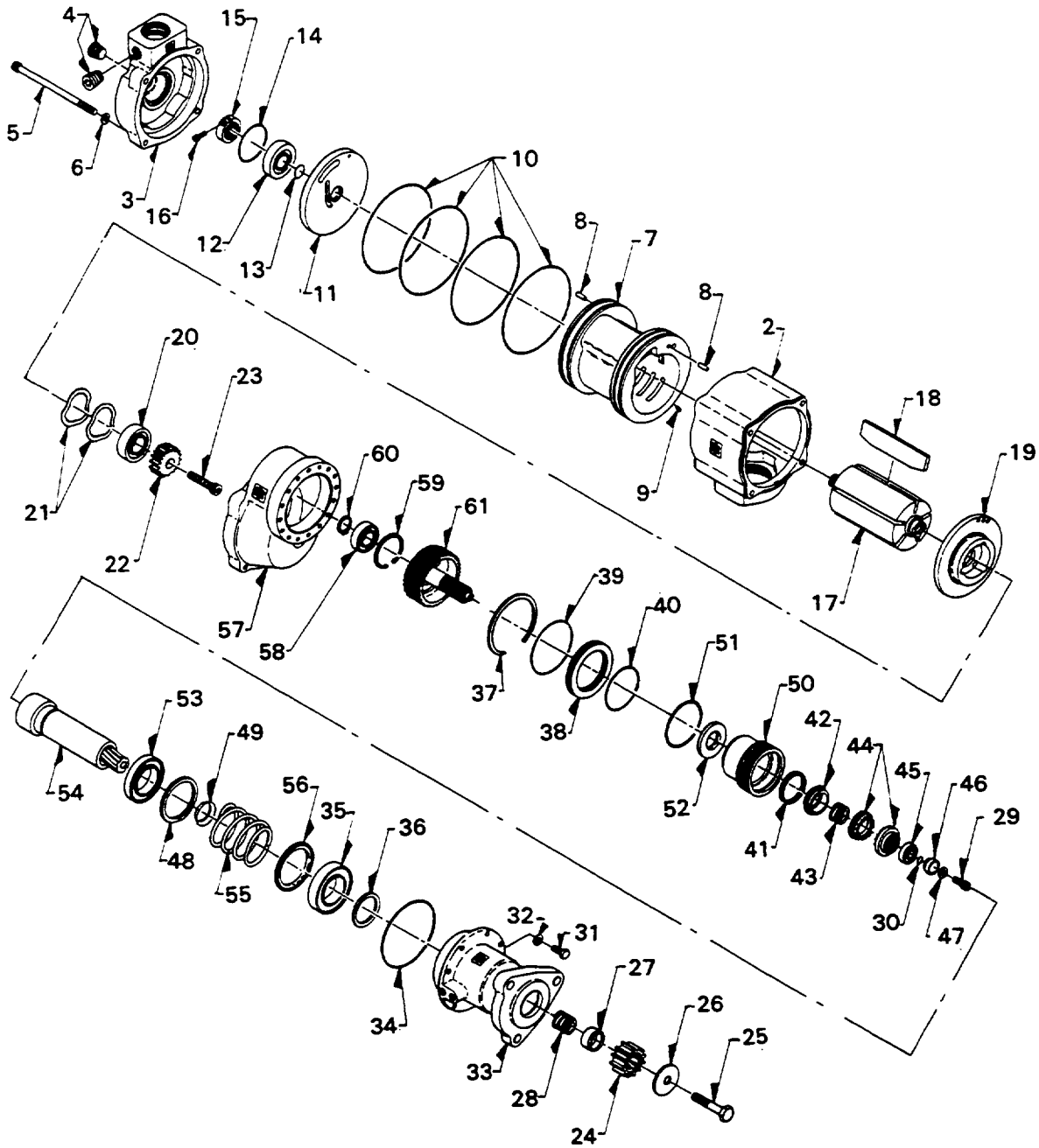
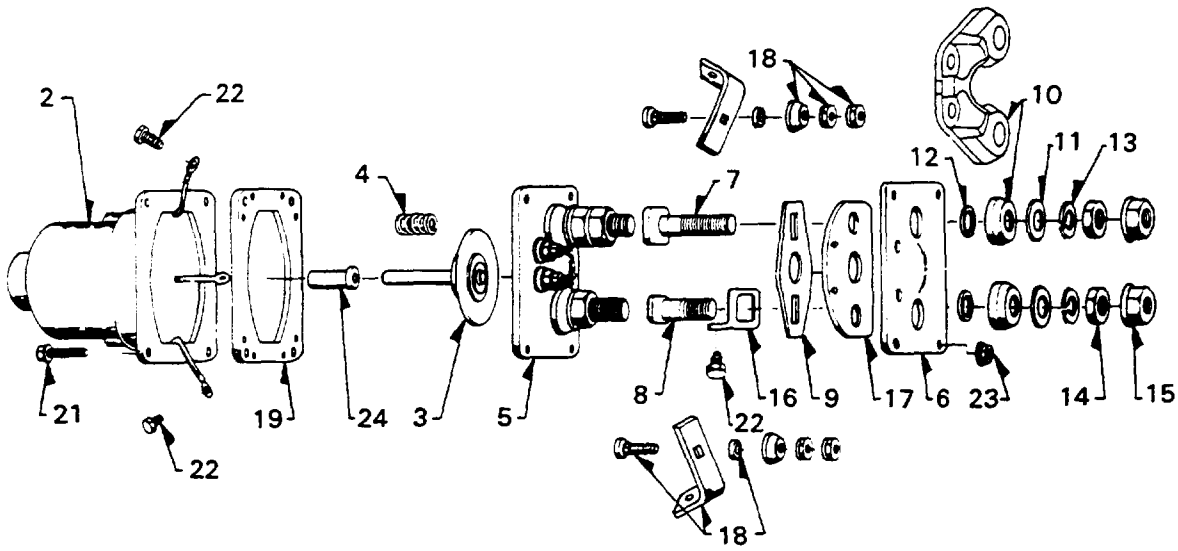


PLATE B25-14

P.L. No. B25

STARTER MOTOR AND MOUNTING
Solenoid Switch Assembly



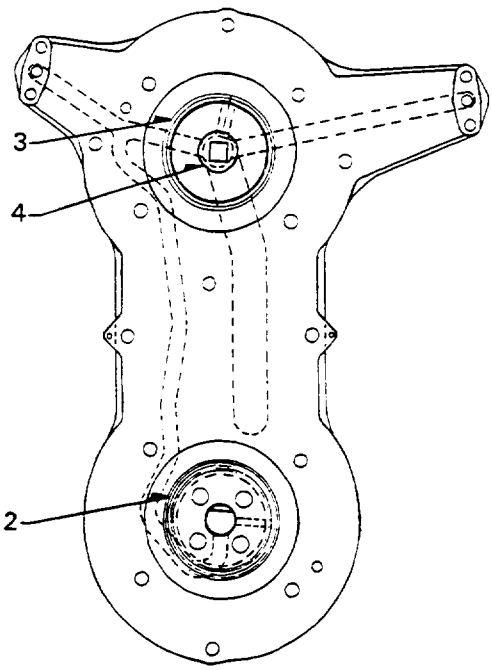
Ref. No. 1
PLATE B25-15

Ref. No.	Part Number	Qty. Req.	Description
1	1115568	1	SWITCH ASM. .. Solenoid - 64V - See Page 11 for application
2		1	CASE .. Switch - Includes coil and leads
3	1967335	1	CONTACT ASM. .. Disc
4	1945402	1	SPRING .. Contact
5	1979832	1	TERMINAL ASM. .. Switch
6	1979367	1	PLATE .. Terminal
7	1953244	1	STUD .. Battery terminal
8	1906049	1	STUD .. Motor terminal
9	1979369	1	INSULATION .. Terminal
ϕ10	1944836	2	INSULATOR .. Bushing - Previous design
ϕ10	1984705	2	INSULATOR .. Bushing - Current design with 4 holes
11	1914647	2	WASHER .. Terminal stud
12	1942969	2	BUSHING .. Insulating
13	9421427	2	WASHER .. Lock
14	9414418	2	NUT .. Stud 1/2 - 13 hex.
15	1979451	2	NUT ASM. .. Includes washer 1/2 - 13
16	1906051	1	CLIP .. Support
17	1979368	1	INSULATOR .. Terminal
18	1979776	2	TERMINAL PACKAGE
19	1979384	1	GASKET .. Terminal plate
20	----	-	Ref. Number Not Used
21	1979385	4	SCREW ASM. .. Cover
22	1840633	3	SCREW .. Coil lead
23	1979365	4	NUT ASM. .. Includes washer
24	1972716	1	BUSHING .. Plunger guide

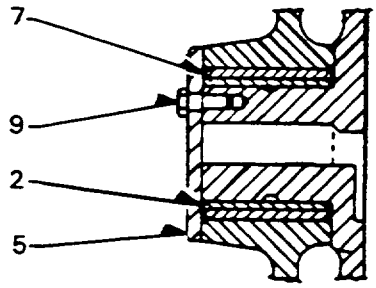
Parts List No. B26

CAMSHAFT DRIVE GEAR TRAIN

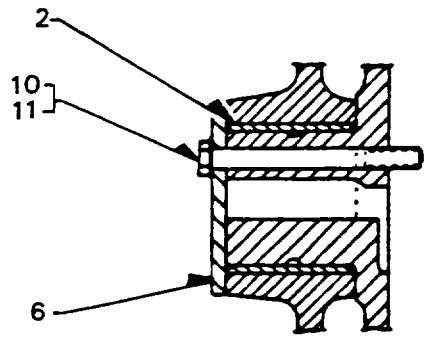
Idler Gear Stubshaft Arrangement
645 Roots Blown Engines



Ref. No. 1
Column D



PREVIOUS DESIGN



CURRENT DESIGN
Lower Stubshaft
Sectioned Through

PLATE B26-1

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
		A	B	C	D	Previous Application - Right Hand Rotation Engines Previous Application - Left Hand Rotation Engines Current Application - Right Hand Rotation Engines Current Application - Left Hand Rotation Engines
⁄ 1	8241533	1	-	-	-	STUBSHAFT ASM. .. Idler gear - No longer furnished
⁄ 1	8163034	-	1	-	-	STUBSHAFT ASM. .. Idler gear - No longer furnished
1	8484305	-	-	1	-	STUBSHAFT ASM. .. Idler gear - Through bolt design
1	8484128	-	-	-	1	STUBSHAFT ASM. .. Idler gear - Through bolt design
2	8081396	1	1	-	-	BEARING .. Lower stubshaft
2	8418334	-	-	1	1	BEARING .. Lower stubshaft
3	8241558	1	-	-	-	BEARING .. Upper stubshaft
3	8081393	-	1	-	-	BEARING .. Upper stubshaft
3	8484103	-	-	1	1	BEARING .. Upper stubshaft
4	106644	1	1	1	1	PLUG .. Pipe 1-1/4 N.P.T.
5	8081394	1	1	-	-	PLATE .. Thrust - Lower idler
6	8418364	-	-	1	1	PLATE .. Thrust - Lower idler
7	8069155	1	1	-	-	BUSHING .. Lower idler - 4.617 O.D. 8229678 - 4.677 O.D. 8267496 - 4.647 O.D.
* 8	8081391	1	1	-	-	BUSHING .. Upper idler - 4.617 O.D. 8229677 - 4.677 O.D. 8267497 - 4.647 O.D.
9	8048764	4	4	-	-	BOLT .. Thrust plate 1/2-13 x 1-1/4 drilled hex. head
10	8418363	-	-	4	4	BOLT .. Thrust plate 5/8-18 x 6-1/2 drilled hex. head
11	8282178	-	-	4	4	WASHER .. Hardened 5/8

⁄ *Stubshaft assemblies 8241533 and 8163034 are no longer available and have been replaced by current design Stubshafts 8484305 and 8484128, respectively. When converting to this latest design, new idler gear mounting hardware (Ref. Nos. 6,10, and 11) is also required. Ref. Nos. 7 and 8 are only required on the earlier design Stubshafts. Refer to M.I. 9587 (Rev. A).*

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN

Roots Blown Engines
PLATE B26-2

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A			8-645E1,E2,E6,E8 Engines
			B		12-645E1,E2,E6,E8 Engines
				C	16-645E1,E2,E6,E8 Engines
1	- - - -	1	1	1	STUBSHAFT .. Idler gear - See page 1
2	8483945	1	1	1	GEAR .. Idler - Upper - Replaces 8082766
3	8483944	1	1	1	GEAR .. Idler - Lower - Replaces 8069030
4	8028329	15	15	15	BOLT .. Stubshaft mtg. - 1/2 - 20 x 1-1/4 drilled hex. head - Previous design stubshaft
4	8028302	15	15	15	BOLT .. Stubshaft mtg. - 1/2 - 20 x 1-1/2 drilled hex. head - Current design stubshaft
5	8260114	15	15	15	WASHER .. Hardened 1/2 - Current design only
6	8028327	2	2	2	BOLT .. Dowel 5/16-24 x 1/2 drilled hex. head
7	8306807	2	2	2	DOWEL .. Locating .5000 dia. x 1-3/16 with 5/16-24 thread 8306808 - .5050 dia. 8306810 - .5150 dia. 8306809 - .5100 dia.
8	8418363	4	4	4	BOLT .. Lower idler gear 5/8-18 x 6-1/2 drilled hex. head
9	8282178	4	4	4	WASHER .. Hardened 5/8
10	8418364	1	1	1	PLATE .. Thrust - Lower idler gear
11	8081392	1	1	1	COLLAR .. Thrust - Upper idler gear
12	8069014	1	1	1	GEAR .. Crankshaft
13	8031949	1	1	1	SLINGER .. Oil
14	- - - -	As Req.			SHIM .. Oil slinger 8035526 - .010 8035527 - .021 8035528 - .030
15	8028288	8	8	8	BOLT .. Oil slinger 5/16-24 x 3/4 hex. head
16	- - - -	-	-	-	BOLT .. Coupling disc. - See Parts List 24
17	8069019	2	2	2	GEAR .. Camshaft drive - Left and right bank
18	8266426	8	-	-	BOLT .. Gear mounting 1/2-20 x 2-1/4 hex. head } See Parts List 28
18	8028335	-	8	8	BOLT .. Gear mounting 1/2-20 x 2-1/8 hex. head }
19	8081390	1	-	1	STUBSHAFT .. Right bank blower drive gear
19	8098077	-	1	-	STUBSHAFT .. Right bank blower drive gear
20	8098078	-	1	-	STUBSHAFT .. Left bank blower drive gear
20	8081389	-	-	1	STUBSHAFT .. Left bank blower drive gear
21	8028329	3	6	6	BOLT .. Stubshaft mounting 1/2-20 x 1-1/4 drilled hex. head
22	455013	5	10	10	BOLT .. Stubshaft mounting 1/2-20 x 1-3/8 hex. head - Formerly 8028291
23	8260114	8	16	16	WASHER .. Hardened - 1/2
24	8028736	1	2	2	DOWEL .. Locating .5000 dia. x 1-1/16 with 5/16-24 thread 8082371 - .5050 dia. 8082369 - .5150 dia. 8082370 - .5100 dia. 8298523 - .5200 dia.
25	8028327	1	2	2	BOLT .. Dowel 5/16-24 x 1/2 drilled hex. head
26	8483947	1	-	2	GEAR .. Blower drive - 29 tooth - Replaces 8362081
26	8483946	-	2	-	GEAR .. Blower drive - 39 tooth - Replaces 8362082
28	8069139	1	2	2	WASHER .. Thrust - Bronze - Outboard
29	8166495	1	2	2	WASHER .. Thrust - Cast iron - Inboard
30	8069495	1	2	2	HUB .. Blower drive
31	8069480	1	2	2	PLATE .. Thrust
32	113229	6	12	12	SCREW .. Thrust plate 1/4-28 x 3/4 flat head - Slotted
33	8069557	3	6	6	BOLT .. Hub mounting 1/2-20 x 2 hex. head
34	8069556	3	6	6	DOWEL .. Locating .5000 dia. x 1-3/4 with 5/16-24 thread 8115083 - .5050 dia. 8115081 - .5100 dia. 8115082 - .5150 dia.
35	8069157	1	2	2	BUSHING .. Drive gear - Floating
36	8028327	3	6	6	BOLT .. Dowel 5/16-24 x 1/2 drilled hex. head
37	8069558	1	2	2	PLATE .. Retainer
38	8116738	As Req.			WIRE .. Lock - 500 ft. length
39	8175731	1	1	1	RETAINER ASM. .. Oil seal - Replaces 8175730
40	8175858	1	1	1	GASKET .. Oil retainer
41	181370	24	24	24	BOLT .. Oil retainer to housing - 3/8-24 x 1-1/4 hex. head
42	6101225	24	24	24	WASHER .. Plain - 3/8

8475600,8475602,8475604

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN

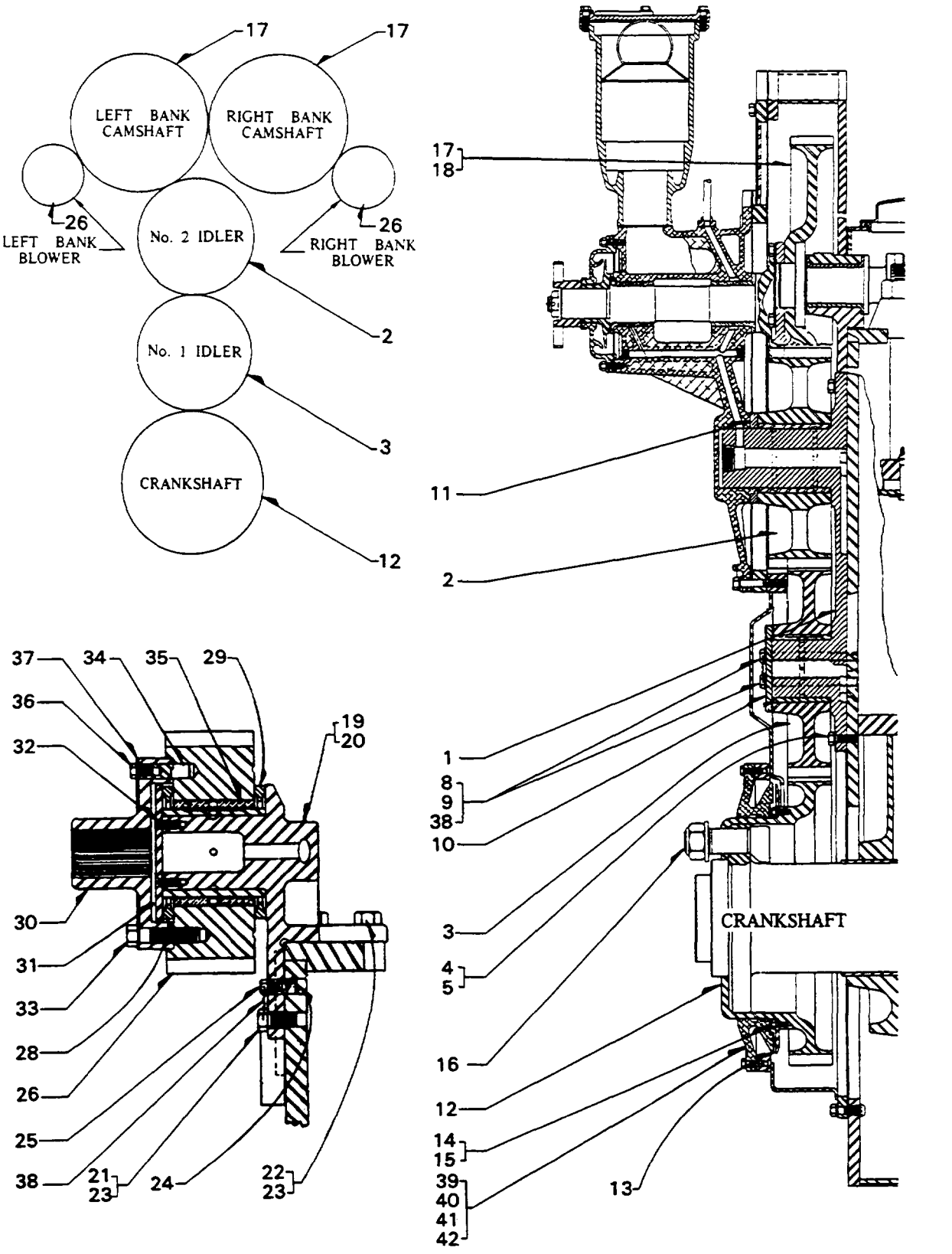


PLATE B26-2

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN

645 Turbocharged Engines

PLATE B26-3

Ref. No.	Part Number	Quantity Required							Description
		A	B	C	D	E	F	G	8-645E4,E4B,E5,E7,E7B L.H. Rotation Engines 8-645E5,E7 L.H. Rotation Engines - Solid Drive Gear 12,16,20-645E4,E5,E7 L.H. Rotation Engines Without High Capacity Gear Turbochargers 8-645E5,E7;12,16,20-645E4,E5,E7 R.H. Rotating Engines and L.H. Rotating Engines With High Capacity Gear Turbochargers - Solid Drive Gear 12,16,20-645E4,E5,E7 L.H. Rotating Engines Without High Capacity Gear Turbochargers - Solid Drive Gear 8-645E5,E7,E7B,E7C; 12-645E4B,E5,E7,E7B,E7C; 16-645E4,E4B,E5,E7,E7C; 20-645E4B,E5,E7,E7B, E7C R.H. Rotating Engines 12-645E4B,E5,E7,E7B,E7C,E9,E9B,16-645E4,E5,E7, E7B,E7C,E9,E9B,E10B; 20-645E4,E4B,E5,E7,E7B,E7C, E9,E9B,E10B L.H. Rotating Engines With High Capacity Gear Turbochargers
1	8069014	1	1	1	1	1	1	1	GEAR .. Crankshaft - 79 teeth - Except 20 cyl. engines
1	8360843	-	-	1	1	1	1	1	GEAR .. Crankshaft - 79 teeth - 20 cyl. engines only
2	8031949	1	1	1	1	1	1	1	SLINGER .. Oil
3	8028288	8	8	8	8	8	8	8	BOLT .. Slinger to gear - 5/16-24 x 3/4 hex. head
4	- - - -	As Required							SHIM .. Slinger 8035526 - .010 8035527 - .020 8035528 - .030
5	- - - -	-	-	-	-	-	-	-	BOLT .. Coupling disc to crankshaft - See Parts List 24
6	8483944	1	1	1	1	1	1	1	GEAR .. Lower idler - 58 teeth - Replaces 8069030
7	- - - -	4	4	4	4	4	4	4	BOLT .. Gear mounting - See page 6
8	- - - -	1	1	1	1	1	1	1	PLATE .. Thrust - See page 6
/* 9	9515339	1	-	-	-	-	-	-	GEAR ASM. .. Spring drive - Replaces 8448324
9	8391505	-	1	-	-	-	-	-	GEAR ASM. .. Solid drive
/* 9	9515338	-	-	1	-	-	-	-	GEAR ASM. .. Spring drive - Replaces 8419151
9	8261300	-	-	-	1	-	-	-	GEAR ASM. .. Solid drive
9	8360295	-	-	-	-	1	-	-	GEAR ASM. .. Solid drive
/* 9	9531160	-	-	-	-	-	1	-	GEAR ASM. .. Spring drive - Formerly 8261300
/* 9	9515331	-	-	-	-	-	-	1	GEAR ASM. .. Spring drive - Replaces 8449231
									See Pages 8 and 9
10	- - - -	1	1	1	1	1	1	1	STUBSHAFT ASM. .. Idler gear - See page 6 for stubshaft and mounting hardware
11	8069019	2	2	2	2	2	2	2	GEAR .. Camshaft drive - 79 teeth
12	8266426	8	8	-	8	-	8	-	BOLT .. Gear mounting - 8 cyl. engines
12	8028335	-	-	8	8	8	8	8	BOLT .. Gear mounting - 12,16,20 cyl. engines
13	- - - -	-	-	-	-	-	-	-	BOLT .. Coupling disc - See Parts List 24
									See Parts List 28

/ Spring Drive Gears have replaced Solid Drive Gears except for certain marine propulsion applications (Refer to Marine Pointers 3M-81). Also, Friction Drive Gears are no longer available since the Ratchet Clutch Turbocharger has been discontinued. All Ratchet Clutch Turbochargers returned to E.M.D. for rebuild will be converted to the Roller Clutch design. The Solid or Spring Drive Gear should be ordered as a replacement for the Friction Drive Gear whenever a Roller Clutch Turbocharger is applied.

14	8175731	1	1	1	1	1	1	1	RETAINER .. Oil seal - Replaces 8175730
15	8175858	1	1	1	1	1	1	1	GASKET .. Oil retainer
16	181370	24	24	24	24	24	24	24	BOLT .. Oil retainer to housing - 3/8-24 x 1-1/4 hex. head
17	6101225	24	24	24	24	24	24	24	WASHER .. Plain - 3/8

CAMSHAFT DRIVE GEAR TRAIN

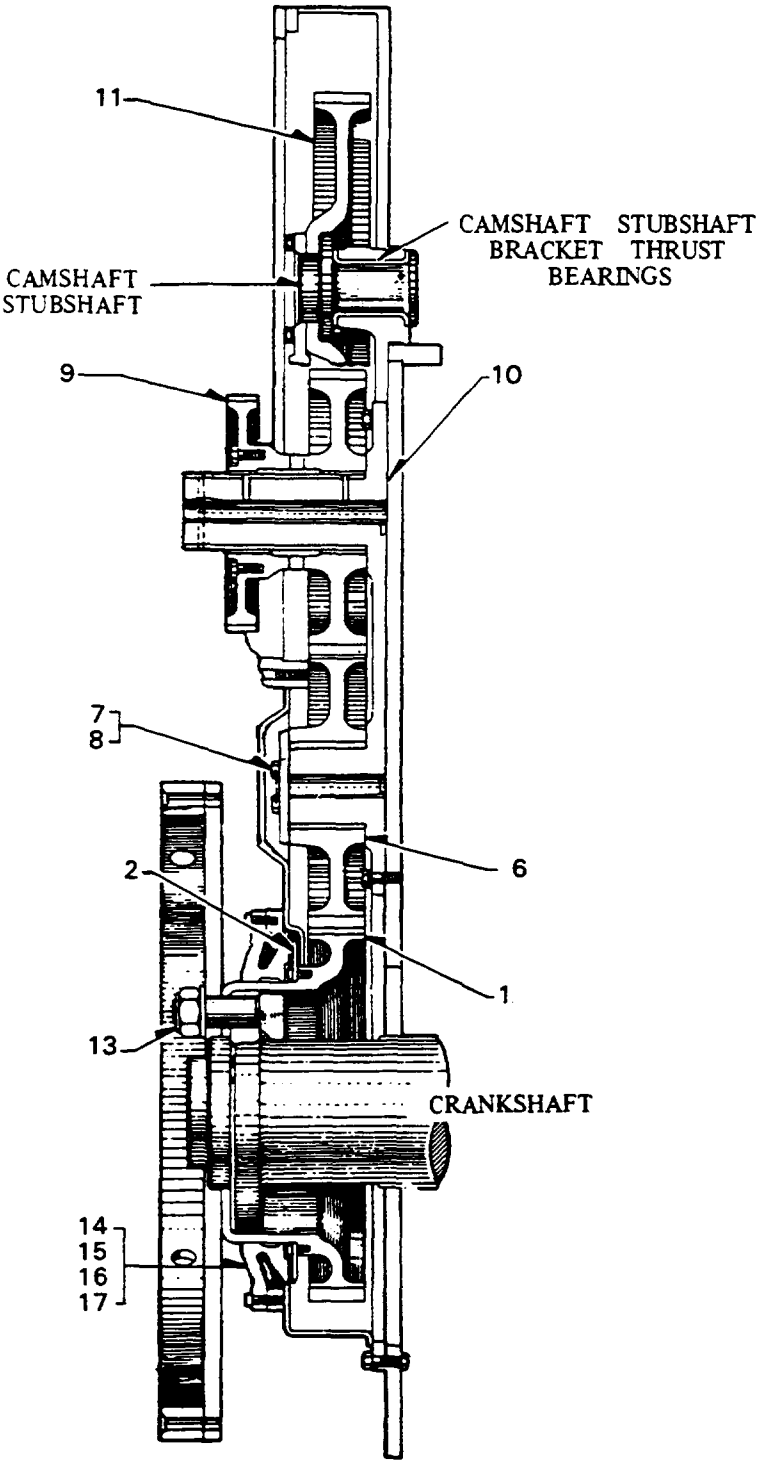


PLATE B26-3

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN

Idler Gear Stubshaft Assemblies and Mounting
8,12,16,20-645 Turbocharged Engines

PLATE B26-4

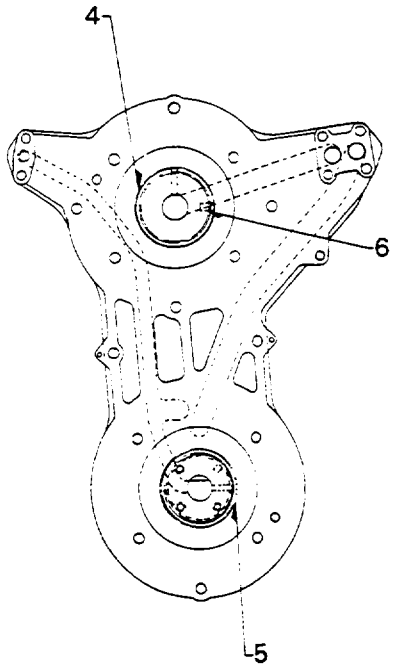
Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	Original Design - Bolt-on Thrust Plate Arrangement Bolt Through Design - With Original Oil Passages Bolt Through Design - With Improved Oil Passages and Current Mounting Arrangement (Applied Since July 1974).
/ 1	8288760	1	-	-	STUBSHAFT ASM. .. Idler gear - No longer furnished
2	8442661	-	1	-	STUBSHAFT ASM. .. Idler gear
3	8470154	-	-	1	STUBSHAFT ASM. .. Idler gear
# 4	8261195	1	1	1	BEARING .. Sleeve - Upper stubshaft
# 5	8081396	1	-	-	BEARING .. Sleeve - Lower stubshaft
# 5	8418334	-	1	1	BEARING .. Sleeve - Lower stubshaft
6	141238	1	1	1	DOWEL .. Upper bearing
7	8069155	1	-	-	BUSHING .. Floating - Lower idler gear - Required on original design only 8267496 - .030 oversize O.D. 8229678 - .060 oversize O.D.
8	8081394	1	-	-	PLATE .. Thrust
8	8418364	-	1	1	PLATE .. Thrust
9	8048764	4	-	-	BOLT .. Thrust plate 1/2-13 x 1-1/4 drilled hex. head
9	8418363	-	4	4	BOLT .. Thrust plate 5/8-18 x 6-1/2 drilled hex. head
10	8282178	-	4	4	WASHER .. Hardened - 5/8
* 11	8028329	15	-	-	BOLT .. Stubshaft mounting 1/2-20 x 1-1/4 hex. head
* 11	8028302	-	15	18	BOLT .. Stubshaft mounting 1/2-20 x 1-1/2 hex. head
* 12	8260114	-	15	18	WASHER .. Hardened - 1/2
* 13	8306807	2	2	2	DOWEL .. Locating .5000 dia. x 1-3/16 with 5/16-24 thread 8306808 - .5050 dia. 8306810 - .5150 dia. 8306809 - .5100 dia.
* 14	8028327	2	2	2	BOLT .. Dowel 5/16-24 x 1/2 drilled hex. head
* 15	8116738	A.R.			WIRE .. Lock 3/64 dia. x 500 ft. long

/ *Stubshaft 8288760 is no longer available. If it requires replacement, a conversion to the current Stubshaft, 8470154, is suggested. This conversion will require drilling and tapping additional mounting holes and the application of the newer design Thrust Plate and Mounting Hardware (Ref. Nos. 8,9,10,11,12). Refer to M.I. 9587 (Rev. A).*

Replacement Bearings must be applied with a heat shrink press fit.

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN



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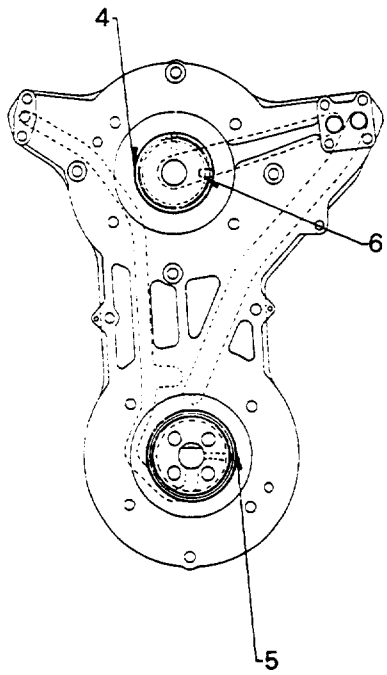

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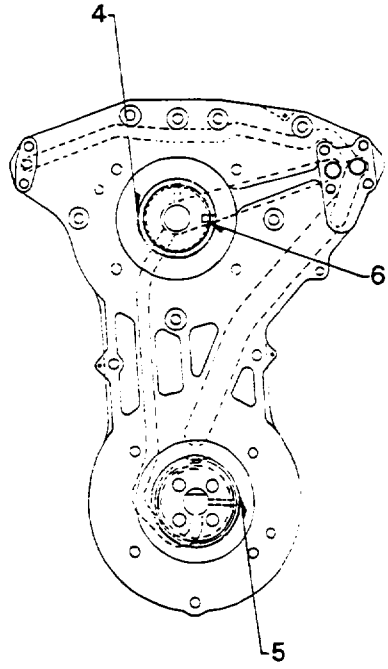

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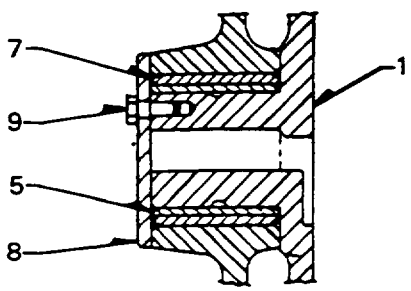
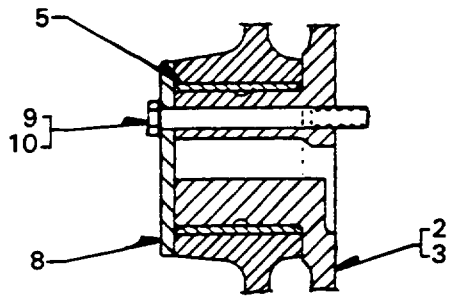


Previous Design



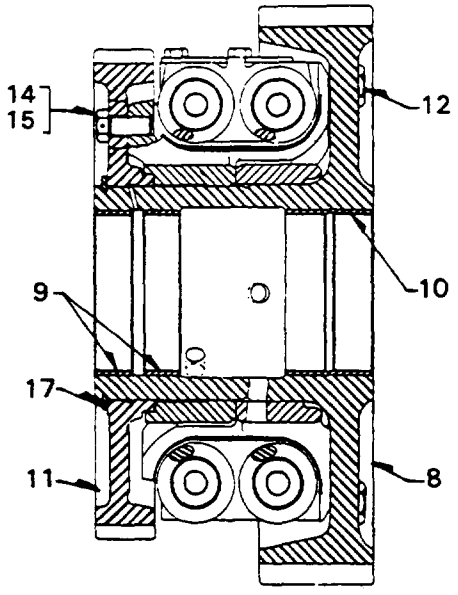
Current Design

Lower Stubshaft Sectioned Through

PLATE B26-4

P.L. No. B26

CAMSHAFT DRIVE GEAR TRAIN
Upper Idler and Turbocharger Drive Gear Assembly
8,12,16,20-645 Turbocharged Engines
Spring Drive Gear

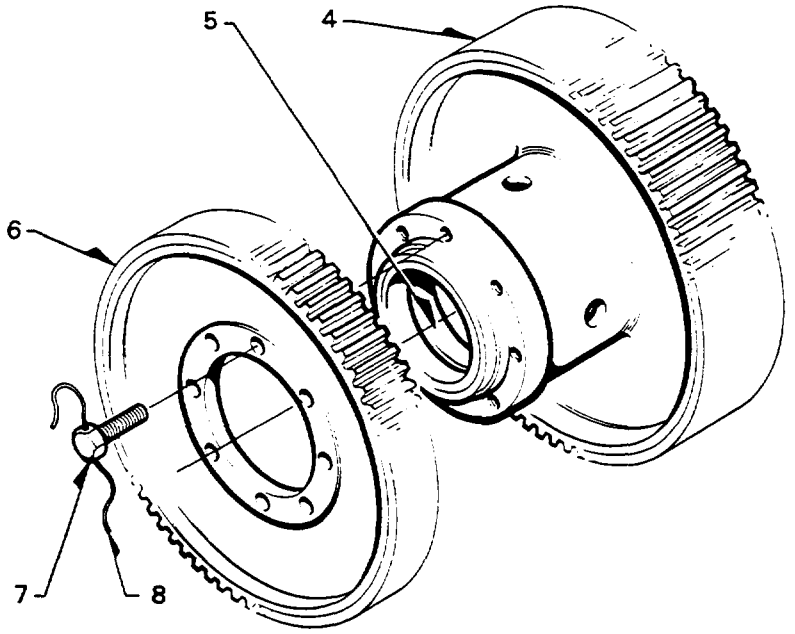


Ref. Nos. 1 Through 7
PLATE B26-5

Ref. No.	Part Number	Quantity Required							Description
		A	B	C	D	E	F	G	
1	8449231	1	-	-	-	-	-	-	GEAR ASM. .. Spring drive - Replaced by 9515331
2	8419151	-	1	-	-	-	-	-	GEAR ASM. .. Spring drive - Replaced by 9515338
3	8448324	-	-	1	-	-	-	-	GEAR ASM. .. Spring drive - Replaced by 9515339
4	9515331	-	-	-	1	-	-	-	GEAR ASM. .. Spring drive - For L.H. rotating engines with high capacity gear train turbochargers
5	9515338	-	-	-	-	1	-	-	GEAR ASM. .. Spring drive - For L.H. rotating engines without high capacity gear turbocharger - Except 8 cylinder engines
6	9515339	-	-	-	-	-	1	-	GEAR ASM. .. Spring drive - For L.H. rot. 8 cylinder engines
7	9531160	-	-	-	-	-	-	1	GEAR ASM. .. Spring drive - For all R.H. rotating engines
8	8418926	1	1	1	-	-	-	-	GEAR ASM. .. Upper idler - 58 tooth
8	9515336	-	-	-	1	1	1	1	GEAR ASM. .. Upper idler - 58 tooth
⁄ 9	8407341	2	2	2	2	2	2	2	BEARING .. Hub - 1 in. long
⁄ 10	8261101	1	1	1	1	1	1	1	BEARING .. Gear - 2.271 in. long
11	8449232	1	-	-	1	-	-	1	GEAR .. Turbo drive - 87 tooth
11	8419054	-	1	-	-	1	-	-	GEAR .. Turbo drive - 74 tooth
11	8448310	-	-	1	-	-	1	-	GEAR .. Turbo drive - 70 tooth
12	9091626	4	4	4	-	-	-	-	BOLT .. Idler gear 5/8-11 x 1-3/8 hex. head - Replaces 426448
12	9513657	-	-	-	4	4	4	4	BOLT .. Idler gear - Special 3/4-16 x 4 drilled hex. head
* 13	8070243	2	2	2	2	2	2	2	DOWEL .. Locating .5000 dia. x 1 with 1/4-28 thread 8115096 - .5050 dia. 8115098 - .5150 dia. 8115097 - .5100 dia.
14	8314057	8	8	8	8	8	8	8	BOLT .. Drive gear 1/2-13 x 1-1/4 formerly 8419063, which was 1-1/8 long and applied without a washer
15	8260114	8	8	8	8	8	8	8	WASHER .. Special 1/2
* 16	8116738	As Required							WIRE .. Lock 3/64 dia. x 500 ft. long
17	9414864	1	1	1	1	1	1	1	RING .. Snap - Drive gear retaining
* 18	9523254	-	-	-	2	2	2	2	BOLT .. Idler gear - 1/2-20 x 2 hex. head drilled
* 19	9513922	-	-	-	4	4	4	4	DAMPER .. Bolt - Applied with 9513657 bolt
* 20	102593	-	-	-	4	4	4	4	SCREW .. Set - Idler gear bolt - 3/8 - 16 x 1/2 hex. socket head

⁄ *Bearings must be precision bored after installation into gear.*

CAMSHAFT DRIVE GEAR TRAIN
Upper Idler and Turbocharger Drive Gear Assembly
8,12,16,20-645 Turbocharged Engines
Solid Drive Gear



Ref. Nos. 1,2, and 3
PLATE B26-6

Ref. No.	Part Number	Qty. Req.			Description
1	8261300	1	-	-	GEAR ASM. .. Solid drive - 8-645E5,E7;12,16,20-645E4,E5,E7 R.H. rotating engines and L.H. rotating engines with high capacity gear turbochargers
2	8391505	-	1	-	GEAR ASM. .. Solid drive - 8-645E5,E7 L.H. rotation engines
3	8360295	-	-	1	GEAR ASM. .. Solid drive - 12,16,20-645E4,E5,E7 L.H. rotating engines without high capacity gear turbochargers
4	8261103	1	1	1	GEAR ASM. .. Upper idler - 58 tooth
5	8261101	1	1	1	BEARING .. Idler gear
6	8261211	1	-	-	GEAR .. Turbocharger drive - 87 tooth
6	8391725	-	1	-	GEAR .. Turbocharger drive - 70 tooth
6	8360296	-	-	1	GEAR .. Turbocharger drive - 74 tooth
7	8028329	8	8	8	BOLT .. 1/2-20 x 1-1/4 drilled hex. head
8	8116738	As Req.			WIRE .. Lock - 3/64 dia. x 500 ft. long

Parts List No. B28

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS

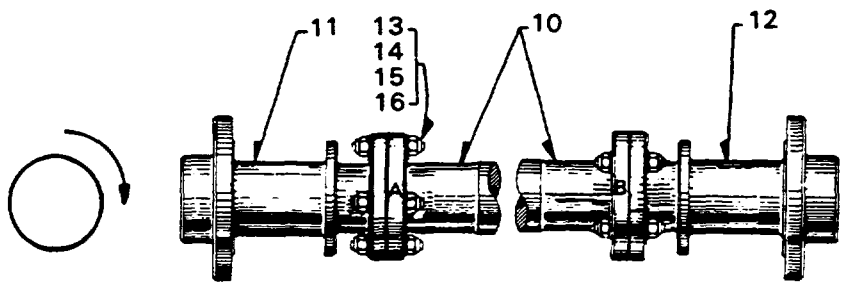
Camshaft Assembly
8-645 Engines

PLATE B28-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E1,E2,E4,E5,E6,E7,E8 engines } Left Hand Rotation
		-	B	-	-	8-645E4B,E7B,E7C engines } Left Hand Rotation
		-	-	C	-	8-645E2,E6 } Right Hand Rotation
		-	-	-	D	8-645E5,E7,E7B } Right Hand Rotation
1	8274793	1	-	-	-	CAMSHAFT ASM. .. Right bank
1	8491993	-	1	-	-	CAMSHAFT ASM. .. Right bank
1	9526830	-	-	1	-	CAMSHAFT ASM. .. Right bank - Replaces 8274803
1	9319330	-	-	-	1	CAMSHAFT ASM. .. Right bank - Replaces 8422542
2	8261194	1	-	-	-	SEGMENT .. Camshaft
2	8419849	-	1	-	-	SEGMENT .. Camshaft
2	9319320	-	-	1	1	SEGMENT .. Camshaft - Replaces 8261448
3	8028361	1	1	1	-	STUBSHAFT .. Accessory drive end
3	8241974	-	-	-	1	STUBSHAFT .. Accessory drive end
4	8070749	1	1	1	-	STUBSHAFT .. Camshaft drive end
4	8241971	-	-	-	1	STUBSHAFT .. Camshaft drive end
5	8034672	2	2	2	2	STUD .. Locating 3/8-24 x 2-3/8 - 7/16 in. shoulder
6	8034673	6	6	6	6	STUD .. Segment 3/8-24 x 2-3/8 - 1/2 in. shoulder
7	8035950	16	16	16	16	WASHER .. Special - 3/8 I.D.
8	8032717	16	16	16	16	NUT .. Lock 3/8-24 hex.
9	8274792	1	-	-	-	CAMSHAFT ASM. .. Left bank
9	8491992	-	1	-	-	CAMSHAFT ASM. .. Left bank
9	9526829	-	-	1	-	CAMSHAFT ASM. .. Left bank - Replaces 8274802
9	9319331	-	-	-	1	CAMSHAFT ASM. .. Left bank - Replaces 8422543
10	8261194	1	-	-	-	SEGMENT .. Camshaft
10	8419849	-	1	-	-	SEGMENT .. Camshaft
10	9319320	-	-	1	1	SEGMENT .. Camshaft - Replaces 8261448
11	8028361	1	1	1	-	STUBSHAFT .. Camshaft drive end
11	8241974	-	-	-	1	STUBSHAFT .. Camshaft drive end
12	8070749	1	1	1	-	STUBSHAFT .. Accessory drive end
12	8241971	-	-	-	1	STUBSHAFT .. Accessory drive end
13	8034672	2	2	2	2	STUD .. Locating 3/8-24 x 2-3/8 - 7/16 in. shoulder
14	8034673	6	6	6	6	STUD .. Segment 3/8-24 x 2-3/8 - 1/2 in. shoulder
15	8035950	16	16	16	16	WASHER .. Special - 3/8 I.D.
16	8032717	16	16	16	16	NUT .. Lock 3/8-24 hex.

P.L. No. B28

CAMSHAFT AND CAMSHAFT COUNTERWEIGHTS
Camshaft Assembly
8-645 Engines

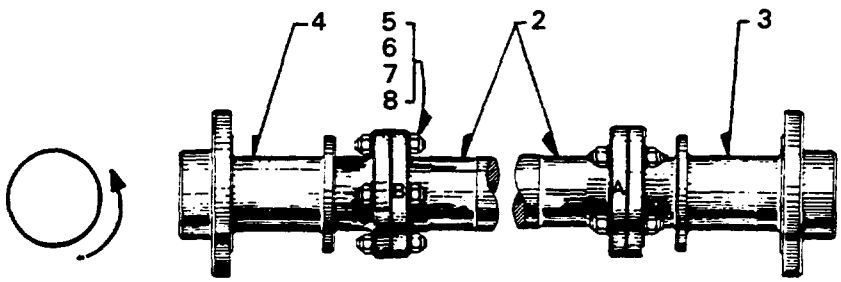


Left Bank

Camshaft Drive End

Accessory Drive End

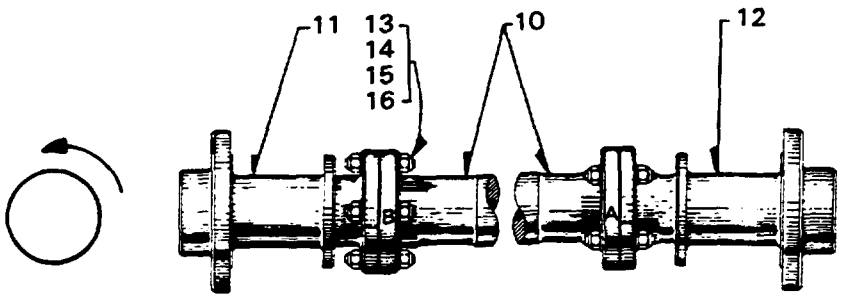
Ref. No. 9



Right Bank

Ref. No. 1

All Left Hand Rotating 8 Cylinder Engines And Right Hand Rotating 8 Cylinder Roots Blown Engines

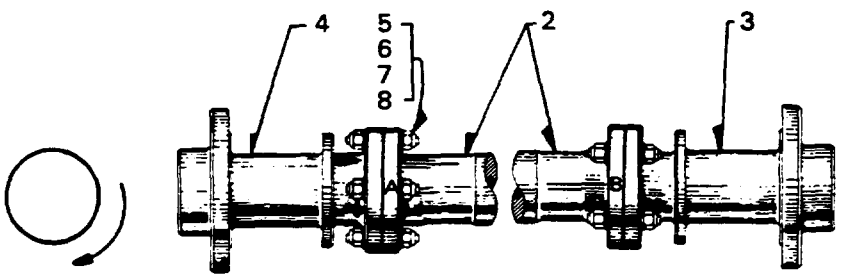


Left Bank

Camshaft Drive End

Accessory Drive End

Ref. No. 9



Right Bank

Ref. No. 1

All Right Hand Rotating 8 Cylinder Turbocharged Engines

PLATE B28-1

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Camshaft Assembly
12-645 Engines

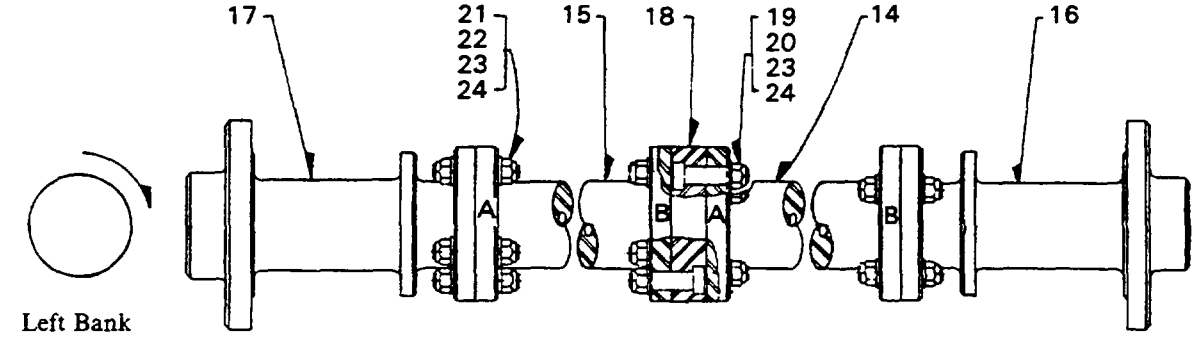
PLATE B28-2

Ref. No.	Part Number	Quantity Required				Description	
		A	-	-	-	12-645E1,E2,E4,E5,E6,E7,E8,E9 }	Left Hand Rotation
		-	B	-	-	12-645E4B,E7B,E7C,E9B }	
		-	-	C	-	12-645E2,E6 }	Right Hand Rotation
		-	-	-	D	12-645E4,E5,E7,E7B,E7C }	
1	8274797	1	-	-	-	CAMSHAFT ASM. .. Right bank	
1	9318996	-	1	-	-	CAMSHAFT ASM. .. Right bank	
1	9526831	-	-	1	-	CAMSHAFT ASM. .. Right bank - Replaces 8274795	
1	9319332	-	-	-	1	CAMSHAFT ASM. .. Right bank - Replaces 8368331	
2	8261443	1	-	-	-	SEGMENT .. Camshaft - Accessory drive end	
2	9318995	-	1	-	1	SEGMENT .. Camshaft - Accessory drive end	
2	9318994	-	-	1	-	SEGMENT .. Camshaft - Accessory drive end	
3	8261442	1	-	-	-	SEGMENT .. Camshaft - Camshaft drive end	
3	9318994	-	1	-	1	SEGMENT .. Camshaft - Camshaft drive end	
3	9318995	-	-	1	-	SEGMENT .. Camshaft - Camshaft drive end	
4	8028482	1	1	-	-	STUBSHAFT .. Accessory drive end	
4	8249797	-	-	1	-	STUBSHAFT .. Accessory drive end	
4	8241974	-	-	-	1	STUBSHAFT .. Accessory drive end	
5	8028610	1	1	-	-	STUBSHAFT .. Camshaft drive end	
5	8249795	-	-	1	-	STUBSHAFT .. Camshaft drive end	
5	8028546	-	-	-	1	STUBSHAFT .. Camshaft drive end	
6	8028975	1	1	-	-	SPACER .. Segment	
6	8071263	-	-	1	-	SPACER .. Segment	
6	8071264	-	-	-	1	SPACER .. Segment	
7	8034693	2	2	2	2	BOLT .. Eccentric 3/8-24 x 2-1/8	.4370 shoulder
8	8034692	6	6	6	6	BOLT .. Eccentric 3/8-24 x 2-1/8	.5000 shoulder
9	8034672	2	2	2	2	STUB .. Locating 3/8-24 x 2-3/8	.4370 shoulder
10	8034673	6	6	6	6	STUD .. Segment 3/8-24 x 2-3/8	.5000 shoulder
11	8035950	24	24	24	24	WASHER .. Special	
12	8032717	24	24	24	24	NUT .. Lock 3/8-24 hex.	
13	8274796	1	-	-	-	CAMSHAFT ASM. .. Left bank	
13	9318997	-	1	-	-	CAMSHAFT ASM. .. Left bank	
13	9526832	-	-	1	-	CAMSHAFT ASM. .. Left bank - Replaces 8274794	
13	9319333	-	-	-	1	CAMSHAFT ASM. .. Left bank - Replaces 8368332	
14	8261442	1	-	-	-	SEGMENT .. Camshaft - Accessory drive end	
14	9318994	-	1	-	1	SEGMENT .. Camshaft - Accessory drive end	
14	9318995	-	-	1	-	SEGMENT .. Camshaft - Accessory drive end	
15	8261443	1	-	-	-	SEGMENT .. Camshaft - Camshaft drive end	
15	9318995	-	1	-	1	SEGMENT .. Camshaft - Camshaft drive end	
15	9318994	-	-	1	-	SEGMENT .. Camshaft - Camshaft drive end	
16	8028610	1	1	-	-	STUBSHAFT .. Accessory drive end	
16	8253382	-	-	1	-	STUBSHAFT .. Accessory drive end	
16	8249796	-	-	-	1	STUBSHAFT .. Accessory drive end	
17	8028482	1	1	-	-	STUBSHAFT .. Camshaft drive end	
17	8249796	-	-	1	-	STUBSHAFT .. Camshaft drive end	
17	8028483	-	-	-	1	STUBSHAFT .. Camshaft drive end	
18	8028481	1	1	-	-	SPACER .. Segment	
18	8071264	-	-	1	-	SPACER .. Segment	
18	8071263	-	-	-	1	SPACER .. Segment	
19	8034693	2	2	2	2	BOLT .. Eccentric 3/8-24 x 2-1/8	.4370 shoulder
20	8034692	6	6	6	6	BOLT .. Eccentric 3/8-24 x 2-1/8	.5000 shoulder
21	8034672	2	2	2	2	STUD .. Locating 3/8-24 x 2-3/8	.4370 shoulder
22	8034673	6	6	6	6	STUD .. Segment 3/8-24 x 2-3/8	.5000 shoulder
23	8035950	24	24	24	24	WASHER .. Special	
24	8032717	24	24	24	24	NUT .. Lock 3/8-24 hex.	

P.L. No. B28

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS

Camshaft Assembly
12-645 Engines



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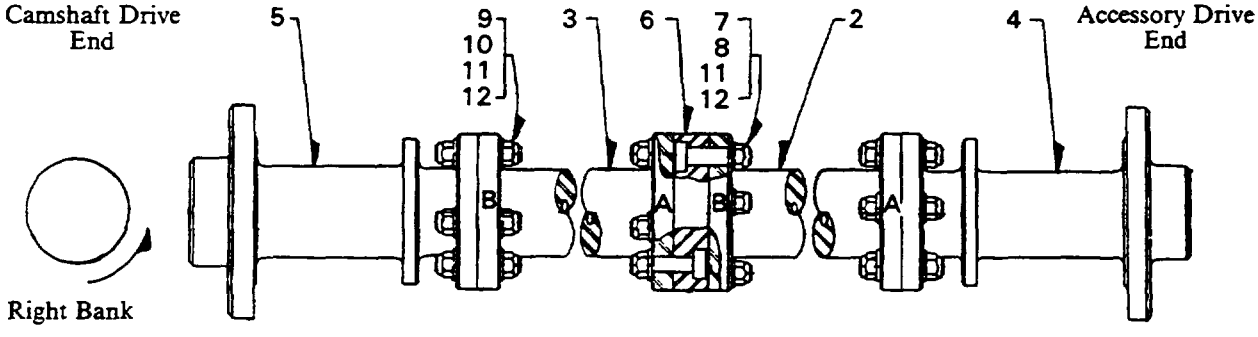
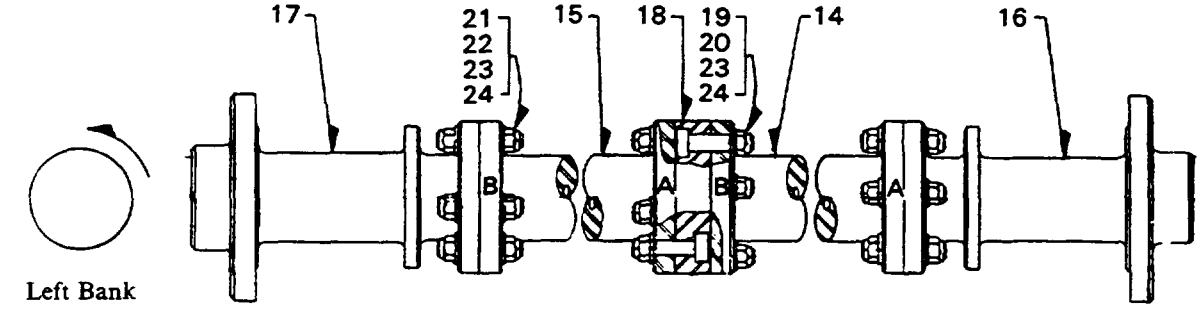


Ref. No. 1

All Left Hand Rotating 12 Cylinder Engines And Right Hand Rotating 12 Cylinder Roots Blown Engines



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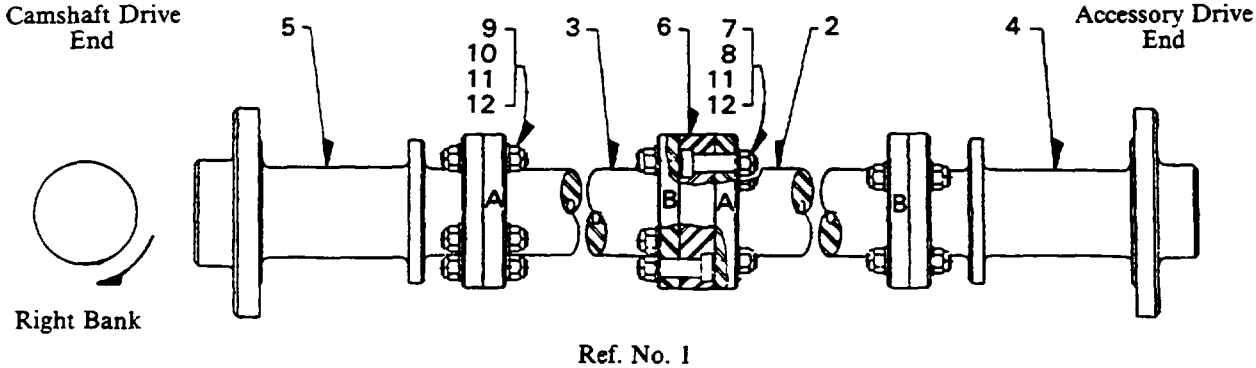


Ref. No. 1

All Right Hand Rotating 12 Cylinder Turbocharged Engines

PLATE B28-2

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS

Camshaft Assembly
16-645 Engines

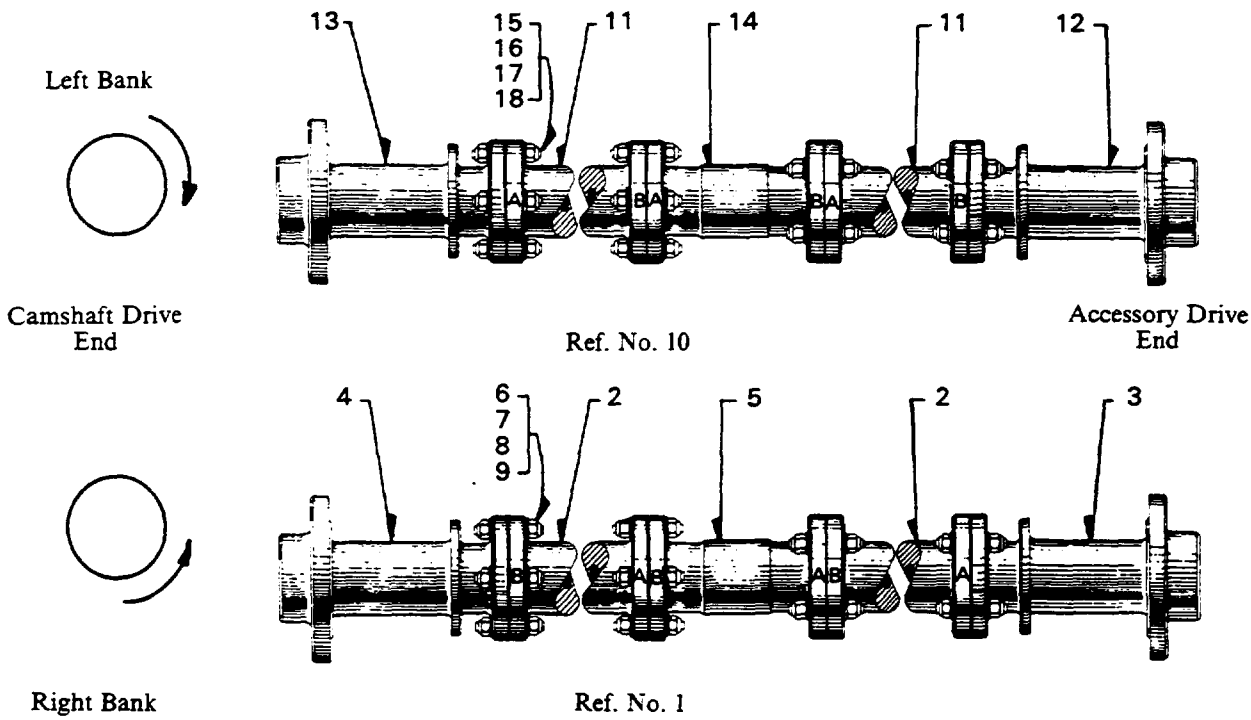
PLATE B28-3

Ref. No.	Part Number	Quantity Required				Description	
		A	-	-	-	16-645E1,E2,E4,E5,E6,E7,E8,E9	Left Hand Rotation
		-	B	-	-	16-645E4B,E7B,E7C,E9B,E10B	
		-	-	C	-	16-645E2,E6	Right Hand Rotation
		-	-	-	D	16-645E4,E4B,E7,E7B,E7C	
1	8274791	1	-	-	-	CAMSHAFT ASM. .. Right bank	
1	8419911	-	1	-	-	CAMSHAFT ASM. .. Right bank	
1	9526833	-	-	1	-	CAMSHAFT ASM. .. Right bank - Replaces 8274801	
1	9319335	-	-	-	1	CAMSHAFT ASM. .. Right bank - Replaces 8296162	
2	8261194	2	-	-	-	SEGMENT .. Camshaft	
2	8419849	-	2	-	-	SEGMENT .. Camshaft	
2	9319320	-	-	2	2	SEGMENT .. Camshaft - Replaces 8261448	
3	8028361	1	1	-	-	STUBSHAFT .. Accessory drive end	
3	8241971	-	-	1	-	STUBSHAFT .. Accessory drive end	
3	8028483	-	-	-	1	STUBSHAFT .. Accessory drive end	
4	8070749	1	1	-	-	STUBSHAFT .. Camshaft drive end	
4	8241973	-	-	1	-	STUBSHAFT .. Camshaft drive end	
4	8241971	-	-	-	1	STUBSHAFT .. Camshaft drive end	
5	8028637	1	1	-	1	SPACER .. Segment	
5	8028638	-	-	1	-	SPACER .. Segment	
6	8034672	4	4	4	4	STUD .. Locating 3/8-24 x 2-3/8	.4370 shoulder
7	8034673	12	12	12	12	STUD .. Segment 3/8-24 x 2-3/8	.5000 shoulder
8	8035950	32	32	32	32	WASHER .. Special	
9	8032717	32	32	32	32	NUT .. Lock 3/8-24 hex.	
10	8274790	1	-	-	-	CAMSHAFT ASM. .. Left bank	
10	8419910	-	1	-	-	CAMSHAFT ASM. .. Left bank	
10	9526834	-	-	1	-	CAMSHAFT ASM. .. Left bank - Replaces 8274800	
10	9319334	-	-	-	1	CAMSHAFT ASM. .. Left bank - Replaces 8296161	
11	8261194	2	-	-	-	SEGMENT .. Camshaft	
11	8419849	-	2	-	-	SEGMENT .. Camshaft	
11	9319320	-	-	2	2	SEGMENT .. Camshaft - Replaces 8261448	
12	8070749	1	1	-	-	STUBSHAFT .. Accessory drive end	
12	8241974	-	-	1	-	STUBSHAFT .. Accessory drive end	
12	8241971	-	-	-	1	STUBSHAFT .. Accessory drive end	
13	8028361	1	1	-	-	STUBSHAFT .. Camshaft drive end	
13	8241972	-	-	1	-	STUBSHAFT .. Camshaft drive end	
13	8241974	-	-	-	1	STUBSHAFT .. Camshaft drive end	
14	8028638	1	1	-	1	SPACER .. Segment	
14	8028637	-	-	1	-	SPACER .. Segment	
15	8034672	4	4	4	4	STUD .. Locating 3/8-24 x 2-3/8	.4370 shoulder
16	8034673	12	12	12	12	STUD .. Segment 3/8-24 x 2-3/8	.5000 shoulder
17	8035950	32	32	32	32	WASHER .. Special	
18	8032717	32	32	32	32	NUT .. Lock 3/8-24 hex.	

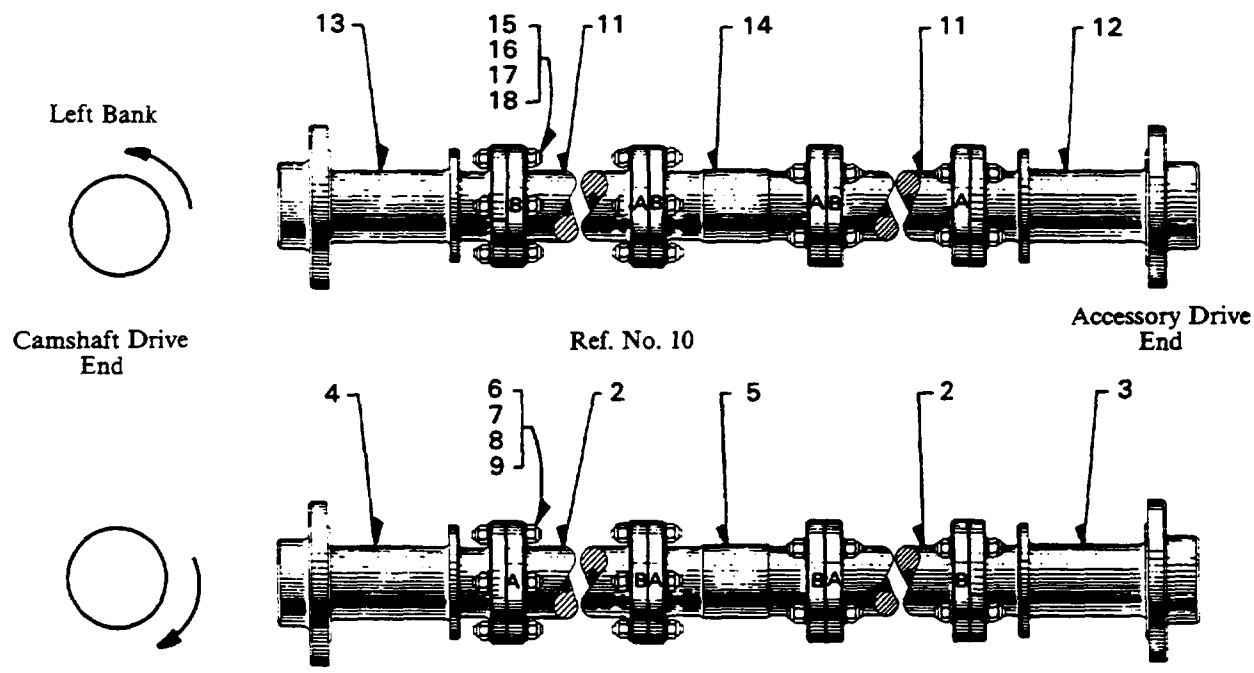
P.L. No. B28

CAMSHAFT AND CAMSHAFT COUNTERWEIGHTS

Camshaft Assembly
16-645 Engines



All Left Hand Rotating 16 Cylinder Engines And Right Hand Rotating 16 Cylinder Roots Blown Engines



All Right Hand Rotating 16 Cylinder Turbocharged Engines

PLATE B28-3

P.L. No. B28

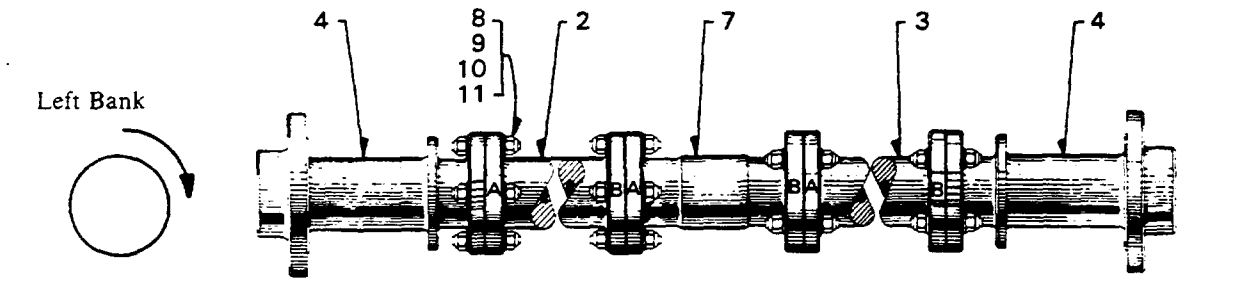
CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Camshaft Assembly
20-645 Engines

PLATE B28-4

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	20-645E4,E5,E7,E9 } Left Hand Rotation
		-	B	-	20-645E4B,E7B,E7C,E9B,E10B } Left Hand Rotation
		-	-	C	20-645E4,E4B,E5,E7,E7B,E7C - Right Hand Rotation
1	8361017	2	-	-	CAMSHAFT ASM. .. Right and left banks
1	8433603	-	2	-	CAMSHAFT ASM. .. Right and left banks
1	9319336	-	-	2	CAMSHAFT ASM. .. Right and left banks - Replaces 8374312
2	8361012	2	-	-	SEGMENT .. Camshaft } Accessory drive end - Right bank
2	8433618	-	2	2	SEGMENT .. Camshaft } Camshaft drive end - Left bank
3	8361013	2	-	-	SEGMENT .. Camshaft } Accessory drive end - Left bank
3	8433602	-	2	2	SEGMENT .. Camshaft } Camshaft drive end - Right bank
4	8028482	4	4	-	STUBSHAFT .. Both ends
5	8241972	-	-	2	STUBSHAFT .. Accessory drive end - Left bank Camshaft drive end - Right bank
6	8253382	-	-	2	STUBSHAFT .. Accessory drive end - Right bank Camshaft drive end - Left bank
7	8028637	2	2	-	SPACER .. Segment
7	8374313	-	-	2	SPACER .. Segment
8	8034672	8	8	8	STUD .. Locating 3/8-24 x 2-3/8 .4370 shoulder
9	8034673	24	24	24	STUD .. Segment 3/8-24 x 2-3/8 .5000 shoulder
10	8035950	64	64	64	WASHER .. Special
11	8032717	64	64	64	NUT .. Lock 3/8-24 hex.

P.L. No. B28

CAMSHAFT AND CAMSHAFT COUNTERWEIGHTS
Camshaft Assembly
20-645 Engines



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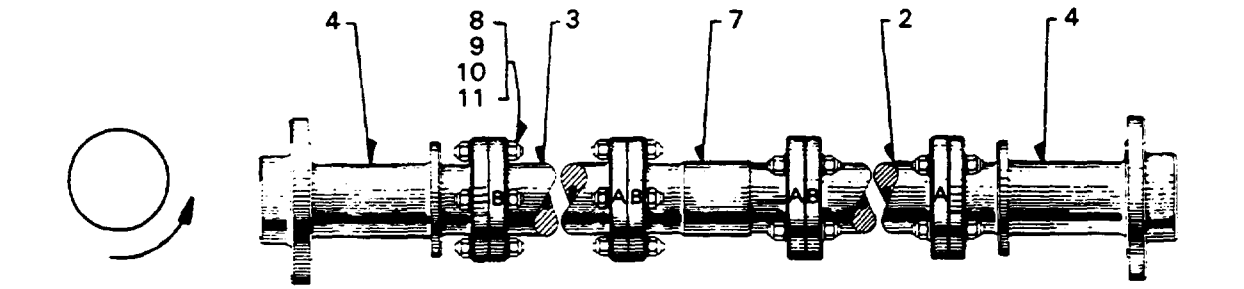
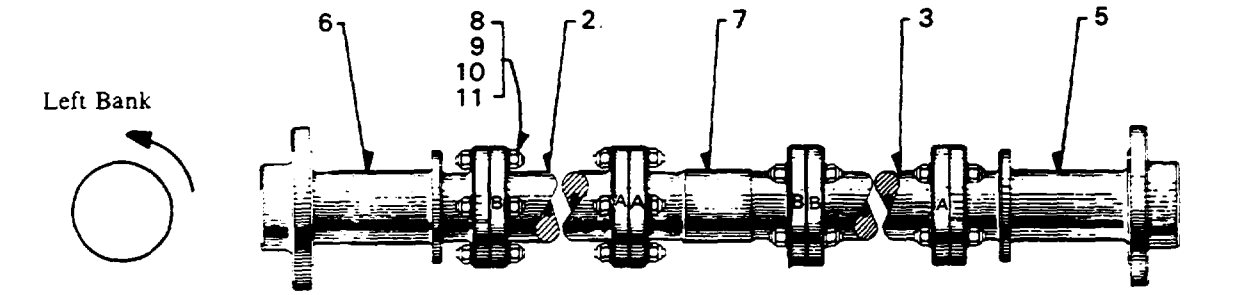


Ref. No. 1

All Left Hand Rotating 20 Cylinder Engines



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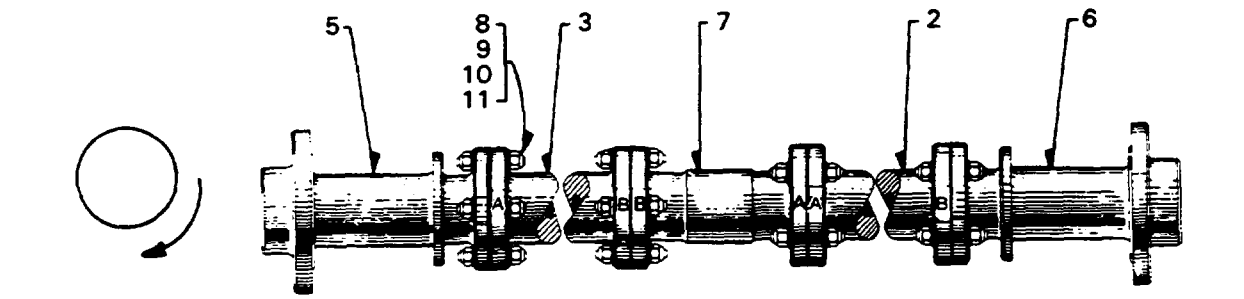
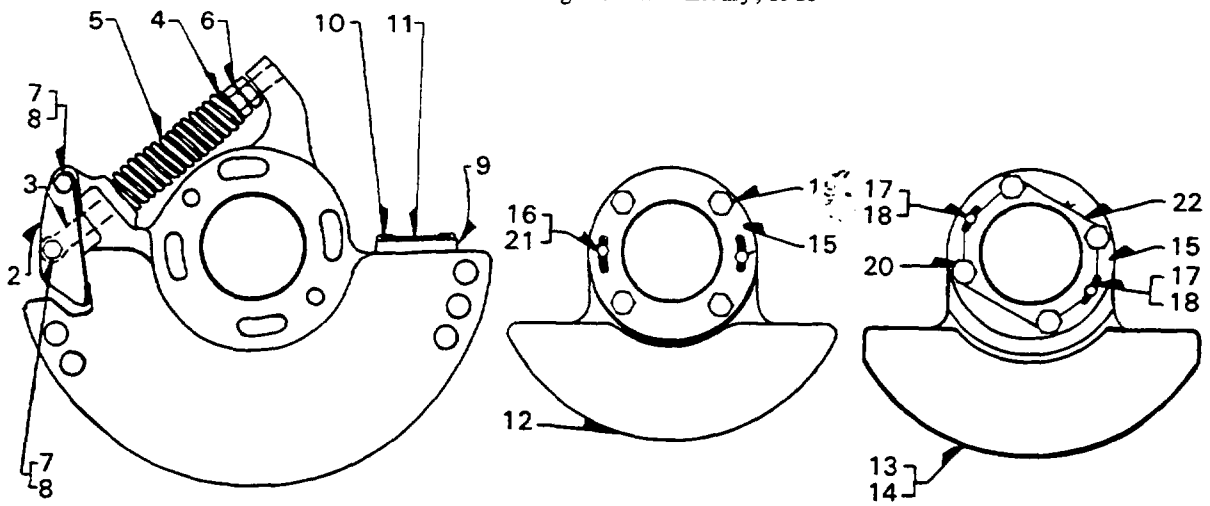


Ref. No. 1

All Right Hand Rotating 20 Cylinder Engines

PLATE B28-4

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Counterweights and Overspeed Trip
8-645 Engines Prior January, 1985



Ref. No. 1
Accessory Drive End
Right Bank

Accessory Drive End
Left Bank

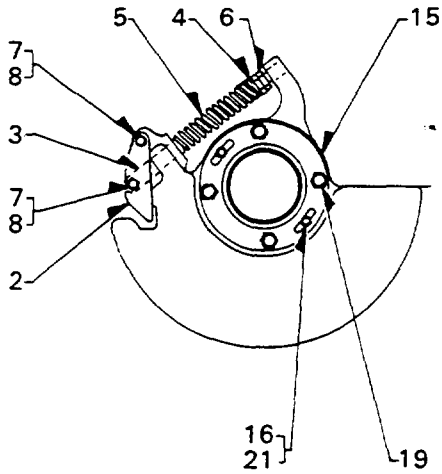
Camshaft Drive End
Right and Left Banks

PLATE B28-5

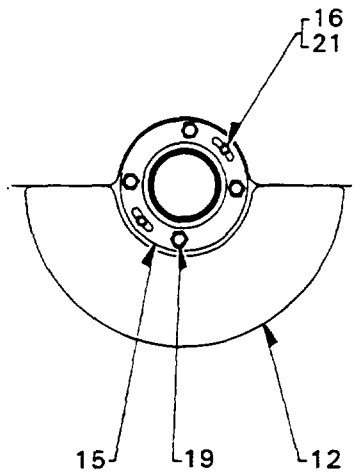
Ref. No.	Part Number	Qty. Req. A		B	Description
	—				All 8-645 L.H. rotating engines and 8-645E2,E6 R.H. rotating engines
				B	8-645E5,E7,E7B - R.H. rotating engines
1	8371518	1	-	-	TRIP ASM. .. Overspeed - 900 R.P.M. operation } Required Unbalanced
1	8402912	-	1	-	TRIP ASM. .. Overspeed - 720 R.P.M. operation } Moment 220.50 ± .25 in. lbs.
1	8440002	-	-	1	TRIP ASM. .. Overspeed - 900 R.P.M. operation }
2	8059630	1	1	-	WEIGHT .. Throw out
2	8440001	-	-	1	WEIGHT .. Throw out
3	8059642	1	1	1	GUIDE .. Spring
4	116097	1	1	1	WASHER .. Flat 5/8
5	8324000	1	-	1	SPRING .. Compression
5	8400100	-	1	-	SPRING .. Compression
6	114498	2	2	2	NUT .. Jam 5/8-18 hex.
7	8032715	2	2	2	NUT .. Lock 1/4-28 hex.
8	8059643	2	2	2	BOLT .. Shoulder 1/4-28 x 1-5/8 hex. head .370 shoulder
9	8283377	1	1	1	PLATE .. Cover
10	8058363	5	5	5	BOLT .. Hex. head 1/4-20 x 3/4 - Cover plate
11	8116738	As Req.			WIRE .. Lock 3/64 dia. - 500 ft. long
12	8371519	1			COUNTERWEIGHT .. Accessory drive end - Left bank
13	8371520	1			COUNTERWEIGHT .. Camshaft drive end - Left bank
14	8371521	1			COUNTERWEIGHT .. Camshaft drive end - Right bank
15	8266455	4			PLATE .. Dowel retainer
16	8236004	4			DOWEL .. Counterweight - Accessory drive end .5000 dia. x 1-9/16 long 8236005 - .5050 dia. 8236007 - .5150 dia. 8236006 - .5100 dia.
17	8028738	4			DOWEL .. Counterweight - Camshaft drive end .5000 dia. x 2-1/16 long 8082379 - .5050 dia. 8045884 - .5150 dia. 8082380 - .5100 dia.
18	8286669	4			BOLT .. Dowel - 5/16-24 x 5/8 drilled hex. head
19	455014	8			BOLT .. Acc. drive end - Not drilled 1/2-20 x 1-1/2 - Formerly 8028302
20	8266426	8			BOLT .. Camshaft drive end - Drilled hex. head 1/2-20 x 2-1/4
21	181333	4			BOLT .. Dowel - 5/16-24 x 5/8 - Not drilled - Hex. head
22	8116738	As Req.			WIRE .. Lock 3/64 dia. - 500 ft long

P.L. No. B28

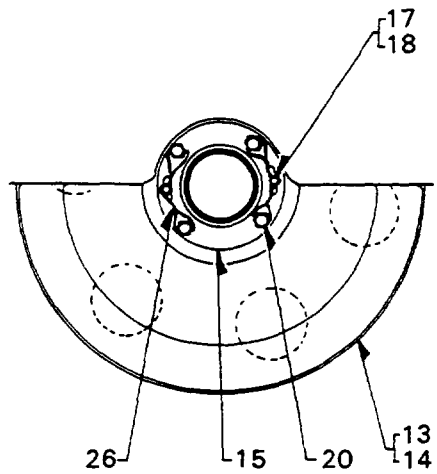
CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Counterweights and Overspeed Trip
8-645 Engines After January 1985



Ref. No. 1
Accessory Drive End
Right Bank



Accessory Drive End
Left Bank



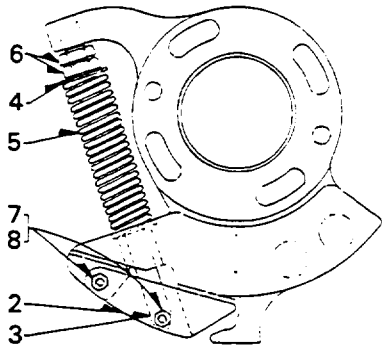
Camshaft Drive End
Right and Left Banks

PLATE B28-6

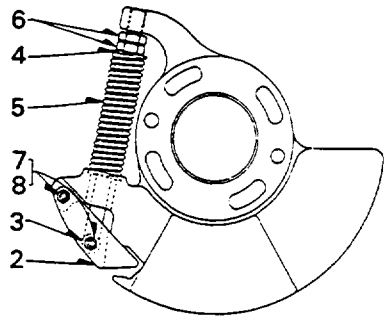
Ref. No.	Part Number	Quantity Required A		B	Description
					All 8-645 L.H. Rotation and 8-645E6 R.H. Rotating Engines
					8-645E7B,E7C R.H. Rotating Engines
1	9571251	1	-	-	TRIP ASM. .. Overspeed - 900 RPM Operation } Required Unbalanced
1	9571203	-	1	-	TRIP ASM. .. Overspeed - 750 RPM Operation } Moment 221.9 ± .3 in. lbs.
1	9571252	-	-	1	TRIP ASM. .. Overspeed - 900 RPM Operation }
2	8059630	1	1	-	WEIGHT .. Throw out
2	8440001	-	-	1	WEIGHT .. Throw out
3	8059642	1	1	1	GUIDE .. Spring
4	116097	1	1	1	WASHER .. Flat 5/8
5	8324000	1	-	1	SPRING .. Compression
5	8400100	-	1	-	SPRING .. Compression
6	114498	2	2	2	NUT .. Jam 5/8-18 hex.
7	8032715	2	2	2	NUT .. Lock - 1/4-28 hex.
8	8059643	2	2	2	BOLT .. Shoulder 1/4-28 x 1-5/8 hex. head .370 Shoulder
*9	8283377	1	1	1	PLATE .. Cover
*10	8058363	5	5	5	BOLT .. Cover plate - 1/4-20 x 3/4 drilled hex. head
*11	8116738	As Req.			WIRE .. Lock 3/64 dia. - 500 ft. long
12	9571261	1			COUNTERWEIGHT .. Accessory drive end - Left bank
13	9571260	1			COUNTERWEIGHT .. Camshaft drive end - Left bank
14	9571259	1			COUNTERWEIGHT .. Camshaft drive end - Right bank
15	8266455	4			PLATE .. Dowel retainer
16	8236004	4			DOWEL .. Counterweight - Accessory drive end .5000 dia. x 1-9/16 long 8236005 .. .5050 dia. 8236007 .. .5150 dia. 8236006 .. .5100 dia.
17	8028738	4			DOWEL .. Counterweight - Camshaft drive end .5000 dia. x 2-1/16 long 8082379 .. .5050 dia. 8045884 .. .5150 dia. 8082380 .. .5100 dia.
18	8286669	4			BOLT .. Dowel - 5/16-24 x 5/8 drilled hex. head
19	455014	8			BOLT .. Acc. drive end - Not drilled 1/2-20 x 1-1/2 - Formerly 8028302
20	8266426	8			BOLT .. Camshaft drive end - Drilled hex. head 1/2-20 x 2-1/4
21	181333	4			BOLT .. Dowel - 5/16-24 x 5/8 - Not drilled - Hex. head
22	8116738	As Req.			WIRE .. Lock 3/64 dia. - 500 ft. long

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS

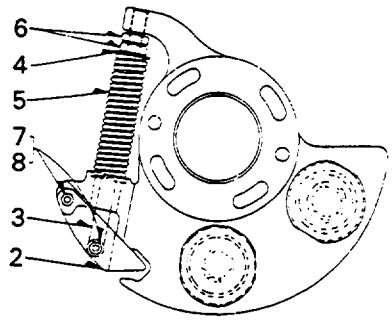
Counterweights and Overspeed Trip
12-645 Engines



8383745
Trip Assembly



8416525
Trip Assembly



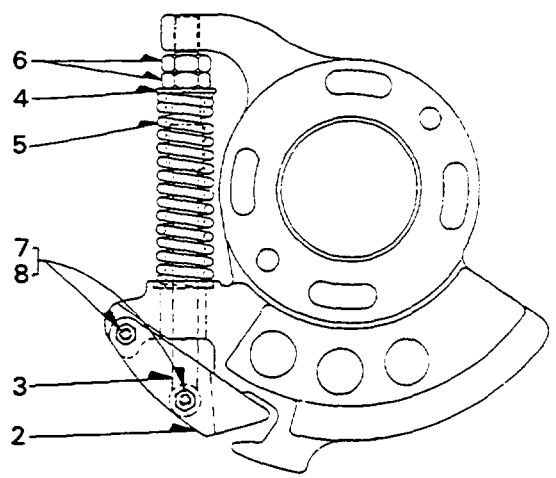
8494301
Trip Assembly

PLATE B28-7

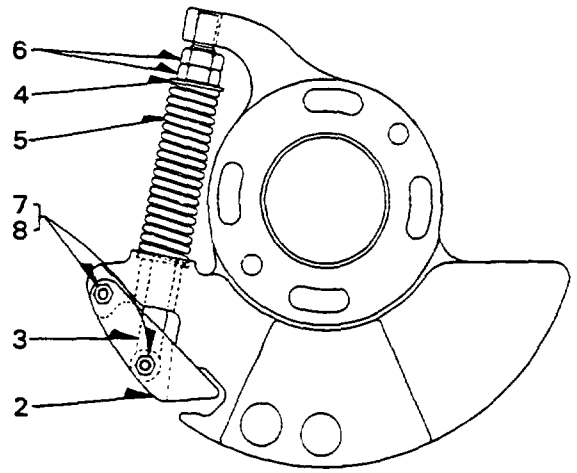
Ref. No.	Part Number	Qty. Req. A		B	Description
		A			All 12-645 L.H. rotating engines
				B	12-645E2,E4,E5,E6,E7,E7B,E7C - R.H. rotating engines
1	8383745	1	-	-	TRIP ASM. .. Overspeed - 900 R.P.M. operation
1	8416525	-	1	-	TRIP ASM. .. Overspeed - 720 R.P.M. operation
* 1	9556031	-	-	1	TRIP ASM. .. Overspeed - 900 R.P.M. operation - Form. 8383745 - Repl. 8494301
2	8059630	1	1	1	WEIGHT .. Throw out
3	8059642	1	1	1	GUIDE .. Spring
4	116097	1	1	1	WASHER .. Flat 5/8
5	8324000	1	-	1	SPRING .. Compression
5	8400100	-	1	-	SPRING .. Compression
6	114498	2	2	2	NUT .. Jam 5/8-18 hex.
7	8032715	2	2	2	NUT .. Lock 1/4-28 hex.
8	8059643	2	2	2	BOLT .. Shoulder 1/4-28 x 1-5/8 hex. head - .370 shoulder
* 9	8367949	1	1	1	COUNTERWEIGHT .. Accessory drive end - Left bank
* 10	8367950	1	1	-	COUNTERWEIGHT } Camshaft Drive End - Right Bank
* 10	8367951	-	-	1	COUNTERWEIGHT }
* 11	8367950	-	-	1	COUNTERWEIGHT } Camshaft Drive End - Left Bank
* 11	8367951	1	1	-	COUNTERWEIGHT }
* 12	8266455	4	4	4	PLATE .. Dowel retainer
* 13	8028739	4	4	4	DOWEL .. Counterweight - Accessory drive end - .5000 dia. x 1-5/16 long 8082389 - .5050 dia. 8082381 - .5150 dia. 8082388 - .5100 dia. 8319459 - .5200 dia.
* 14	8028738	4	4	4	DOWEL .. Counterweight - Camshaft drive end - .5000 dia. x 2-1/16 long 8082379 - .5050 dia. 8045884 - .5150 dia. 8082380 - .5100 dia. 8319462 - .5200 dia.
* 15	8286669	4	4	4	BOLT .. Dowel 5/16-24 x 5/8 drilled hex. head - Camshaft drive end
* 16	181333	4	4	4	BOLT .. Dowel 5/16-24 x 5/8 not drilled - Accessory drive end
* 17	181430	8	8	8	BOLT .. Acc. drive end 1/2-20 x 1-3/8 not drilled - Formerly 8028287
* 18	8028335	8	8	8	BOLT .. Camshaft drive end - 1/2-20 x 2-1/8 drilled hex. head
* 19	8116738	As Req.			WIRE .. Lock 3/64 dia. x 500 ft. - Currently applied to camshaft drive end only

P.L. No. B28

CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Counterweights and Overspeed Trip
16-645 Engines



8350518 and 8402914
Trip Assemblies

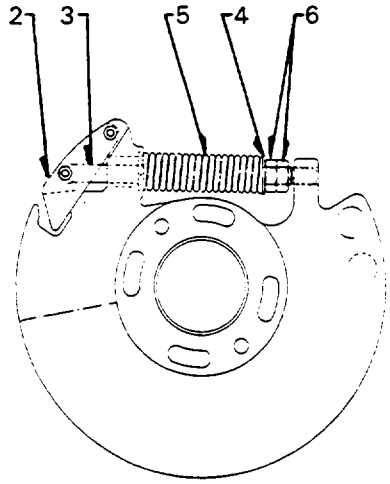


9339141
Trip Assembly

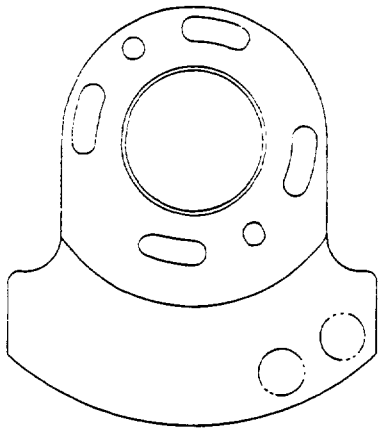
PLATE B28-8

Ref. No.	Part Number	Qty. Req. A		B	Description
					All 16-645 L.H. rotating engines and 16-645E2,E6 R.H. rotating engines
					16-645E4,E4B,E5,E7,E7B - R.H. rotating engines
1	8350518	1	-	-	TRIP ASM. .. Overspeed - 900 R.P.M. operation or higher
1	8402914	-	1	-	TRIP ASM. .. Overspeed - 600 and 720 R.P.M. operation
1	9339141	-	-	1	TRIP ASM. .. Overspeed - 900 R.P.M. operation
2	8059630	1	1	1	WEIGHT .. Throw out
3	8059642	1	1	1	GUIDE .. Spring
4	116097	1	1	1	WASHER .. Flat 5/8
5	8324000	1	-	1	SPRING .. Compression
5	8400100	-	1	-	SPRING .. Compression
6	114498	2	2	2	NUT .. Jam 5/8-18 hex.
7	8032715	2	2	2	NUT .. Lock 1/4-28 hex.
8	8059643	2	2	2	BOLT .. Shoulder 1/4-28 x 1-5/8 hex. head .370 shoulder
* 9	8350516	1	1	1	COUNTERWEIGHT .. Accessory drive end - Left bank
* 10	8350517	2	2	2	COUNTERWEIGHT .. Camshaft drive end - Right and left banks
* 11	8266455	1	1	1	PLATE .. Dowel retaining
* 12	8028739	4	4	4	DOWEL .. Counterweight - Accessory drive end .5000 dia. x 1-5/16 long 8082389 - .5050 dia. 8082381 - .5150 dia. 8082388 - .5100 dia. 8319459 - .5200 dia.
* 13	8028738	4	4	4	DOWEL .. Counterweight - Camshaft drive end .5000 dia. x 2-1/16 8082379 - .5050 dia. 8045884 - .5150 dia. 8082380 - .5100 dia. 8319462 - .5200 dia.
* 14	8286669	4	4	4	BOLT .. Dowel 5/16 - 24 x 5/8 drilled hex. head - Camshaft drive end
* 15	181333	4	4	4	BOLT .. Dowel 5/16 - 24 x 5/8 not drilled - Accessory drive end
* 16	181430	8	8	8	BOLT .. Acc. drive end - 1/2-20 x 1-3/8 hex. head not drilled - Formerly 8028287
* 17	8028335	8	8	8	BOLT .. Camshaft drive end - 1/2-20 x 2-1/8 drilled hex. head
* 18	8116738	As Req.			WIRE .. Lock 3/64 dia. x 500 ft. - Currently applied to camshaft drive end only

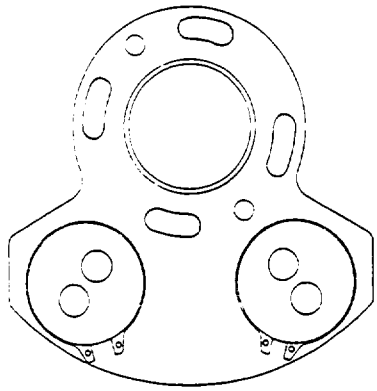
CAMSHAFTS AND CAMSHAFT COUNTERWEIGHTS
Counterweights and Overspeed Trip
20-645 Engines



Ref. No. 1
Columns A and B



Ref. No. 9
Column A
PLATE B28-9



Ref. No. 9
Column B

Ref. No.	Part Number	Qty. Req. A		B	Description
					All 20-645 L.H. and R.H. rotating engines Except model 20-645E10B
				B	20-645E10B L.H. rotating engine
1	8389517	1	-	-	TRIP ASM. .. Overspeed - 900 R.P.M. operation
1	8432599	-	1	-	TRIP ASM. .. Overspeed - 750 R.P.M. operation
1	9333648	-	-	1	TRIP ASM. .. Overspeed - 1000 R.P.M. operation
2	8059630	1	1	-	WEIGHT .. Throw out
2	9333646	-	-	1	WEIGHT .. Throw out
3	8059642	1	1	1	GUIDE .. Spring
4	116097	1	1	1	WASHER .. Flat 5/8
5	8324000	1	-	1	SPRING .. Compression
5	8400100	-	1	-	SPRING .. Compression
6	114498	2	2	2	NUT .. Jam 5/8-18 hex.
7	8032715	2	2	2	NUT .. Lock 1/4-28 hex.
8	8059643	2	2	2	BOLT .. Shoulder 1/4-28 x 1-5/8 hex. head .370 shoulder
9	8361015	1	1	-	COUNTERWEIGHT .. Accessory drive end - Left bank
9	9571899	-	-	1	COUNTERWEIGHT .. Accessory drive end - Left bank - Replaces 8474389
* 10	8361016	2	2	2	COUNTERWEIGHT .. Camshaft drive end - Right and left banks
* 11	8266455	4	4	4	PLATE .. Dowel retainer
* 12	8028739	4	4	4	DOWEL .. Counterweight - Accessory drive end .5000 dia. x 1-5/16 long 8082389 - .5050 dia. 8082381 - .5150 dia. 8082388 - .5100 dia. 8319459 - .5200 dia.
* 13	8028738	4	4	4	DOWEL .. Counterweight - Camshaft drive end .5000 dia. x 2-1/16 long 8082379 - .5050 dia. 8045884 - .5150 dia. 8082380 - .5100 dia. 8319462 - .5200 dia.
* 14	8286669	4	4	4	BOLT .. Dowel 5/16-24 x 5/8 drilled hex. head - Camshaft drive end
* 15	181333	4	4	4	BOLT .. Dowel 5/16-24 x 5/8 not drilled - Accessory drive end
* 16	181430	8	8	8	BOLT .. Acc. drive end 1/2-20 x 1-3/8 not drilled - Formerly 8028287
* 17	8028335	8	8	8	BOLT .. Camshaft drive end - 1/2-20 x 2-1/8 drilled hex. head
* 18	8116738	As Req.			WIRE .. Lock 3/64 dia. - Currently applied to camshaft drive end only

Parts List No. B30

CAMSHAFT BEARING BRACKETS

12,16,20-645 Engines

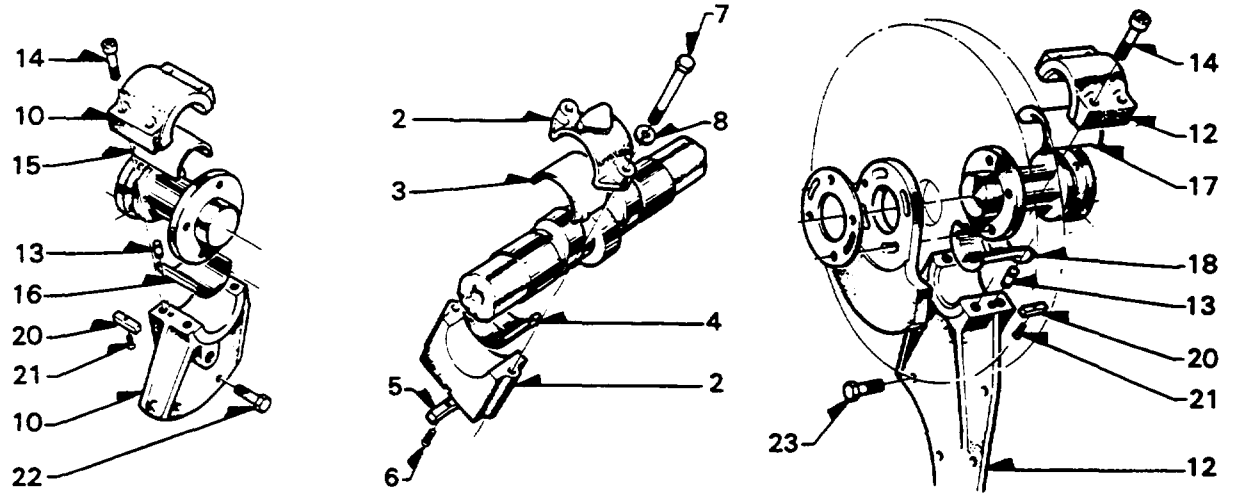


PLATE B30-1

Ref. No.	Part Number	Quantity Required A	B	C	Description
					12-645 engines 16-645 engines 20-645 engines
*1	8320994	12	16	20	BLOCK ASM. .. Bearing - Drilled cap
2	8320995	12	16	20	BLOCK ASM. .. Bearing - Plain cap
3	8071176	24	32	40	BEARING .. Shell - Upper half
4	8071176	24	32	40	BEARING .. Shell - Lower half
†5	8045976	24	32	40	KEY .. Block to crankcase - .5000 x .5000 x 2-1/4 long
6	110534	24	32	40	SCREW .. Key No. 10 - 24 x 7/8 - Flat head - Slotted
7	188146	48	64	80	BOLT .. 3/8 - 24 x 4-5/8 hex. head
8	8373316	48	64	80	WASHER .. Special - Formerly 103321
*9	8253146	1	1	1	BRACKET ASM. .. Bearing - Left bank } Accessory Drive End
10	8253152	1	1	1	BRACKET ASM. .. Bearing - Right bank } Accessory Drive End
*11	8253259	1	1	1	BRACKET ASM. .. Bearing - Left bank } Camshaft Drive End
12	8253250	1	1	1	BRACKET ASM. .. Bearing - Right bank } Camshaft Drive End
13	8029147	8	8	8	DOWEL .. Locating - .3125 x 9/16 long
14	138294	8	8	8	SCREW .. Socket head cap - 1/2 - 13 x 2 - Formerly 8253973
15	8237900	2	2	2	BEARING .. Shell - Upper half } Accessory Drive End
16	8237900	2	2	2	BEARING .. Shell - Lower half } Accessory Drive End
17	8253825	2	2	2	BEARING .. Shell - Upper half } Camshaft Drive End
18	8253825	2	2	2	BEARING .. Shell - Lower half } Camshaft Drive End
*19	187697	8	8	8	SCREW .. Bracket to crankcase - 1/2 - 20 x 4-3/4 - Socket head cap
††20	8044728	4	4	4	KEY .. Bracket to crankcase - .5000 x .5000 x 1-3/4 long
21	110534	4	4	4	SCREW .. Key No. 10 - 24 x 7/8 - Flat head - Slotted
22	455012	6	6	6	BOLT .. Hex. head - Not drilled - 1/2 - 20 x 1-1/4 - Formerly 8028329
23	8028329	6	6	6	BOLT .. Hex. head - Drilled - 1/2 - 20 x 1-1/4 - For mounting Ref. Nos. 11 and 12
*24	8028312	6	6	6	BOLT .. Hex. head - Drilled - 3/8 - 24 x 1 - For mounting Ref. Nos. 11 and 12
*25	8116738	A.R.			WIRE .. Lock - 500 ft. - Currently applied to camshaft drive end only

†For Oversize Crankcase Keyway, use Stepdown Key 8136773 - .5000 to .5625 step - 2-1/4 long.

††For Oversize Crankcase Keyway, use Stepdown Key 8166324 - .5000 to .5625 step - 1-1/4 long.

P.L. No. B30

CAMSHAFT BEARING BRACKETS
8-645 Engines

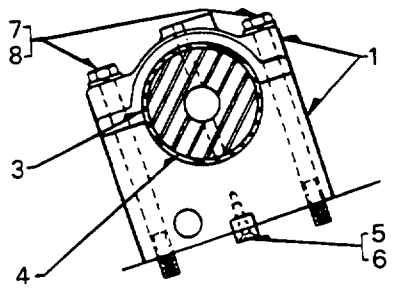
PLATE B30-2

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
						8-645 engines manufactured since September 1982
						8-645 engines manufactured from January 1976 to August 1982
						8-645 engines manufactured in 1974 and 1975
						8-645 engines manufactured in 1973 and before
1	8320994	8	8	8	8	BLOCK ASM. .. Bearing - Drilled cap
2	8320995	8	8	8	8	BLOCK ASM. .. Bearing - Plain cap
3	8071176	16	16	16	16	BEARING .. Shell - Upper half
4	8071176	16	16	16	16	BEARING .. Shell - Lower half
†5	8045976	16	16	16	16	KEY .. Block asm. to crankcase .5000 x .5000 x 2-1/4 long
6	110534	16	16	16	16	SCREW .. Key - No. 10 - 24 x 7/8 flat head - Slotted
7	188146	32	32	32	32	BOLT .. Hex. head - 3/8 - 24 x 4-5/8
8	8373316	32	32	32	32	WASHER .. Hardened
*9	9095828	1	1	-	-	BRACKET ASM. .. Bearing } Left Bank - Accessory Drive End
*10	8494043	-	-	1	-	BRACKET ASM. .. Bearing
*11	8371597	-	-	-	1	BRACKET ASM. .. Bearing
12	9095834	1	1	-	-	BRACKET ASM. .. Bearing } Right Bank - Accessory Drive End
13	8494041	-	-	1	-	BRACKET ASM. .. Bearing
14	8371596	-	-	-	1	BRACKET ASM. .. Bearing
15	9095832	1	1	-	-	BRACKET ASM. .. Bearing } Left Bank - Camshaft Drive End
16	8494044	-	-	1	-	BRACKET ASM. .. Bearing
17	8371595	-	-	-	1	BRACKET ASM. .. Bearing
*18	9095830	1	1	-	-	BRACKET ASM. .. Bearing } Right Bank - Camshaft Drive End
*19	8494042	-	-	1	-	BRACKET ASM. .. Bearing
*20	8371594	-	-	-	1	BRACKET ASM. .. Bearing
21	8029147	8	8	8	8	DOWEL .. Locating - .3125 x 9/16
22	8266361	16	16	16	16	BOLT .. Hex. head - 5/8 - 18 x 3
23	8497575	16	16	16	-	WASHER .. Hardened - 5/8
24	8237900	2	2	2	2	BEARING .. Shell - Upper half } Accessory Drive End
25	8237900	2	2	2	2	BEARING .. Shell - Lower half
26	8253825	2	2	2	2	BEARING .. Shell - Upper half } Camshaft Drive End
27	8253825	2	2	2	2	BEARING .. Shell - Lower half
*28	8266424	8	8	8	8	BOLT .. Bracket to crankcase - 5/8 - 18 x 5-1/2 drilled hex. head
29	8497575	8	8	8	-	WASHER .. Hardened - 5/8
††30	8044728	4	4	4	4	KEY .. Bracket asm. to crankcase - .5000 x .5000 x 1-3/4 long
31	110534	4	4	4	4	SCREW .. Key - No. 10 - 24 x 7/8 flat head - Slotted
32	8499216	2	4	10	-	BOLT .. Brackets to crankcase - 5/8 - 18 x 3 drilled hex. head
33	223737	6	-	-	-	BOLT .. Brackets to crankcase - 5/8 - 18 x 1-3/4 hex. head
34	223742	2	-	-	-	BOLT .. Brackets to crankcase - 5/8 - 18 x 3 hex. head
35	181356	2	-	-	-	BOLT .. Brackets to crankcase - 3/8 - 24 x 5/8 hex. head
36	8028329	4	4	-	-	BOLT .. Brackets to crankcase - 1/2 - 20 x 1-1/4 drilled hex. head
37	8028312	2	2	6	6	BOLT .. Brackets to crankcase - 3/8 - 24 x 1 drilled hex. head
38	8499156	4	10	4	-	BOLT .. Brackets to crankcase - 5/8 - 18 x 1-3/4 drilled hex. head
39	8050937	2	4	4	-	BOLT .. Brackets to crankcase - 3/8 - 24 x 5/8 drilled hex. head
40	8028302	-	-	-	14	BOLT .. Brackets to crankcase - 1/2 - 20 x 1-1/2 drilled hex. head
41	9095913	4	4	-	-	DOWEL .. Locating - .8750 dia. x 2-1/2 long
42	8388954	-	-	4	-	DOWEL .. Locating - .7500 dia. x 1-1/2 long
43	8497575	14	14	14	-	WASHER .. Hardened - 5/8
44	8116738	A.R.		A.R.		WIRE .. Lock - 3/64 dia. x 500 ft.

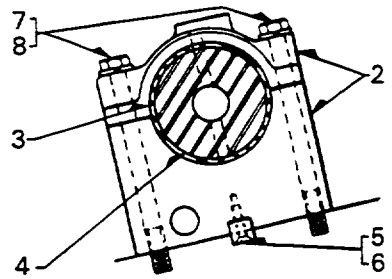
† For Oversize Crankcase Keyway, use Stepdown Key 8136773 - .5000 x .5625 step - 2-1/4 in. long.

†† For Oversize Crankcase Keyway, use Stepdown Key 8166324 - .5000 x .5625 step - 1-1/4 in. long.

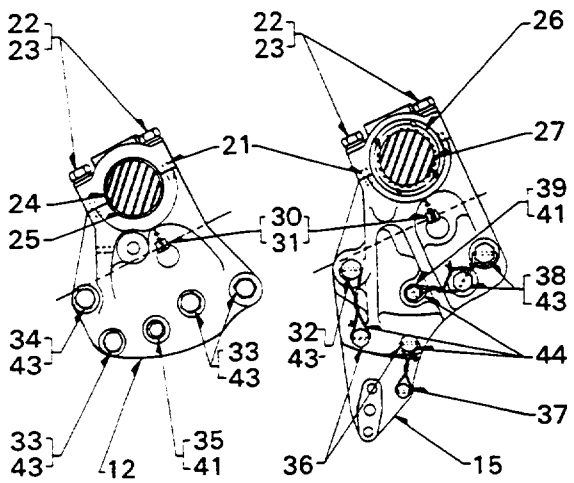
CAMSHAFT BEARING BRACKETS
8-645 Engines



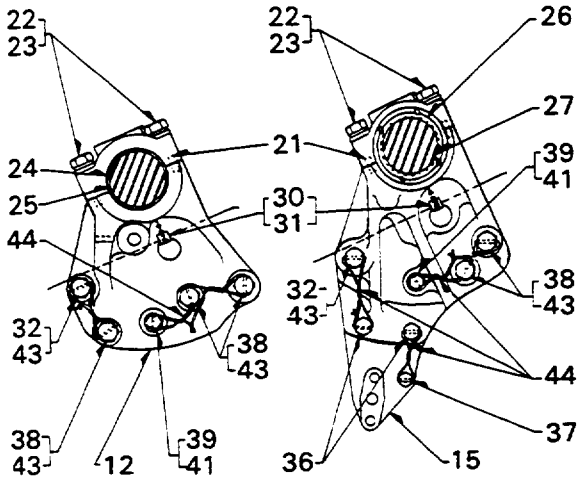
Drilled Cap
Columns A, B, C, & D



Plain Cap
Columns A, B, C, & D



Column A



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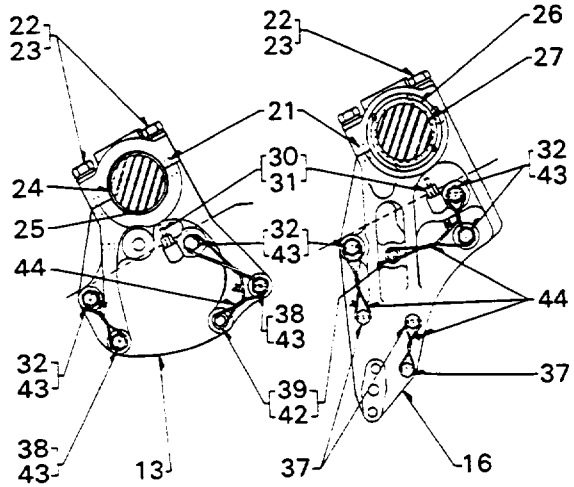

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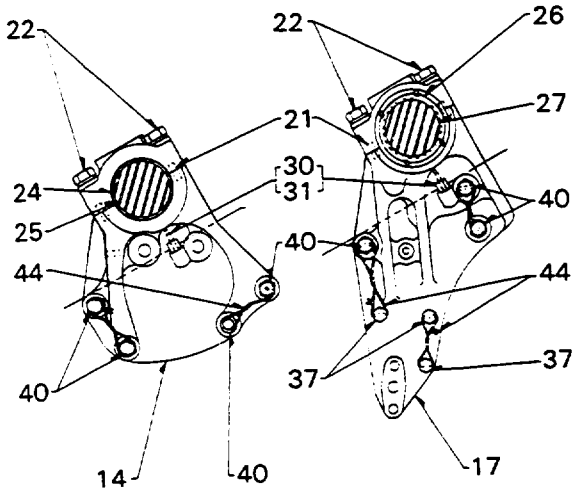


Column D

PLATE B30-2

Parts List No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE

Overspeed Pawl Camshaft and Trip Assemblies
All 645 Engines

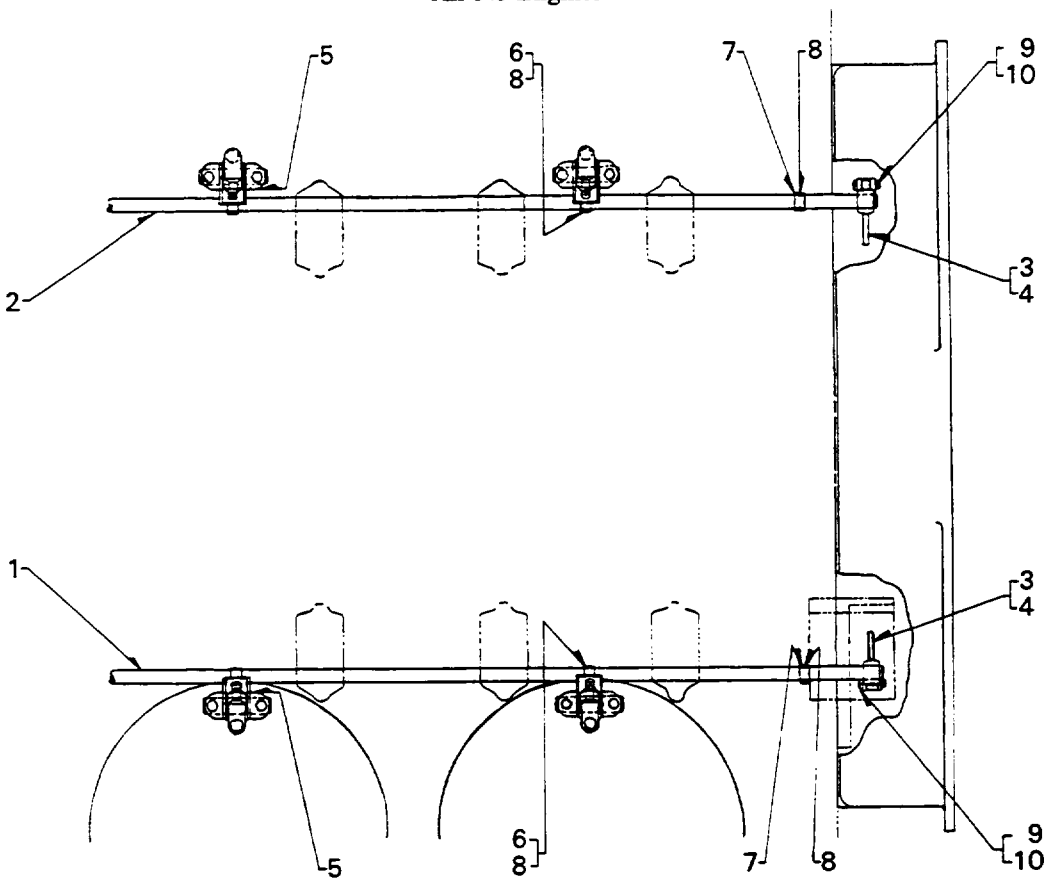


PLATE B32-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 engines
		-	B	-	-	12-645 engines
		-	-	C	-	16-645 engines
		-	-	-	D	20-645 engines
1	8320746	1	-	-	-	CAMSHAFT ASM. .. Pawl } Right Bank
1	8320748	-	1	-	-	CAMSHAFT ASM. .. Pawl } Right Bank
1	8320750	-	-	1	-	CAMSHAFT ASM. .. Pawl } Right Bank
1	8360923	-	-	-	1	CAMSHAFT ASM. .. Pawl } Right Bank
2	8320747	1	-	-	-	CAMSHAFT ASM. .. Pawl } Left Bank
2	8320749	-	1	-	-	CAMSHAFT ASM. .. Pawl } Left Bank
2	8320751	-	-	1	-	CAMSHAFT ASM. .. Pawl } Left Bank
2	8360922	-	-	-	1	CAMSHAFT ASM. .. Pawl } Left Bank
3	8028790	2	2	2	2	LEVER .. Trip shaft - Accessory end only
4	103605	2	2	2	2	PIN .. Taper - No. 4 x 1-1/4
5	8028487	8	12	16	20	TRIP ASM. .. Overspeed - Includes mounting bolts - See Page 4
6	8320742	8	12	16	20	CAM .. Pawl camshaft
7	8320743	2	2	2	2	COLLAR .. Pawl camshaft
8	456652	10	14	18	22	PIN .. Spring - 3/16 x 7/8 - Cam and collar to shaft
9	114785	2	2	2	2	PIN .. Clevis - 3/8 x 1-3/32 - Lever to linkage
10	107762	2	2	2	2	PIN .. Cotter - 3/32 x 5/8

8118977, 9522709

P.L. No. B32

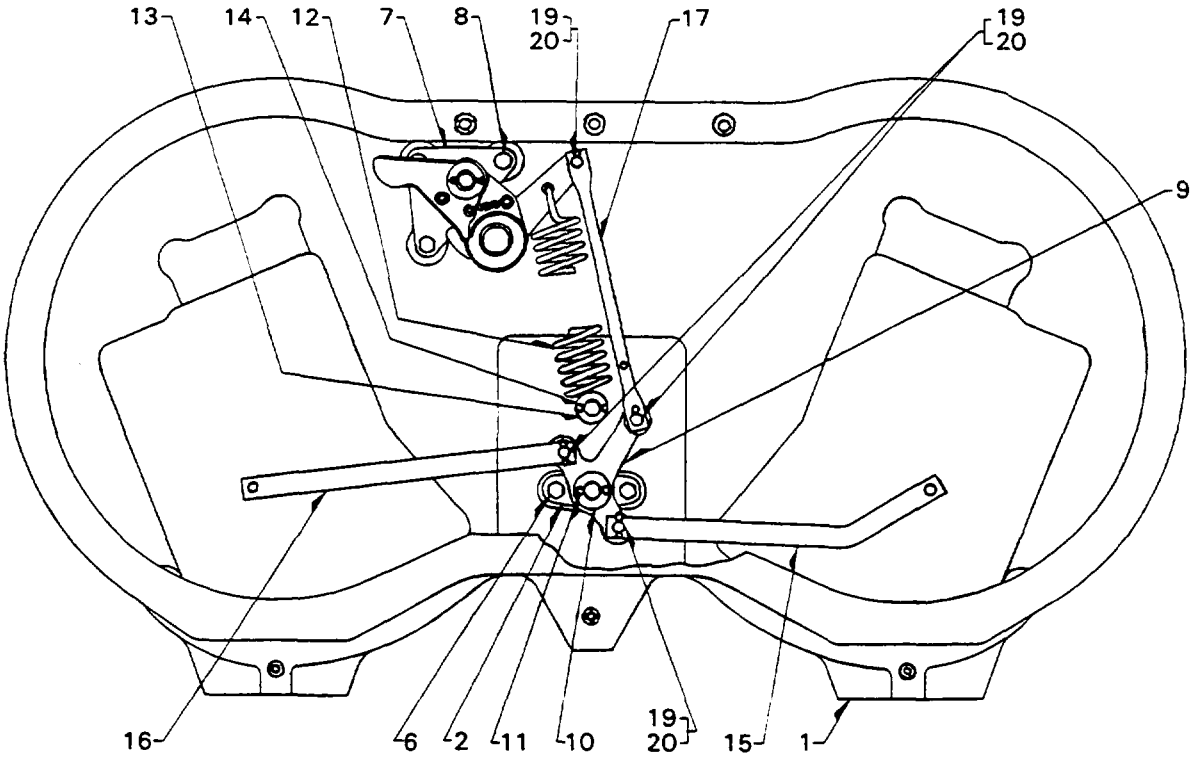
CAMSHAFT OVERSPEED TRIP LINKAGE
Trip Linkage Application
All 645 Engines

PLATE B32-2

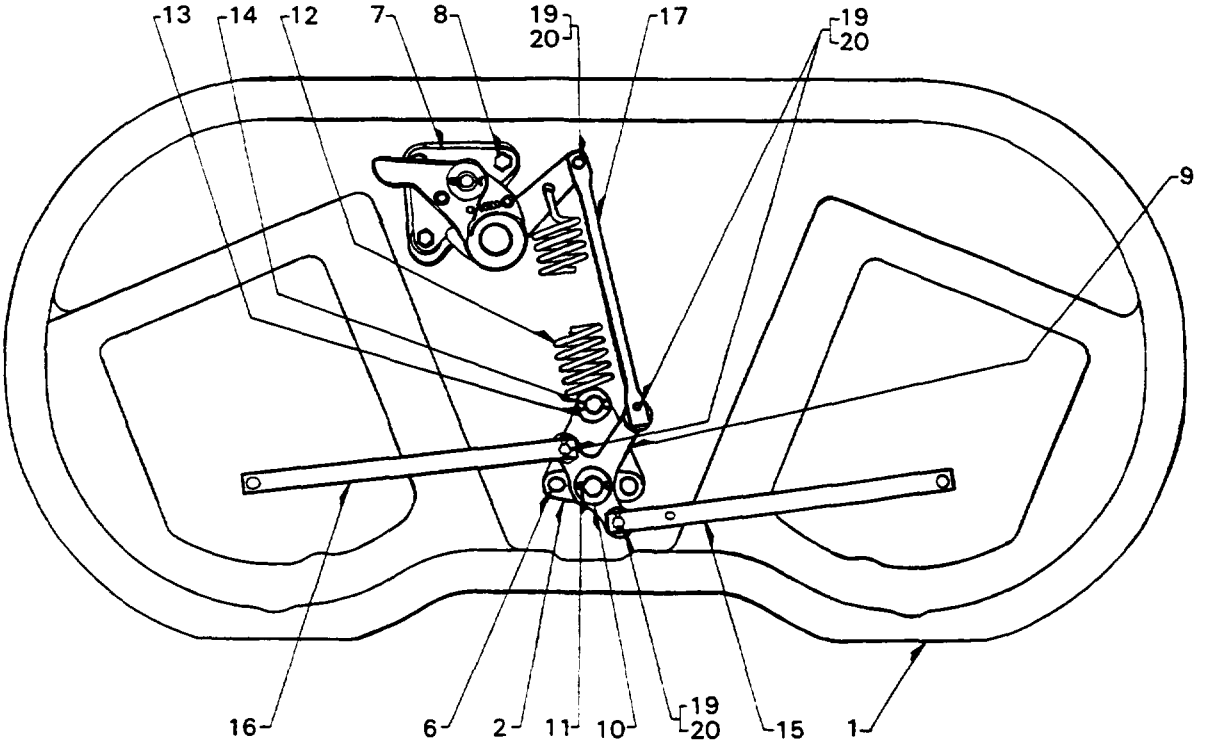
Ref. No.	Part Number	Qty. Req.		Description
		A	-	8-645 engines
		-	B	12,16,20-645 engines
1	----	1	1	HOUSING ASM. .. Overspeed trip linkage - See Pages 12 and 13
2	8028204	1	1	BRACKET ASM. .. Toggle lever
*3	8028210	1	1	BRACKET .. Shaft
*4	8028216	1	1	SHAFT .. Toggle lever
*5	112053	1	1	PIN .. Dowel - 3/16 x 1-1/4 - Shaft to bracket
6	181364	2	2	BOLT .. Hex. head - 3/8 - 24 x 1
ϕ7	8074711	1	1	BRACKET ASM. .. Trip pawl - Engines without manual trip lever } See Page 5
ϕ7	8242289	1	1	BRACKET ASM. .. Trip pawl - Engines with manual trip lever } See Page 5
8	181365	3	3	BOLT .. Hex. head - 3/8 - 24 x 1-1/8
9	8028495	1	1	LEVER .. Toggle
10	8028732	1	1	WASHER .. Flat - 5/8
11	103385	1	1	PIN .. Cotter - 1/8 x 1
12	9097192	1	1	SPRING .. Actuating - Replaces 8311814
13	6101229	1	1	WASHER .. Flat - 1/2
14	108629	1	1	PIN .. Cotter - 3/32 x 7/8
15	8297815	1	-	LINK .. Left bank
15	8028205	-	1	LINK .. Left bank
16	8028206	1	1	LINK .. Right bank
17	8028207	1	1	LINK .. Upper
18	----	-	-	Reference Number Not Used
19	114785	4	4	PIN .. Clevis - 3/8 x 1-3/32
20	107762	4	4	PIN .. Cotter - 3/32 x 5/8
+21	8085119	1	1	ANCHOR .. Spring - See Page 12

8452889, 8452906, 8452909, 9522707

CAMSHAFT OVERSPEED TRIP LINKAGE



Column A

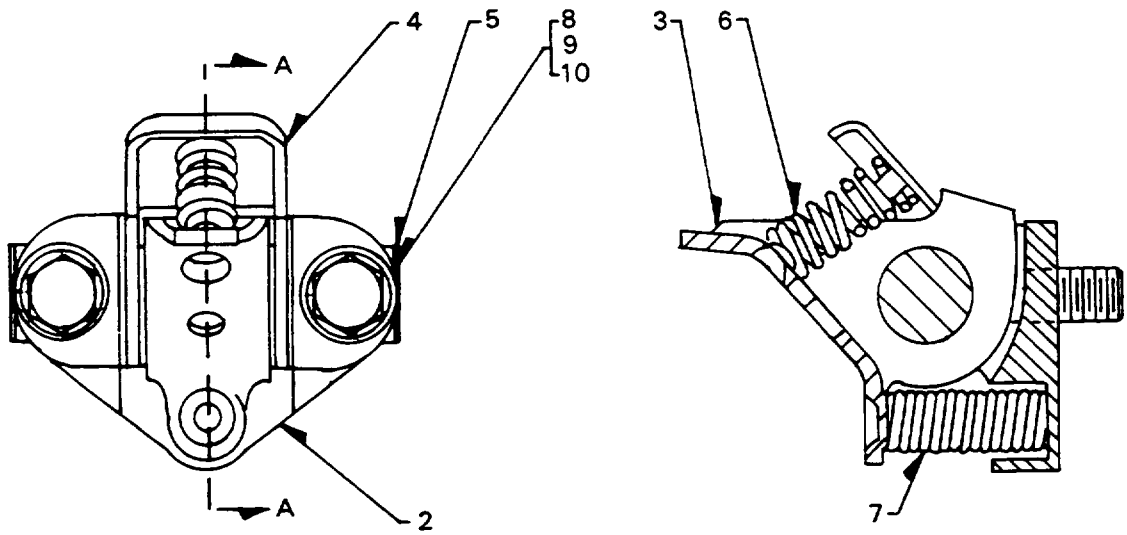


Column B

PLATE B32-2

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE
Overspeed Trip Assembly
All 645 Engines

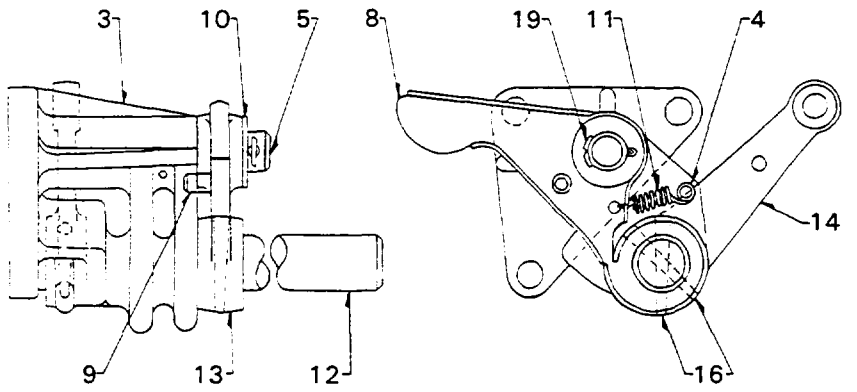


Section A-A

Ref. No. 1
PLATE B32-3

Ref. No.	Part Number	Qty. Req.	Description
1	8028487	1	TRIP ASM. .. Overspeed
2	8402557	1	BRACKET .. Trip pawl - Replaces 8028230
3	9326198	1	PAWL .. Rocker lever - Formerly 8028498
4	9511456	1	REST .. Spring - Formerly 8028200
5	8028234	1	SHAFT .. Pawl
6	8028787	1	SPRING .. Rest to lever
7	8028788	1	SPRING .. Lever to bracket
8	179848	2	BOLT .. Hex. head 3/8 - 16 x 2-1/4
9	103321	2	WASHER .. Lock - 3/8
10	9414322	2	WASHER .. Flat - 3/8

CAMSHAFT OVERSPEED TRIP LINKAGE
Overspeed Trip Pawl Bracket Assembly
All 645 Engines



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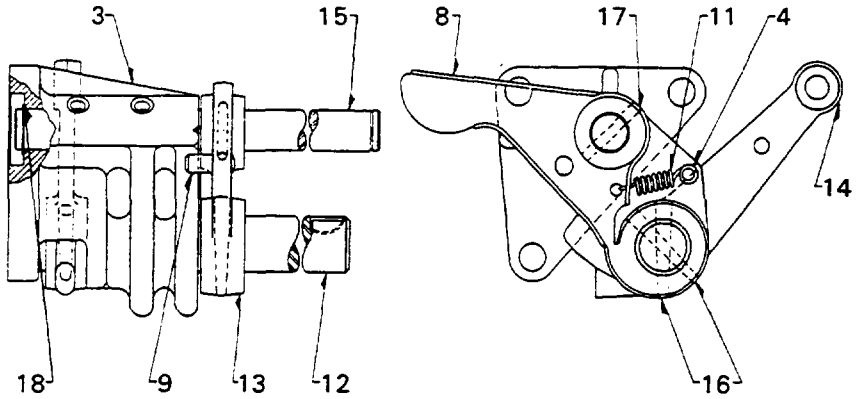


Ref. No. 2
PLATE B32-4

Ref. No.	Part Number	Qty. Req.		Description
1	8074711	1	-	BRACKET ASM. .. Trip pawl - Engines without manual trip lever
2	8242289	-	1	BRACKET ASM. .. Trip pawl - Engines with manual trip lever
3	8028201	1	-	BRACKET ASM. .. Mounting
3	8242286	-	1	BRACKET ASM. .. Mounting
4	8028212	1	1	ANCHOR .. Spring
5	8028219	1	-	SHAFT .. Pawl pivot
*6	103696	1	-	PIN .. Dowel - 1/8 x 1-1/4 - Shaft to bracket
*7	8242284	-	2	BUSHING .. Trip shaft
8	8069264	1	1	PAWL .. Overspeed trip
9	8028223	1	1	PIN .. Stop - Pawl
10	8028732	1	-	WASHER .. Pawl shaft
11	8028791	1	1	SPRING .. Trip pawl
12	8029624	1	1	SHAFT .. Lock
13	8028214	1	1	LOCK .. Overspeed trip
14	8028213	1	1	LEVER .. Stop
15	8242287	-	1	SHAFT .. Trip
16	103596	2	2	PIN .. Taper #3 - Lock and stop lever to shaft
17	455277	-	1	PIN .. Spring - 1/8 x 1-1/8 - Pawl to trip shaft
18	9411497	-	1	RING .. Snap
19	103385	1	-	PIN .. Cotter - 1/8 x 1
*20	181365	3	3	BOLT .. Hex. head - 3/8 - 24 x 1-1/8 - Bracket mounting

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE
Overspeed Trip Limit Switch and Reset Lever
Application Prior to May, 1970
8,12,16-645E1; 8,12,16-645E4 Engines

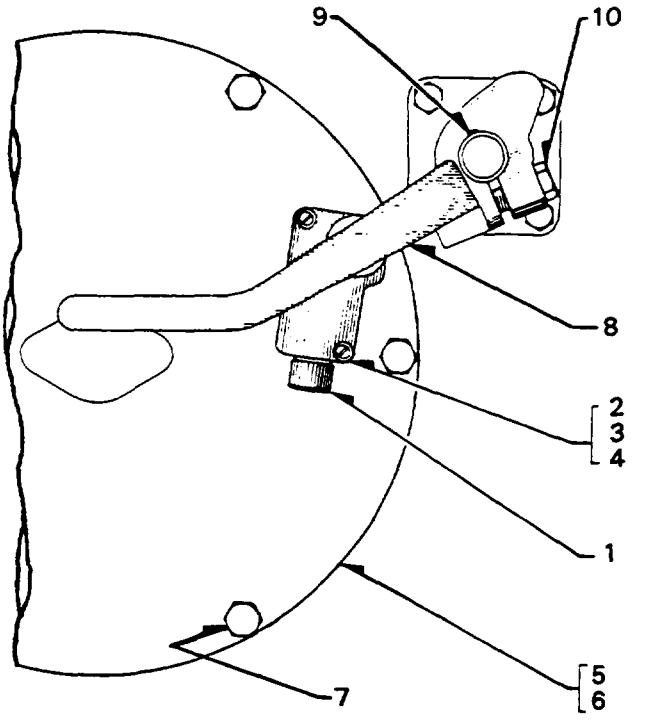


PLATE B32-5

Ref. No.	Part Number	Qty. Req.	Description
1	8246095	1	SWITCH .. Overspeed trip limit
2	100718	2	SCREW .. Filister head - No. 8 - 32 x 1-1/4 - Slotted
3	8032811	2	NUT .. Lock - No. 8 - 32
4	114986	2.	WASHER .. Flat - No. 8
5	8345498	1	PLATE .. Cover - Includes switch mounting bracket - See Page 14
6	8028765	1	GASKET .. Cover plate
7	181364	6	BOLT .. Hex. head - 3/8 - 24 x 1
8	8285804	1	LEVER .. Reset
9	124548	1	KEY .. Woodruff - 5/32 x 3/4
10	181364	1	BOLT .. Hex. head

8345297

CAMSHAFT OVERSPEED TRIP LINKAGE
Previously Applied Overspeed Trip and Reset Levers
8,12,16-645E1,E2 and 8,12,16,20-645E5 Engines

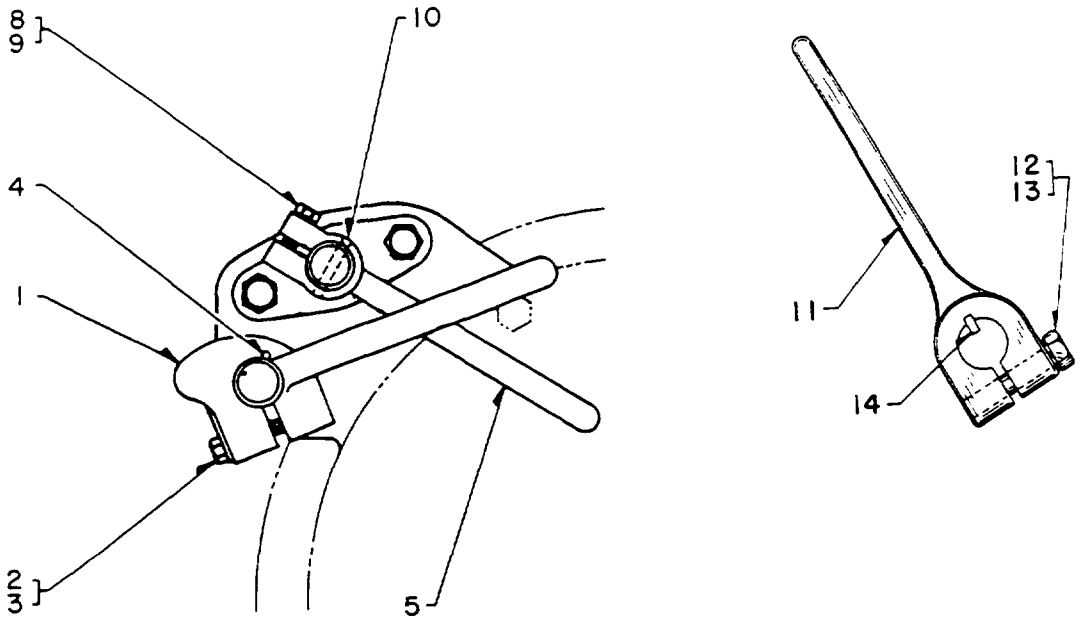
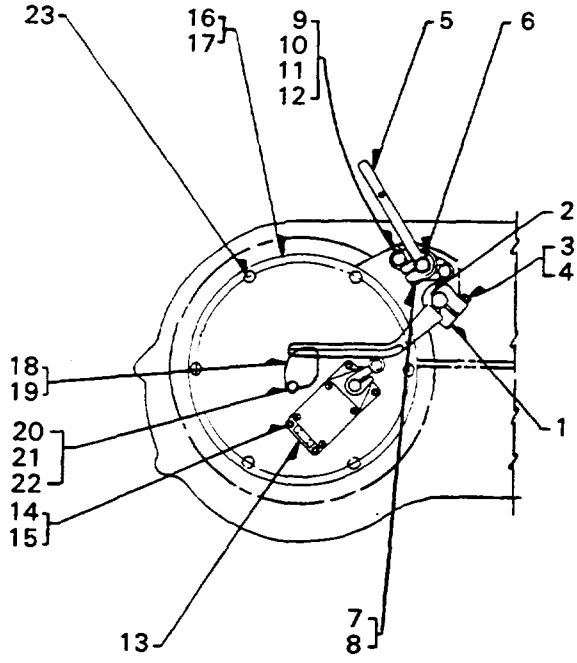


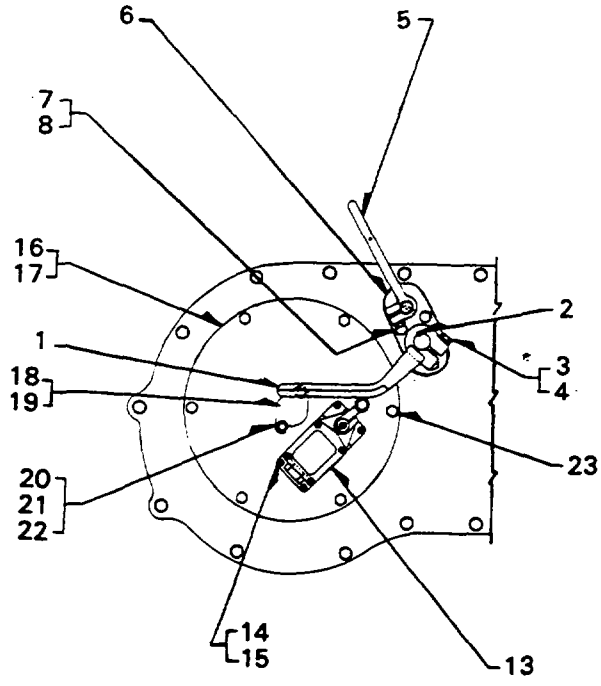
PLATE B32-6

Ref. No.	Part Number	Qty. Req.	Description	
1	8242265	1	LEVER .. Reset	
2	181374	1	BOLT .. Hex. head - 3/8 - 24 x 1-1/2	
3	103321	1	WASHER .. Lock - 3/8	
4	124548	1	KEY .. Woodruff - 5/32 x 3/4	
5	8242288	1	LEVER .. Trip	
*6	3329093	1	LEVER .. Trip - With 13/64 dia. spring hole	Special 16-645E5 engines
*7	3330183	1	SPRING .. Trip lever - Used with Ref. 6	Special 16-645E5 engines
8	181339	1	BOLT .. Hex. head - 5/16 - 24 x 1	
9	103320	1	WASHER .. Lock - 5/16	
10	103584	1	PIN .. Taper - No. 2 x 1 in. long	
11	8029623	1	LEVER .. Reset	Used on SR11E1, SR12E1, and SR16E1 models
12	181377	1	BOLT .. Hex. head - 3/8 - 24 x 1-3/4	Used on SR11E1, SR12E1, and SR16E1 models
13	103321	1	WASHER .. Lock - 3/8	Used on SR11E1, SR12E1, and SR16E1 models
14	124548	1	KEY .. Woodruff - 5/32 x 3/4	Used on SR11E1, SR12E1, and SR16E1 models

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE
Overspeed Trip Lever, Reset Lever, and Limit Switch





Column A Column B

PLATE B32-7

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
		A	-	All 8-645 engines; 12,16,20-645 engines with frequency generator
		-	B	12,16,20-645 engines without frequency generator
1	9096707	1	1	LEVER - Reset
2	124548	1	1	KEY .. Woodruff - 5/32 x 3/4
3	181374	1	1	BOLT .. Hex. head - 3/8 - 24 x 1-1/2
4	103321	1	1	WASHER .. Lock - 3/8
5	8431880	1	1	LEVER .. Trip
6	455277	1	1	PIN .. Spring - 1/8 x 1-1/8
7	181339	1	1	BOLT .. Hex. head - 5/16 - 24 x 1
8	103320	1	1	WASHER .. Lock - 5/16
9	8242410	1	-	FLANGE .. Mounting
10	8366345	1	-	GASKET .. Flange
11	8242408	1	-	SEAL .. Oil
12	181364	2	-	BOLT .. Hex. head - 3/8 - 24 x 1
φ13	8422449	1	1	SWITCH .. Limit
φ14	187828	4	4	SCREW .. Cap - No. 10 - 32 x 1/2
φ15	106497	4	4	WASHER .. Lock - No. 10
16	8422448	1	1	PLATE .. Cover - Used when Ref. 13 is applied } See Page 14
*16	8028222	1	1	PLATE .. Cover - Used when Ref. 13 is not applied
17	8028765	1	1	GASKET .. Cover plate
18	8058255	1	1	COVER .. Cover plate opening
19	8058257	1	1	GASKET .. Cover
20	181311	2	2	BOLT .. Hex. head - 1/4 - 28 x 5/8
21	103319	2	2	WASHER .. Lock - 1/4
22	103339	1	1	WASHER .. Flat - 1/4
23	181364	6	6	BOLT .. Hex. head - 3/8 - 24 x 1

8450925, 8449515, 9096708, 9096738

P.L. No. B32

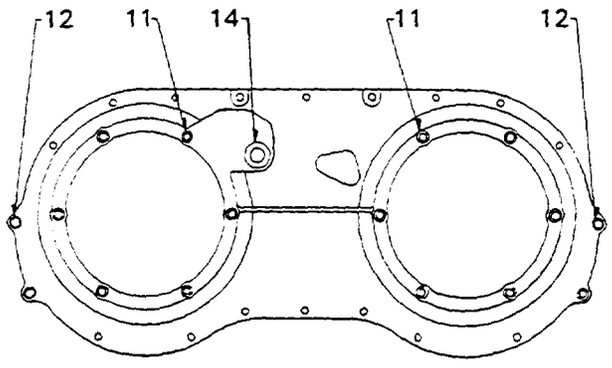
CAMSHAFT OVERSPEED TRIP LINKAGE
Trip Housing Cover

PLATES B32-8 and B32-9

Ref. No.	Part Number	Quantity Required										Description
		A	-	-	-	-	-	-	-	-	-	12-645E1; 16,20-645E4 engines
		-	B	-	-	-	-	-	-	-	-	8-645E1,E4 engines
		-	-	C	-	-	-	-	-	-	-	12,16-645E4B,E6 engines
		-	-	-	D	-	-	-	-	-	-	12-645E8; 16-645E4,E8,E9B; 20-645E4,E4B,E9B engines
		-	-	-	-	E	-	-	-	-	-	8-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8 engines
		-	-	-	-	-	F	-	-	-	-	12,16-645E1; 12,16,20-645E4 engines
		-	-	-	-	-	-	G	-	-	-	12-645E2,E4,E5,E6,E7; 16-645E2,E5,E6,E7; 20-645E5,E7 engines
		-	-	-	-	-	-	-	H	-	-	12,16,20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B; 12-645E1,
		-	-	-	-	-	-	-	-	-	-	E6,E8; 16-645E1,E6,E8,E10B; 20-645E10B engines
		-	-	-	-	-	-	-	-	J	-	12-645E1,E4B,E8; 16-645E8,E9B; 20-645E4B,E10B engines
		-	-	-	-	-	-	-	-	-	K	12,20-645E4B engines
1	8094879	1	-	-	-	-	-	-	-	-	-	COVER ASM. .. Trip linkage housing
2	8235619	-	1	-	-	-	-	-	-	-	-	COVER ASM. .. Trip linkage housing
3	8242263	-	-	1	-	-	-	-	-	-	-	COVER ASM. .. Trip linkage housing
4	8246099	-	-	-	1	-	-	-	-	-	-	COVER ASM. .. Trip linkage housing
5	8247631	-	-	-	-	1	-	-	-	-	-	COVER ASM. .. Trip linkage housing
6	8264373	-	-	-	-	-	1	-	-	-	-	COVER ASM. .. Trip linkage housing
7	9096658	-	-	-	-	-	-	1	-	-	-	COVER ASM. .. Trip linkage housing
8	9522706	-	-	-	-	-	-	-	1	-	-	COVER ASM. .. Trip linkage housing
9	9537509	-	-	-	-	-	-	-	-	1	-	COVER ASM. .. Trip linkage housing
10	9541210	-	-	-	-	-	-	-	-	-	1	COVER ASM. .. Trip linkage housing
11	8084755	12	12	14	15	14	-	-	-	-	-	NUT .. Spline - 3/8 - 24 x 7/32 spline length
12	8084754	4	-	4	4	-	-	-	-	-	-	NUT .. Spline - 3/8 - 24 x 3/8 spline length
13	8280665	-	-	-	-	-	20	20	10	12	10	NUT .. Spline - 3/8 - 24 x 1/4 spline length
14	8028754	1	1	1	1	1	1	1	1	1	1	SEAL .. Oil - .875 I.D. x 1.503 O.D.
15	8242408	-	-	-	-	-	-	1	1	1	1	SEAL .. Oil - .625 I.D. x 1.129 O.D.
16	8028220	-	-	-	-	-	1	-	-	-	-	RETAINER .. Oil seal
17	9096523	-	-	-	-	-	-	1	1	1	1	RETAINER .. Oil seal
18	8028766	-	-	-	-	-	1	-	-	-	-	GASKET .. Oil seal retainer
19	8384820	-	-	-	-	-	-	1	1	1	1	GASKET .. Oil seal retainer
20	181361	-	-	-	-	-	4	-	-	-	-	BOLT .. Hex. head - 3/8 - 24 x 7/8
21	181370	-	-	-	-	-	-	4	4	4	4	BOLT .. Hex. head - 3/8 - 24 x 1-1/4
22	6101225	-	-	-	-	-	4	4	4	4	4	WASHER .. Flat - 3/8
23	9537508	-	-	-	-	-	-	-	-	1	-	PAD .. Tapping - 3/8 - 24
24	8059609	-	-	-	-	-	-	-	-	-	2	FLANGE .. 3/8 N.P.T.
25	8086257	-	-	-	-	-	-	-	-	-	1	FLANGE .. 1/2 N.P.T.
*26	8235618	-	1	-	-	1	-	-	-	-	-	GASKET .. Cover to housing
*26	8049496	1	-	1	1	-	1	1	-	-	-	GASKET .. Cover to housing
*26	9529801	-	-	-	-	-	-	-	1	1	1	GASKET .. Cover to housing
*27	181374	20	20	20	20	20	20	20	17	17	17	BOLT .. Hex. head 3/8 - 24 x 1-1/2 - Cover to housing
*28	181365	-	-	-	-	-	-	-	2	2	2	BOLT .. Hex. head - 3/8 - 24 x 1-1/8 - Cover to housing
*29	8032717	-	-	-	-	-	-	-	17	17	17	NUT .. Lock - 3/8 - 24 hex.
*30	6101225	20	20	20	20	20	20	20	36	36	36	WASHER .. Flat - 3/8
*31	----	-	-	-	-	-	-	-	-	-	-	PLATE .. Cover - See Page 14

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE



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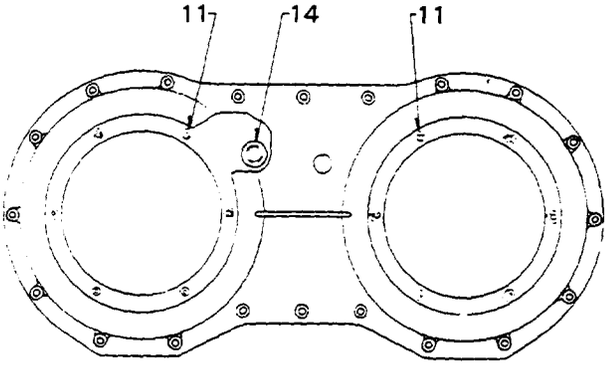

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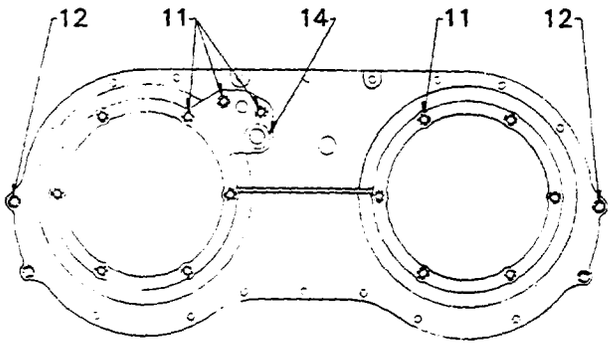

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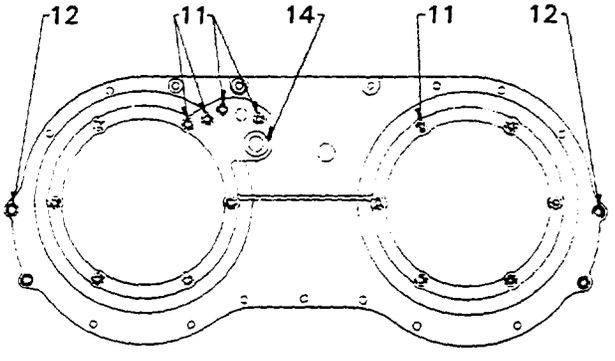

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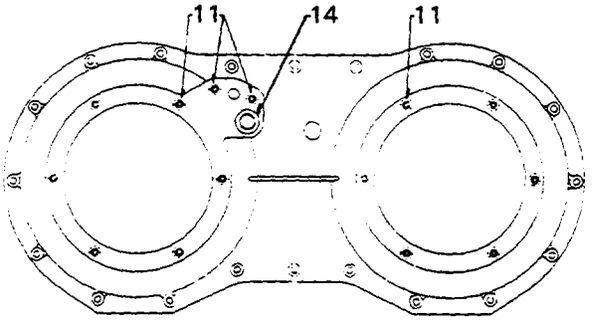
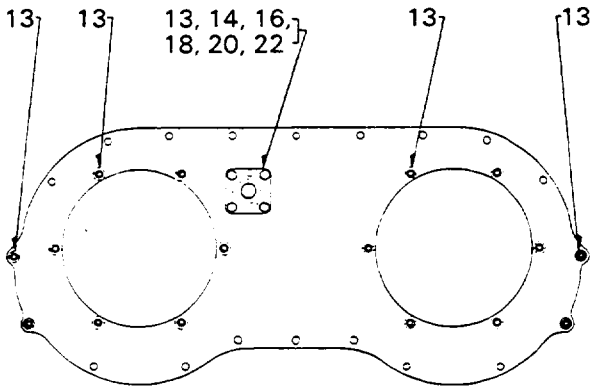


Ref. No. 5

PLATE B32-8

CAMSHAFT OVERSPEED TRIP LINKAGE



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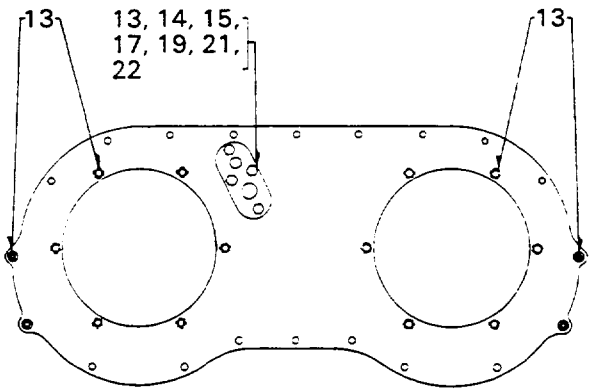

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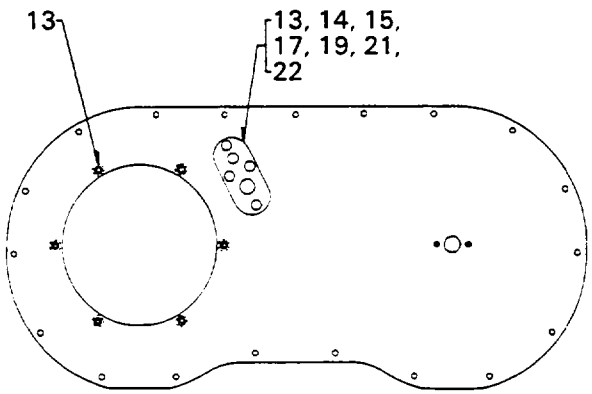

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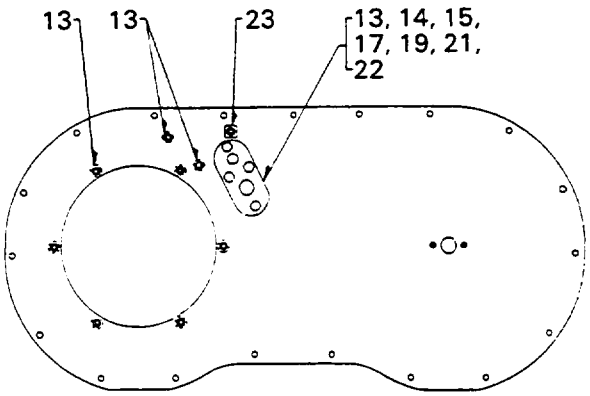

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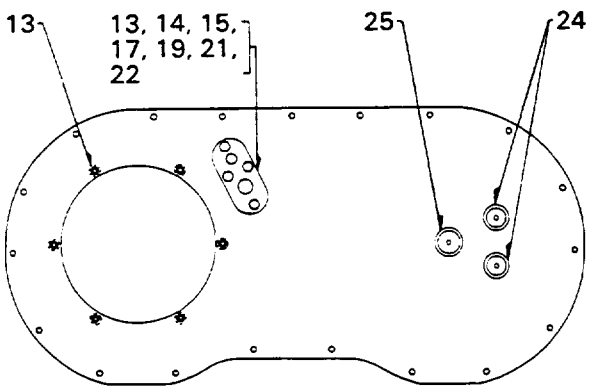


Ref. No. 10

PLATE B32-9

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE
Trip Linkage Housing

PLATE B32-10

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8 engines
		-	B	-	12,16,20-645 engines with bottom oil drains (into accessory drive housing)
		-	-	C	12,16,20-645 engines with rear oil drains (into crankcase)
1	8235620	1	-	-	HOUSING ASM. .. Overspeed trip linkage - With bottom oil drains
2	8159741	-	1	-	HOUSING ASM. .. Overspeed trip linkage - With bottom oil drains
3	9529804	-	-	1	HOUSING ASM. .. Overspeed trip linkage - With rear oil drains
4	8084755	23	19	19	NUT .. Spline - 3/8 - 24 x 7/32 spline length
5	8084754	20	16	2	NUT .. Spline - 3/8 - 24 x 3/8 spline length
6	8085119	1	1	1	ANCHOR .. Spring
7	8035440	3	3	-	STUD .. 3/8 - 16 x 3/8 - 24 x 1-7/8 long - For oversize pitch dia. - See below 8123048 .. .002 O.S. 8126933 .. .017 O.S. 8123049 .. .004 O.S. 8126934 .. .019 O.S. 8126932 .. .015 O.S.
*8	8235617	2	-	-	GASKET .. Housing to crankcase
*8	8044742	-	2	-	GASKET .. Housing to crankcase
*8	9529800	-	-	2	GASKET .. Housing to crankcase
9	8044725	2	2	-	BRACKET .. Support
*10	8035329	4	4	-	BOLT .. Hex. head - 3/8 - 16 x 1-1/8 - Drilled head
*11	181370	4	4	-	BOLT .. Hex. head - 3/8 - 24 x 1-1/4
*12	8116738	As Req.			WIRE .. Lock - 3/64 dia. x 500 ft.
13	8143441	2	2	-	SLEEVE .. Oil drain - Trip housing to accessory drive housing
14	8143446	2	2	-	SEAL .. Oil - Bottom groove
15	9095686	2	2	-	SEAL .. Oil - Top groove - Formerly 8143446
*16	8239648	2	-	-	RETAINER .. Oil drain sleeve
*16	8143444	-	2	-	RETAINER .. Oil drain sleeve
17	9529807	-	-	2	SEAL .. Oil - Rear drain to crankcase
18	181428	6	6	-	BOLT .. Hex. head - 1/2 - 20 x 1-1/8 - Housing to crankcase
18	181430	-	-	8	BOLT .. Hex. head - 1/2 - 20 x 1-3/8 - Housing to crankcase
19	6101229	6	6	8	WASHER .. Flat - 1/2
*20	- - - -	1	1	1	COVER ASM. .. Trip linkage housing - See Page 9
*21	8235618	1	-	-	GASKET .. Cover to housing
*21	8049496	-	1	-	GASKET .. Cover to housing
*21	9529801	-	-	1	GASKET .. Cover to housing

CAMSHAFT OVERSPEED TRIP LINKAGE

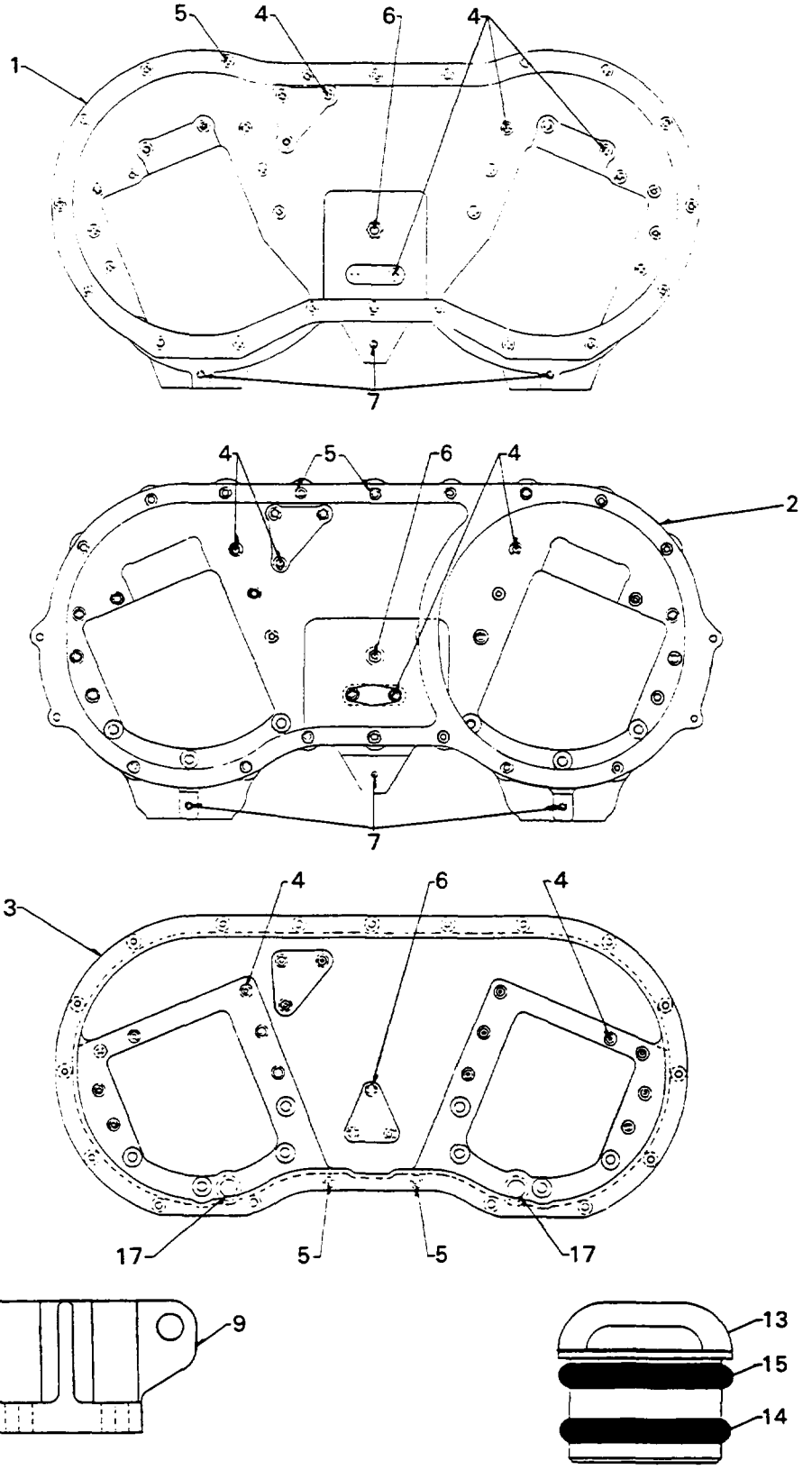


PLATE B32-10

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE
Cover Plates
All 645 Engines

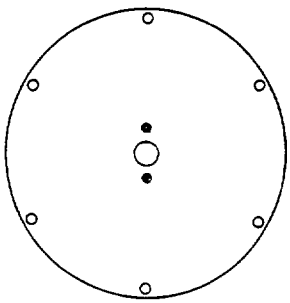
PLATE B32-11

Ref. No.	Part Number	Qty. Req.	Description
1	8028222	1	PLATE .. Cover
2	8246102	1	PLATE .. Cover
3	8263261	1	PLATE .. Cover
4	6102945	4	NUT .. Spline - 1/4 - 28 x 5/16 spline length
5	8086257	1	FLANGE .. 1/2 N.P.T.
6	8345498	1	PLATE .. Cover
7	8345296	1	BRACKET .. Switch mounting
8	8380099	1	PLATE .. Cover
9	8380096	1	PLATE .. Mounting - Hydraulic cylinder
10	8380095	1	GUSSET .. Mounting plate
11	8380490	1	PLATE .. Cover
12	8177095	1	PAD .. Mounting - Limit switch
13	8412131	1	PLATE .. Cover
14	8422448	1	PLATE .. Cover
15	9083164	1	PLATE .. Cover
16	9083155	2	PAD .. Mounting - Limit switch
17	9522463	1	PLATE .. Cover
18	8059609	2	FLANGE .. 3/8 N.P.T.
19	9532576	1	PLATE .. Cover
20	6102945	4	NUT .. Spline - 1/4 - 28 x 5/16 spline length
21	8086257	1	FLANGE .. 1/2 N.P.T.
22	8059609	2	FLANGE .. 3/8 N.P.T.
23	8058255	1	COVER .. Cover plate
*24	8028765	1	GASKET .. Cover plate - Cork - Used with Ref. Nos. 1,2,6,8,13,14, and 17
*25	8221675	1	GASKET .. Cover plate - Rubber fiber - Used with Ref. Nos. 3 and 19
*26	8382826	1	GASKET .. Cover plate - Rubber asbestos - Used with Ref. Nos. 11 and 15
*27	8058257	1	GASKET .. Cover plate cover - Used only with Ref. No. 23
*28	8028304	2	DOWEL .. Cover plate alignment - 1/4 dia. x 5/8 - Used with Ref. Nos. 3 and 19
*29	181311	2	BOLT .. Hex. head - 1/4 - 28 x 5/8 } Used with Ref. No. 23
*30	103319	2	WASHER .. Lock - 1/4 } Used with Ref. No. 23
*31	103339	1	WASHER .. Plain - 1/4 } Used with Ref. No. 23

COVER PLATE MOUNTING HARDWARE

*32	181361	A.R.	BOLT .. Hex. head - 3/8 - 24 x 7/8
*32	181364	A.R.	BOLT .. Hex. head - 3/8 - 24 x 1
*32	181370	A.R.	BOLT .. Hex. head - 3/8 - 24 x 1-1/4
*32	181371	A.R.	BOLT .. Hex. head - 3/8 - 24 x 1-3/8
*32	181374	A.R.	BOLT .. Hex. head - 3/8 - 24 x 1-1/2

CAMSHAFT OVERSPEED TRIP LINKAGE



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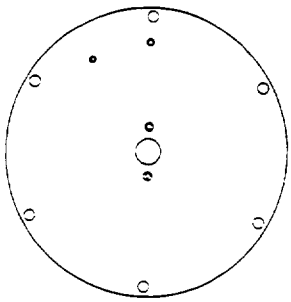

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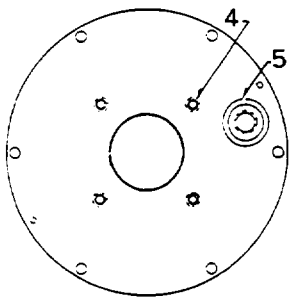

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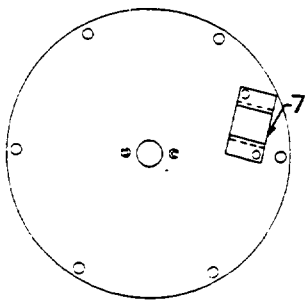

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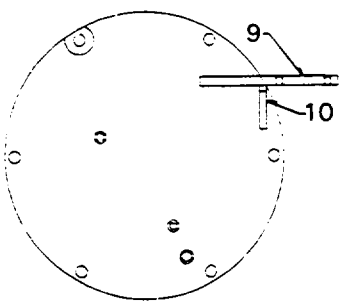

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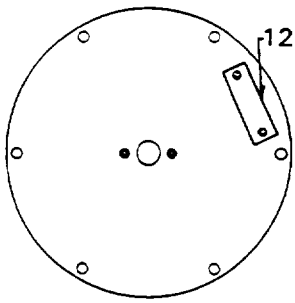

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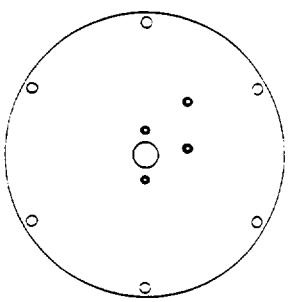

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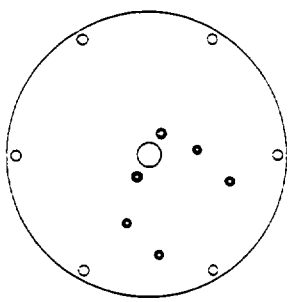

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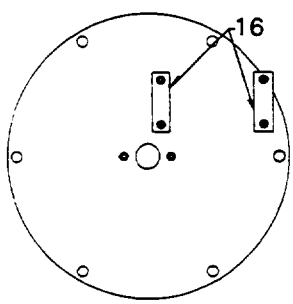

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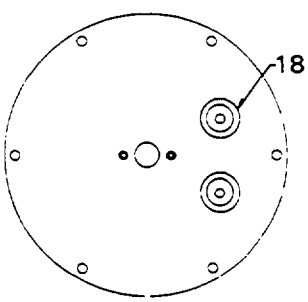

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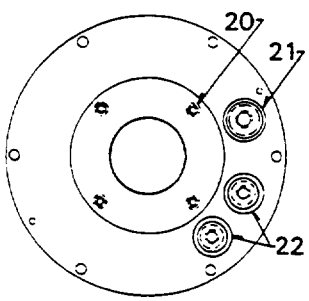

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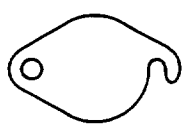


Ref. No. 23

PLATE B32-11

P.L. No. B32

CAMSHAFT OVERSPEED TRIP LINKAGE

Overspeed Trip Limit Switch and Reset Lever
8-645E2 (Special) Marine Engines

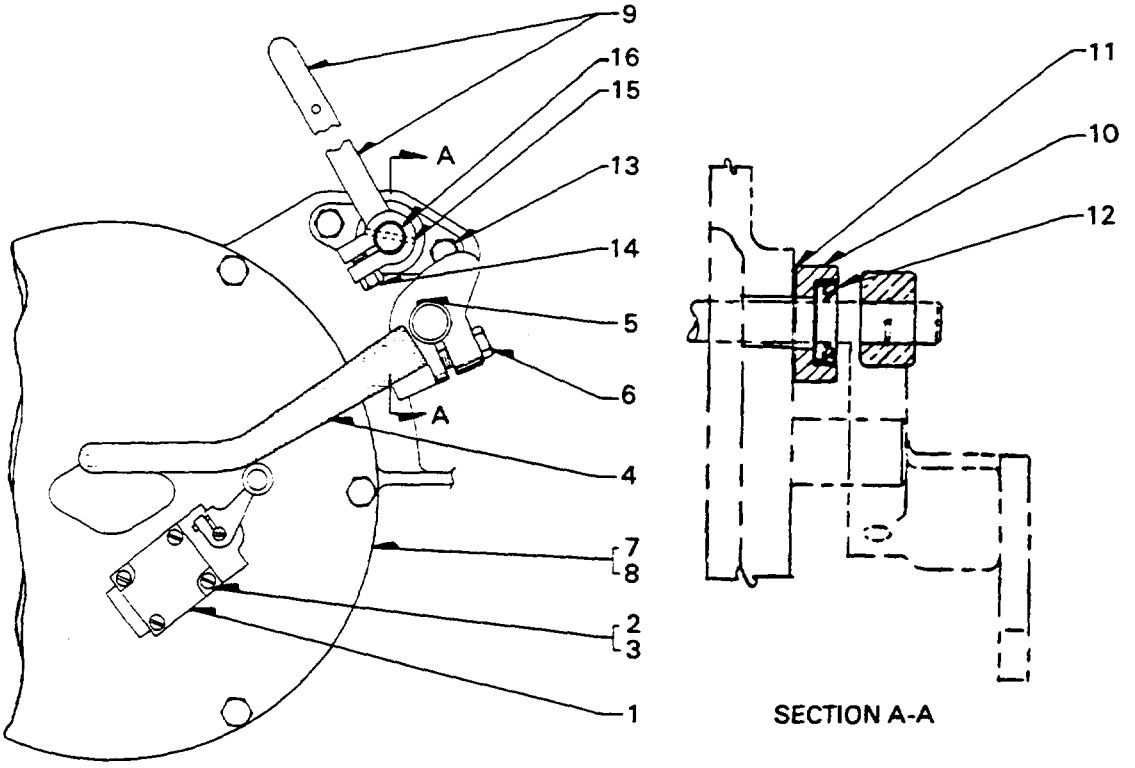


PLATE B32-12

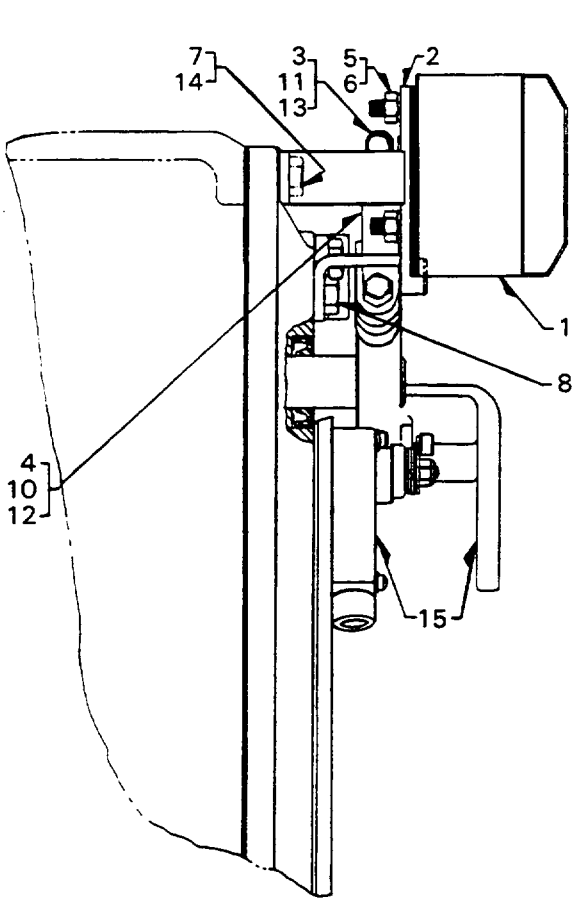
Ref. No.	Part Number	Qty. Req.	Description
1	8412194	1	SWITCH .. Overspeed trip limit
2	132153	2	SCREW .. Switch mounting
3	120217	2	WASHER .. Lock - No. 10
4	8409371	1	LEVER .. Reset
5	124548	1	KEY .. Woodruff - 5/32 x 3/4 in. long
6	181374	1	BOLT .. Reset lever - 3/8 - 24 x 1-1/2 hex. head
7	8412131	1	PLATE .. Cover
8	8028765	1	GASKET .. Cover plate
9	8431880	1	LEVER .. Trip - Manual
10	8242410	1	FLANGE .. Lever mounting
11	8242409	1	GASKET .. Flange mounting
12	8242408	1	SEAL .. Oil
13	181364	2	BOLT .. 3/8 - 24 x 1 hex. head
14	181339	1	BOLT .. 5/16 - 24 x 1 hex. head
15	455277	1	PIN .. Spring
16	8242287	1	SHAFT .. Trip

8439135, 8431589

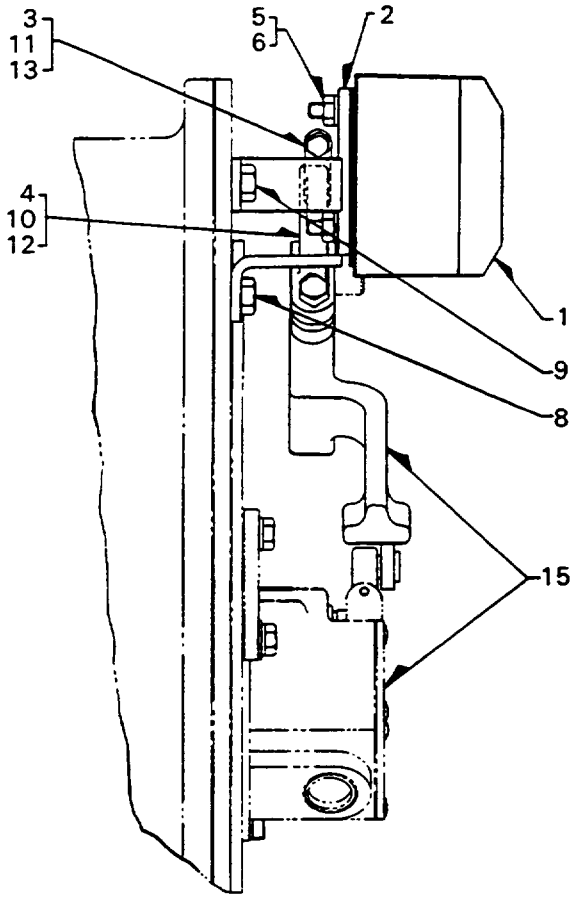
Parts List No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN

Electric Operated Engine Shutdown Solenoid
8,12,16-645E1; 8,12,16-20-645E4,E4B; 12,16-645E8; 16-645E7,E9B Engines



Application To Cast Trip Housing Cover



Application To Flat Trip Housing Cover

PLATE B33-1

Ref. No.	Part Number	Qty. Req.	Description
ϕ1	8246092	1	SOLENOID .. Engine shutdown - 48V DC - Includes 24 in. leads
ϕ1	8246103	1	SOLENOID .. Engine shutdown - 120V DC - Includes 24 in. leads
ϕ1	9535246	1	SOLENOID .. Engine shutdown - 24V DC - Includes 24 in. leads
ϕ2	8246100	1	BRACKET .. Mounting - Applied to cast trip housing cover
ϕ2	9537513	1	BRACKET .. Mounting - Applied to flat trip housing cover
3	8246101	1	CAM .. Trip
4	8246097	1	LEVER .. Trip
5	103024	2	NUT .. Hex. - 1/4 - 28 - Solenoid to bracket
6	103319	2	WASHER .. Lock - 1/4
7	181374	A.R.	BOLT .. Hex. head - 3/8 - 24 x 1-1/2
8	181361	A.R.	BOLT .. Hex. head - 3/8 - 24 x 7/8
9	181356	1	BOLT .. Hex. head - 3/8 - 24 x 5/8
10	181339	1	BOLT .. Hex. head - 5/16 - 24 x 1 - Trip lever
11	181314	1	BOLT .. Hex. head - 1/4 - 28 x 7/8 - Trip cam
12	103584	1	PIN .. Taper - No. 2 - Trip lever
13	103563	1	PIN .. Taper - No. 0 - Trip cam
14	6101225	A.R.	WASHER .. Flat - 3/8
15	- - - -	1	RESET LEVER AND LIMIT SWITCH - See Parts List 32

9537514, 8245981

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Frequency Generator Mounting
12-645E1,E4,E4B,E6,E7,E8; 16-645E4,E4B,E8,E9B; 20-645E4,E4B,E9B Engines

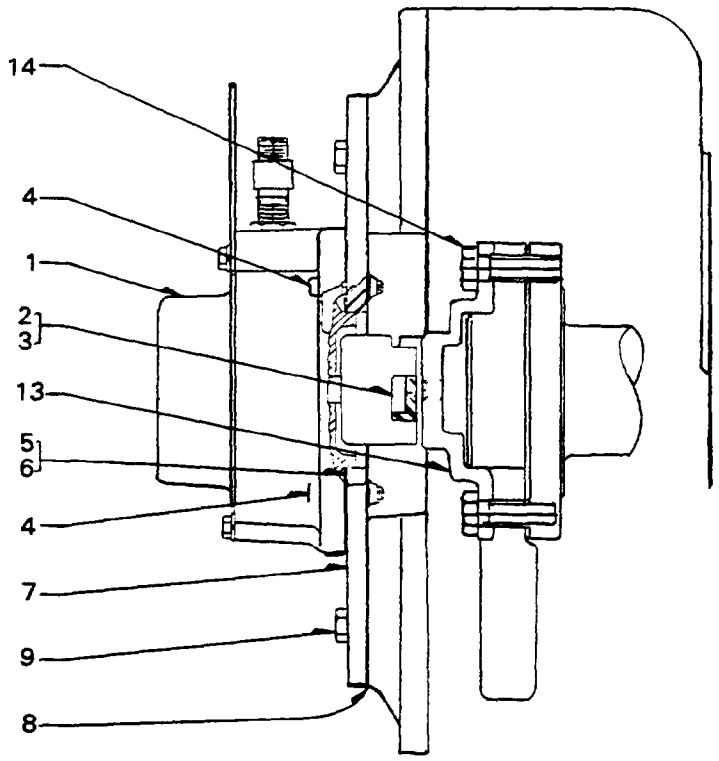


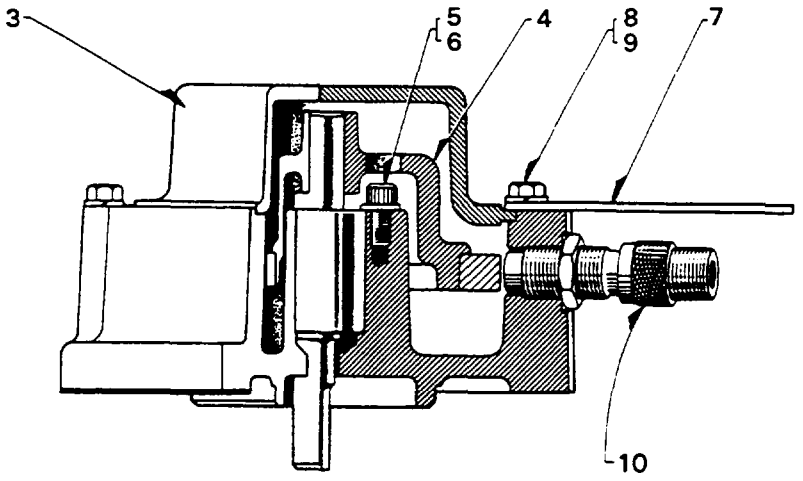
PLATE B33-2

Ref. No.	Part Number	Qty. Req.	Description
ϕ1	8397998	1	GENERATOR .. Frequency - Dual power pickup } See Page 3
ϕ1	8397999	1	GENERATOR .. Frequency - Single power pickup }
2	8276102	1	COUPLING .. Flexible drive - Applicable to 8397998 and 8397999
ϕ3	9312006	1	SPIDER .. Viton - For industrial applications
ϕ3	8084884	1	SPIDER .. Rubber - For marine applications
4	138212	4	SCREW .. Cap - 1/4 - 28 x 1 socket head
5	8263262	A.R.	GASKET .. Generator mounting - Applied to each side of shims
6	9522899	A.R.	SHIM .. Generator mounting - .030
6	9515138	A.R.	SHIM .. Generator mounting - .060
7	9532576	1	PLATE .. Cover - Formerly 8263261 - See Parts List 32
8	8221675	1	GASKET .. Cover plate
9	181370	6	BOLT .. Hex. head 3/8 - 24 x 1-1/4
*10	8348620	1	PLUG .. Pipe - 1/2
*11	8348619	2	PLUG .. Pipe - 3/8 - Used with 9532576 cover plate only
*12	8028304	2	DOWEL .. Locating - Cover plate - 1/4 x 5/8
13	8450470	1	ADAPTER .. Generator to camshaft
14	8028302	4	BOLT .. Hex. head 1/2 - 20 x 1-1/2 - Adapter to crankshaft
*15	8270183	A.R.	PLUG .. Power pickup - 2 pole male
*16	8175600	A.R.	CLAMP .. Cable

8409611

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Frequency Generator Assembly



Ref. Nos. 1 and 2
PLATE B33-3

Ref. No.	Part Number	Qty. Req.		Description
1	8397998	1	-	GENERATOR .. Frequency - Dual power pickup - Replace 8294100
2	8397999	-	1	GENERATOR .. Frequency - Single power pickup - Replaces 8270395
3		1	1	COVER .. Generator
4	8411573	1	1	ARMATURE .. Includes bearing and shaft
5	9417965	3	3	SCREW .. Cap - 1/4 - 20 x 1/2 socket head
6	120392	3	3	WASHER .. Plain - 1/4
7		1	1	SHIELD .. Power pickup
8	180016	3	3	BOLT .. Hex. head 1/4 - 20 x 1/2
9	120380	3	3	WASHER .. Lock - 1/4
10	8270383	2	1	PICKUP .. Power - 2 pole female
*11	8276102	1	1	COUPLING .. Flexible drive
*12	8270183	2	1	PLUG .. Power pickup - 2 pole male

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Junction Box and Cable Application
8,12,16-645E6 and 8,12,16,20-645E7,E7B,E7C Engines

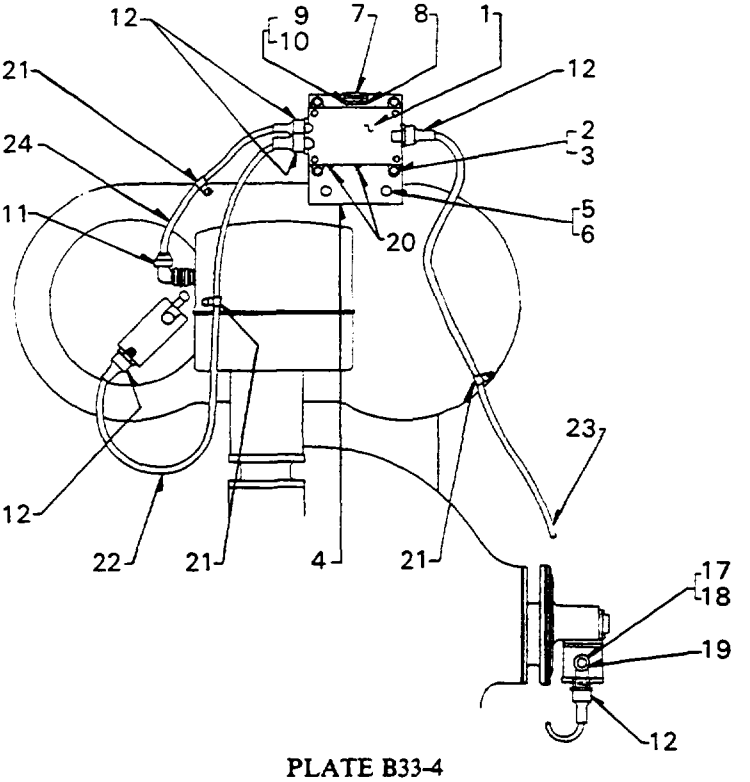


PLATE B33-4

Ref. No.	Part Number	Qty. Req.	Description
1	8438535	1	BOX .. Junction
2	180081	4	BOLT .. Hex. head - 5/16 - 18 x 1-1/4
3	8035145	4	NUT .. Lock - 5/16 - 18 hex.
*ϕ4	8438536	1	PLATE .. Mounting - 11 in. high - Applied to trip housing cover plate
ϕ4	9524304	1	PLATE .. Mounting - 7-5/8 in. high - Applied to trip housing cover
5	181371	2	BOLT .. Hex. head - 3/8 - 24 x 1-3/8
6	6101225	2	WASHER .. Flat - 3/8 - Not used with 8438536 mounting plate
7	8439022	1	RECEPTACLE .. Connector - 12 point male
8	8451362	1	GASKET .. Receptacle
9	436667	4	SCREW .. Slotted - No. 6 - 32 x 3/4
10	8035119	4	NUT .. Lock - No. 6 - 32
11	8262427	1	PLUG .. Governor - 90° - 5 point male
12	9547032	5	SEAL .. Cable entry - Plastic - Formerly applied were 8445869 - Brass terminal and 8427361 - Packing (1/8 in. square x 42 ft.)
*13	8189218	4	LUG .. Terminal - No. 6
*14	8210498	2	LUG .. Terminal - No. 10
*15	8200891	10	CONNECTOR .. 2-way butt - Insulated
*16	8250906	3	RECEPTACLE .. Terminal tab - Faston 250 type
17	8038409	1	ELBOW .. Conduit - 90°
18	8038594	1	BUSHING .. Insulating - 1/2 N.P.T.
19	8038584	2	NUT .. Lock - 1/2 - Conduit
20	143981	2	PLUG .. Pipe - 1/2
21	9553076	4	CLAMP .. Cable - Insulated - 7/16 I.D.
22	8438064	A.R.	CABLE .. 16 gauge - 2 conductor - Sold by the foot
23	8438065	A.R.	CABLE .. 16 gauge - 3 conductor - Sold by the foot
24	8438068	A.R.	CABLE .. 18 gauge - 7 conductor - Sold by the foot
*25	3261563	1	GENERATOR .. Frequency - Formerly applied - For cable and connections see frequency generator application on Pages 6 and 7

8436684, 9524306

ELECTRIC OPERATED ENGINE SHUTDOWN
Junction Box and Cable Application
20-645E7B Engines With EGB Governors

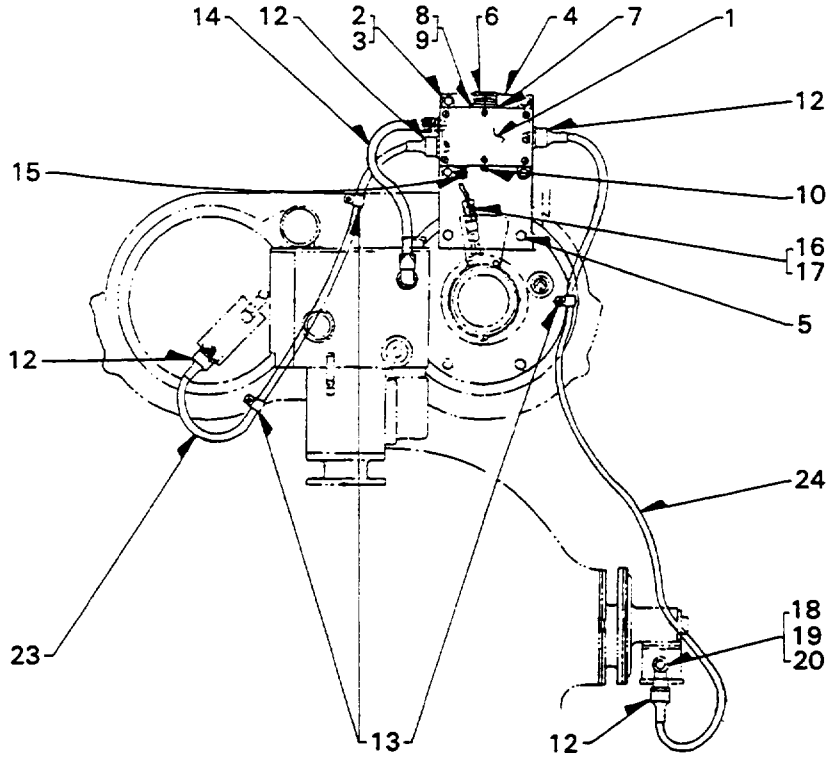


PLATE B33-5

Ref. No.	Part Number	Qty. Req.	Description
*ϕ1	8448072	1	BOX .. Junction
ϕ1	8438535	1	BOX .. Junction - Used when frequency generator is applied
2	180081	4	BOLT .. Hex. head - 5/16 - 18 x 1-1/4
3	8035145	4	NUT .. Lock - 5/15 - 18 hex.
4	8438536	1	PLATE .. Mounting
5	181374	2	BOLT .. Hex. head - 3/8 - 24 x 1-1/2
6	8446923	1	RECEPTACLE .. Connector - 20 pole male
7	8451362	1	GASKET .. Receptacle
8	436667	4	SCREW .. Slotted - No. 6 - 32 x 3/4
9	8035119	4	NUT .. Lock - No. 6 - 32
10	143981	1	PLUG .. Pipe - 1/2 - Qty. of two with 8448072 junction box
*11	8200891	20	CONNECTOR .. 2-way butt
12	9547032	4	SEAL .. Cable entry - Plastic - Formerly applied were 8445869 - Brass terminal and 8427361 - Packing (1/8 in. square x 42 ft.)
13	9553076	3	CLAMP .. Cable - 7/16 insulated - Formerly 8447902
14	9085019	1	CABLE ASM. .. Junction box to governor
15	8250161	1	BUSHING .. Strain relief - 1/2
16	8270133	1	PLUG .. Male - 2 pin
17	8175600	1	CLAMP .. Cable - 5/8 - 24 thread
18	8038594	1	BUSHING .. Insulating - 1/2
19	8038584	1	NUT .. Lock - 1/2
20	8038409	1	ELBOW .. 90° - 1/2 M x 1/2 F
*21	8189218	5	LUG .. Terminal - No. 6
22	9523892	A.R.	CABLE .. 14 gauge - 2 conductor - Copper braid - 100 ft. length
23	8438064	A.R.	CABLE .. 16 gauge - 2 conductor - Sold by the foot
24	8438065	A.R.	CABLE .. 16 gauge - 3 conductor - Sold by the foot

9527752, 9531939

P.L. No. B33

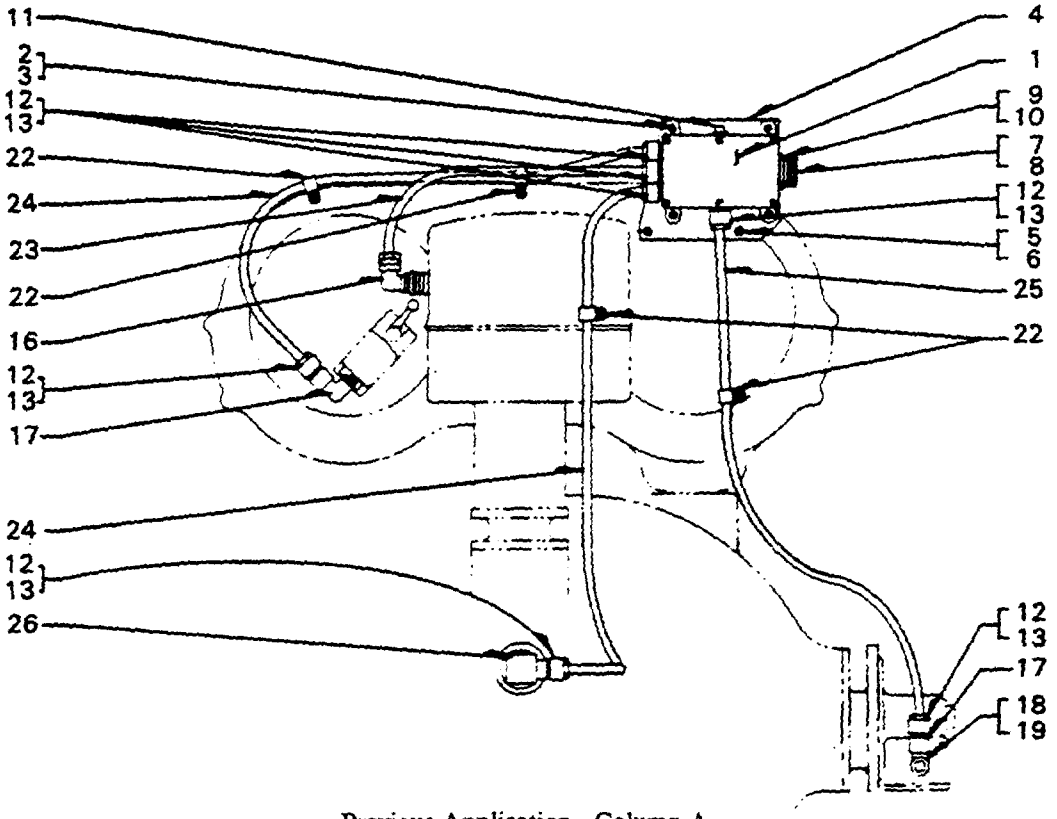
ELECTRIC OPERATED ENGINE SHUTDOWN
Junction Box and Cable Application
12,16-645E6; 8,12,16-645E7; 16-645E7B Engines

PLATE B33-6

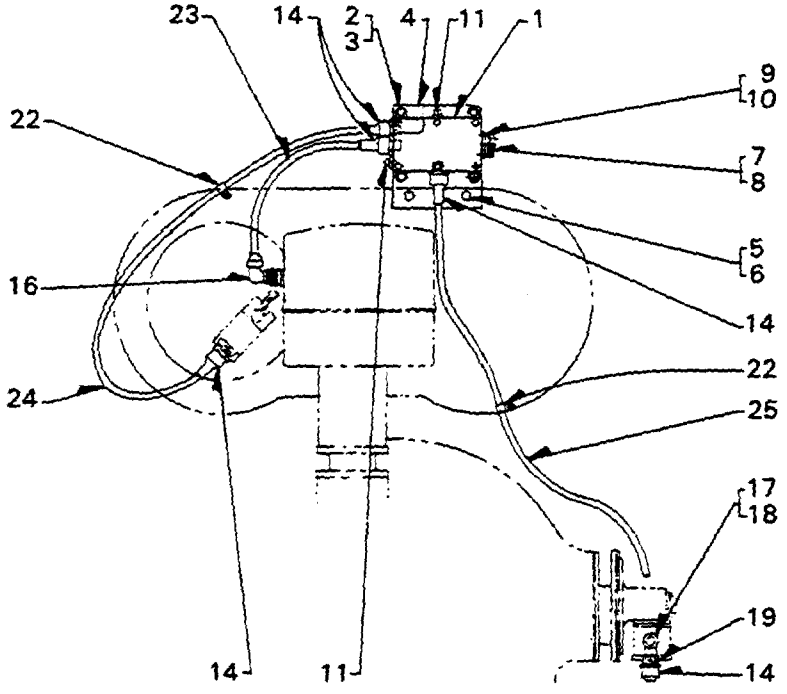
Ref. No.	Part Number	Qty. Req.		Description
		A	-	PREVIOUS APPLICATION
		-	B	CURRENT APPLICATION
1	8477361	1	1	BOX .. Junction
2	179817	4	4	BOLT .. Hex. head 5/16 - 18 x 7/8
3	103320	4	4	WASHER .. Lock - 5/16
*ϕ4	9524304	-	1	PLATE .. Mounting - Applied to trip housing cover
ϕ4	8477737	1	1	PLATE .. Mounting - Applied to trip housing cover plate
5	181371	2	2	BOLT .. Hex. head 3/8 - 24 x 1-3/8
6	6101225	2	2	WASHER .. Flat - 3/8
7	8439022	1	1	RECEPTACLE .. Connector - 12 point male
8	8451362	1	1	GASKET .. Receptacle
9	436667	4	4	SCREW .. Slotted - No. 6 - 32 x 3/4
10	8035119	4	4	WASHER .. Lock - No. 6
11	143981	1	2	PLUG .. Pipe - 1/2 P.T.
12	8445869	7	-	TUBE .. Terminal - Brass
13	8427361	A.R.	-	PACKING .. Terminal - 1/8 in. square x 42 ft.
14	9547032	-	5	SEAL .. Cable entry - Plastic - Heat shrink seal
*15	8200891	10	10	CONNECTOR .. 2-way butt - Insulated
16	8262427	1	1	PLUG .. Governor - 90° - 5 pole male
17	8038409	2	1	ELBOW .. Conduit - 1/2 F x 1/2 M - 90°
18	8038594	1	1	BUSHING .. Insulating - 1/2 N.P.T.
19	8038584	2	2	NUT .. Lock - 1/2 pipe
*20	8189218	4	4	LUG .. Terminal - No. 6
*21	8210498	2	2	LUG .. Terminal - No. 10
22	9553076	4	3	CLAMP .. Cable - 7/16 - Insulated - Formerly 8447902
23	8438068	A.R.		CABLE .. 18 gauge - 7 conductor - Sold by the foot
24	8438064	A.R.		CABLE .. 16 gauge - 2 conductor - Sold by the foot
25	8438065	A.R.		CABLE .. 16 gauge - 3 conductor - Sold by the foot
26	3261563	1	-	GENERATOR .. Tachometer

8453169, P6734,
8477738, 9539363

ELECTRIC OPERATED ENGINE SHUTDOWN



Previous Application - Column A



Current Application - Column B
PLATE B33-6

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Junction Box and Cable Application
20-645E4 Engine - Model 999-20

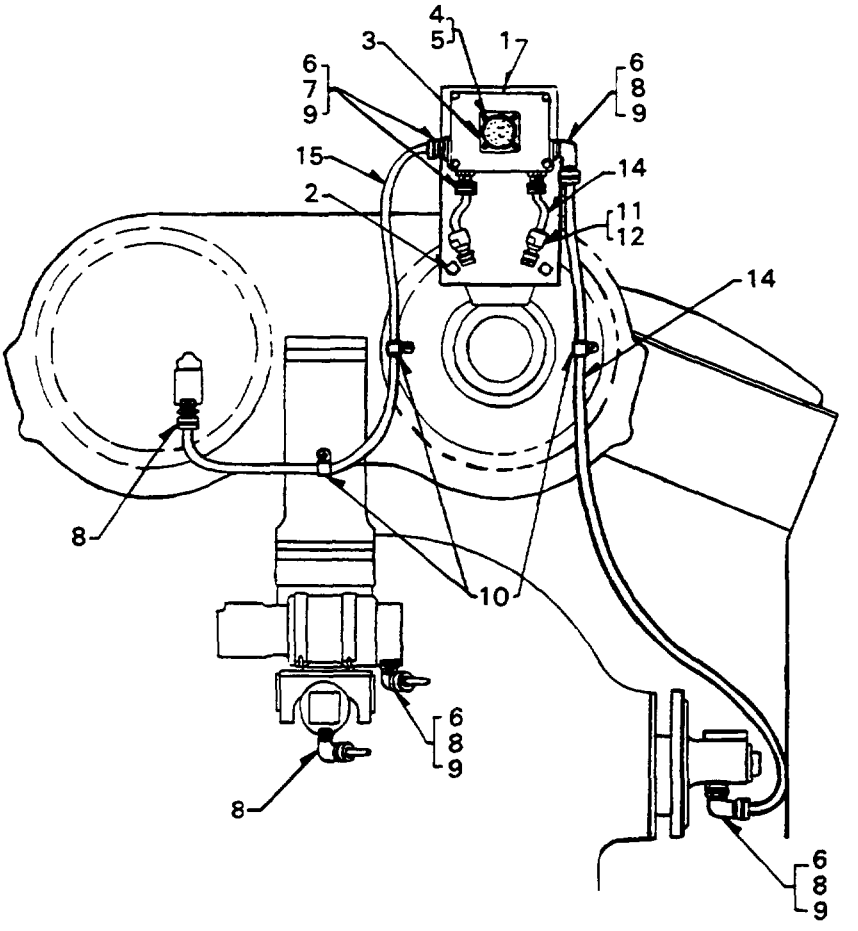


PLATE B33-7

Ref. No.	Part Number	Qty. Req.	Description
1	8411588	1	BOX .. Junction - Includes mounting plate
2	181374	2	BOLT .. Hex. head - 3/8 - 24 x 1-1/2
3	8342429	1	RECEPTACLE .. 19 pole - Female
4	132124	4	SCREW .. Slotted - No. 10 - 32 x 3/4
5	8035122	4	NUT .. Lock - No. 10 - 32 hex.
6	8038594	7	BUSHING .. Insulating - 1/2 N.P.T.
7	8086270	4	BUSHING .. Strain relief - 1/2 N.P.T.
8	8327965	5	BUSHING .. Strain relief - 90° - 1/2 N.P.T.
9	8038584	7	NUT .. Lock - 1/2
10	9553076	3	CLAMP .. Cable - Insulated - Formerly 8447902
11	8270133	2	PLUG .. Male - 2 pole
12	8175600	2	CLAMP .. Cable
*13	8165658	3	BLANK .. Snap-in (applied to unused junction box entries)
14	8475694	A.R.	CABLE .. 16 gauge - 2 conductor - 50 ft. length
15	8337787	A.R.	CABLE .. 16 gauge - 3 conductor - Sold by the foot

8412441

ELECTRIC OPERATED ENGINE SHUTDOWN
Booster Pump Mounting
12-645E1; 12,16,20-645E4; 8,12,16-645E6; 12,20-645E7 Engines

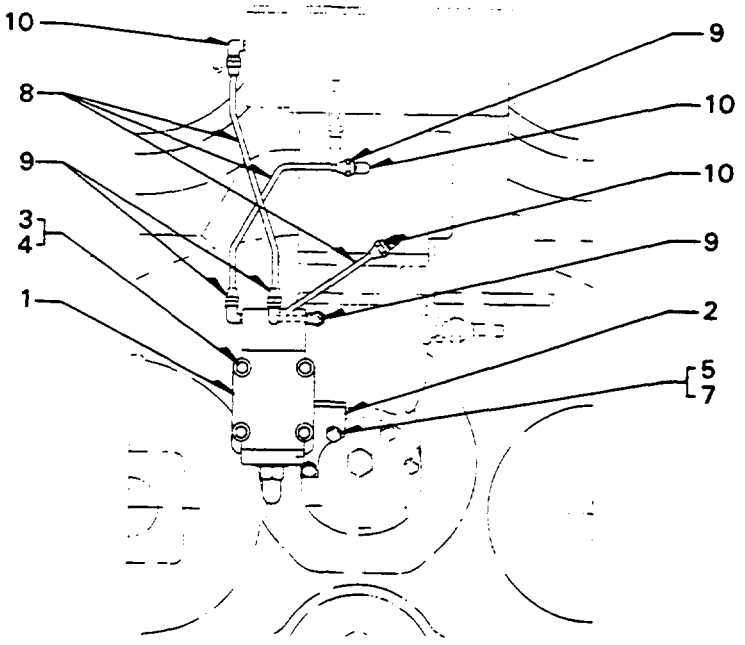


PLATE B33-8

Ref. No.	Part Number	Qty. Req.	Description
†1	8418945	1	PUMP ASSEMBLY .. Booster - No longer furnished - See Note
2	8419045	1	BRACKET .. Pump mounting
3	186271	4	BOLT .. Hex. head - 5/16 - 18 x 3-3/4 - Pump to bracket
4	8035131	4	NUT .. Lock - 5/16 - 18 hex.
5	179841	2	BOLT .. Hex. head - 3/8 - 16 x 1-1/4 - Bracket mounting
*6	6101225	2	WASHER .. Flat - 3/8 - Applied between bracket and drive housing
7	103321	2	WASHER .. Lock - 3/8 - Formerly 103319
8	8098593	A.R.	TUBING .. Copper brazed steel - 1/4 O.D. x .028 wall x 20 ft.
9	116452	A.R.	NUT .. Tube - 1/4
10	118753	A.R.	ELBOW .. 1/4 tube x 1/8 M.P.T.
*11	103877	A.R.	PLUG .. Pipe - 1/8

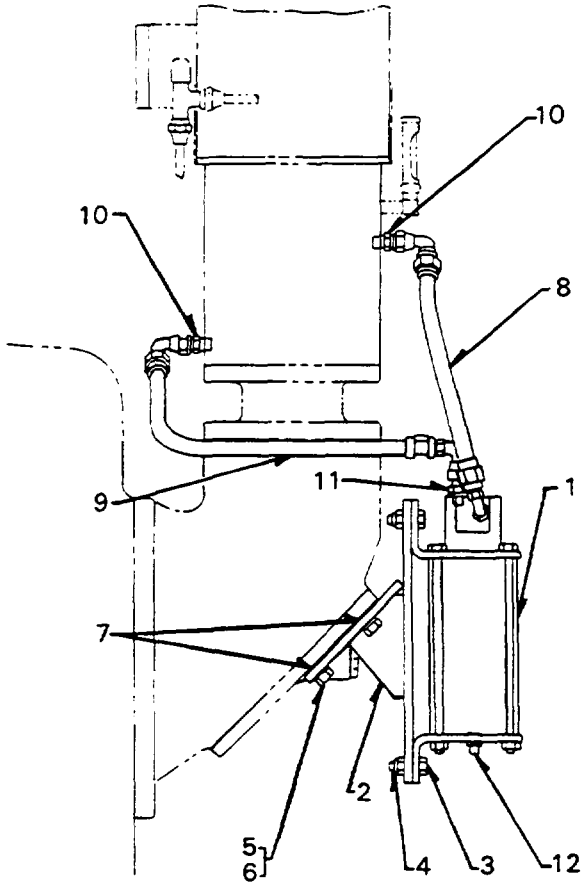
†Booster Pump, 8418945, is no longer available. If replacement is required, the new style Booster Pump, 9086388, can be ordered. Due to its different mounting arrangement, the components below must be ordered to accommodate the new style pump.

*12	9086388	1	PUMP ASM. .. Booster - See Pages 10 and 11
*13	9090198	1	PLATE .. Adapter - New style pump to old style bracket
*14	181336	4	BOLT .. Hex. head - 5/16 - 24 x 3/4 - Pump to adapter plate
*15	179820	4	BOLT .. Hex. head - 5/16 - 18 x 1-1/4 - Adapter plate to bracket
*16	8035131	4	NUT .. Lock - 5/16 - 18 hex.

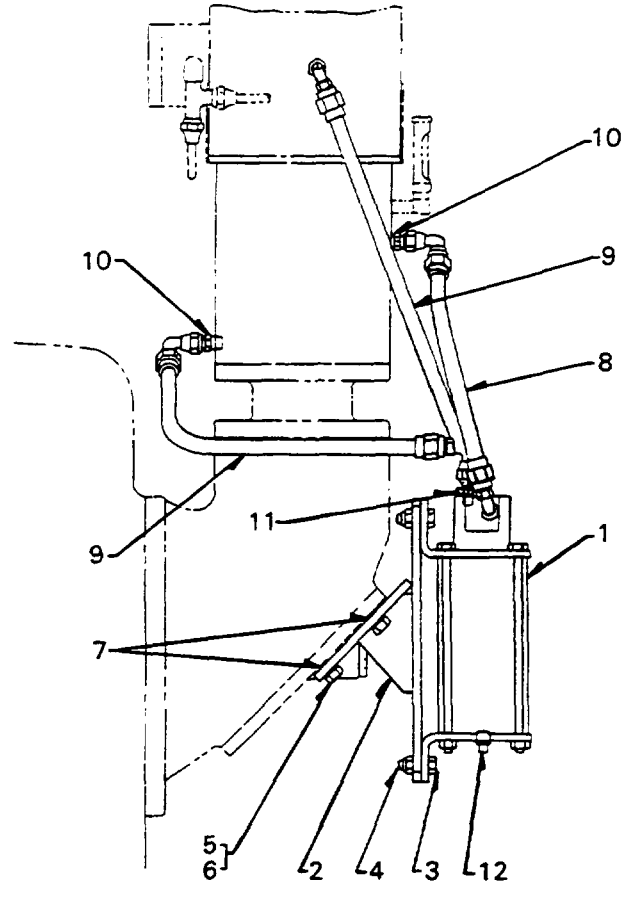
8418980, SR-77R

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Servo-Booster Pump Application
645E1,E4,E4B,E6,E7,E7B,E7C,E8,E9,E9B Engines



Application With EGB Governor



Application With PGA Governor

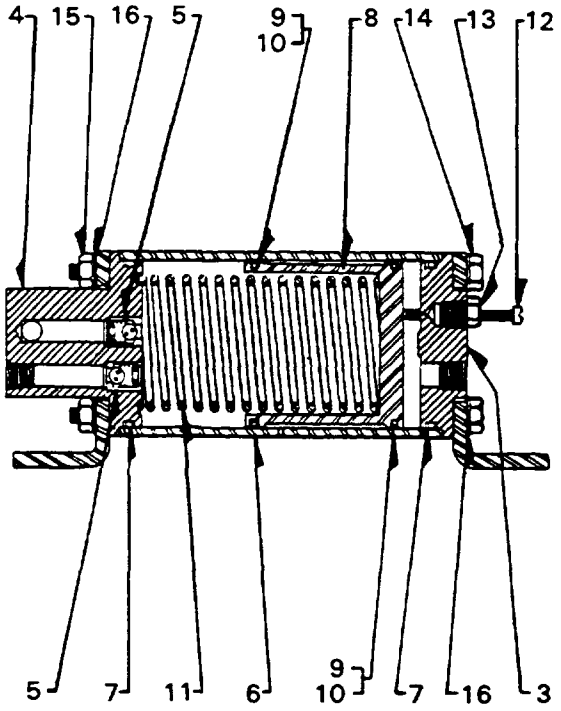
PLATE B33-9

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
		A	B	APPLICATION WITH EGB GOVERNOR APPLICATION WITH PGA GOVERNOR
1	9086388	1	1	PUMP ASM. .. Servo-booster - Replaces 8475841 - See Page 11
2	8476037	1	1	BRACKET .. Pump mounting
3	179818	4	4	BOLT .. Hex. head - 5/16 - 18 x 1 - Pump to bracket
4	8035131	4	4	NUT .. Lock - 5/16 - 18 hex.
5	179841	2	2	BOLT .. Hex. head - 3/8 - 16 x 1-1/4
6	103319	2	2	WASHER .. Lock - 3/8
7	6101225	2	2	WASHER .. Flat - 3/8
8	8476017	1	1	HOSE ASM. .. Pump - U.S.C.G. approved - Includes fittings - 12 in. long
9	8476010	1	2	HOSE ASM. .. Pump - U.S.C.G. approved - Includes fittings - 15-3/4 in. long
10	118748	3	5	CONNECTOR .. 1/4 tube x 1/8 P.T.
11	116436	1	1	CONNECTOR .. 1/4 tube x 1/4 P.T. - Formerly 118748
12	103877	2	1	PLUG .. Pipe - 1/8 P.T.

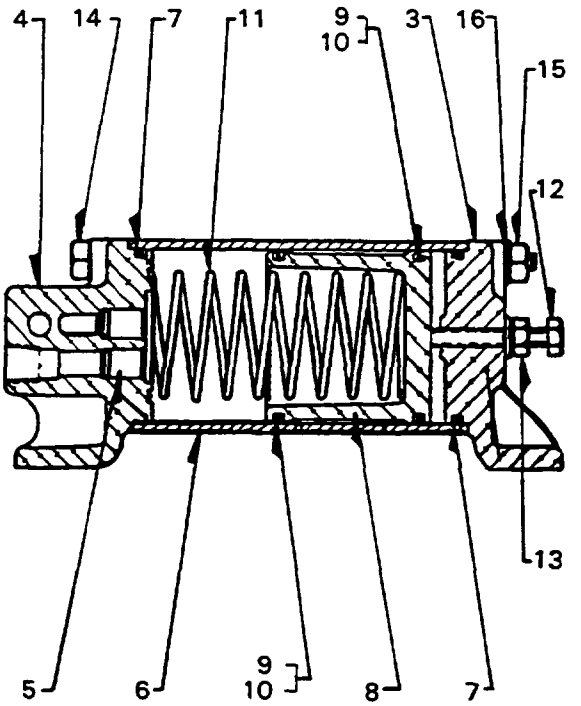
8475790, 8475791

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Servo-Booster Pump Assembly



Ref. No. 1



Ref. No. 2

PLATE B33-10

Ref. No.	Part Number	Qty. Req.		Description
1	8475841	1	-	PUMP ASM. .. Servo-booster - Replaced by 9086388
2	9086388	-	1	PUMP ASM. .. Servo-booster
3	8481739	1	-	CAP ASM. .. Pump
3		-	1	CAP ASM. .. Pump
4	8481740	1	-	HEAD ASM. .. Pump
4		-	1	HEAD ASM. .. Pump
5	8326398	3	-	VALVE .. Check
5	8326398	-	3	VALVE .. Check - Formerly included with head asm.
6	8481743	1	-	CYLINDER .. Power
6		-	1	CYLINDER .. Power
7	8444377	2	2	PACKING .. O-Ring - Cap and head to cylinder
8	8481744	1	-	PISTON .. Power
8		-	1	PISTON .. Power
9	8481745	2	2	RING .. Piston
10	8481741	2	-	PACKING .. Piston
10		-	2	PACKING .. Piston
11	8481742	1	-	SPRING .. Piston
11		-	1	SPRING .. Piston
12	132148	1	-	SCREW .. Stop - No. 10 - 32 x 1-3/4
12		-	1	SCREW .. Stop - 1/4 - 20
13	8075907	1	-	NUT .. Stop
13		-	1	NUT .. Stop
14	9434228	4	-	BOLT .. Hex. head - 5/16 - 24 x 6-3/4
14		-	4	BOLT .. Hex. head
15	120368	4	-	NUT .. Hex. - 5/16 - 24
15		-	4	NUT .. Hex.
16	115548	8	-	WASHER .. Lock - 5/16
16		-	4	WASHER .. Lock

P.L. No. B33

ELECTRIC OPERATED ENGINE SHUTDOWN
Single Motor-Driven Booster Pump Application
12,16-645E1; 12,16,20-645E4,E4B Engines

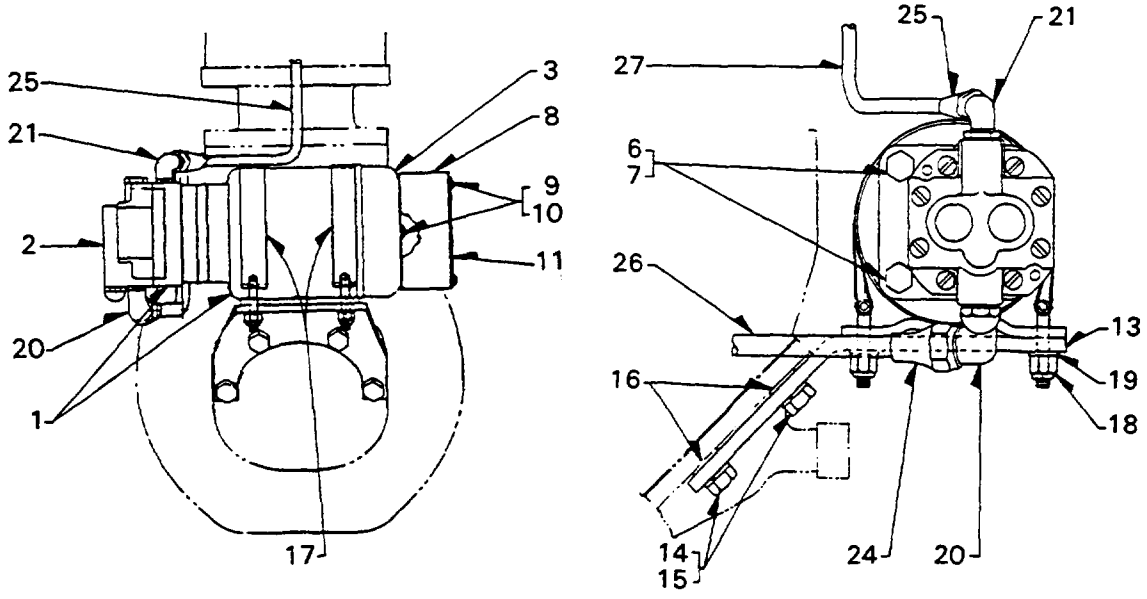
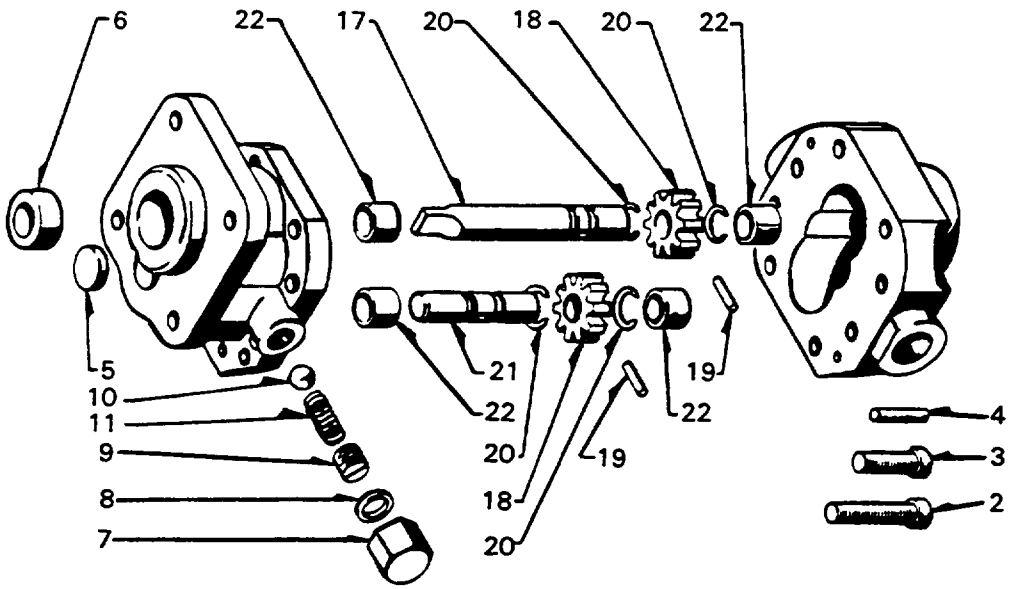


PLATE B33-11

Ref. No.	Part Number	Qty. Req.	Description
1	8280353	1	PUMP ASSEMBLY .. Booster - Motor driven
2	8286931	1	PUMP .. Booster - See Page 13
†3	8286934	1	MOTOR .. Pump - Not furnished - See Note
*4	8286932	1	COUPLING .. Motor to pump
*5	8286933	1	GASKET .. Motor to pump
6	180077	4	BOLT .. Hex. head 5/16 - 18 x 3/4 - Motor to pump
7	120214	4	WASHER .. Lock - 5/16
ϕ8	8281201	1	BOX .. Junction - With access hole on side
ϕ8	8409899	1	BOX .. Junction - With access hole on bottom
9	122159	6	SCREW .. Machine - No. 8 - 32 x 1/4 - Junction box mounting and cover
10	138530	6	WASHER .. Lock - No. 8
11	8281200	1	COVER .. Junction box
*12	9556646	1	NAMEPLATE .. Cover - "Motor Voltages . . ."
13	8280356	1	BRACKET .. Mounting
14	179841	4	BOLT .. Hex. head 3/8 - 16 x 1-1/4 - Mounting bracket
15	103319	4	WASHER .. Lock - 3/8
16	6101225	4	WASHER .. Flat - 3/8
17	8301769	2	STRAP .. Mounting - Pump to bracket - Includes T-bolts
18	8032715	4	NUT .. Lock - 1/4 - 28 hex.
19	103339	4	WASHER .. Plain - 1/4
20	118755	1	ELBOW .. 3/8 tube x 1/4 P.T. - Pump inlet port
21	116453	1	ELBOW .. 1/4 tube x 1/4 P.T. - Pump outlet port
*22	8040337	1	ELBOW .. 3/8 tube x 1/8 P.T. - Governor outlet port
*23	118753	1	ELBOW .. 1/4 tube x 1/8 P.T. - Governor inlet port
24	118539	2	NUT .. Tube - 3/8 - Flared fitting
25	118537	2	NUT .. Tube - 1/4 - Flared fitting
26	8098594	A.R.	TUBING .. Steel - Copper brazed - 3/8 O.D. x .028 wall x 20 ft.
27	8098593	A.R.	TUBING .. Steel - Copper brazed - 1/4 O.D. x .028 wall x 20 ft.

† Motor 8286934 and its components are not available. If replacement is required, an entire Pump Assembly, 8280353, must be ordered.

ELECTRIC OPERATED ENGINE SHUTDOWN
Booster Pump Assembly



Ref. No. 1
PLATE B33-12

Ref. No.	Part Number	Qty. Req.	Description
†1	8286931	1	PUMP ASSEMBLY .. Booster
2		4	SCREW .. 12 point - 1/4 - 20 x 1-3/8 - Housing to stator
3		4	SCREW .. 12 point - 1/4 - 20 x 1 - Housing to stator
4	9414289	2	PIN .. Dowel - Housing to stator alignment
5	172530	1	PLUG .. Expansion - 11/16
6	8286941	1	SEAL .. Oil
7		1	CAPNUT .. Hex. - 1/2 - 20
8	8286946	1	GASKET .. Copper - 1/2 I.D.
9	8286944	1	SCREW .. Adjusting - 1/2 - 20 x 9/16
10		1	BALL .. Pressure
11		1	SPRING .. Coil
*12	8286940	1	CAP .. Hex. - 9/16 - 18
*13		1	GASKET .. Copper - 5/8 I.D.
*14		1	BALL .. Pressure
*15		1	SPRING .. Coil - 1/2 in. free length
*16	8156967	1	SEAL .. O-Ring - 1/4 I.D. x 3/8 O.D.
†17	8286938	1	SHAFT .. Drive
†18		2	GEAR .. Idler and drive
19	8334753	2	PIN .. Drive
20	9415584	4	RING .. Snap - Gear
†21		1	SHAFT .. Idler
22	457176	4	BEARING .. Needle

† Pump 8286931 incurred a design change in September 1967. The internal rotating parts of the old style pump are not available; a current design pump - 8286931 - will have to be ordered if the previous design rotating parts need replacement.

LUBE OIL SYSTEM

Lube Oil Manifold Assembly
All 645 Engines

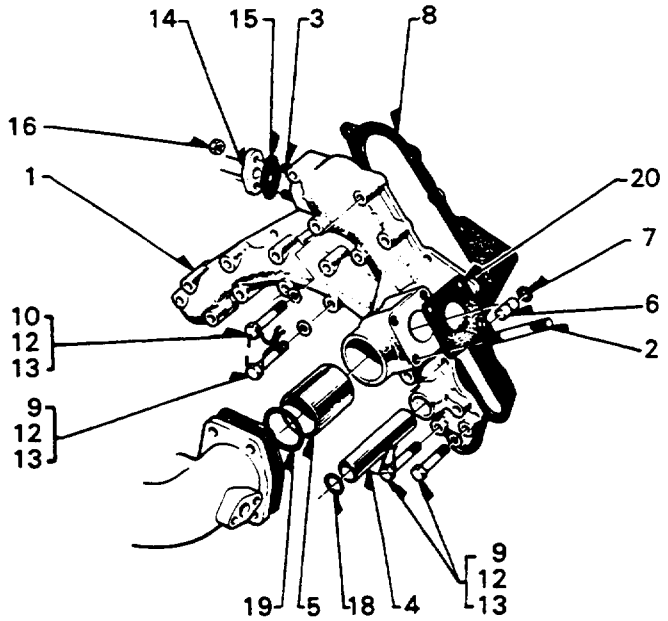
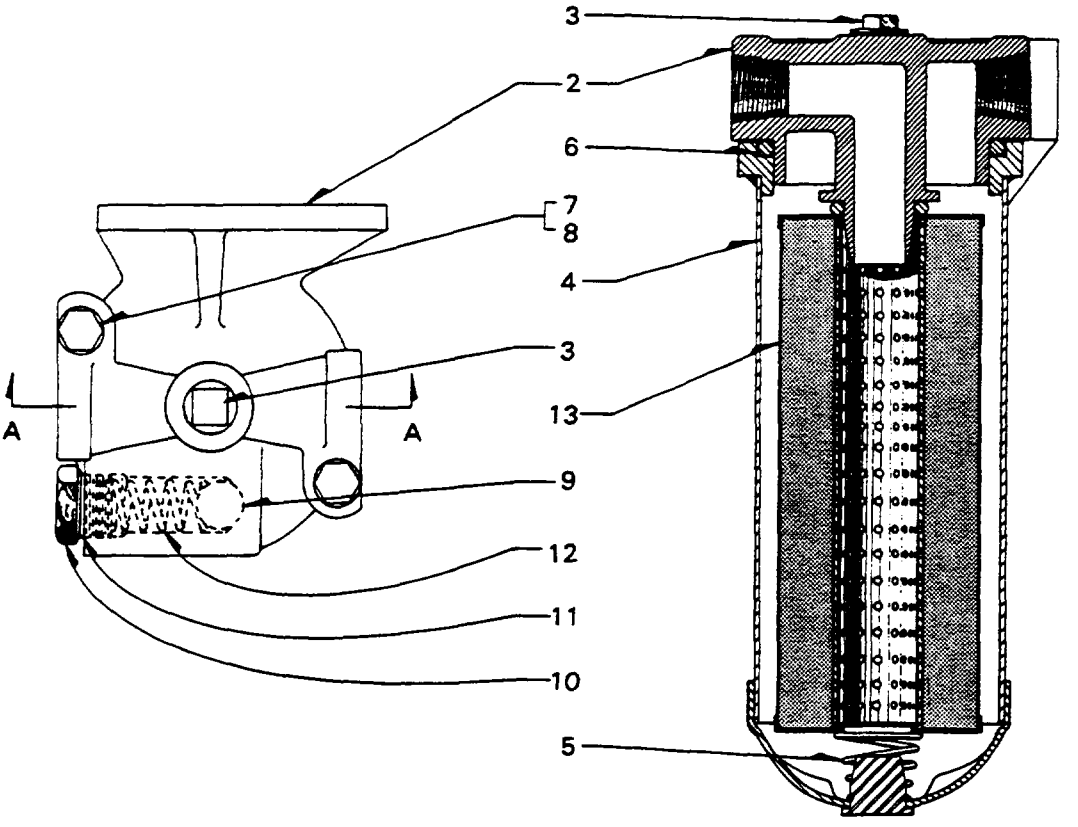


PLATE B34-1

Ref. No.	Part Number	Qty. Req.	Description
1	9573207	1	MANIFOLD ASSEMBLY .. Lube oil - Formerly 8160287
2	8028714	4	STUD .. Relief valve - 1/2 - 13 x 1/2 - 20 x 4-1/4 in. long 8123070 .. .002 O.S. 8126920 .. .015 O.S. 8126922 .. .019 O.S. 8123071 .. .004 O.S. 8126921 .. .017 O.S.
3	8029137	2	STUD .. Oil line - 3/8 - 16 x 3/8 - 24 x 1-3/4 in. long 8115306 .. .002 O.S. 8115308 .. .015 O.S. 8115310 .. .019 O.S. 8115307 .. .004 O.S. 8115309 .. .017 O.S.
4	8082557	1	TUBE .. Piston cooling oil - 1.740 O.D. x 6-3/4 in. long
5	8082558	1	TUBE .. Main bearing oil - 2.865 O.D. x 3-1/2 in. long
6	8085062	2	DOWEL .. Special - Manifold locating
7	8085063	2	RING .. Snap - Dowel
8	8167060	1	GASKET .. Manifold to crankcase
9	8088763	14	BOLT .. Hex. head - 1/2 - 20 x 2-1/4 drilled head
10	8088764	6	BOLT .. Hex. head - 1/2 - 20 x 3-1/4 drilled head
*11	8028329	3	BOLT .. Hex. head - 1/2 - 20 x 1-1/4 drilled head
12	6101229	23	WASHER .. Flat - 1/2
13	8116738	A.R.	WIRE .. Lock - 3/64 dia. x 500 ft.
14	8166331	1	LINE .. Oil - Manifold to governor drive gear stubshaft
15	8029165	2	GASKET .. Oil line
16	8032717	2	NUT .. Lock - 3/8 - 24 hex.
*17	8028312	2	BOLT .. Hex. head - 3/8 - 24 x 1 drilled - Oil line to stubshaft
18	8082586	1	SEAL .. O-Ring
19	8082587	1	SEAL .. O-Ring
20	8069445	1	GASKET .. Relief valve - See Page 18 for relief valve asm.

P.L. No. B34

LUBE OIL SYSTEM
Soak Back Filter Assembly - With Threaded Connection
12-645E5 and 16,20-645E4,E5 Engines

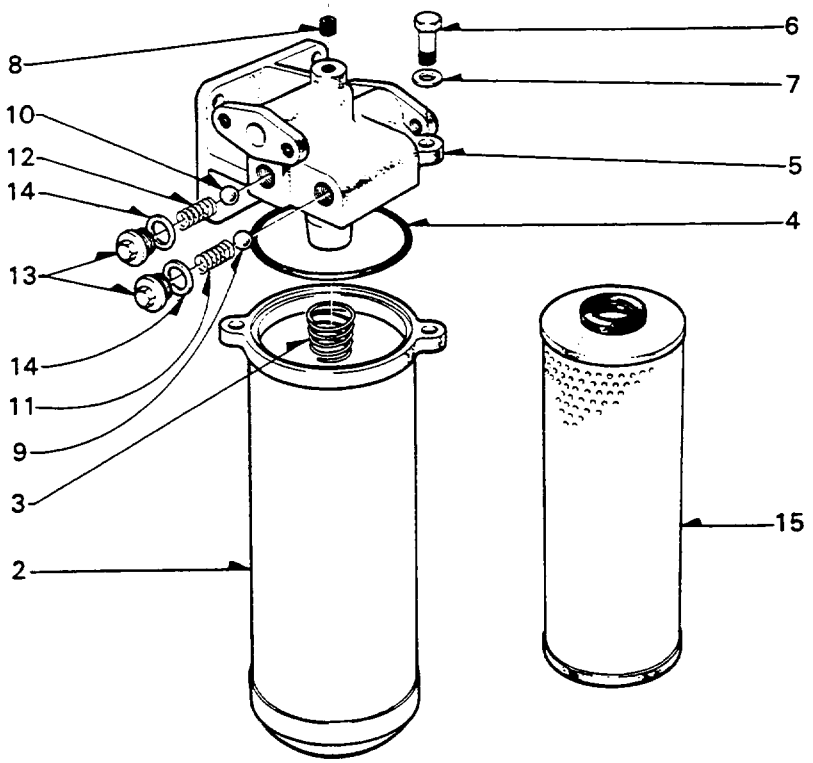


Section A-A

Ref. No. 1
PLATE B34-2

Ref. No.	Part Number	Qty. Req.		Description
1	8350459	1	-	FILTER ASSEMBLY .. Soak back - Replaces 8343379
*1	8343379	-	1	FILTER ASSEMBLY .. Soak back - Replaced by 8350459
2		1	-	COVER .. Filter
*2	8346496	-	1	COVER .. Filter
3	103879	1	-	PLUG .. Pipe - 3/8 M.P.T. - Square head
4	8343159	1	1	SHELL ASSEMBLY .. Filter
5	8408735	1	1	SPRING .. Compression
6	8343161	1	1	SEAL .. O-Ring - Cover to shell
7	179847	2	2	BOLT .. Cover to shell - 3/8 - 16 x 2 hex. head
8	446363	2	2	WASHER .. Plain - 3/8
9	104925	1	1	BALL .. 11/16 dia. - By-pass valve
10	8343162	1	1	PLUG .. By-pass valve
11	8411918	1	-	GASKET .. Plug to cover
*11	8343160	-	1	GASKET .. Plug to cover
12	8343677	1	1	SPRING .. By-pass valve
13	8340000	1	1	ELEMENT .. Filter - Pleated paper - 7-1/2 in. long

LUBE OIL SYSTEM
Soak Back Filter Assembly - With Flanged Connections
All 645 Turbocharged Engines



Ref. No. 1
PLATE B34-3

Ref. No.	Part Number	Quantity Required				Description
1	8408629	1	-	-	-	FILTER ASM. .. Soak back - Replaced by 9528661 - (8-645E5,E7,E7B engines)
1	8397431	-	1	-	-	FILTER ASM. .. Soak back - Replaced by 9528662
†1	9528661	-	-	1	-	FILTER ASM. .. Soak back - Replaces 8408629 - (8-645E5,E7,E7B engines)
1	9528662	-	-	-	1	FILTER ASM. .. Soak back - Applied to all 645 turbo engines after May, 1980
2	8343159	1	1	-	-	SHELL .. Filter
2		-	-	1	1	SHELL .. Filter
3	8408735	1	1	1	1	SPRING .. Element seating
4	8343161	1	1	1	1	SEAL .. O-Ring - Shell to cover
5	9086742	1	1	1	1	COVER .. Filter
6	179847	2	2	2	2	BOLT .. Hex. head - 3/8 - 16 x 2
7	446363	2	2	2	2	WASHER .. Plain - 3/8
8	103877	1	1	1	1	PLUG .. Pipe - 1/8
9	104925	1	1	1	1	BALL .. 11/16 dia. - By-pass valve
10	104922	1	1	-	-	BALL .. 1/2 dia. - By-pass valve
10	104924	-	-	1	1	BALL .. 5/8 dia. - By-pass valve
11		1	-	-	-	SPRING .. Valve
11	8343677	-	1	-	1	SPRING .. Valve
11		-	-	1	-	SPRING .. Valve
12		1	-	-	-	SPRING .. Valve
12	8494098	-	1	-	-	SPRING .. Valve
12		-	-	1	-	SPRING .. Valve
12	40007522	-	-	-	1	SPRING .. Valve
13	8343162	2	2	2	2	PLUG .. Hex. head - By-pass valve
14	8411918	2	2	2	2	GASKET .. Valve plug
15	8340000	1	1	1	1	ELEMENT .. Filter - Pleated paper - 7-1/2 in. long

† Soak back filter 9528661 is used only as replacement for 8408629 on 8-645E5,E7,E7B engines manufactured before May, 1980.

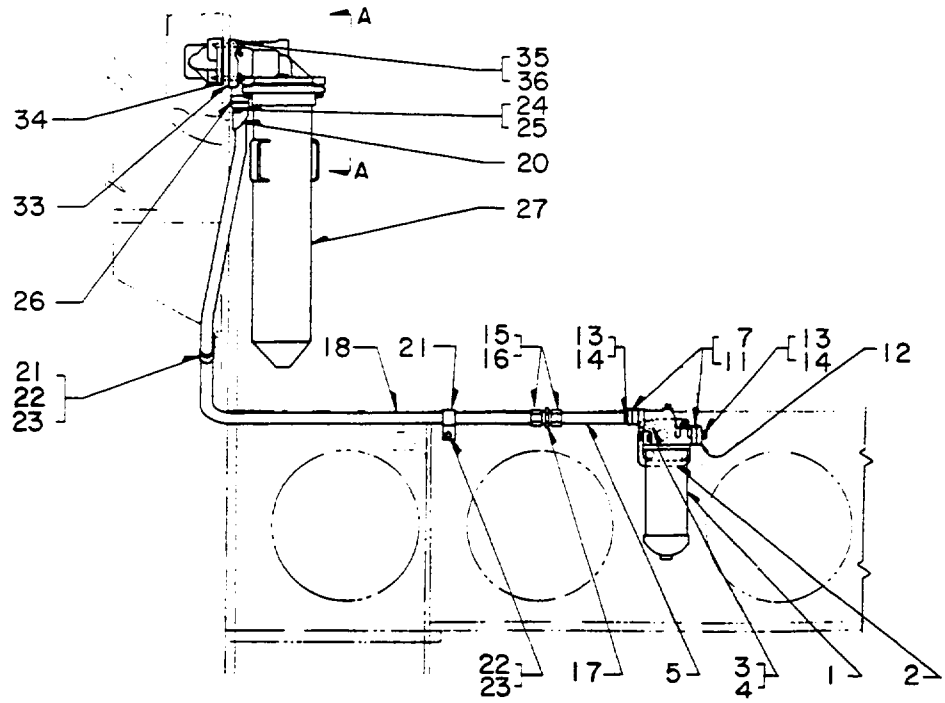
P.L. No. B34

LUBE OIL SYSTEM
Soak Back Lube Oil System - With Flanged Connections
8,12,16,20-645E5,E7,E7B,E7C Engines
PLATE B34-4

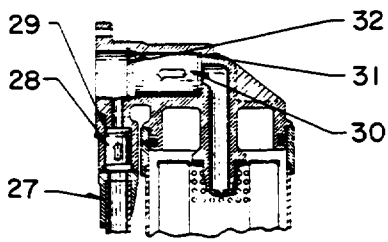
Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E5,E7,E7B,E7C engines
		-	B	-	-	12-645E5,E7,E7B,E7C engines
		-	-	C	-	16-645E5,E7,E7B,E7C engines
		-	-	-	D	20-645E5,E7,E7B,E7C engines
†1	9528661	1	-	-	-	FILTER ASSEMBLY .. Soak back - Replaces 8408629 } See Page 3
†1	9528662	1	1	1	1	FILTER ASSEMBLY .. Soak back - Replaces 8397431 } See Page 3
2	8390072	1	1	1	1	GASKET .. Filter mounting to oil pan
3	179839	4	4	4	4	BOLT .. Filter mounting - 3/8 - 16 x 1 hex. head
4	6101225	4	4	4	4	WASHER .. Plain - 3/8
5	8408535	1	-	-	-	TUBE ASSEMBLY }
5	8414252	-	1	-	-	TUBE ASSEMBLY } Soak back filter to union
5	8414426	-	-	1	-	TUBE ASSEMBLY }
5	8413747	-	-	-	1	TUBE ASSEMBLY }
*6	8133421	As Required				TUBING .. Steel - 1 in. O.D. x .083 wall thickness x 20 ft.
7	8408533	1	-	-	-	FLANGE .. Tube
7	8366346	-	1	1	1	FLANGE .. Tube
8	8342993	-	1	1	2	CLAMP .. Soak back filter to union tube mounting
9	179880	-	1	1	2	BOLT .. Clamp mounting - 1/2 - 13 x 7/8 hex. head
10	6101229	-	1	1	2	WASHER .. Plain - 1/2
11	8366345	2	2	2	2	GASKET .. Tube and flange to filter
12	8413761	1	1	1	1	FLANGE .. Soak back filter
13	179841	4	4	4	4	BOLT .. Tube flange to filter - 3/8 - 16 x 1-1/4 hex. head
14	6101225	4	4	4	4	WASHER .. Plain - 3/8
15	274228	2	2	2	2	FERRULE .. 1 in. tube
16	9410617	2	2	2	2	NUT .. 1 in. tube
17	9410406	1	1	1	1	UNION .. 1 in. tube
18	8366652	1	1	1	1	TUBE ASSEMBLY .. Union to turbocharger filter
*19	8133421	As Required				TUBING .. Steel - 1 in. O.D. x .083 wall thickness x 20 ft.
20	8366346	1	1	1	1	FLANGE .. Tube
21	8342993	2	2	2	2	CLAMP .. Turbocharger filter to union tube mounting
22	179880	1	1	1	1	BOLT .. Clamp mounting - 1/2 - 13 x 7/8 hex. head
22	179837	1	1	1	1	BOLT .. Clamp mounting - 3/8 - 16 x 3/4 hex. head
23	6101229	1	1	1	1	WASHER .. Plain - 1/2
23	6101225	1	1	1	1	WASHER .. Plain - 3/8
24	179841	2	2	2	2	BOLT .. Tube to turbocharger filter - 3/8 - 16 x 1-1/4 hex. head
25	6101225	2	2	2	2	WASHER .. Plain - 3/8
26	8366345	1	1	1	1	GASKET .. Tube flange to turbocharger filter mounting
27	8366743	1	1	1	1	FILTER ASSEMBLY .. Oil - Turbocharger - See Page 13
28	8366533	1	1	1	1	VALVE .. Check - Soak back filter
29	8366436	1	1	1	1	SEAL .. Soak back filter check valve
30	8366577	1	1	1	1	VALVE .. Check - Turbocharger filter
31	8280352	1	1	1	1	SEAL .. Turbocharger filter check valve
32	9413378	1	1	1	1	RING .. Retainer
33	8366424	1	1	1	1	GASKET .. Turbocharger filter mounting
34	8366331	1	1	1	1	GASKET .. Manifold to camshaft drive housing
35	8310841	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-3/8 in. long
35	8032717	4	4	4	4	NUT .. Lock - 3/8 - 24 hex.
36	6101225	4	4	4	4	WASHER .. Lock - 3/8
*37	8366379	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-7/8 in. long

† Soak back filter 9528661 is used only as a replacement for 8408629, on 8-645 E5, E7, E7 B engines manufactured before May, 1980. Soak back filter 9528662 has been applied to all 645 turbocharged engines since May, 1980.

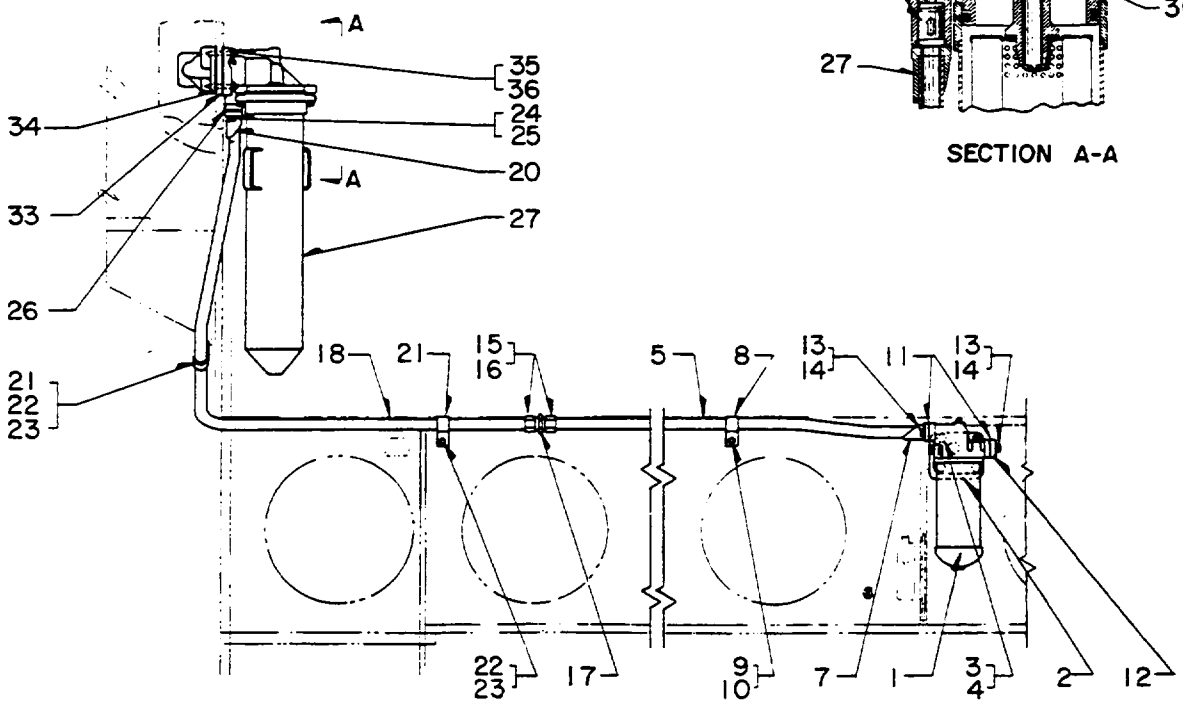
LUBE OIL SYSTEM



Column A



SECTION A-A



Columns B,C and D
PLATE B34-4

P.L. No. B34

LUBE OIL SYSTEM
Soak Back Lube Oil System - With Flanged Connections
8,12,16,20-645E4,E4B; 12,16,20-645E9,E9B; 16,20-645E10B Engines

PLATE B34-5

Ref. No.	Part Number	Qty. Req.	Description
1	9528662	1	FILTER ASSEMBLY .. Soak back - Replaces 8397431 - See Page 3
2	179839	4	BOLT .. 3/8 - 16 x 1 hex. head
3	6101225	4	WASHER .. Plain - 3/8
4	8133421	A.R.	TUBING .. Steel - 1 in. O.D. x .083 in. wall thickness - 20 ft. length
5	8366346	1	FLANGE .. 1 in. tube
6	8398611	1	ELBOW .. Flange - 8,12,16,20-645E4,E4B and 16,20-645E10B engines
*6	8366346	1	FLANGE .. 1 in. tube - 12,16,20-645E9,E9B engines
7	8390072	1	GASKET .. Filter to flange
8	179841	4	BOLT .. 3/8 - 16 x 1-1/4 hex. head
9	6101225	4	WASHER .. Plain - 3/8
10	8366345	2	GASKET .. Tube to filter
11	9410406	1	UNION .. 1 in. tube
12	274228	2	FERRULE .. 1 in. tube
13	9410617	2	NUT .. 1 in. tube
14	8342993	-	CLAMP .. Tube Quantity 2 required with 8 cylinder engine Quantity 3 required with 12 and 16 cylinder engines Quantity 4 required with 20 cylinder engine
15	179880	-	BOLT .. 1/2 - 13 x 7/8 hex. head Quantity 1 required with 8 cylinder engine Quantity 2 required with 12 and 16 cylinder engines Quantity 3 required with 20 cylinder engine
16	6101229	-	WASHER .. Plain - 1/2 Quantity 1 required with 8 cylinder engine Quantity 2 required with 12 and 16 cylinder engines Quantity 3 required with 20 cylinder engine
17	179837	1	BOLT .. 3/8 - 16 x 3/4 hex. head
18	6101225	1	WASHER .. Plain - 3/8
19	8366533	1	VALVE .. Check - Soack back filter
20	8366436	1	SEAL .. Check valve - Soak back filter
21	8366577	1	VALVE .. Check - Turbocharger filter
22	8280352	1	SEAL .. Check valve - Turbocharger filter
23	9413378	1	RING .. Retainer

FILTER ASSEMBLY .. Oil - Turbocharger

24	8366743	1	FILTER ASSEMBLY .. Oil - Turbocharger - See Page 13
25	8366424	1	GASKET .. Filter mounting
26	8366331	1	GASKET .. Manifold to camshaft drive housing
27	8032717	4	NUT .. Lock - 3/8 - 24 hex.
28	6101225	4	WASHER .. Plain - 3/8
29	8310841	2	STUD .. 3/8 - 16 - 24 x 2-3/8 in. long
30	8366379	2	STUD .. 3/8 - 16 - 24 x 2-7/8 in. long

NOTE: For those units with provisions for an immersion heater, See Page 8.

LUBE OIL SYSTEM

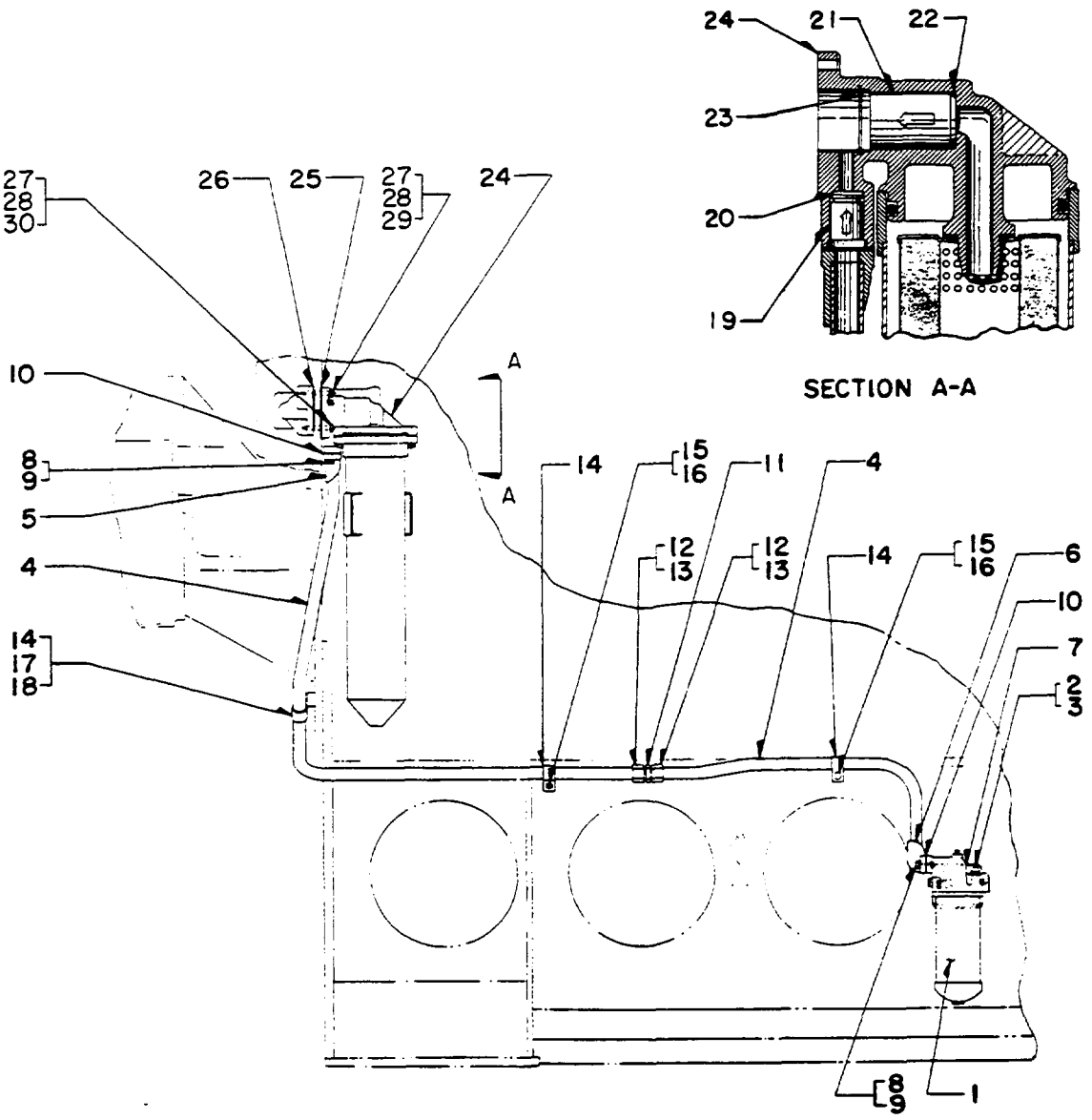


PLATE B34-5

P.L. No. B34

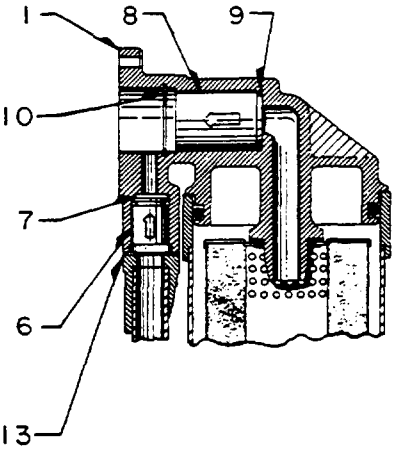
LUBE OIL SYSTEM
Soak Back Lube Oil System
For Units With Immersion Heaters
8,12,16,20-645E4,E4B; 12,16,20-645E9,E9B; 16,20-645E10B Engines

PLATE B34-6

Ref. No.	Part Number	Qty. Req.	Description
1	8366743	1	FILTER ASSEMBLY .. Oil - Turbocharger - See Page 13
2	8366424	1	GASKET .. Filter mounting
3	8366331	1	GASKET .. Manifold to camshaft drive housing
4	8032717	4	NUT .. Lock - 3/8 - 24 hex.
5	6101225	4	WASHER .. Plain - 3/8
6	8366533	1	VALVE .. Check - Soak back
7	8366436	1	SEAL .. Check valve
8	8366577	1	VALVE .. Check - Turbocharger filter
9	8280352	1	SEAL .. Check valve
10	9413378	1	RING .. Retainer
11	8133421	A.R.	TUBING .. Steel - 1 in. O.D. x .083 in. wall thickness - 20 ft. length
12	8366346	1	FLANGE .. 1 in. tube
13	8366345	1	GASKET .. Tube assembly to filter
14	179841	2	BOLT .. Flange to filter - 3/8 - 16 x 1-1/4 hex. head
15	6101225	2	WASHER .. Plain - 3/8
16	9410406	1	UNION .. 1 in. tube
17	274228	4	FERRULE .. 1 in. tube - Formerly 27428
18	9410617	4	NUT .. Tube - 1 in.
19	9410458	1	ELBOW .. Compression - 1 in. tube
20	8342993	-	CLAMP .. Tube Quantity 3 required with 8 cylinder engine Quantity 6 required with 12 and 16 cylinder engines Quantity 8 required with 20 cylinder engine
21	179880	-	BOLT .. 1/2 - 13 x 7/8 hex. head Quantity 2 required with 8 cylinder engine Quantity 5 required with 12 and 16 cylinder engines Quantity 7 required with 20 cylinder engine
22	6101229	-	WASHER .. Plain - 1/2 Quantity 2 required with 8 cylinder engine Quantity 5 required with 12 and 16 cylinder engines Quantity 7 required with 20 cylinder engine
23	179837	1	BOLT... 3/8 - 16 x 3/4 hex. head
24	6101225	1	WASHER .. Plain - 3/8
25	8399163	1	FLANGE .. Blind - 4 x 3-5/8 in. - 4 holes
26	8390072	1	GASKET .. Blind flange
27	179839	4	BOLT .. Flange mounting - 3/8 - 16 x 1 hex. head
28	6101225	4	WASHER .. Plain - 3/8

8471287, 8447104, 8480484, 8452148, 8480481,
8480482, 8480483

LUBE OIL SYSTEM



SECTION A-A

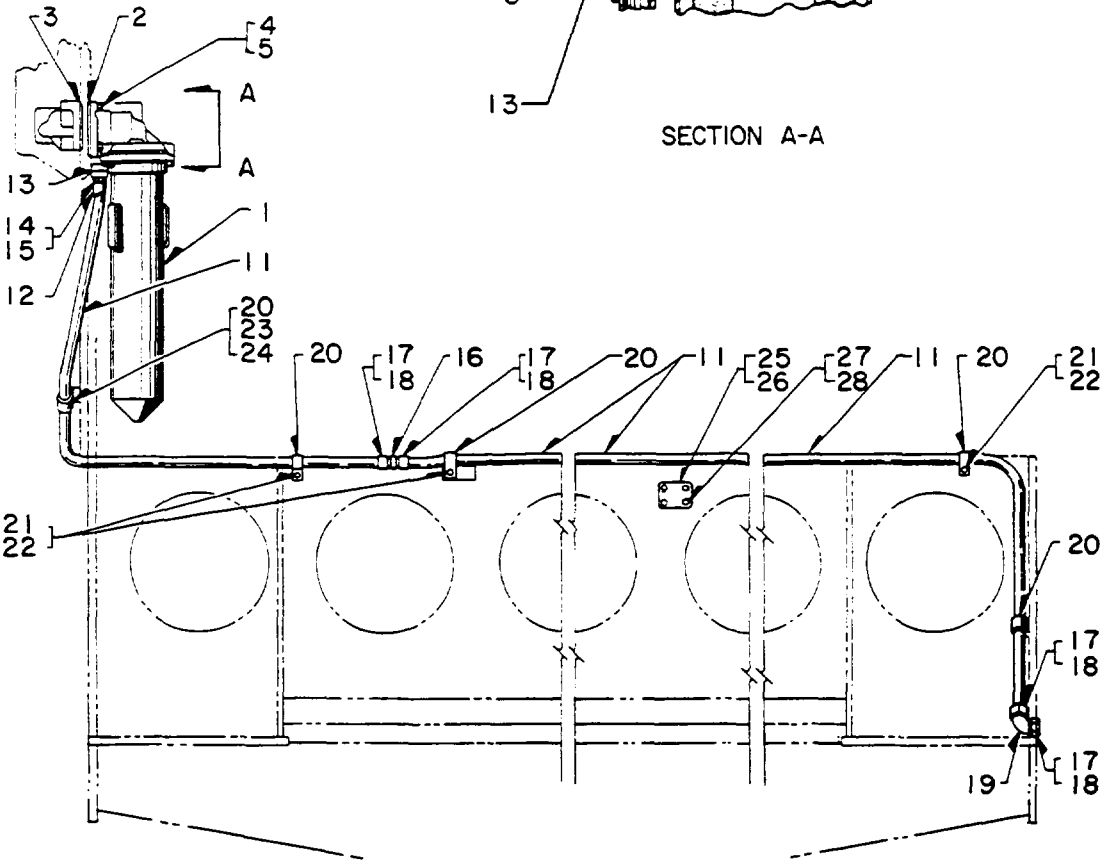


PLATE B34-6

P.L. No. B34

LUBE OIL SYSTEM
Soak Back Lube Oil System - With Threaded Connections
12,16,20-645E5 and 16,20-645E4 Engines

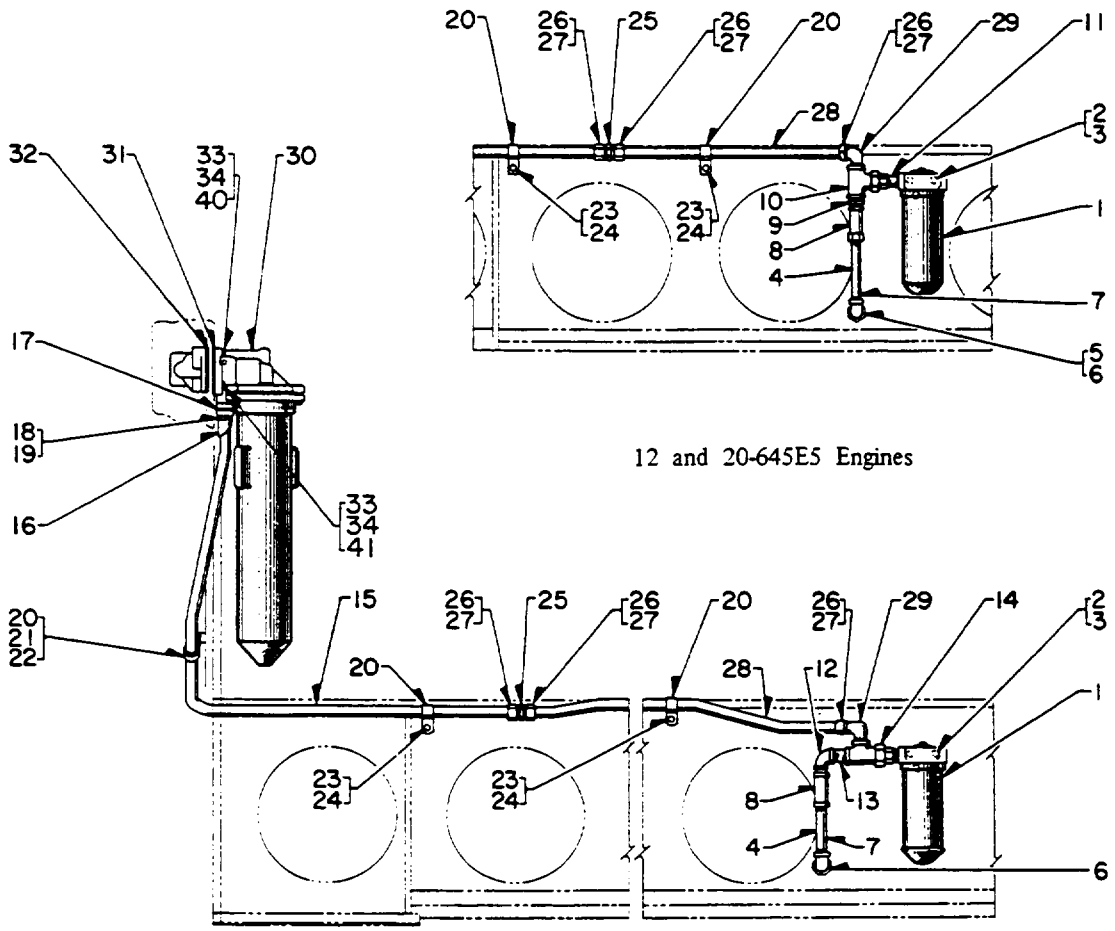
PLATES B34-7 and B34-8

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	12-645E5 engine
		-	B	-	-	-	-	-	16-645E5 engine
		-	-	C	-	-	-	-	20-645E5 engine
		-	-	-	D	-	-	-	16-645E4 engine - Except model MP36
		-	-	-	-	E	-	-	20-645E4 engine - Except models MP45 & 999-20
		-	-	-	-	-	F	-	16-645E4 engine - Model MP36
		-	-	-	-	-	-	G	20-645E4 engine - Models MP45 & 999-20
†1	8350459	1	1	1	1	1	-	-	FILTER ASSEMBLY .. Soak back - Replaces 8343379 - See Page 2
2	179838	3	3	3	3	3	-	-	BOLT .. Filter mounting - 3/8 - 16 x 7/8 hex. head
3	103321	3	3	3	3	3	-	-	WASHER .. Lock - 3/8
4	8368287	1	-	-	-	-	-	-	PIPE ASSEMBLY }
4	8345176	-	1	-	-	-	-	-	PIPE ASSEMBLY } Filter to sump
4	8375922	-	-	1	-	-	-	-	PIPE ASSEMBLY }
4	8342999	-	-	-	1	1	-	-	PIPE ASSEMBLY }
5	8060973	1	-	1	-	-	-	-	NIPPLE .. Short pipe - 1/2 M.P.T.
6	8044168	1	-	1	-	-	-	-	ELBOW .. Union - 1/2 F.P.T. x 1/2 F.P.T. x 90°
6	8052082	-	1	-	1	1	-	-	ELBOW .. Union - 1/2 F.P.T. x 1/2 M.P.T. x 90°
7	190716	1	-	1	-	-	-	-	NIPPLE .. Pipe - 1/2 M.P.T. x 6 in. long
7	8125667	-	1	-	-	-	-	-	NIPPLE .. Pipe - 1/2 M.P.T. x 5 in. long
7	8060973	-	-	-	1	1	-	-	NIPPLE .. Pipe - 1/2 M.P.T. x 1-1/2 in. long
8	8366704	1	1	1	1	1	-	-	VALVE .. Check - 50 P.S.I. - 1/2 M.P.T. inlet x 1/2 F.P.T. outlet
9	144034	1	-	1	-	-	-	-	BUSHING .. Pipe reducing - 3/4 M.P.T. x 1/2 F.P.T.
10	8049352	1	-	1	-	-	-	-	TEE .. Union pipe - 3/4 F.P.T.
11	8060974	1	-	-	-	-	-	-	NIPPLE .. Short pipe - 3/4 M.P.T.
12	192651	-	1	-	1	1	-	-	ELBOW .. Pipe reducing - 3/4 F.P.T. x 1/2 F.P.T.
13	8060974	-	1	-	1	1	-	-	NIPPLE .. Pipe - 3/4 M.P.T. x 2 in. long
14	8044936	-	1	-	1	1	-	-	TEE .. Union - 3/4 F.P.T. x 3/4 M.P.T. x 3/4 M.P.T.
*14	8113319	-	-	1	-	-	-	-	NIPPLE .. Pipe - 3/4 M.P.T. x 3 in. long
15	8366652	1	1	1	1	1	1	1	TUBE ASSEMBLY .. Union to turbocharger filter
*15	8133421	As Required							TUBING .. Steel - 1 in. O.D. x .083 in. wall thickness x 20 ft.
16	8366346	1	1	1	1	1	1	1	FLANGE .. Tube
17	8366345	1	1	1	1	1	1	1	GASKET .. Tube to filter
18	179841	2	2	2	2	2	2	2	BOLT .. Flange to filter - 3/8 - 16 x 1-1/4 hex. head
19	6101225	2	2	2	2	2	2	2	WASHER .. Plain - 3/8
20	8342993	3	3	4	3	4	7	8	CLAMP .. Tube mounting
21	179837	1	1	1	1	1	1	1	BOLT .. Clamp mounting - 3/8 - 16 x 3/4 hex. head
22	6101225	1	1	1	1	1	1	1	WASHER .. Plain - 3/8 - Formerly 103321
23	179880	2	2	3	2	3	6	7	BOLT .. Clamp mounting - 1/2 - 13 x 7/8 hex. head
24	6101229	2	2	3	2	3	6	7	WASHER .. Plain - 1/2 - Formerly 103323
25	9410406	1	1	1	1	1	1	1	UNION .. Tube - 1 in.
26	9410617	3	3	3	3	3	4	4	NUT .. Tube - 1 in.
27	274228	3	3	3	3	3	4	4	FERRULE .. 1 in. tube
28	8368286	1	-	-	-	-	-	-	TUBE }
28	8366729	-	1	-	-	-	-	-	TUBE }
28	8375921	-	-	1	-	-	-	-	TUBE } Union to soak back filter
28	8366728	-	-	-	1	-	-	-	TUBE }
28	8366730	-	-	-	-	1	-	-	TUBE }
28	8367596	-	-	-	-	-	1	-	TUBE } Soak back line from union
28	8366651	-	-	-	-	-	-	1	TUBE }
29	9422423	1	1	1	-	-	-	-	ELBOW .. 3/4 M.P.T. x 1 in. tube
29	9422178	-	-	-	1	1	-	-	CONNECTOR .. 1 in. tube x 3/4 M.P.T.
29	9410458	-	-	-	-	-	1	1	ELBOW .. Compression - 1 in. tube
30	8366743	1	1	1	1	1	1	1	FILTER ASSEMBLY .. Oil - Turbocharger - See Page 13
31	8366424	1	1	1	1	1	1	1	GASKET .. Filter mounting
32	8366331	1	1	1	1	1	1	1	GASLET .. Manifold to camshaft drive housing

† Refer to Parts List 745, Cat. 321 for soak back filter applicable to models MP36 and MP45.

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	12-645 engine
		-	B	-	-	-	-	-	16-645E5 engine
		-	-	C	-	-	-	-	20-645E5 engine
		-	-	-	D	-	-	-	16-645E4 engine - Except model MP36
		-	-	-	-	E	-	-	20-645E4 engine - Except models MP45 & 999-20
		-	-	-	-	-	F	-	16-645E4 engine - Model MP36
		-	-	-	-	-	-	G	20-645E4 engine - Models MP45 & 999-20
33	8032717	4	4	4	4	4	4	4	NUT .. Lock - 3/8 - 24 hex.
34	6101225	4	4	4	4	4	4	4	WASHER .. Plain - 3/8
35	8366577	1	1	1	1	1	1	1	VALVE .. Check - Turbocharger filter
36	8280352	1	1	1	1	1	1	1	SEAL .. Check valve
37	9413378	1	1	1	1	1	1	1	RING .. Retainer
38	8366533	1	1	1	1	1	1	1	VALVE .. Check - Soak back filter
39	8366436	1	1	1	1	1	1	1	SEAL .. Check valve
40	8310841	2	2	2	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-3/8 in. long
41	8366379	2	2	2	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-7/8 in. long



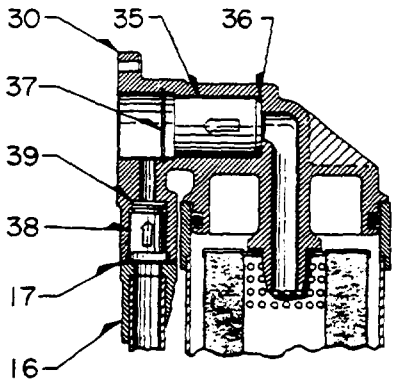
12 and 20-645E5 Engines

16-645E5 Engines

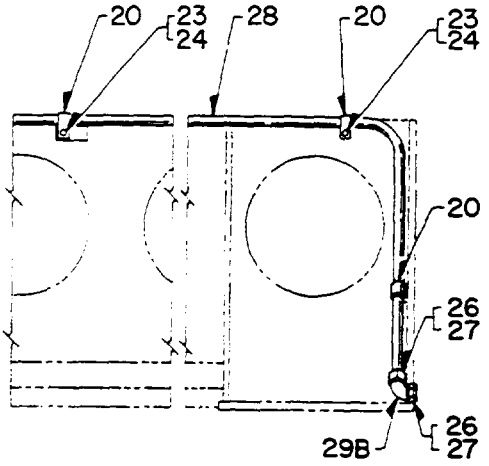
PLATE B34-7

P.L. No. B34

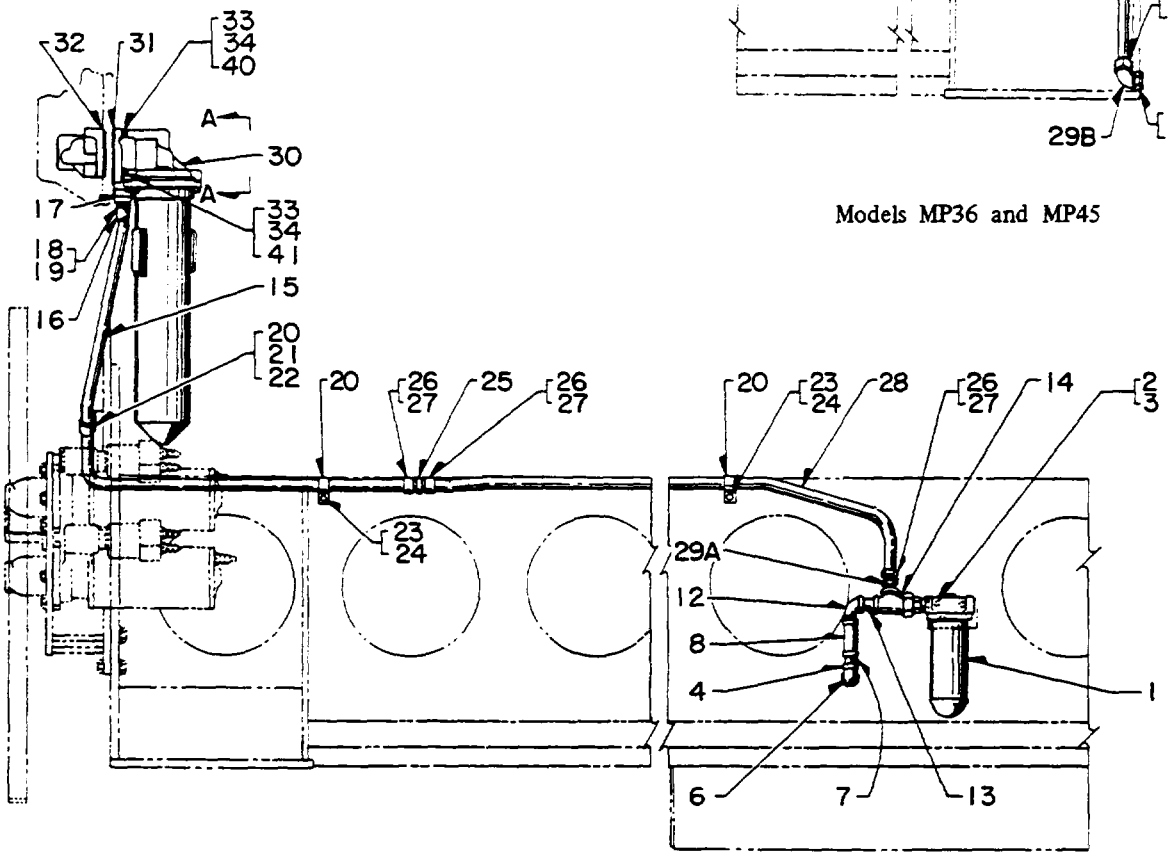
LUBE OIL SYSTEM



SECTION A-A



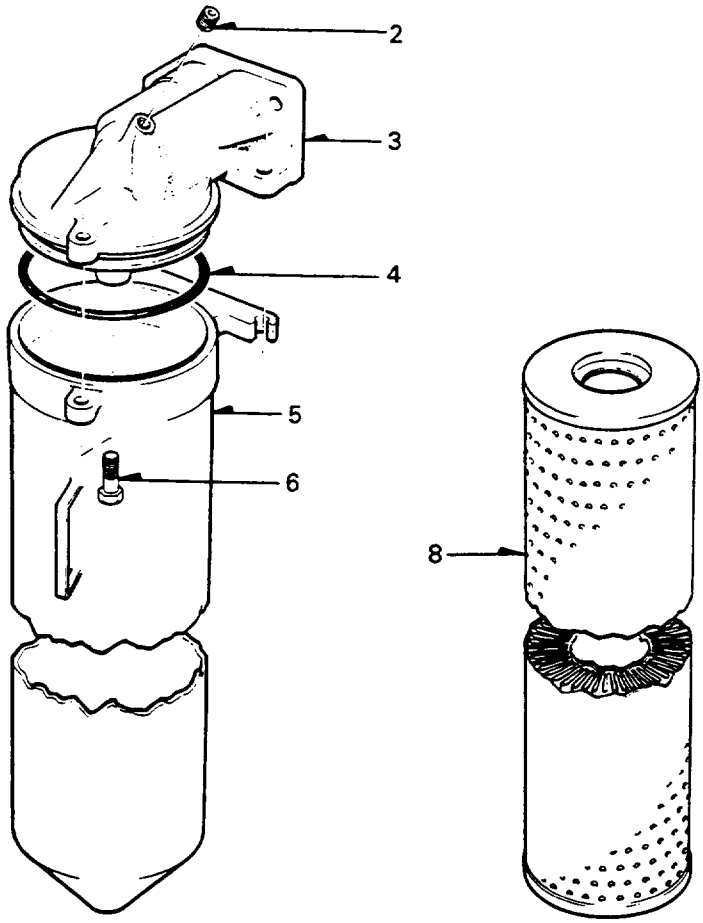
Models MP36 and MP45



16 and 20-645E4 Engines

PLATE B34-8

LUBE OIL SYSTEM
Turbocharger Lube Oil Filter
All 645 Turbocharged Engines



Ref. No. 1
PLATE B34-9

Ref. No.	Part Number	Qty. Req.	Description
1	8366743	1	FILTER ASSEMBLY .. Lube oil - Turbocharger
2	8348617	1	PLUG .. Pipe - 1/8 M.P.T. - Formerly 103877
3	8366231	1	COVER .. Filter
4	8288955	1	SEAL .. O-Ring
5	8327347	1	SHELL .. Filter
6	8350942	2	BOLT .. Hex. head - 7/16 - 14 x 2-1/4
*7	103342	2	WASHER .. Plain - 7/16
8	8322064	1	ELEMENT .. Filter

P.L. No. B34

LUBE OIL SYSTEM
Piston Cooling, Camshaft Stubshaft, Rocker Arm
Lubricating Oil Lines and Turbocharger Filter
All 645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B Engines

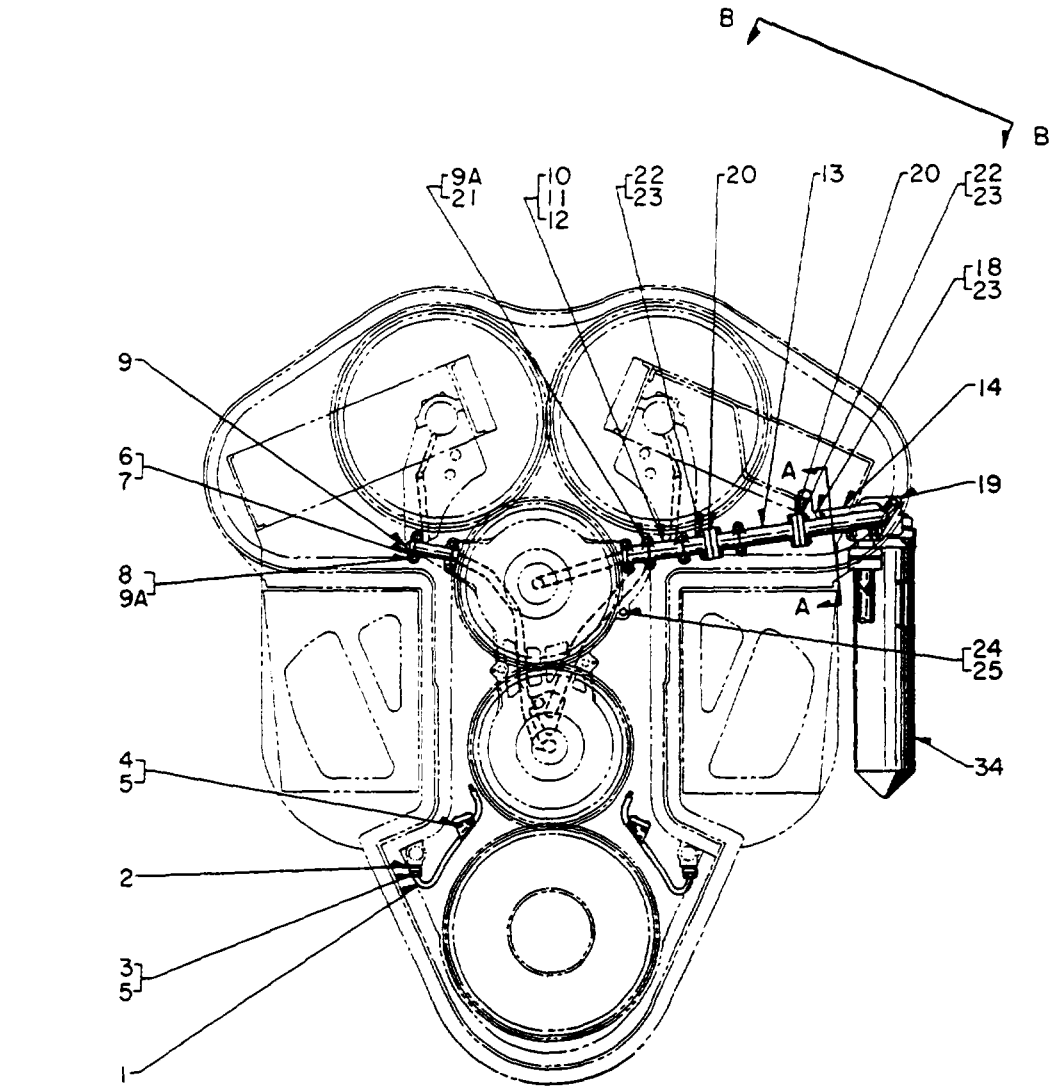
PLATE B34-10

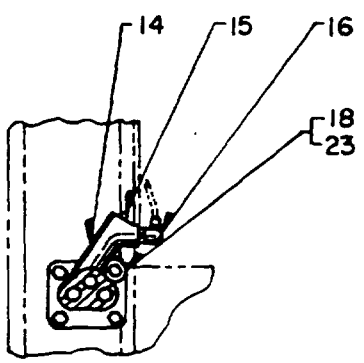
Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E4,E4B,E5,E7,E7B,E7C engines
		-	B	-	-	12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B engines
		-	-	C	-	16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B, engines
		-	-	-	D	20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
1	9549578	8	12	16	20	TUBE .. Oil - Piston cooling - Replaces 8453422 and 8405427
2	8025988	8	12	16	20	GASKET .. Tube to manifold
3	181339	16	24	32	40	BOLT .. Flange to manifold - 5/16 - 24 x 1 hex. hd. - Formerly 181338
4	179819	16	24	32	40	BOLT .. Tube to liner - 5/16 - 18 x 1-1/8 hex. head
5	103320	32	48	64	80	WASHER .. Lock - 5/16
6	8117605	1	1	1	1	OIL LINE .. Stubshaft - Left bank
7	8081594	2	2	2	2	GASKET .. Oil line mounting
8	8167141	4	4	4	4	BOLT .. Oil line mounting - 3/8 - 24 x 1-5/8 hex. head
9	103878	1	1	1	1	PLUG .. Pipe - 1/4 M.P.T. - Square head
9A	8116738	As Required				WIRE .. Lock - 3/64 dia. - Available 500 ft. length
10	8288093	1	1	1	1	MANIFOLD .. Oil line - End - Right bank
11	8288139	1	1	1	1	GASKET .. Manifold mounting
12	8081594	1	1	1	1	GASKET .. Manifold mounting - Replaces 8288231
13	8288094	1	1	1	1	MANIFOLD .. Oil line - Center - Right bank
14	8366329	1	1	1	1	MANIFOLD ASM. .. Adapter - From center manifold to filter
15	103878	1	1	1	1	PLUG .. Pipe - 1/4 M.P.T.
16	116453	1	1	1	1	ELBOW .. 90° - 1/4 tube x 1/4 M.P.T.
*17	8310841	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-3/8 in. long
*17A	8366379	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2-7/8 in. long
18	181384	1	1	1	1	BOLT .. Manifold to manifold - 3/8 - 24 x 2-3/4 hex. head
19	8366331	1	1	1	1	GASKET .. Manifold to camshaft drive housing
20	8366330	2	2	2	2	GASKET .. Manifold - Used between sections
21	8288257	8	8	8	8	BOLT .. Manifold mounting - 3/8 - 24 x 3-1/2 drilled hex. head
22	181376	7	7	7	7	BOLT .. Manifold to manifold - 3/8 - 24 x 1-5/8 hex. head
23	8032717	8	8	8	8	NUT .. Lock - 3/8 - 24 hex.
24	8288784	1	1	1	1	BOLT .. 3/8 - 24 x 1-1/8 drilled hex. head
25	6101225	1	1	1	1	WASHER .. Plain - 3/8
*26	8159199	2	2	2	2	FLANGE .. Manifold - Piston cooling
*27	8159200	2	2	2	2	GASKET .. Flange mounting
*28	8028314	4	4	4	4	BOLT .. Flange mounting - 3/8 - 24 x 7/8 drilled hex. head
29	8039842	8	12	16	20	LINE .. Oil rocker arm
30	8029167	16	24	32	40	GASKET .. Oil line to camshaft block
31	181311	16	24	32	40	BOLT .. Oil line to rocker arm shaft - 1/4 - 28 x 5/8 hex. head
32	179795	16	24	32	40	BOLT .. Oil line to camshaft bearing - 1/4 - 20 x 3/4 hex. head
33	103319	32	48	64	80	WASHER .. Lock - 1/4

FILTER ASSEMBLY .. Oil - Turbocharger

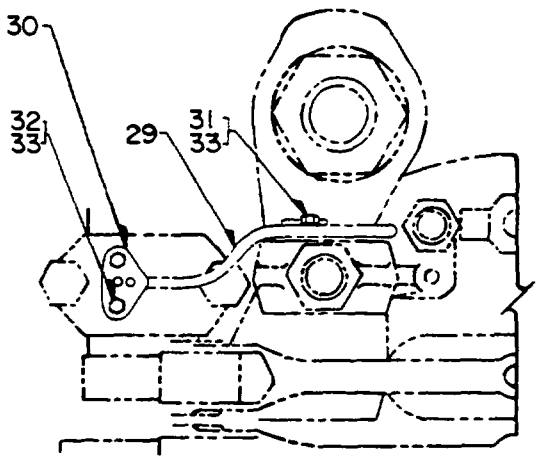
34	8366743	1	1	1	1	FILTER ASSEMBLY .. Oil - Turbocharger - See Page 13

LUBE OIL SYSTEM





Section A-A

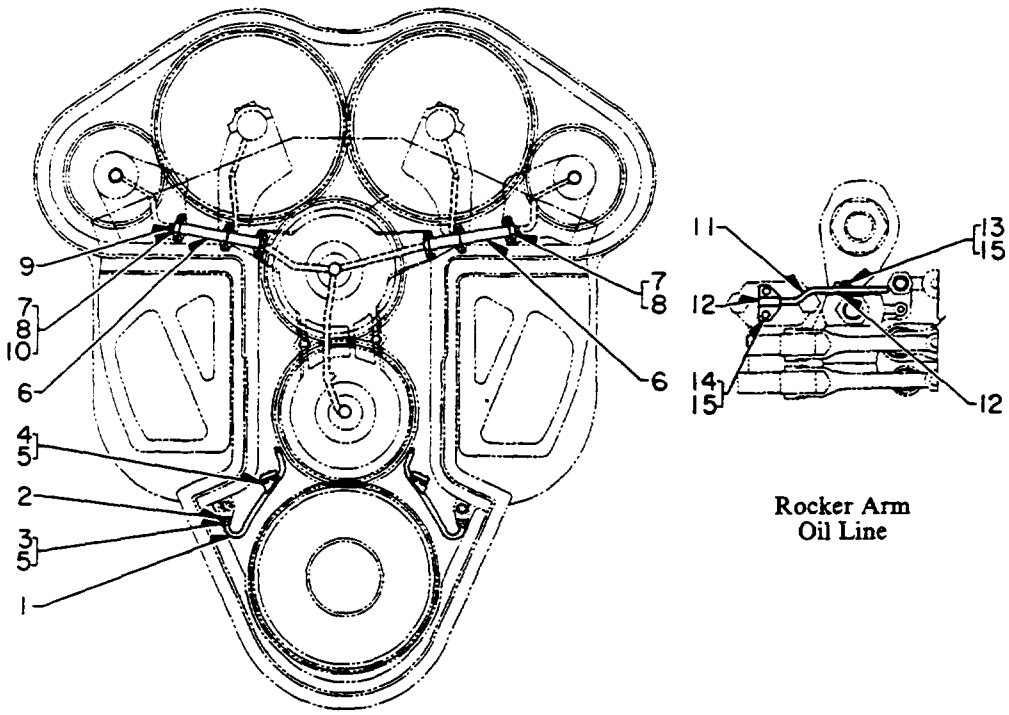


View B-B

PLATE B34-10

P.L. No. B34

LUBE OIL SYSTEM
Piston Cooling, Camshaft Stubshaft and Rocker Arm
Lubricating Oil Lines
All 645E1,E2,E6,E8 Engines



Rocker Arm
Oil Line

PLATE B34-11

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	12-645E1,E2,E6,E8 engines
		-	-	C	16-645E1,E2,E6,E8 engines
1	9549578	8	12	16	TUBE .. Oil - Piston cooling - Replaces 8453422 and 8405427
2	8025988	8	12	16	GASKET .. Tube to manifold
3	181339	16	24	32	BOLT .. Flange to manifold - 5/16 - 24 x 1 hex. hd. - Formerly 181338
4	179819	16	24	32	BOLT .. Tube to liner - 5/16 - 18 x 1-1/8 hex. head
5	103320	32	48	64	WASHER .. Lock - 5/16
6	8081503	1	2	2	LINE .. Oil - Camshaft stubshaft - 8 cylinder - Right bank, 12,16 cylinder - Right and left bank
6	8117605	1	-	-	LINE .. Oil - Camshaft stubshaft - Left bank
7	8081594	5	6	6	GASKET .. Oil line mounting
8	8167141	10	12	12	BOLT .. Oil line mtg. - 3/8 - 24 x 1-5/8 hex. hd. drilled
9	103878	2	2	2	PLUG .. Pipe - 1/4 M.P.T. - Square head
10	8116738	As Required			WIRE .. Lock - 3/64 dia. - Avail. 500 ft. length
11	8039842	8	12	16	LINE .. Oil - Rocker arm
12	8029167	16	24	32	GASKET .. Oil line to camshaft block
13	181311	16	24	32	BOLT .. Oil line to rocker arm shaft - 1/4 - 28 x 5/8 hex. head
14	179795	16	24	32	BOLT .. Oil line to camshaft brg. block - 1/4 - 20 x 3/4 hex. head
15	103319	32	48	64	WASHER .. Lock - 1/4

LUBE OIL SYSTEM
Rear End Lines Mounting and Piping
All 645E1,E2,E6,E8 Engines

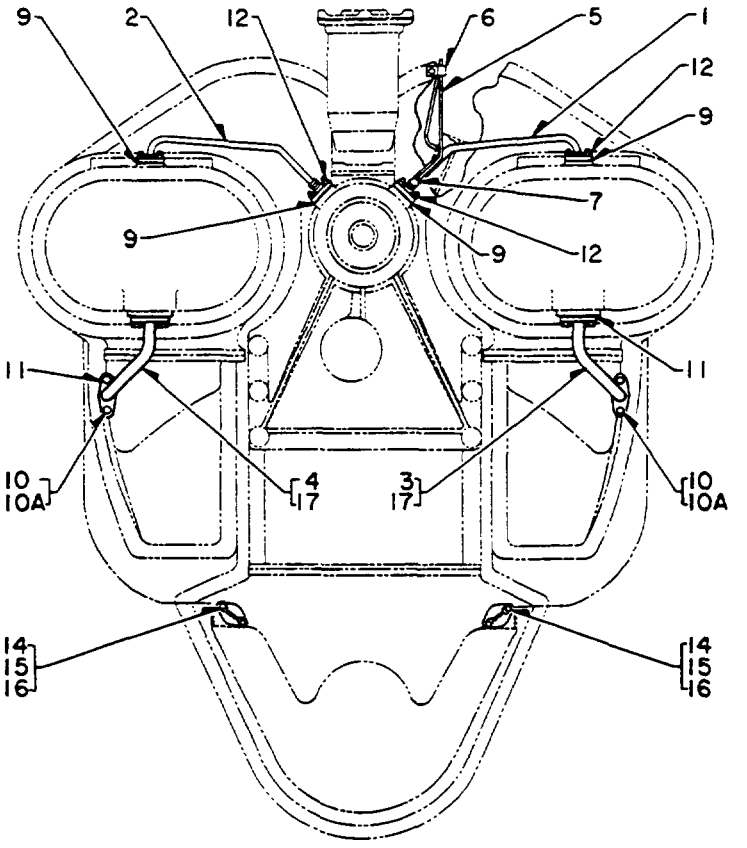
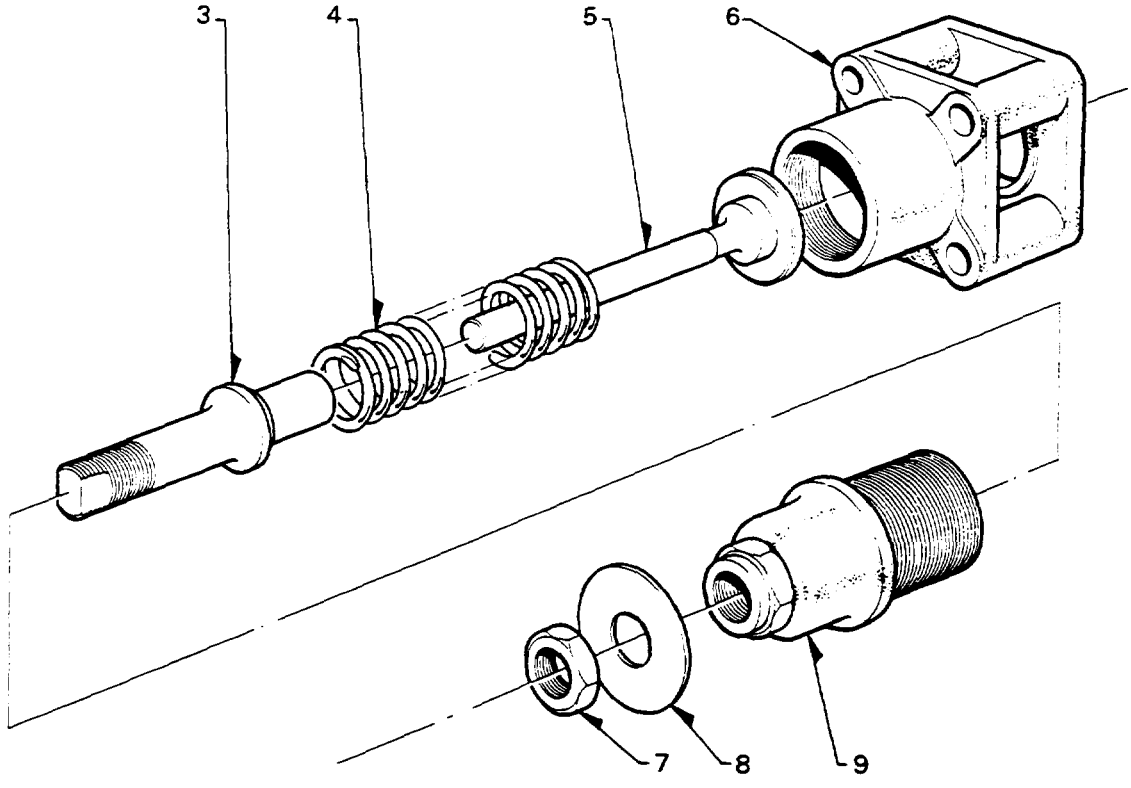


PLATE B34-12

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	12-645E1,E2,E6,E8 engines
		-	-	C	16-645E1,E2,E6,E8 engines
1	8224549	1	-	1	LINE .. Oil - Blower supply - Right bank
1	8224551	-	1	-	LINE .. Oil - Blower supply - Right bank
2	8224552	-	1	-	LINE .. Oil - Blower supply - Left bank
2	8224550	-	-	1	LINE .. Oil - Blower supply - Left bank
3	8369720	1	-	1	LINE .. Oil - Blower drain - Right bank
3	8369724	-	1	-	LINE .. Oil - Blower drain - Right bank
4	8369723	-	1	-	LINE .. Oil - Blower drain - Left bank
4	8369719	-	-	1	LINE .. Oil - Blower drain - Left bank
5	8224548	1	1	1	TUBE ASSEMBLY .. Low oil pressure - Right bank
6	8085799	1	1	1	CLAMP .. Oil pressure line
7	118748	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
*8	103878	-	1	1	PLUG .. Pipe - 1/4 M.P.T.
*8	8029169	1	-	-	FLANGE .. Blind
9	8029153	3	4	4	GASKET .. Blower supply line flange
10	181427	4	8	8	BOLT .. 1/2 - 20 x 1 hex. head
10A	6101229	4	8	8	WASHER .. Plain - 1/2
11	8029159	2	4	4	GASKET .. Blower drain line flange
12	8032717	6	8	8	NUT .. Lock - 3/8 - 24 hex.
13	8159199	2	2	2	FLANGE .. Lube oil manifold - Camshaft drive end
14	8159200	2	2	2	GASKET .. Flange to crankcase
15	8028314	4	4	4	BOLT .. Flange mounting - 3/8 - 24 x 7/8 hex. head
16	8116738	A.R.			WIRE .. Lock - 3/64 dia. - Avail. 500 ft. lengths
17	9085710	A.R.			TAPE .. Glass insulation - 100 ft. - Replaces 8122246 (Asbestos)

P.L. No. B34

LUBE OIL SYSTEM
Manifold Relief Valve
All 645 Engines

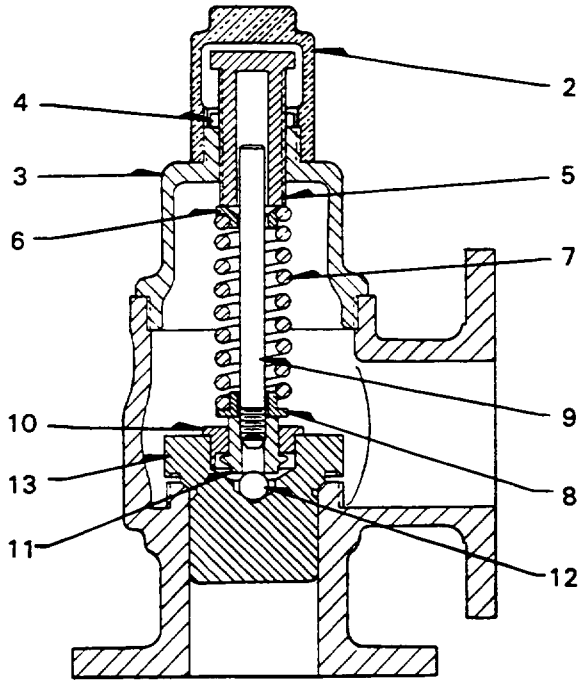


Ref. No. 2
PLATE B34-13

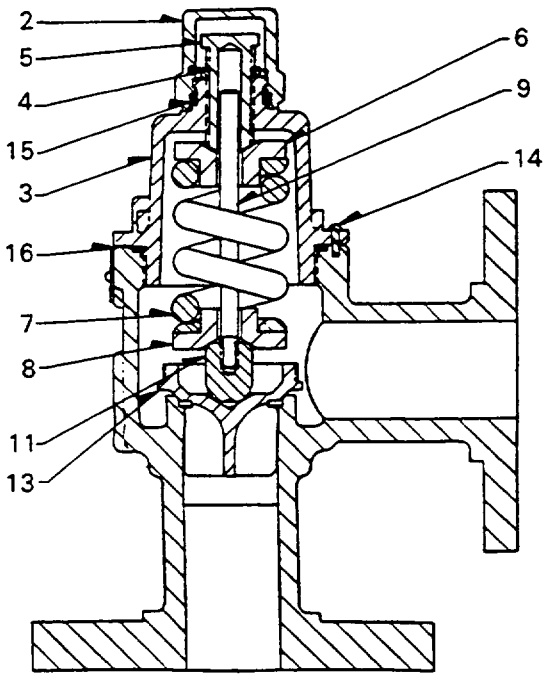
Ref. No.	Part Number	Qty. Req.		Description
*1	8077201	1	-	VALVE ASSEMBLY .. Relief - Roots blown engines
2	8292205	-	1	VALVE ASSEMBLY .. Relief - Turbocharged engines
3	8335222	1	-	GUIDE .. Valve
3	8335224	-	1	GUIDE .. Valve
4	8028785	1	-	SPRING .. Valve
4	8291928	-	1	SPRING .. Valve
5	8028512	1	-	VALVE .. Relief
5	8292090	-	1	VALVE .. Relief
6	8077202	1	1	BODY .. Valve
7	273200	1	1	NUT .. Hex. - 1 - 12
8	8335226	-	1	PLATE .. Safety
9	8335223	1	-	HOLDER .. Valve
9	8335225	-	1	HOLDER .. Valve
*10	8069445	1	1	GASKET .. Relief valve mounting } See Page 1
*11	8032719	4	4	NUT .. Lock - 1/2 - 20 hex. } See Page 1

P.L. No. B34

LUBE OIL SYSTEM
Lube Oil By-Pass Pressure Relief Valve Assembly
All 645 Marine Engines



3328025



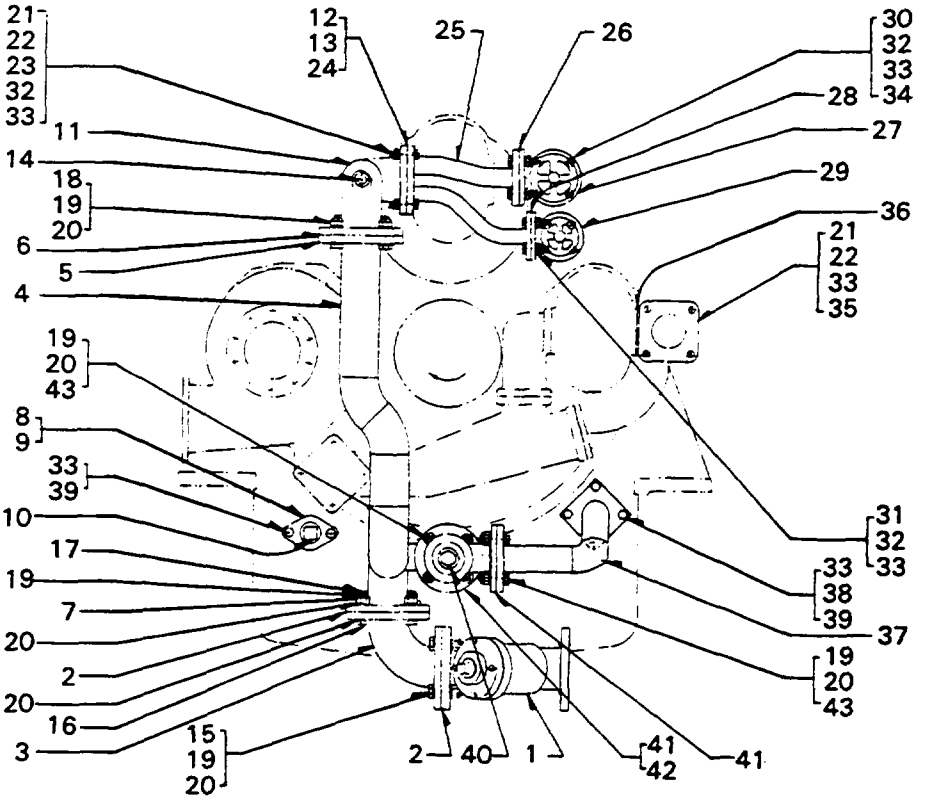
9543099

PLATE B34-14

Ref. No.	Part Number	Qty. Req.		Description
1	3328025	1	-	VALVE ASM. .. Relief - 40 PSI - 2 in. flange - Replaced by 9543099
1	9543099	-	1	VALVE ASM. .. Relief - 40 PSI - 2 in. flange - Replaces 3328025 and 3325217
2	3387590	1	-	HOOD .. Valve
2		-	1	HOOD .. Valve
3	8322753	1	-	CAP .. Valve
3		-	1	CAP .. Valve
4	3387592	1	-	NUT .. Lock - Pressure screw
4		-	1	NUT .. Lock - Pressure screw
5		1	-	SCREW .. Pressure
5		-	1	SCREW .. Pressure
6	8322754	1	-	PLATE .. Spring retainer - Upper
6		-	1	PLATE .. Spring retainer - Upper
7	8322755	1	-	SPRING .. Valve
7		-	1	SPRING .. Valve
8	8322756	1	-	PLATE .. Spring retainer - Lower
8		-	1	PLATE .. Spring retainer - Lower
9	3387605	1	-	SPINDLE .. Valve
9		-	1	SPINDLE .. Valve
10	8322757	1	-	NUT .. Lock - Spindle retainer
11	8322758	1	-	RETAINER .. Spindle
11		-	1	RETAINER .. Spindle
12	8322724	1	-	BALL .. Valve
13	8322759	1	-	DISC .. Valve
13		-	1	DISC .. Valve
14		-	2	SCREW .. Drive - Cap mounting
15		-	1	SEAL .. Hood to cap
16		-	1	SEAL .. Cap to body

P.L. No. B34

LUBE OIL SYSTEM
"Y" Type Lube Oil Strainer and By-Pass Valve Arrangement
Left Hand Rotation Engines
8-645E2,E5,E6; 12-645E2,E5,E6,E7,E7B; 16-645E2,E5,E6,E7B; 20-645E4B,E5,E7,E7B Engines



Left Hand Engine Rotation

PLATE B34-15

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	8-645E2,E6 engines - L.H. rotation
		-	B	-	-	-	8-645E5 and 12-645E2,E6 engines - L.H. rotation
		-	-	C	-	-	12-645E5,E7,E7B and 16-645E2,E6 engines - L.H. rotation
		-	-	-	D	-	16-645E5,E7B engines - L.H. rotation
		-	-	-	-	E	20-645E4B,E5,E7,E7B engines - L.H. rotation
1	8339106	1	1	-	-	-	STRAINER .. Lube oil - "Y" type - 3 inch
1	3328980	-	-	1	1	1	STRAINER .. Lube oil - "Y" type - 4 inch
2	3324753	2	2	-	-	-	GASKET .. Strainer and elbow
2	3314795	-	-	2	2	2	GASKET .. Strainer and elbow
3	8409543	1	1	-	-	-	ELBOW .. Flanged - 90°
3	8409544	-	-	1	1	1	ELBOW .. Flanged - 90°
4	8409550	1	1	-	-	-	PIPE ASM. .. Strainer to pump - Includes bottom flange only
4	8409552	-	-	1	1	1	PIPE ASM. .. Strainer to pump - Includes bottom flange only
5	8409546	1	-	-	-	-	FLANGE .. Pipe } Welded to Ref. 4
5	3324741	-	1	-	-	-	FLANGE .. Pipe
5	3318505	-	-	1	1	1	FLANGE .. Pipe
6	3258858	1	-	-	-	-	GASKET .. Flange to elbow
6	3324753	-	1	-	-	-	GASKET .. Flange to elbow
6	3314794	-	-	1	1	1	GASKET .. Flange to elbow
7	8408548	1	1	-	-	-	BRACKET .. Pipe support
7	8408549	-	-	1	1	1	BRACKET .. Pipe support
8	8409542	1	1	1	1	1	FLANGE .. Pipe - 1-1/2 M.P.T.
9	8409541	1	1	1	1	1	GASKET .. Pipe flange
10	106643	1	1	1	1	1	PLUG .. Pipe - 1-1/2 M.P.T.

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
11	3324721	1	-	-	-	-	ELBOW .. Distributing
11	3324747	-	1	-	-	-	ELBOW .. Distributing
11	3324709	-	-	1	-	-	ELBOW .. Distributing
11	3328512	-	-	-	1	-	ELBOW .. Distributing
11	8367757	-	-	-	-	1	ELBOW .. Distributing
12	8029482	1	-	-	-	-	GASKET .. Elbow to pump - Front port
12	8029151	-	1	-	-	-	GASKET .. Elbow to pump - Front port
12	8029470	-	-	1	-	-	GASKET .. Elbow to pump - Front port
12	8029150	-	-	-	1	-	GASKET .. Elbow to pump - Front port
12	8360530	-	-	-	-	1	GASKET .. Elbow to pump - Front and rear port
13	8029470	1	-	-	-	-	GASKET .. Elbow to pump - Rear port
13	8029150	-	1	-	-	-	GASKET .. Elbow to pump - Rear port
13	8029467	-	-	1	-	-	GASKET .. Elbow to pump - Rear port
13	8251950	-	-	-	1	-	GASKET .. Elbow to pump - Rear port
14	8326564	1	1	1	1	1	ADAPTER .. Gauge - Brass
15	271589	4	4	-	-	-	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Strainer mounting
15	271590	-	-	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-3/4 - Strainer mounting
16	271589	2	2	-	-	-	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Elbow to pipe
16	271588	-	-	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Elbow to pipe
17	271590	2	2	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-3/4 - Bracket and elbow to pipe
18	271562	4	-	-	-	-	BOLT .. Hex. head - 5/8 - 11 x 2 - Pipe flange to elbow
18	271589	-	4	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Pipe flange to elbow
19	8032721	12	12	24	24	24	NUT .. Lock - 5/8 - 18 hex.
20	6101223	12	12	24	24	24	WASHER .. Flat - 5/8
21	190256	2	10	8	-	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/2 - Elbows to pumps
22	179885	8	6	8	24	24	BOLT .. Hex. head - 1/2 - 13 x 1-1/2 - Elbows to pumps
23	181436	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/4 - Elbow to by-pass pipe
24	3324701	1	1	-	-	-	GASKET .. Elbow to by-pass pipe
24	3324702	-	-	1	1	1	GASKET .. Elbow to by-pass pipe
25	3324729	1	-	-	-	-	PIPE ASM. .. By-pass
25	3324743	-	1	-	-	-	PIPE ASM. .. By-pass
25	3327517	-	-	1	-	-	PIPE ASM. .. By-pass
25	3328693	-	-	-	1	1	PIPE ASM. .. By-pass
26	3203355	2	2	-	-	-	GASKET .. By-pass valve mounting (1-1/2 in.)
26	3316782	-	-	2	2	2	GASKET .. By-pass valve mounting (2 in.)
27	3330454	1	1	-	-	-	VALVE .. By-pass - 1-1/2 in.
27	3324697	-	-	1	1	1	VALVE .. By-pass - 2 in.
28	3389504	1	1	-	-	-	GASKET .. By-pass valve (1 in.)
28	3313295	-	-	1	1	1	GASKET .. By-pass valve (1-1/4 in.)
29	3324728	1	1	-	-	-	VALVE .. By-pass - 1 in.
29	3255251	-	-	1	1	1	VALVE .. By-pass - 1-1/4 in.
30	181435	8	8	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 2 - Valve mounting (1-1/2 in.)
30	271588	-	-	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Valve mounting (2 in.)
31	181433	8	8	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 1-3/4 - Valve mounting (1 and 1-1/4 in.)
32	8032719	20	20	12	12	12	NUT .. Lock - 1/2 - 20 hex.
32	8032721	-	-	8	8	8	NUT .. Lock - 5/8 - 18 hex.
33	6101229	24	28	20	24	24	WASHER .. Flat - 1/2
34	6101223	-	-	8	8	8	WASHER .. Flat - 5/8
35	3324200	1	-	-	-	-	ELBOW .. Discharge - Scavenging pump
35	3323867	-	1	-	-	-	ELBOW .. Discharge - Scavenging pump
35	3323311	-	-	1	-	-	ELBOW .. Discharge - Scavenging pump
35	3328499	-	-	-	1	1	ELBOW .. Discharge - Scavenging pump
36	8029467	1	-	1	-	-	GASKET .. Elbow to pump
36	8029150	-	1	-	-	-	GASKET .. Elbow to pump
36	8251951	-	-	-	1	1	GASKET .. Elbow to pump
37	8409545	1	1	1	1	1	ELBOW .. Relief valve to oil pan
38	3323820	1	1	1	1	1	GASKET .. Elbow to oil pan
39	181435	6	6	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 2 - Elbow and flange mounting
40	9543099	1	1	1	1	1	VALVE .. Relief - Replaces 3328025 - See Page 19
41	3316782	2	2	2	2	2	GASKET .. Relief valve
42	3315934	1	1	1	1	1	FLANGE .. Relief valve mounting - Welded to Ref. 4
43	271588	8	8	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Relief valve mounting

8451079, 8449500, 8450907, 8449845, 8450863

P.L. No. B34

LUBE OIL SYSTEM
Scavenging and Piston Cooling Pump Arrangement - Engines with "Y" Type Strainer
Left Hand Rotation Engines
8-645E2,E5,E6; 12-645E2,E5,E6,E7,E7B; 16-645E2,E5,E6,E7B; 20-645E4B,E5,E7,E7B Engines

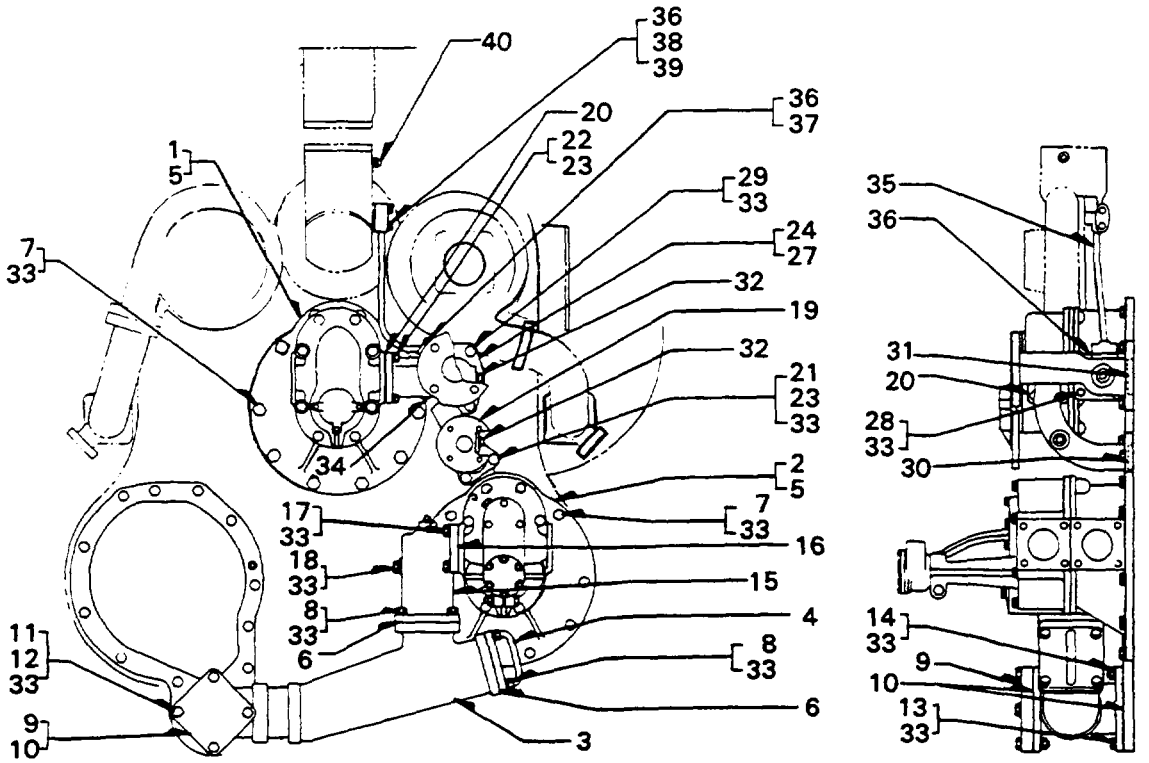


PLATE B34-16

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	8-645E2,E6 engines - L.H. rotation
		-	B	-	-	-	8-645E5 and 12-645E2,E6 engines - L.H. rotation
		-	-	C	-	-	12-645E5,E7,E7B and 16-645E2,E6 engines - L.H. rotation
		-	-	-	D	-	16-645E5,E7B engines - L.H. rotation
		-	-	-	-	E	20-645E4B,E5,E7,E7B engines - L.H. rotation
1	8176033	1	-	-	-	-	PUMP ASM. .. Piston cooling and pressure
1	8106919	-	1	-	-	-	PUMP ASM. .. Piston cooling and pressure
1	8084556	-	-	1	-	-	PUMP ASM. .. Piston cooling and pressure } See P.L. 38
1	9330012	-	-	-	1	-	PUMP ASM. .. Piston cooling and pressure
1	9330013	-	-	-	-	1	PUMP ASM. .. Piston cooling and pressure
†2	8449658	1	-	-	-	-	PUMP ASM. .. Scavenging and fuel
†2	8417810	-	1	-	-	-	PUMP ASM. .. Scavenging and fuel } See P.L. 40
†2	8417754	-	-	1	-	-	PUMP ASM. .. Scavenging and fuel
†2	8417074	-	-	-	1	1	PUMP ASM .. Scavenging and fuel
3	8242235	1	1	1	1	1	HOUSING .. Strainer
4	8352925	1	1	1	1	1	SCREEN .. Strainer
5	8028264	2	2	2	2	2	GASKET .. Piston cooling pump and scavenging pump
6	8242869	2	2	2	2	2	GASKET .. Strainer housing to screen and elbow
7	181432	20	20	20	20	20	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
8	179883	8	8	8	8	8	BOLT .. Hex. head - 1/2 - 13 x 1-1/4

† Current scavenging pumps have fuel pumps with flanged connections, for previous style pumps with threaded connections - See Parts List 40.

P.L. No. B34

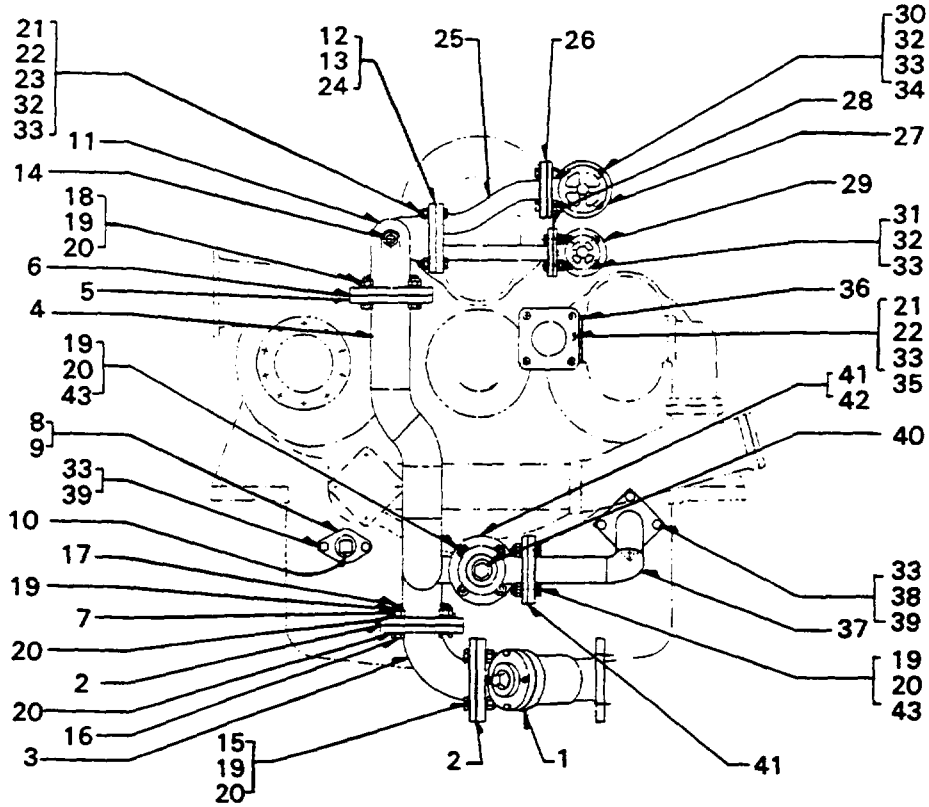
LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
9	3324740	1	1	1	1	1	FLANGE .. Blind
10	8144286	2	2	2	2	2	GASKET .. Strainer housing to flange and acc. drive housing
11	179890	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 13 x 2-1/4 - Flange mounting
12	102637	4	4	4	4	4	NUT .. Hex. - 1/2 - 13
13	181440	2	2	2	2	2	BOLT .. Hex. head - 1/2 - 20 x 2-1/2 - Strainer tee to acc. drive housing
14	103028	2	2	2	2	2	NUT .. Hex. - 1/2 - 20
15	8247127	1	-	-	-	-	ELBOW .. Pump to strainer housing
15	8242040	-	1	-	-	-	ELBOW .. Pump to strainer housing
15	8242145	-	-	1	-	-	ELBOW .. Pump to strainer housing
15	8296006	-	-	-	1	1	ELBOW .. Pump to strainer housing
16	8029467	1	-	2	-	-	GASKET .. Elbow to pump
16	8029150	-	2	-	-	-	GASKET .. Elbow to pump
16	8251951	-	-	-	1	-	GASKET .. Elbow to pump
16	8360530	-	-	-	-	1	GASKET .. Elbow to pump
17	179885	2	4	6	8	8	BOLT .. Hex. head - 1/2 - 13 x 1-1/2
18	189787	2	3	1	2	2	BOLT .. Hex. head - 1/2 - 13 x 5-1/4
19	8246876	1	-	-	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8246699	-	1	-	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8246702	-	-	1	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8295643	-	-	-	1	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8372922	-	-	-	-	1	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
20	8029482	1	-	-	-	-	GASKET .. Elbow to pump
20	8029151	-	1	-	-	-	GASKET .. Elbow to pump
20	8029470	-	-	1	-	-	GASKET .. Elbow to pump
20	8029150	-	-	-	1	-	GASKET .. Elbow to pump
20	8360530	-	-	-	-	1	GASKET .. Elbows to pump (for Ref. Nos. 19 and 24)
21	8082964	1	1	1	1	1	GASKET .. Elbow to accessory drive housing
22	179885	2	4	4	4	4	BOLT .. Hex. head - 1/2 - 13 x 1-1/2 - Elbow to pump
23	181433	3	3	3	3	3	BOLT .. Hex. head - 1/2 - 20 x 1-3/4 - Elbow to accessory drive housing
24	8246877	1	-	-	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8246701	-	1	-	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8246704	-	-	1	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8364962	-	-	-	1	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8373604	-	-	-	-	1	ELBOW .. Pump to manifold to by-pass valve (2 in.)
*25	8020772	2	2	2	2	2	STUD .. Oil line mounting - 3/8 - 16 x 3/8 - 24 x 2 in. long
*26	8029470	1	-	-	-	-	GASKET .. Elbow to pump
*26	8029150	-	1	-	-	-	GASKET .. Elbow to pump
*26	8029467	-	-	1	-	-	GASKET .. Elbow to pump
*26	8251950	-	-	-	1	-	GASKET .. Elbow to pump
27	8082965	1	1	1	1	1	GASKET .. Elbow to accessory drive housing
28	179885	4	4	4	8	4	BOLT .. Hex. head - 1/2 - 13 x 1-1/2 - Elbow to pump
29	181433	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 20 x 1-3/4 - Elbow to accessory drive housing
30	8082586	1	1	1	1	1	SEAL .. O-Ring - Elbow to oil manifold tube - 2-1/4 O.D.
31	8082587	1	1	1	1	1	SEAL .. O-Ring - Elbow to oil manifold tube - 3-1/2 O.D.
32	113177	2	2	2	2	2	PLUG .. Pipe - 3/4 M.P.T. - Elbow drain
33	6101229	As Required					WASHER .. Flat - 1/2 - Used with all 1/2 in. bolts and nuts
34	103877	1	1	1	1	1	PLUG .. Pipe - 1/8 M.P.T.
35	8079912	1	1	1	1	-	LINE .. Oil - Elbow to governor drive housing
35	8360558	-	-	-	-	1	LINE .. Oil - Elbow to governor drive housing
36	8029154	2	2	2	2	2	GASKET .. Oil line
37	8032717	2	2	2	2	2	NUT .. Lock - 3/8 hex. - Oil line to elbow studs
38	179845	2	2	2	2	2	BOLT .. Hex. head - 3/8 - 16 x 1-3/4 - Oil line to gov. dr. housing
39	6101225	2	2	2	2	2	WASHER .. Flat - 3/8
40	103879	1	1	1	1	1	PLUG .. Pipe - 3/8

8451079, 8449500, 8450907, 8449845, 8450863

P.L. No. B34

LUBE OIL SYSTEM
"Y" Type Lube Oil Strainer and By-Pass Valve Arrangement
Right Hand Rotation Engines
8-645E2,E5,E6; 12-645E2,E5,E6,E7,E7B; 16-645E2,E5,E6,E7B; 20-645E5 Engines



Right Hand Engine Rotation

PLATE B34-17

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	8-645E2,E6 engines - R.H. rotation
		-	B	-	-	-	8-645E5 and 12-645E2,E6 engines - R.H. rotation
		-	-	C	-	-	12-645E5,E7,E7B and 16-645E2,E6 engines - R.H. rotation
		-	-	-	D	-	16-645E5,E7B engines - R.H. rotation
		-	-	-	-	E	20-645E5 engines - R.H. rotation
1	8339106	1	1	-	-	-	STRAINER .. Lube oil - "Y" type - 3 in.
1	3328980	-	-	1	1	1	STRAINER .. Lube oil - "Y" type - 4 in.
2	3324753	2	2	-	-	-	GASKET .. Strainer and elbow
2	3314795	-	-	2	2	2	GASKET .. Strainer and elbow
3	8409543	1	1	-	-	-	ELBOW .. Flanged - 90°
3	8409544	-	-	1	1	1	ELBOW .. Flanged - 90°
4	8409551	1	1	-	-	-	PIPE ASM. .. Strainer to pump - Includes bottom flange only
4	8409553	-	-	1	1	1	PIPE ASM. .. Strainer to pump - Includes bottom flange only
5	8409546	1	-	-	-	-	FLANGE .. Pipe
5	3324741	-	1	-	-	-	FLANGE .. Pipe } Welded to Ref. 4
5	3318505	-	-	1	1	1	FLANGE .. Pipe
6	3258858	1	-	-	-	-	GASKET .. Flange to elbow
6	3324753	-	1	-	-	-	GASKET .. Flange to elbow
6	3314794	-	-	1	1	1	GASKET .. Flange to elbow
7	8409548	1	1	-	-	-	BRACKET .. Pipe support
7	8409549	-	-	1	1	1	BRACKET .. Pipe support
8	8409542	1	1	1	1	1	FLANGE .. Pipe - 1-1/2 M.P.T.
9	8409541	1	1	1	1	1	GASKET .. Pipe flange
10	106643	1	1	1	1	1	PLUG .. Pipe - 1-1/2 M.P.T.

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
11	3324721	1	-	-	-	-	ELBOW .. Distributing
11	3324747	-	1	-	-	-	ELBOW .. Distributing
11	3324709	-	-	1	-	-	ELBOW .. Distributing
11	3328512	-	-	-	1	-	ELBOW .. Distributing
11	8367757	-	-	-	-	1	ELBOW .. Distributing
12	8029482	1	-	-	-	-	GASKET .. Elbow to pump - Front port
12	8029151	-	1	-	-	-	GASKET .. Elbow to pump - Front port
12	8029470	-	-	1	-	-	GASKET .. Elbow to pump - Front port
12	8029150	-	-	-	1	-	GASKET .. Elbow to pump - Front port
12	8360530	-	-	-	-	1	GASKET .. Elbow to pump - Front and rear ports
13	8029470	1	-	-	-	-	GASKET .. Elbow to pump - Rear port
13	8029150	-	1	-	-	-	GASKET .. Elbow to pump - Rear port
13	8029467	-	-	1	-	-	GASKET .. Elbow to pump - Rear port
13	8251950	-	-	-	1	-	GASKET .. Elbow to pump - Rear port
14	8326564	1	1	1	1	1	ADAPTER .. Gauge - Brass
15	271589	4	4	-	-	-	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Strainer mounting
15	271590	-	-	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-3/4 - Strainer mounting
16	271589	2	2	-	-	-	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Elbow to pipe
16	271588	-	-	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Elbow to pipe
17	271590	2	2	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-3/4 - Bracket and elbow to pipe
18	271562	4	-	-	-	-	BOLT .. Hex. head - 5/8 - 11 x 2 - Pipe flange to elbow
18	271589	-	4	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/2 - Pipe flange to elbow
19	8032721	12	12	24	24	24	NUT .. Lock - 5/8 - 18 hex.
20	6101223	12	12	24	24	24	WASHER .. Flat - 5/8
21	190256	2	10	8	-	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/2 - Elbows to pumps
22	179885	8	6	8	24	24	BOLT .. Hex. head - 1/2 - 13 x 1-1/2 - Elbows to pumps
23	181436	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/4 - Elbow to by-pass pipe
24	3324701	1	1	-	-	-	GASKET .. Elbow to by-pass pipe
24	3324702	-	-	1	1	1	GASKET .. Elbow to by-pass pipe
25	3324752	1	-	-	-	-	PIPE ASM. .. By-pass
25	3324746	-	1	-	-	-	PIPE ASM. .. By-pass
25	3324706	-	-	1	-	-	PIPE ASM. .. By-pass
25	3328562	-	-	-	1	1	PIPE ASM. .. By-pass
26	3203355	2	2	-	-	-	GASKET .. By-pass valve mounting (1-1/2 in.)
26	3316782	-	-	2	2	2	GASKET .. By-pass valve mounting (2 in.)
27	3330454	1	1	-	-	-	VALVE .. By-pass - 1-1/2 in.
27	3324697	-	-	1	1	1	VALVE .. By-pass - 2 in.
28	3389504	2	2	-	-	-	GASKET .. By-pass valve mounting (1 in.)
28	3313295	-	-	2	2	2	GASKET .. By-pass valve mounting (1-1/4 in.)
29	3324728	1	1	-	-	-	VALVE .. By-pass - 1 in.
29	3255251	-	-	1	1	1	VALVE .. By-pass - 1-1/4 in.
30	181435	8	8	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 2 - Valve mounting (1-1/2 in.)
30	271588	-	-	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Valve mounting (2 in.)
31	181433	8	8	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 1-3/4 - Valve mounting (1 and 1-1/4 in.)
32	8032719	20	20	12	12	12	NUT .. Lock - 1/2 - 20 hex.
32	8032721	-	-	8	8	8	NUT .. Lock - 5/8 - 18 hex.
33	6101229	24	28	20	24	24	WASHER .. Flat - 1/2
34	6101223	-	-	8	8	8	WASHER .. Flat - 5/8
35	3324200	1	-	-	-	-	ELBOW .. Discharge - Scavenging pump
35	3323867	-	1	-	-	-	ELBOW .. Discharge - Scavenging pump
35	3323311	-	-	1	-	-	ELBOW .. Discharge - Scavenging pump
35	3328499	-	-	-	1	1	ELBOW .. Discharge - Scavenging pump
36	8029467	1	-	1	-	-	GASKET .. Elbow to pump
36	8029150	-	1	-	-	-	GASKET .. Elbow to pump
36	8251951	-	-	-	1	1	GASKET .. Elbow to pump
37	8409545	1	1	1	1	1	ELBOW .. Relief valve to oil pan
38	3323820	1	1	1	1	1	GASKET .. Elbow to oil pan
39	181435	6	6	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 2 - Elbow and flange mounting
40	9543099	1	1	1	1	1	VALVE .. Relief - Replaces 3328025 - See Page 19
41	3316782	2	2	2	2	2	GASKET .. Relief valve
42	3315934	1	1	1	1	1	FLANGE .. Relief valve mounting - Welded to Ref. 4
43	271588	8	8	8	8	8	BOLT .. Hex. head - 5/8 - 18 x 2-1/4 - Relief valve mounting

8451080, 8449640, 8450908, 8450721, 8450864

P.L. No. B34

LUBE OIL SYSTEM
Scavenging and Piston Cooling Pump Arrangement - Engines with "Y" Type Strainer
Right Hand Rotation Engines
8-645E2,E5,E6; 12-645E2,E5,E6,E7,E7B; 16-645E2,E5,E7B; 20-645E5 Engines

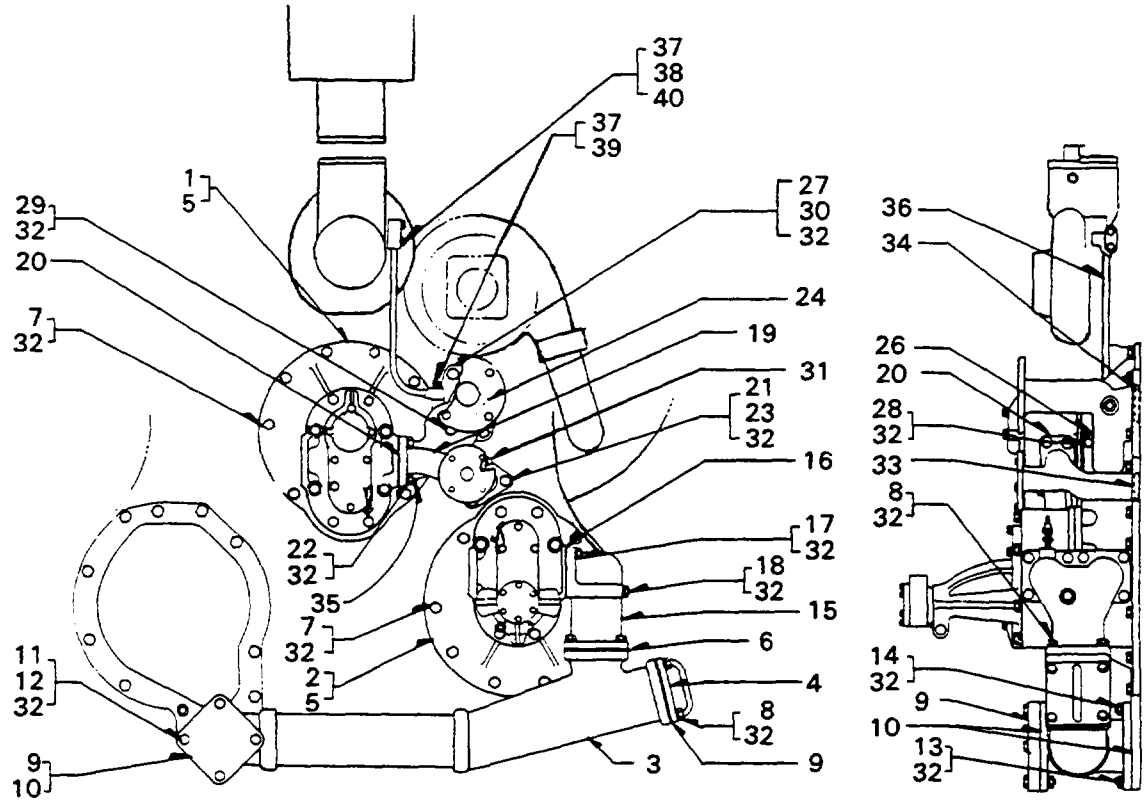


PLATE A34-18

Ref. No.	Part Number	Quantity Required					Description	
		A	-	-	-	-	8-645E2,E6 engines - R.H. rotation	
		-	B	-	-	-	8-645E5 and 12-645E2,E6 engines - R.H. rotation	
		-	-	C	-	-	12-645E5,E7,E7B and 16-645E2,E6 engines - R.H. rotation	
		-	-	-	D	-	16-645E5,E7B engines - R.H. rotation	
		-	-	-	-	E	20-645E5 engines - R.H. rotation	
1	8176033	1	-	-	-	-	PUMP ASM. .. Piston cooling and pressure	See P.L. 38
1	8106919	-	1	-	-	-	PUMP ASM. .. Piston cooling and pressure	
1	8084556	-	-	1	-	-	PUMP ASM. .. Piston cooling and pressure	
1	9330012	-	-	-	1	-	PUMP ASM. .. Piston cooling and pressure	
1	9330013	-	-	-	-	1	PUMP ASM. .. Piston cooling and pressure	
†2	8449658	1	-	-	-	-	PUMP ASM. .. Scavenging and fuel	See P.L. 40
†2	8417810	-	1	-	-	-	PUMP ASM. .. Scavenging and fuel	
†2	8417754	-	-	1	-	-	PUMP ASM. .. Scavenging and fuel	
†2	8417074	-	-	-	1	1	PUMP ASM. .. Scavenging and fuel	
3	8242201	1	1	1	1	1	HOUSING .. Strainer	
4	8352925	1	1	1	1	1	SCREEN .. Strainer	
5	8028264	2	2	2	2	2	GASKET .. Piston cooling pump and scavenging pump	
6	8242869	2	2	2	2	2	GASKET .. Strainer housing to screen and elbow	
7	181432	20	20	20	20	20	BOLT .. Hex. head - 1/2 - 20 x 1-5/8	
8	179883	8	8	8	8	8	BOLT .. Hex. head - 1/2 - 13 x 1-1/4	

† Current scavenging pumps have fuel pumps with flanged connections, for previous style pumps with threaded connections - See P.L. 40.

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
9	3324740	1	1	1	1	1	FLANGE .. Blind
10	8144286	2	2	2	2	2	GASKET .. Strainer to flange and acc. drive housing
11	179890	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 13 x 2-1/4 - Flange to strainer
12	102637	4	4	4	4	4	NUT .. Hex. - 1/2 - 13
13	181440	2	2	2	2	2	BOLT .. Hex. head - 1/2 - 20 x 2-1/2 - Strainer to acc. drive housing
14	103028	2	2	2	2	2	NUT .. Hex. - 1/2 - 20
15	8247126	1	-	-	-	-	ELBOW .. Pump to strainer housing
15	8242039	-	1	-	-	-	ELBOW .. Pump to strainer housing
15	8242145	-	-	1	-	-	ELBOW .. Pump to strainer housing
15	8296007	-	-	-	1	1	ELBOW .. Pump to strainer housing
16	8029467	1	-	2	-	-	GASKET .. Elbow to pump
16	8029150	-	2	-	-	-	GASKET .. Elbow to pump
16	8251951	-	-	-	1	-	GASKET .. Elbow to pump
16	8360530	-	-	-	-	1	GASKET .. Elbow to pump
17	179885	2	4	6	8	8	BOLT .. Hex. head - 1/2 - 13 x 1-1/2
18	189787	2	3	1	2	2	BOLT .. Hex. head - 1/2 - 13 x 5-1/4
19	8246617	1	-	-	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8243110	-	1	-	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8242184	-	-	1	-	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8295671	-	-	-	1	-	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
19	8372889	-	-	-	-	1	ELBOW .. Pump to manifold to by-pass valve (1-1/2 in.)
20	8029482	1	-	-	-	-	GASKET .. Elbow to pump
20	8029151	-	1	-	-	-	GASKET .. Elbow to pump
20	8029470	-	-	1	-	-	GASKET .. Elbow to pump
20	8029150	-	-	-	1	-	GASKET .. Elbow to pump
20	8360530	-	-	-	-	1	GASKET .. Elbows to pump (For Ref. Nos. 19 and 24)
21	8082964	1	1	1	1	1	GASKET .. Elbow to accessory drive housing
22	179885	2	4	4	4	4	BOLT .. Hex. head - 1/2 - 13 x 1-1/2
23	181433	3	3	3	3	3	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
24	8246879	1	-	-	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8243109	-	1	-	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8242548	-	-	1	-	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8296008	-	-	-	1	-	ELBOW .. Pump to manifold to by-pass valve (2 in.)
24	8373606	-	-	-	-	1	ELBOW .. Pump to manifold to by-pass valve (2 in.)
*25	8020772	2	2	2	2	2	STUD .. Oil line mounting - 3/8 - 16 x 3/8 - 24 x 2 in. long
26	8029470	1	-	-	-	-	GASKET .. Elbow to pump
26	8029150	-	1	-	-	-	GASKET .. Elbow to pump
26	8029467	-	-	1	-	-	GASKET .. Elbow to pump
26	8251950	-	-	-	1	-	GASKET .. Elbow to pump
27	8082965	1	1	1	1	1	GASKET .. Elbow to accessory drive housing
28	179885	4	4	4	8	4	BOLT .. Hex. head - 1/2 - 13 x 1-1/2 - Elbow to pump
29	186336	1	-	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 4-1/2
29	186338	-	1	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 5
29	186340	-	-	1	-	-	BOLT .. Hex. head - 1/2 - 20 x 5-1/2
29	8299679	-	-	-	1	-	BOLT .. Hex. head - 1/2 - 20 x 7-1/2
29	273012	-	-	-	-	1	BOLT .. Hex. head - 1/2 - 20 x 7
30	181433	3	3	3	3	3	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
31	113177	2	2	2	2	2	PLUG .. Pipe - 3/4 M.P.T. - Elbow drain
32	6101229	As Required					WASHER .. Flat - 1/2 - Used with all 1/2 in. bolts and nuts
33	8082586	1	1	1	1	1	SEAL .. O-Ring - 2-1/4 O.D. - Elbow to oil manifold tube
34	8082587	1	1	1	1	1	SEAL .. O-Ring - 3-1/2 O.D. - Elbow to oil manifold tube
35	103877	1	1	1	1	1	PLUG .. Pipe - 1/8 M.P.T.
36	8242558	1	1	1	1	1	LINE .. Oil - Elbow to governor drive housing
37	8029154	2	2	2	2	2	GASKET .. Oil line
38	179845	2	2	2	2	2	BOLT .. Hex. head - 3/8 - 16 x 1-/34
39	8032717	2	2	2	2	2	NUT .. Lock - 3/8 hex. - Oil line to elbow studs
40	6101225	2	2	2	2	2	WASHER .. Flat - 3/8

8451080, 8449640, 8450908, 8450721, 8450864

P.L. No. B34

LUBE OIL SYSTEM
Lube Oil Pumps and "Box" Type Lube Oil Strainer
Left Hand Rotation Engines
8,12,16-645E6 and 8,12,16,20-645E7,E7B,E7C Engines

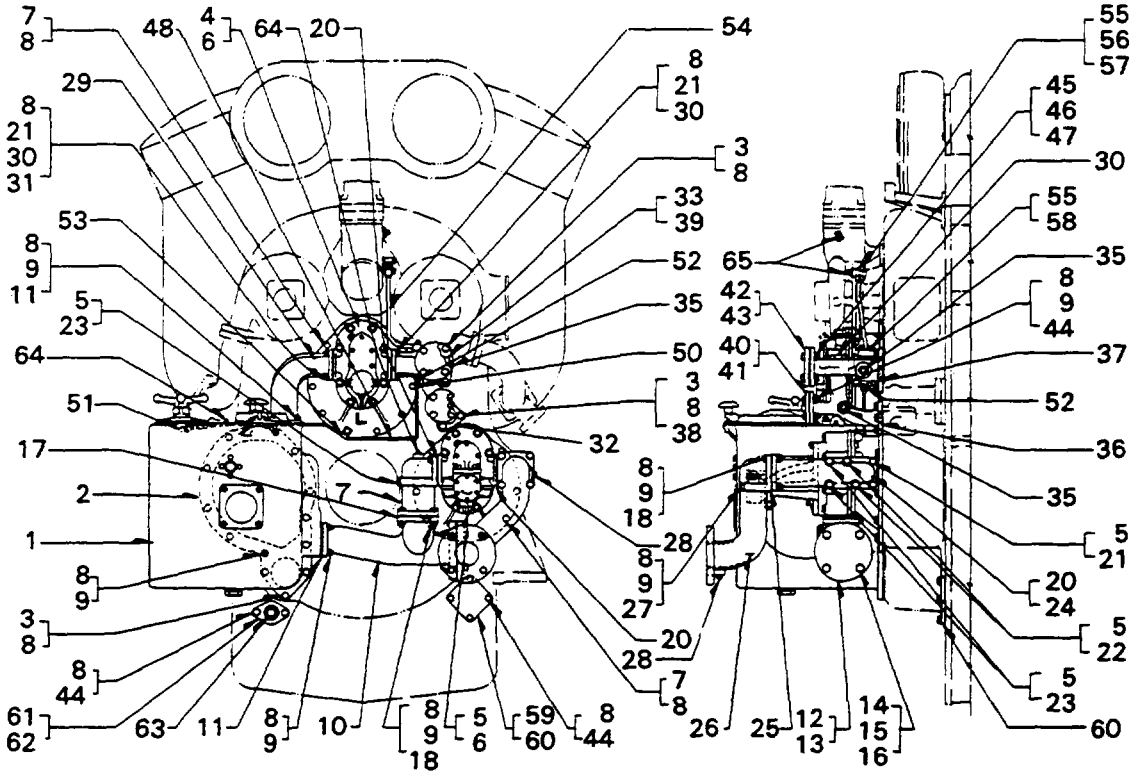


PLATE A34-19

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	8-645E6 engines - L.H. rotation
		-	B	-	-	-	8-645E7,E7B,E7C and 12-645E6 engines - L.H. rotation
		-	-	C	-	-	12-645E7,E7B,E7C and 16-645E6 engines - L.H. rotation
		-	-	-	D	-	16-645E7,E7B,E7C engines - L.H. rotation
		-	-	-	-	E	20-645E7,E7B,E7C engines - L.H. rotation
1	8269263	1	1	1	1	1	STRAINER .. Lube oil } See P.L. 36
ϕ1	8186776	1	1	1	1	1	STRAINER .. Lube oil } See P.L. 36
2	8080850	1	1	1	1	1	GASKET .. Strainer mounting
3	181433	19	19	19	19	19	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
4	8176033	1	-	-	-	-	PUMP .. Piston cooling and pressure } See P.L. 38
4	8106919	-	1	-	-	-	PUMP .. Piston cooling and pressure } See P.L. 38
4	8084556	-	-	1	-	-	PUMP .. Piston cooling and pressure } See P.L. 38
4	9330012	-	-	-	1	-	PUMP .. Piston cooling and pressure } See P.L. 38
4	9330013	-	-	-	-	1	PUMP .. Piston cooling and pressure } See P.L. 38
5	8449658	1	-	-	-	-	PUMP .. Scavenging and fuel oil } See P.L. 40
5	8417810	-	1	-	-	-	PUMP .. Scavenging and fuel oil } See P.L. 40
5	8417754	-	-	1	-	-	PUMP .. Scavenging and fuel oil } See P.L. 40
5	8417074	-	-	-	1	1	PUMP .. Scavenging and fuel oil } See P.L. 40
6	8028264	2	2	2	2	2	GASKET .. Pump - Scavenging and piston cooling
7	181432	20	20	20	20	20	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
8	6101229	91	96	99	99	99	WASHER .. Flat - 1/2
9	8032719	26	26	22	26	22	NUT .. Lock - 1/2 - 20 hex.

8450794, 8419964, 8422069, 8426324, 8423405

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
10	8413278	1	1	1	1	1	PIPE .. Flanged - Strainer to scavenging pump elbow
11	8074661	2	2	2	2	2	GASKET .. Strainer to connecting pipe and elbow
12	8420530	1	1	1	1	1	FLANGE .. Blind - 3 IPS
13	8420529	1	1	1	1	1	GASKET .. Blind flange
14	271591	4	4	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 3
15	8032721	4	4	4	4	4	NUT .. Lock - 5/8 - 18 hex.
16	6101233	4	4	4	4	4	WASHER .. Flat - 5/8
17	8242869	1	1	1	1	1	GASKET .. Pipe to scavenging pump elbow
18	181436	6	6	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
19	8247127	1	-	-	-	-	ELBOW .. Scavenging pump inlet
19	8242040	-	1	-	-	-	ELBOW .. Scavenging pump inlet
19	8242145	-	-	1	-	-	ELBOW .. Scavenging pump inlet
19	8296006	-	-	-	1	1	ELBOW .. Scavenging pump inlet
20	8029467	2	-	2	-	-	GASKET .. Elbows to scavenging pump
20	8029150	-	4	-	-	-	GASKET .. Elbows to scavenging pump
20	8251951	-	-	-	2	2	GASKET .. Elbows to scavenging pump
21	179885	16	22	24	38	30	BOLT .. Hex. head - 1/2 - 13 x 1-1/2
22	190270	2	2	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/4
23	189787	2	5	5	6	6	BOLT .. Hex. head - 1/2 - 13 x 5-1/4
24	8449446	1	-	-	-	-	ELBOW .. Scavenging pump outlet
24	8414033	-	1	-	-	-	ELBOW .. Scavenging pump outlet
24	8414489	-	-	1	-	-	ELBOW .. Scavenging pump outlet
24	8413277	-	-	-	1	1	ELBOW .. Scavenging pump outlet
25	8366787	1	1	1	1	1	GASKET .. Elbow to elbow
26	8413280	1	1	1	1	1	ELBOW .. Lube oil outlet
27	186339	2	2	2	2	2	BOLT .. Hex. head - 1/2 - 20 x 5-1/4
28	103880	2	2	2	2	2	PLUG .. Pipe - 1/2 M.P.T.
29	8118248	1	-	-	-	-	ELBOW .. Strainer to pump
29	8097345	-	1	-	-	-	ELBOW .. Strainer to pump
29	8080166	-	-	1	-	-	ELBOW .. Strainer to pump
29	8251965	-	-	-	1	-	ELBOW .. Strainer to pump
29	8360557	-	-	-	-	1	ELBOW .. Strainer to pump
30	8029482	2	-	-	-	-	GASKET .. Elbows to pump - Front ports
30	8029151	-	2	-	-	-	GASKET .. Elbows to pump - Front ports
30	8029470	-	-	2	-	-	GASKET .. Elbows to pump - Front ports
30	8029150	-	-	-	2	-	GASKET .. Elbows to pump - Front ports
30	8360530	-	-	-	-	2	GASKET .. Elbows to pump - Front and rear ports
31	8029470	2	-	-	-	-	GASKET .. Elbows to pump - Rear ports
31	8029150	-	2	-	-	-	GASKET .. Elbows to pump - Rear ports
31	8029467	-	-	2	-	-	GASKET .. Elbows to pump - Rear ports
31	8251950	-	-	-	2	-	GASKET .. Elbows to pump - Rear ports
32	8246876	1	-	-	-	-	ELBOW .. Piston cooling
32	8246699	-	1	-	-	-	ELBOW .. Piston cooling
32	8246702	-	-	1	-	-	ELBOW .. Piston cooling
32	8295643	-	-	-	1	-	ELBOW .. Piston cooling
32	8372922	-	-	-	-	1	ELBOW .. Piston cooling
33	8246877	1	-	-	-	-	ELBOW .. Lube oil supply
33	8246701	-	1	-	-	-	ELBOW .. Lube oil supply
33	8246704	-	-	1	-	-	ELBOW .. Lube oil supply
33	8364962	-	-	-	1	-	ELBOW .. Lube oil supply
33	8373604	-	-	-	-	1	ELBOW .. Lube oil supply
*34	8020772	2	2	2	2	2	STUD .. 3/8 - 16 x 3/8 - 24 x 2 in. long
35	113117	2	2	2	2	2	PLUG .. Pipe - 3/4 M.P.T.
36	8082586	1	1	1	1	1	SEAL .. Oil - Piston cooling elbow to oil manifold tube
37	8082587	1	1	1	1	1	SEAL .. Oil - Lube oil supply elbow to oil manifold tube
38	8082964	1	1	1	1	1	GASKET .. Piston cooling elbow to drive housing
39	8082965	1	1	1	1	1	GASKET .. Lube oil supply elbow to drive housing
40	8409155	1	1	-	-	-	FLANGE .. Blind - 1 IPS
40	8409156	-	-	1	1	1	FLANGE .. Blind - 1-1/4 IPS
41	8409159	1	1	-	-	-	GASKET .. Blind flange
41	8409160	-	-	1	1	1	GASKET .. Blind flange

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LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
42	8409157	1	1	-	-	-	FLANGE .. Blind - 1-1/2 IPS
42	8422067	-	-	1	1	1	FLANGE .. Blind - 2 IPS
43	8409161	1	1	-	-	-	GASKET .. Blind flange
43	8422068	-	-	1	1	1	GASKET .. Blind flange
44	181435	10	10	10	10	10	BOLT .. Hex. head - 1/2 - 20 x 2
45	181436	4	4	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
45	271589	-	-	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-1/2
46	8032721	-	-	4	4	4	NUT .. Lock - 5/8 - 18 hex.
47	6101223	-	-	4	4	4	WASHER .. Flat - 5/8
48	8423492	1	1	1	1	1	LINE .. Oil - Lube oil supply to strainer
*49	8098593	As Required					TUBING .. Steel - Copper brazed - 1/4 O.D. x 20 ft.
50	116452	2	2	2	2	2	NUT .. Tube - 1/4 - 45° flare
51	118753	1	1	1	1	1	ELBOW .. 90° - 1/4 tube x 1/8 M.P.T.
52	118748	1	1	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
53	8085799	2	2	2	2	2	CLAMP .. Tube
54	8079912	1	1	1	-	-	LINE .. Oil - Lube oil supply to governor drive
54	8360558	-	-	-	1	1	LINE .. Oil - Lube oil supply to governor drive
55	8029154	2	2	2	2	2	GASKET .. Oil line mounting
56	179845	2	2	2	2	2	BOLT .. Hex. head - 3/8 - 16 x 1-3/4
57	6101225	2	2	2	2	2	WASHER .. Flat - 3/8
58	8032717	2	2	2	2	2	NUT .. Lock - 3/8 - 24 hex.
59	8420216	1	1	1	1	1	FLANGE .. Blind
60	3323820	1	1	1	1	1	GASKET .. Blind flange
61	8409542	1	1	1	1	1	FLANGE .. Pipe
62	8409541	1	1	1	1	1	GASKET .. Pipe flange
63	106643	1	1	1	1	1	PLUG .. Pipe - 1-1/2 M.P.T.
64	103878	1	2	2	2	2	PLUG .. Pipe - 1/4 M.P.T.
65	103879	2	2	2	2	2	PLUG .. Pipe - 3/8 M.P.T.

LUBE OIL SYSTEM
Lube Oil Pumps and "Box" Type Lube Oil Strainer
Right Hand Rotation Engines
8,12,16,20-645E7,E7B,E7C and 12,16,20-645E4 Engines

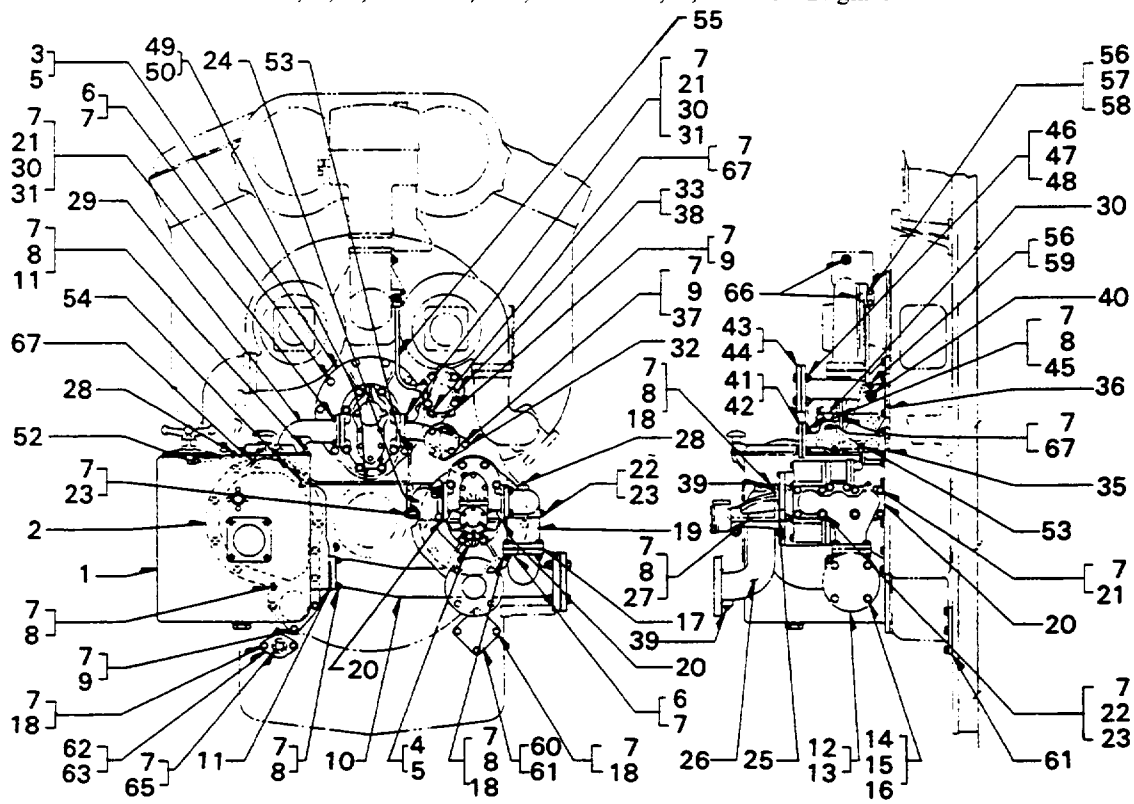

PLATE A34-20

Ref. No.	Part Number	Quantity Required								Description
		A	-	-	-	-	-	-	-	8-645E6 engines - R.H. rotation
		-	B	-	-	-	-	-	-	8-645E7,E7B,E7C and 12-645E6 engines - R.H. rotation
		-	-	C	-	-	-	-	-	12-645E4 engines - R.H. rotation
		-	-	-	D	-	-	-	-	12-645E7,E7B,E7C and 16-645E6 engines - R.H. rotation
		-	-	-	-	E	-	-	-	16-645E7,E7B,E7C engines - R.H. rotation
		-	-	-	-	-	F	-	-	16-645E4 engines - R.H. rotation
		-	-	-	-	-	-	G	-	20-645E4 engines - R.H. rotation
		-	-	-	-	-	-	-	H	20-645E7,E7B,E7C engines - R.H. rotation
1	8269263	1	1	1	1	1	1	1	1	STRAINER .. Lube oil } See P.L. 36
ϕ1	8186776	1	1	1	1	1	1	1	1	STRAINER .. Lube oil } See P.L. 36
2	8080850	1	1	1	1	1	1	1	1	GASKET .. Lube oil strainer mounting
3	8176033	1	-	-	-	-	-	-	-	PUMP .. Piston cooling and pressure
3	8106919	-	1	-	-	-	-	-	-	PUMP .. Piston cooling and pressure
3	8084556	-	-	1	1	-	-	-	-	PUMP .. Piston cooling and pressure } See P.L. 38
3	9330012	-	-	-	-	1	1	-	-	PUMP .. Piston cooling and pressure
3	9330013	-	-	-	-	-	-	1	1	PUMP .. Piston cooling and pressure
4	8449658	1	-	-	-	-	-	-	-	PUMP .. Scavenging and fuel oil
4	8417810	-	1	-	-	-	-	-	-	PUMP .. Scavenging and fuel oil
4	8417754	-	-	1	1	-	-	-	-	PUMP .. Scavenging and fuel oil } See P.L. 40
4	8417074	-	-	-	-	1	1	1	1	PUMP .. Scavenging and fuel oil
5	8028264	2	2	2	2	2	2	2	2	GASKET .. Pump - Scavenging and piston cooling
6	181432	20	20	20	20	20	20	20	20	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
7	6101229	91	99	96	96	99	99	97	99	WASHER .. Flat - 1/2

8452038, 8473359, 9092892, 8431182, 8426325, 8460921, 9089922, 8423406

P.L. No. B34

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
8	8032719	26	26	21	22	22	21	21	22	NUT .. Lock - 1/2 - 20 hex.
9	181433	18	18	18	18	18	18	18	18	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
10	8413281	1	1	1	1	1	1	1	1	PIPE .. Flanged - Strainer to scavenging pump elbow
11	8074661	2	2	2	2	2	2	2	2	GASKET .. Strainer to pipe and elbow
12	8420530	1	1	1	1	1	1	1	1	FLANGE .. Blind - 3 IPS
13	8420529	1	1	1	1	1	1	1	1	GASKET .. Blind flange
14	271591	4	4	4	4	4	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 3
15	8032721	4	4	4	4	4	4	4	4	NUT .. Lock - 5/8 - 18 hex.
16	6101233	4	4	4	4	4	4	4	4	WASHER .. Flat - 5/8
17	8242869	1	1	1	1	1	1	1	1	GASKET .. Pipe to scavenging pump elbow
18	181436	10	10	6	6	6	10	10	6	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
19	8247126	1	-	-	-	-	-	-	-	ELBOW .. Scavenging pump inlet
19	8242039	-	1	-	-	-	-	-	-	ELBOW .. Scavenging pump inlet
19	8242145	-	-	1	1	-	-	-	-	ELBOW .. Scavenging pump inlet
19	8296007	-	-	-	-	1	1	1	1	ELBOW .. Scavenging pump inlet
20	8029467	2	-	4	4	-	-	-	-	GASKET .. Elbows to scavenging pump
20	8029150	-	4	-	-	-	-	-	-	GASKET .. Elbows to scavenging pump
20	8251951	-	-	-	-	2	2	2	2	GASKET .. Elbows to scavenging pump
21	179885	16	22	25	24	38	36	28	30	BOLT .. Hex. head - 1/2 - 13 x 1-1/2
22	189787	2	5	1	5	6	2	2	6	BOLT .. Hex. head - 1/2 - 13 x 4-1/4
23	190270	2	2	1	-	-	2	2	-	BOLT .. Hex. head - 1/2 - 13 x 5-1/4
24	8449446	1	-	-	-	-	-	-	-	ELBOW .. Scavenging pump outlet
24	8414033	-	1	-	-	-	-	-	-	ELBOW .. Scavenging pump outlet
24	9323018	-	-	1	-	-	-	-	-	ELBOW .. Scavenging pump outlet
24	8414489	-	-	-	1	-	-	-	-	ELBOW .. Scavenging pump outlet
24	8413277	-	-	-	-	1	-	-	1	ELBOW .. Scavenging pump outlet
24	9323019	-	-	-	-	-	1	1	-	ELBOW .. Scavenging pump outlet
25	8366787	1	1	1	1	1	1	1	1	GASKET .. Elbow to elbow
26	8413279	1	1	1	1	1	1	1	1	ELBOW .. Lube oil outlet
27	186339	2	2	1	2	2	1	1	2	BOLT .. Hex. head - 1/2 - 20 x 5-1/4
27	190270	-	-	1	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/4
27	190256	-	-	-	-	-	1	1	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/2
28	103878	1	1	2	2	2	2	2	2	PLUG .. Pipe - 1/4 M.P.T.
29	8450767	1	-	-	-	-	-	-	-	ELBOW .. Strainer to pump
29	8414032	-	1	-	-	-	-	-	-	ELBOW .. Strainer to pump
29	8414488	-	-	1	1	-	-	-	-	ELBOW .. Strainer to pump
29	8414192	-	-	-	-	1	1	-	-	ELBOW .. Strainer to pump
29	8413276	-	-	-	-	-	-	1	1	ELBOW .. Strainer to pump
30	8029482	2	-	-	-	-	-	-	-	GASKET .. Elbows to pump - Front ports
30	8029151	-	2	-	-	-	-	-	-	GASKET .. Elbows to pump - Front ports
30	8029470	-	-	2	2	-	-	-	-	GASKET .. Elbows to pump - Front ports
30	8251950	-	-	-	-	2	2	-	-	GASKET .. Elbows to pump - Front ports
30	8360530	-	-	-	-	-	-	2	2	GASKET .. Elbows to pump - Front and rear ports
31	8029470	2	-	-	-	-	-	-	-	GASKET .. Elbows to pump - Rear ports
31	8029150	-	2	-	-	2	2	-	-	GASKET .. Elbows to pump - Rear ports
31	8029467	-	-	2	2	-	-	-	-	GASKET .. Elbows to pump - Rear ports
32	8246617	1	-	-	-	-	-	-	-	ELBOW .. Piston cooling
32	8243110	-	1	-	-	-	-	-	-	ELBOW .. Piston cooling
32	8242184	-	-	1	1	-	-	-	-	ELBOW .. Piston cooling
32	8295671	-	-	-	-	1	1	-	-	ELBOW .. Piston cooling
32	8372889	-	-	-	-	-	-	1	1	ELBOW .. Piston cooling
33	8246879	1	-	-	-	-	-	-	-	ELBOW .. Lube oil supply
33	8243109	-	1	-	-	-	-	-	-	ELBOW .. Lube oil supply
33	8242548	-	-	1	1	-	-	-	-	ELBOW .. Lube oil supply
33	8296008	-	-	-	-	1	1	-	-	ELBOW .. Lube oil supply
33	8373606	-	-	-	-	-	-	1	1	ELBOW .. Lube oil supply
*34	8020772	2	2	2	2	2	2	2	2	STUD .. 3/8 - 16 x 3/8 - 24 x 2 in. long
35	8082586	1	1	1	1	1	1	1	1	SEAL .. OIL - Piston cooling elbow to oil manifold tube
36	8082587	1	1	1	1	1	1	1	1	SEAL .. OIL - Lube oil supply elbow to oil manifold tube
37	8082964	1	1	1	1	1	1	1	1	GASKET .. Piston cooling elbow to drive housing
38	8082965	1	1	1	1	1	1	1	1	GASKET .. Lube oil supply elbow to drive housing

P.L. No. B34

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
39	103880	2	2	2	2	2	2	2	2	PLUG .. Pipe - 1/2 M.P.T.
40	113177	2	2	2	2	2	2	2	2	PLUG .. Pipe - 3/4 M.P.T.
41	8409155	1	1	-	-	-	-	-	-	FLANGE .. Blind - 1 IPS
41	8409156	-	-	1	1	1	1	1	1	FLANGE .. Blind - 1-1/4 IPS
42	8409159	1	1	-	-	-	-	-	-	GASKET .. Blind flange
42	8409160	-	-	1	1	1	1	1	1	GASKET .. Blind flange
43	8409157	1	1	-	-	-	-	-	-	FLANGE .. Blind - 1-1/2 IPS
43	8422067	-	-	1	1	1	1	1	1	FLANGE .. Blind - 2 IPS
44	8409161	1	1	-	-	-	-	-	-	GASKET .. Blind flange
44	8422068	-	-	1	1	1	1	1	1	GASKET .. Blind flange
45	181435	4	4	4	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 20 x 2
46	181436	4	4	-	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
46	271589	-	-	4	4	4	4	4	4	BOLT .. Hex. head - 5/8 - 18 x 2-1/2
47	8032721	-	-	4	4	4	4	4	4	NUT .. Lock - 5/8 - 18 hex.
48	6101233	-	-	4	4	4	4	4	4	WASHER .. Flat - 5/8
49	8431619	1	1	1	1	-	-	-	-	LINE .. Oil - Lube oil supply to strainer
49	8425313	-	-	-	-	1	1	1	1	LINE .. Oil - Lube oil supply to strainer
50	8098593	As Required								TUBING .. Steel - Copper brazed - 1/4 O.D. x 20 ft.
*51	116452	2	2	2	2	2	2	2	2	NUT .. Tube - 1/4 - 45° flare
52	118753	1	1	1	1	1	1	1	1	ELBOW .. 90° - 1/4 tube x 1/8 M.P.T.
53	118748	1	1	1	1	1	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
54	3247504	1	1	1	1	1	1	1	1	CLIP .. Tube
55	8242558	1	1	1	1	1	1	1	1	LINE .. Oil - Lube oil supply to governor drive
56	8029154	2	2	2	2	2	2	2	2	GASKET .. Oil line mounting
57	179845	2	2	2	2	2	2	2	2	BOLT .. Hex. head - 3/8 - 16 x 1-3/4
58	6101225	2	2	2	2	2	2	2	2	WASHER .. Flat - 3/8
59	8032717	2	2	2	2	2	2	2	2	NUT .. Lock - 3/8 - 24 hex.
60	8420216	1	1	-	1	1	-	-	1	FLANGE .. Blind
61	3323820	1	1	-	1	1	-	-	1	GASKET .. Blind flange
62	8409542	1	1	-	1	1	-	-	1	FLANGE .. Pipe
63	8409541	1	1	-	1	1	-	-	1	GASKET .. Pipe flange
64	106643	1	1	-	1	1	-	-	1	PLUG .. Pipe - 1-1/2 M.P.T.
65	181435	2	2	-	2	2	-	-	2	BOLT .. Hex. head - 1/2 - 20 x 2
66	103879	2	2	2	2	2	2	2	2	PLUG .. Pipe - 3/8 M.P.T.
67	186336	1	-	-	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 4-1/2
67	186338	-	1	-	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 5
67	186340	-	-	1	1	-	-	-	-	BOLT .. Hex. head - 1/2 - 20 x 5-1/2
67	8299679	-	-	-	-	1	1	-	-	BOLT .. Hex. head - 1/2 - 20 x 7-1/2
67	273012	-	-	-	-	-	-	1	1	BOLT .. Hex. head - 1/2 - 20 x 7

P.L. No. B34

LUBE OIL SYSTEM
Lube Oil Pumps and "Box" Type Lube Oil Strainer
645E1,E4,E4B,E8,E9,E9B Engines

PLATE A34-21

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	8-645E1,E8 engines
		-	B	-	-	-	-	-	12-645E1,E8 engines
		-	-	C	-	-	-	-	16-645E1,E8 engines
		-	-	-	D	-	-	-	8-645E4,E4B engines
		-	-	-	-	E	-	-	12-645E4,E4B,E9,E9B engines
		-	-	-	-	-	F	-	16-645E4,E4B,E9,E9B,E10B engines
		-	-	-	-	-	-	G	20-645E4,E4B,E9,E9B,E10B engines
1	8225323	1	-	-	-	-	-	-	STRAINER ASM. .. Lube oil - SR11E1A & SR11E1W models
ϕ1	8186776	1	1	1	-	-	-	-	STRAINER ASM. .. Lube oil - Less valve, body pipe, and stop gate - Applies to columns A-C except SR11E1A & SR11E1W models
ϕ1	8269263	1	1	1	1	1	1	1	STRAINER ASM. .. Lube oil - With valve, body pipe, and stop gate - All models except SR11E1A and SR11E1W
									See P.L. 36
2	8080850	1	1	1	1	1	1	1	GASKET .. Strainer to accessory cover
3	181433	12	12	12	12	12	12	12	BOLT .. Strainer mounting - 1/2 - 20 x 1-3/4 hex. head
4	8032719	2	2	2	2	2	2	2	NUT .. Lock - 1/2 - 20 hex.
5	6101229	14	14	14	14	14	14	14	WASHER .. Plain - 1/2
6	8118274	1	-	-	-	-	-	-	PIPE .. Connecting
6	8097348	-	1	-	1	-	-	-	PIPE .. Connecting
6	8082674	-	-	1	-	1	-	-	PIPE .. Connecting
6	8251745	-	-	-	-	-	1	1	PIPE .. Connecting
									Strainer to scavenging pump
7	8074661	1	1	1	1	1	1	1	GASKET .. Pipe to strainer
8	8032719	4	4	4	4	4	4	4	NUT .. Lock - 1/2 - 20 hex.
9	6101229	4	4	4	4	4	4	4	WASHER .. Plain - 1/2
10	8029467	1	-	2	-	2	-	-	GASKET
10	8029150	-	2	-	2	-	-	-	GASKET
10	8251951	-	-	-	-	-	1	1	GASKET
									Pipe to scavenging pump
11	179885	2	4	6	4	6	8	8	BOLT .. 1/2 - 13 x 1-1/2 hex. head
11	190270	2	-	-	-	-	-	-	BOLT .. 1/2 - 13 x 4-1/4 hex. head
11	179897	-	2	-	2	-	-	-	BOLT .. 1/2 - 13 x 4 hex. head
12	190256	-	1	1	1	1	2	2	BOLT .. 1/2 - 13 x 4-1/2 hex. head
13	6101229	4	7	7	7	7	10	10	WASHER .. Plain - 1/2
14	8118248	1	-	-	-	-	-	-	ELBOW
14	8097345	-	1	-	1	-	-	-	ELBOW
14	8080166	-	-	1	-	1	-	-	ELBOW
14	8251965	-	-	-	-	-	1	-	ELBOW
14	8360557	-	-	-	-	-	-	1	ELBOW
									Strainer to piston cooling and main bearing oil pump
15	8074661	1	1	1	1	1	1	1	GASKET .. Elbow to strainer
16	8032719	4	4	4	4	4	4	4	NUT .. Lock - 1/2 - 20 hex.
17	6101229	4	4	4	4	4	4	4	WASHER .. Plain - 1/2
18	8029470	1	-	1	-	1	-	-	GASKET
18	8029482	1	-	-	-	-	-	-	GASKET
18	8029150	-	1	-	1	-	1	-	GASKET
18	8029151	-	1	-	1	-	-	-	GASKET
18	8029467	-	-	1	-	1	-	-	GASKET
18	8251950	-	-	-	-	-	1	-	GASKET
18	8360530	-	-	-	-	-	-	1	GASKET
									Elbow to pressure pump
19	179885	6	8	8	8	8	8	8	BOLT .. Elbow to pump - 1/2 - 13 x 1-1/2 hex. head
20	6101229	6	8	8	8	8	8	8	WASHER .. Plain - 1/2
21	8117467	1	-	-	-	-	-	-	ELBOW
21	8097346	-	1	-	1	-	-	-	ELBOW
21	8082532	-	-	1	-	1	-	-	ELBOW
21	8251654	-	-	-	-	-	1	-	ELBOW
21	8360555	-	-	-	-	-	-	1	ELBOW
									Piston cooling

8371285F, 8396359E, 8396225F, 8480249, 8370395H, 8396081K, 8476417, 8380913J, 8381265L, 8471822, 8393865J, 8470399, 8367591, 8366522

LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	8-645E1,E8 engines
		-	B	-	-	-	-	-	12-645E1,E8 engines
		-	-	C	-	-	-	-	16-645E1,E8 engines
		-	-	-	D	-	-	-	8-645E4,E4B engines
		-	-	-	-	E	-	-	12-645E4,E4B,E9,E9B engines
		-	-	-	-	-	F	-	16-645E4,E4B,E9,E9B,E10B engines
		-	-	-	-	-	-	G	20-645E4,E4B,E9,E9B,E10B engines
22	113177	1	1	1	1	1	1	1	PLUG .. Pipe - 3/4 M.P.T.
23	8029482	1	-	-	-	-	-	-	GASKET }
23	8029151	-	1	-	1	-	-	-	GASKET } Piston cooling elbow to pump
23	8029470	-	-	1	-	1	-	-	GASKET }
23	8029150	-	-	-	-	-	1	-	GASKET }
23	8360530	-	-	-	-	-	-	1	GASKET .. Piston cooling and supply elbows to pump
24	179885	2	4	4	4	4	4	4	BOLT .. 1/2 - 13 x 1-1/2 hex. head
25	8082586	1	1	1	1	1	1	1	SEAL .. Elbow to cover
26	8082964	1	1	1	1	1	1	1	GASKET .. Elbow to cover
*26A	6101229	2	4	4	4	4	4	4	WASHER .. Plain
27	8085838	1	1	1	1	1	1	1	OIL LINE .. Piston cooling oil pump outlet to strainer
28	8085799	2	2	2	2	2	2	2	CLAMP .. Tube
*29	116452	2	2	2	2	2	2	2	NUT .. 1/4 tube
30	118748	1	1	1	1	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
31	118753	1	1	1	1	1	1	1	ELBOW .. 7/16 - 20 U.N.F. x 1/8 - 27 dry seal N.P.T.
32	8453906	1	-	-	-	-	-	-	ELBOW ASM. .. Replaces 8117442 }
32	8453905	-	1	-	1	-	-	-	ELBOW ASM. .. Replaces 8097755 }
32	8444177	-	-	1	-	1	-	-	ELBOW ASM. .. Replaces 8082451 } Supply
32	8430437	-	-	-	-	-	1	-	ELBOW ASM. .. Replaces 8296896 }
32	8436704	-	-	-	-	-	-	1	ELBOW ASM. .. Replaces 8360529 }
33	8020772	2	2	2	2	2	2	2	STUD .. 3/8 - 16 - 24 x 2 in. long 8123064 .. .002 O.S. 8123065 .. .004 O.S. 8126917 .. .015 O.S.
*33A	8084872	-	2	2	2	2	-	-	STUD .. 5/16 - 18 - 24 x 1-1/2 in. lg. 8123044 .. .002 O.S. 8123045 .. .004 O.S. 8126982 .. .015 O.S.
34	113177	1	1	1	1	1	1	1	PLUG .. Pipe - 3/4 M.P.T.
35	8029470	1	-	-	-	-	-	-	GASKET }
35	8029150	-	-	-	1	-	-	-	GASKET } Supply elbow to pump
35	8029467	-	-	1	-	1	-	-	GASKET }
35	8251950	-	1	-	-	-	1	-	GASKET }
36	179885	4	4	4	4	4	4	4	BOLT .. Elbow to pump - 1/2 - 13 x 1-1/2 hex. head
37	8082587	1	1	1	1	1	1	1	SEAL .. Supply elbow to cover
38	8082965	1	1	1	1	1	1	1	GASKET .. Supply elbow to cover
39	181433	7	7	7	7	7	7	7	BOLT .. 1/2 - 20 x 1-3/4 hex. head
40	6101229	11	11	11	11	11	11	11	WASHER .. Plain - 1/2
41	8079912	1	1	1	1	1	1	-	OIL LINE .. Governor drive
41	8360558	-	-	-	-	-	-	1	OIL LINE .. Governor drive
42	8029154	2	2	2	2	2	2	2	GASKET .. Oil line mounting
43	8032717	2	2	2	2	2	2	2	NUT .. Oil line to elbow - Lock - 3/8 - 24 hex.
44	179845	2	2	2	2	2	2	2	BOLT .. Oil line to governor drive - 3/8 - 16 x 1-3/4 hex. head
45	103321	2	2	2	-	-	-	-	WASHER .. Lock - 3/8
45	6101225	-	-	-	2	2	2	2	WASHER .. Plain - 3/8
46	118750	-	-	-	-	-	1	1	CONNECTOR .. 3/8 tube x 1/4 M.P.T. - Applied to early MP36,MP45, and 999-20 models
46	103878	1	1	1	-	-	1	1	PLUG .. Pipe - 1/4 M.P.T. - SR11E1A,W,SR12E1G,W,SR16E1G,GW, MP36,MP45 and 999-20 models after October, 1969
47	103879	2	2	2	2	2	2	2	PLUG .. Pipe - 3/8 M.P.T.
*48	8167195	1	-	-	-	-	-	-	TUBE ASM. .. Low oil pressure - SR11E1A,SR11E1W models only
*48	8290301	-	1	1	-	-	-	-	TUBE ASM. .. Low oil pres. - SR12E1G,W,SR16E1G,GW models only
*49	8118841	1	1	1	-	-	-	-	CLIP .. Tube - SR11E1A,W,SR12E1G,W,SR16E1G,GW models
*50	8236058	1	-	-	-	-	-	-	TUBE ASM. .. Lube oil pump suction - SR11E1A,W models prior 10/69
*50	8198335	-	1	1	-	-	-	-	TUBE ASM. .. Lube oil pump suction - SR12E1GW and SR16E1G,GW models prior Oct., 1969
*51	8109746	1	1	1	-	-	-	-	CLIP .. Tube } SR11E1A,W,SR12E1G,W and
*52	118755	1	1	1	-	-	-	-	ELBOW .. 3/8 tube x 1/4 M.P.T. } SR16E1G,GW models prior 10/69

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LUBE OIL SYSTEM

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	8-645E1,E8 engines
		-	B	-	-	-	-	-	12-645E1,E8 engines
		-	-	C	-	-	-	-	16-645E1,E8 engines
		-	-	-	D	-	-	-	8-645E4,E4B engines
		-	-	-	-	E	-	-	12-645E4,E4B,E9,E9B engines
		-	-	-	-	-	F	-	16-645E4,E4B,E9,E9B,E10B engines
		-	-	-	-	-	-	G	20-645E4,E4B,E9,E9B,E10B engines
53	8221309	1	-	-	-	-	-	-	PUMP ASM. .. Model SR11E1A only
53	8176033	1	-	-	-	-	-	-	PUMP ASM. .. Models S8E1G,SR11E1W, and MD8E8
53	8106919	-	1	-	1	-	-	-	PUMP ASM.
53	8084556	-	-	1	-	1	-	-	PUMP ASM.
53	9330012	-	-	-	-	-	1	-	PUMP ASM. .. Replaces 8252844
53	9330013	-	-	-	-	-	-	1	PUMP ASM. .. Replaces 8360554
54	8213579	1	-	-	-	-	-	-	PUMP ASM.
54	8212728	-	1	-	-	-	-	-	PUMP ASM.
54	8212777	-	-	1	-	1	-	-	PUMP ASM.
54	8252842	-	-	-	-	-	1	1	PUMP ASM.
54	8449658	1	-	-	-	-	-	-	PUMP ASM. .. Models MD8E8 and S8E1G after August, 1970
54	8417810	-	1	-	1	-	-	-	PUMP ASM.
54	8417754	-	-	1	-	1	-	-	PUMP ASM.
54	8417074	-	-	-	-	-	1	1	PUMP ASM.
55	8366785	1	1	1	1	1	1	1	GASKET .. Strainer inlet
55A	8022448	-	1	-	1	-	-	-	GASKET
55A	8029467	1	-	2	-	2	-	-	GASKET
55A	8251951	-	-	-	-	-	1	1	GASKET
56	8028264	2	2	2	2	2	2	2	GASKET .. Pump mounting
57	181432	20	20	20	20	20	20	20	BOLT .. Pump mounting - 1/2 - 20 x 1-5/8 hex. head
58	6101229	20	20	20	20	20	20	20	WASHER .. Plain - 1/2

Main bearing pressure and piston cooling - See Parts List 38

Scavenging & fuel oil - Threaded connection - See Parts List 40

Scavenging & fuel oil - Flanged connection - See Parts List 40

Inlet elbow to scavenging oil pump

LUBE OIL SYSTEM

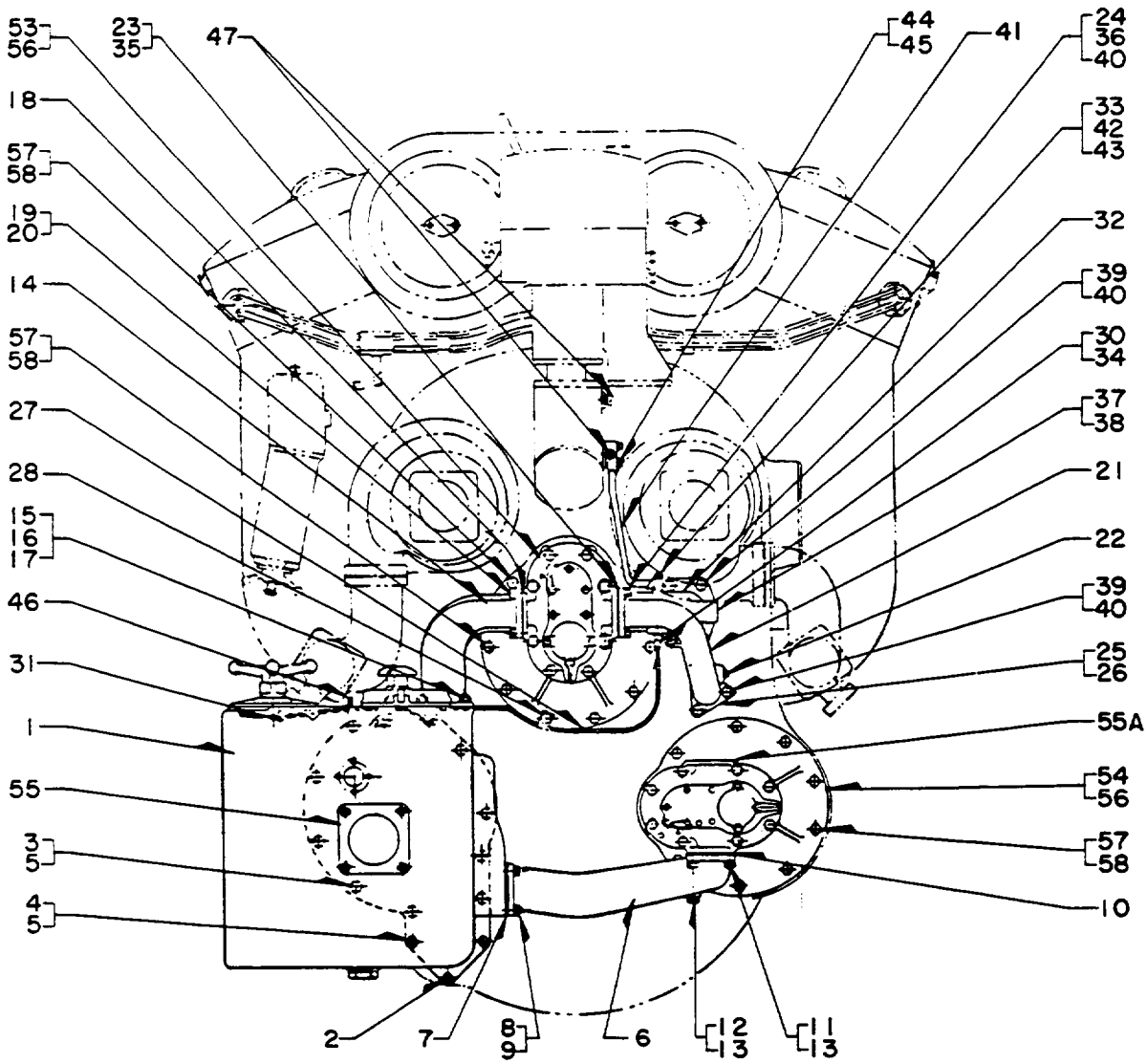

PLATE A34-21

Parts List No. B36

LUBE OIL STRAINER

645E1,E4,E4B,E6,E7,E7B,E7C,E8,E9,E9B,E10B Engines
PLATE A36-1

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
1	8225323	1	-	-	-	-	STRAINER ASM. .. Lube oil - Used on models SR11E1A and SR11E1W only
*2	8186776	-	1	-	-	-	STRAINER ASM. .. Lube oil - Without valve body, drain valve pipe, and stop gate - Previous design - See Ref. Nos. 113 thru 122 to convert to improved design
*3	8186776	-	-	1	-	-	STRAINER ASM. .. Lube oil - Without valve body, drain valve pipe, and stop gate - Improved design - (Since February 1977)
4	8269263	-	-	-	1	-	STRAINER ASM. .. Lube oil - With valve body, drain valve pipe, and stop gate - Previous design - See Ref. Nos. 109 thru 122 to convert to improved design
5	8269263	-	-	-	-	1	STRAINER ASM. .. Lube oil - With valve body, drain valve pipe, and stop gate - Improved design - (Since February 1977)
6	8225867	1	-	-	-	-	HOUSING ASM. .. Strainer
*7	8186761	-	1	1	-	-	HOUSING ASM. .. Strainer
8	8269261	-	-	-	1	1	HOUSING ASM. .. Strainer
9	8084871	8	11	11	11	11	STUD .. 1/2 - 13 - 20 x 2-7/16 in. long 8123046 .. .002 O.S. 8126980 .. .017 O.S. 8123047 .. .004 O.S. 8126981 .. .019 O.S. 8126979 .. .015 O.S.
10	8070517	1	-	-	-	-	STUD .. 1/2 - 13 - 20 x 2-11/16 in. long
11	8080447	-	1	1	1	1	STUD .. 1 - 8 x 3/4 - 10 x 6-1/32 in. long 8123080 .. .002 O.S. 8126968 .. .017 O.S. 8123081 .. .004 O.S. 8126969 .. .019 O.S. 8126967 .. .015 O.S.
12	8225868	2	-	-	-	-	STUD .. 1/2 - 13 - 20 x 4-1/2 in. long
13	8084560	4	4	4	4	4	INSERT .. Stud - 1/2 - 20 x 15/16 in. long
14	141067	4	4	4	4	4	PIN .. Dowel - 3/32 x 1/2 in. long
15	144026	6	-	-	-	-	PLUG .. Pipe - 1-1/2 M.P.T. square socket head
16	9314923	-	-	4	-	4	STUD .. Valve seat - 3/8 - 16 - 24 x 2-5/8 in. long
17	8225645	2	-	-	-	-	STRAINER ASM. .. Piston cooling and main bearing oil
18	8225649	2	-	-	-	-	SCREEN .. Strainer - No. 14 mesh - .020 wire cloth - Brass
19	8225650	2	-	-	-	-	SCREEN .. Strainer - No. 40 mesh - .010 wire cloth - Brass
20	8225651	2	-	-	-	-	DISC .. Screen
21	8225647	2	-	-	-	-	SCREEN .. Disc - No. 14 mesh - .020 wire cloth - Brass
22	8225652	2	-	-	-	-	SCREEN .. Disc - No. 40 mesh - .010 wire cloth - Brass
23	8225653	2	-	-	-	-	RETAINER .. Screen disc
24	8320144	-	2	2	2	2	STRAINER ASM. .. Piston cooling and main bearing oil
25	8320143	-	2	2	2	2	SCREEN ASM. .. Strainer
26	8317396	-	2	2	2	2	SCREEN .. Strainer - Pleated 40 mesh
27	8327306	-	2	2	2	2	COVER ASM. .. Strainer - Perforated metal
28	8317393	-	2	2	2	2	CYLINDER .. Cover
29	8327307	-	2	2	2	2	STUD ASM. .. Cover
30	8317395	-	2	2	2	2	STUD .. 3/8 - 16 - 24 x 18-3/16 in. long
31	114494	-	2	2	2	2	NUT .. Lock - 3/8 - 24 hex.
32	8032717	-	2	2	2	2	NUT .. Lock - 3/8 - 24 hex.
33	8225644	1	-	-	-	-	STRAINER ASM. .. Scavenging oil
34	8225646	1	-	-	-	-	SCREEN .. Strainer - No. 6 mesh - .025 wire cloth - Brass
ϕ35	8114990	1	-	-	-	-	RING .. Screen } Applied prior to September 1972
ϕ36	8114989	1	-	-	-	-	DISC .. Screen }
ϕ*36A	8481775	1	-	-	-	-	DISC ASM. .. Screen - Applied after September 1972

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LUBE OIL STRAINER

Ref. No.	Part Number	Quantity Required A	B	C	D	E	Description
		A	B	C	D	E	STRAINER ASM. .. Lube oil
37	8308586	-	1	1	1	1	STRAINER ASM. .. Scavenging oil
38	8308587	-	1	1	1	1	SCREEN .. Strainer - Perforated metal
*39	8339583	-	1	1	1	1	DISC .. Bottom
40	8310841	-	1	1	1	1	STUD .. 3/8 - 16 x 3/8 - 24 x 2-3/8 - Formerly 8479008
41	8481787	2	-	-	-	-	SEAL .. Strainer - 3.609 I.D.
42	8481786	1	-	-	-	-	SEAL .. Strainer - 2.859 I.D.
43	8085182	-	2	2	2	2	SEAL .. Piston cooling and main bearing strianer - 5-1/2 I.D.
44	8080445	-	1	1	1	1	CRAB .. Strainer
45	8085246	-	1	1	1	1	WHEEL .. Hand
46	8080852	-	1	1	1	1	GASKET .. Scavenging oil strainer
47	8226053	2	-	-	-	-	GASKET .. Piston cooling and main bearing strainer to housing
48	8226051	1	-	-	-	-	GASKET .. Scavenging oil strainer to housing
49	8478924	-	1	1	1	1	SEAL .. Ring - Scavenging oil strainer - 4.859 I.D.
50	8481655	1	-	-	-	-	PLATE ASM. .. Strainer - Replaces 8226050
51	8478893	-	1	1	1	1	PLATE .. Strainer - Basket - Replaces 8186925 and 8269287
52	8032717	-	1	5	1	5	NUT .. Lock - 3/8 - 24 hex.
53	8032719	-	3	3	3	3	NUT .. Lock - 1/2 - 20 hex.
54	8349503	3	-	-	-	-	WASHER .. Plain - 1/2
55	219207	1	-	-	-	-	NUT .. Wing - 1/2 - 20
56	8085693	1	1	1	1	1	COVER ASM. .. Strainer
57	8085692	1	1	1	1	1	COVER .. Strainer
58	8085226	2	2	2	2	2	GUIDE .. Long
59	8085227	2	2	2	2	2	GUIDE .. Short
60	8085253	1	1	1	1	1	GASKET .. Cover
61	179816	8	8	8	8	8	BOLT .. Cover - 5/16 - 18 x 3/4 hex. head
62	103320	8	8	8	8	8	WASHER .. Lock - 5/16 - Formerly 6101223
63	8085507	2	2	2	2	2	BOLT ASM. .. Swivel
64	8020891	2	2	2	2	2	BOLT .. Swivel - 3/8 - 16 x 1-1/4 in. long
65	8085149	2	2	2	2	2	CLEVIS .. Flanged
66	142520	2	2	2	2	2	PIN .. Taper groove - 1/4 x 1 in. long
67	179818	4	4	4	4	4	BOLT .. Clevis - 5/16 - 18 x 1 hex. head
68	103320	4	4	4	4	4	WASHER .. Lock - 5/16 - Formerly 6101223
69	8020893	2	2	2	2	2	HANDWHEEL .. 3/8 - 16
70	8178307	1	-	-	-	-	COCK .. Cut-out - 1/2
71	8034030	2	-	-	-	-	GASKET .. Cut-out cock mounting
72	8089433	1	-	-	-	-	ELBOW .. Flanged
73	103028	2	-	-	-	-	NUT .. 1/2 - 20 hex.
74	8174207	-	1	-	1	-	PLUG .. Drain
74	9314919	-	-	1	-	1	SEAT .. Valve
75	8174208	-	1	-	1	-	GASKET .. Drain plug - Rod
75	9314918	-	-	1	-	1	GASKET .. Valve seat mounting
76	8174213	-	1	-	1	-	ROD ASM. .. Drain
*76	9314922	-	-	1	-	1	ROD ASM. .. Drain
*77	453669	-	1	1	1	1	PIN .. Roll - 1/4 x 3 in. long
*78	454565	-	1	1	1	1	PIN .. Roll - 1/4 - 1-1/4 in. long
*79	9335408	-	-	1	-	1	SEAL .. Plug - Replaces 9314920
*80	9315446	-	-	1	-	1	SEAL .. Rod asm. plug
81	103758	-	1	1	1	1	PIN .. Straight - 5/16 x 1-1/2 in. long
82	8174209	-	1	1	1	1	RETAINER .. Rod
83	8175063	-	1	1	1	1	SPRING .. Retainer
*84	8269124	-	-	-	1	-	BODY .. Valve - No longer available - Replaced by Ref. Nos. 85 thru 89
85	9321252	-	-	-	-	1	BODY .. Valve
*86	8269418	-	-	-	1	1	PIPE ASM. .. Strainer valve body
87	8269125	-	-	-	1	1	COVER .. Valve body
*88	9314757	-	-	-	-	1	SPRING .. Valve retainer
*89	9314756	-	-	-	-	1	RETAINER .. Valve
90	8269415	-	-	-	1	1	GASKET .. Valve mounting

Repl. 8269124 Valve Body

LUBE OIL STRAINER

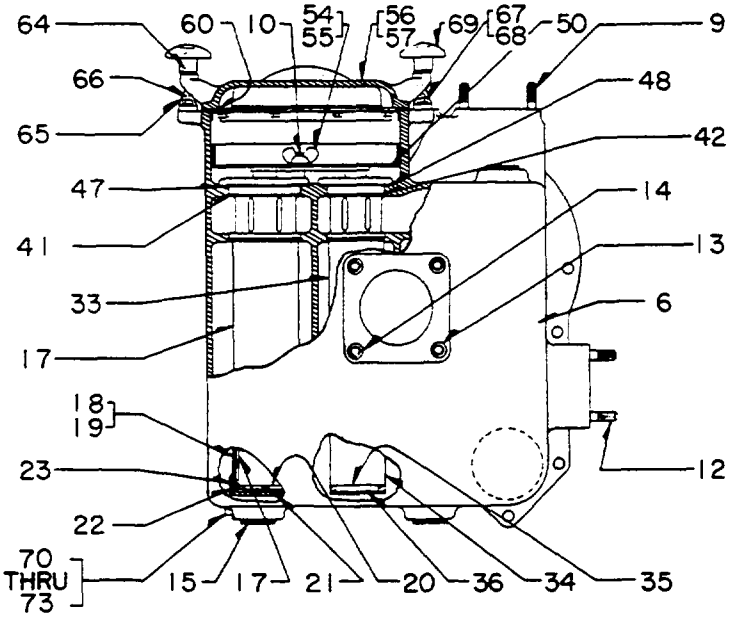
Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	STRAINER ASM. .. Lube oil
91	8269308	-	-	-	1	1	GATE ASM. .. Includes stop
*92	8269150	-	-	-	1	1	GATE ASM. .. Stop
*93	8269143	-	-	-	1	1	STOP ASM. .. Gate
*94	454512	-	-	-	2	2	PIN .. Spring - 3/16 x 3/4 in. long - Formerly 454812
*95	8269288	-	-	-	1	1	CLAMP ASM. .. Pipe
*96	8032743	-	-	-	1	1	NUT .. 3/8 - 16 hex.
97	179851	-	-	-	2	2	BOLT .. Valve mounting - 3/8 - 16 x 3 hex. head
98	179839	-	-	-	3	3	BOLT .. Valve mounting - 3/8 - 16 x 1 hex. head
99	6101225	-	-	-	4	8	WASHER .. Plain - 3/8
+100	8366785	1	2	2	1	1	GASKET .. Main lube oil inlet and flanged elbow (Ref. No. 104)
+101	8080850	1	1	1	1	1	GASKET .. Strainer to housing cover
+102	8074661	2	2	2	2	2	GASKET .. Scavenging and main lube oil outlet
*+103	8218365	-	1	1	-	-	FLANGE .. Lube oil inlet - 5/8 in. thick
*+104	8428233	-	1	1	-	-	ELBOW .. Flanged - 90° - 3.25 O.D. tubing
*+105	181432	-	4	4	-	-	BOLT .. Hex. head 1/2 - 20 x 1-5/8
*+106	6101229	-	4	4	-	-	WASHER .. Flat - 1/2
*+107	8496989	-	1	1	1	1	GASKET KIT .. Lube oil strainer element - See Parts List 99
*+108	8496990	-	1	1	1	1	GASKET KIT .. Lube oil suction strainer - See Parts List 99

The following components are required to convert from the original design to the current design lube oil strainer. See M.I. 9618 or contact our Service Department for details.

*109	9321252	-	-	-	1	-	BODY .. Valve	Required for conversion of gate valve
*110	8269418	-	-	-	1	-	PIPE ASM. .. Strainer	
*111	9314757	-	-	-	1	-	SPRING .. Valve retainer	
*112	9314756	-	-	-	1	-	RETAINER .. Valve	
*113	9314896	-	1	-	1	-	PLATE ASM. .. Adapter	Required for conversion of strainer housing drain
*114	9314898	-	4	-	4	-	STUD .. Adapter plate to valve seat - 3/8 - 16 - 24 x 2-1/16 in. long	
*115	9314899	-	1	-	1	-	GASKET .. Adapter plate to housing	
*116	110532	-	8	-	8	-	SCREW .. Adapter plate to housing - No. 10 - 24 x 5/8 flat head - Slotted	
*117	9314919	-	1	-	1	-	SEAT .. Valve	
*118	9314918	-	1	-	1	-	GASKET .. Valve seat mounting	
*119	9314922	-	1	-	1	-	ROD ASM. .. Drain	
*120	9315446	-	1	-	1	-	SEAL .. Rod asm. plug	
*121	8032717	-	4	-	4	-	NUT .. Lock - 3/8 - 24 hex.	
*122	6101225	-	4	-	4	-	WASHER .. Plain - 3/8	

P.L. No. B36

LUBE OIL STRAINER



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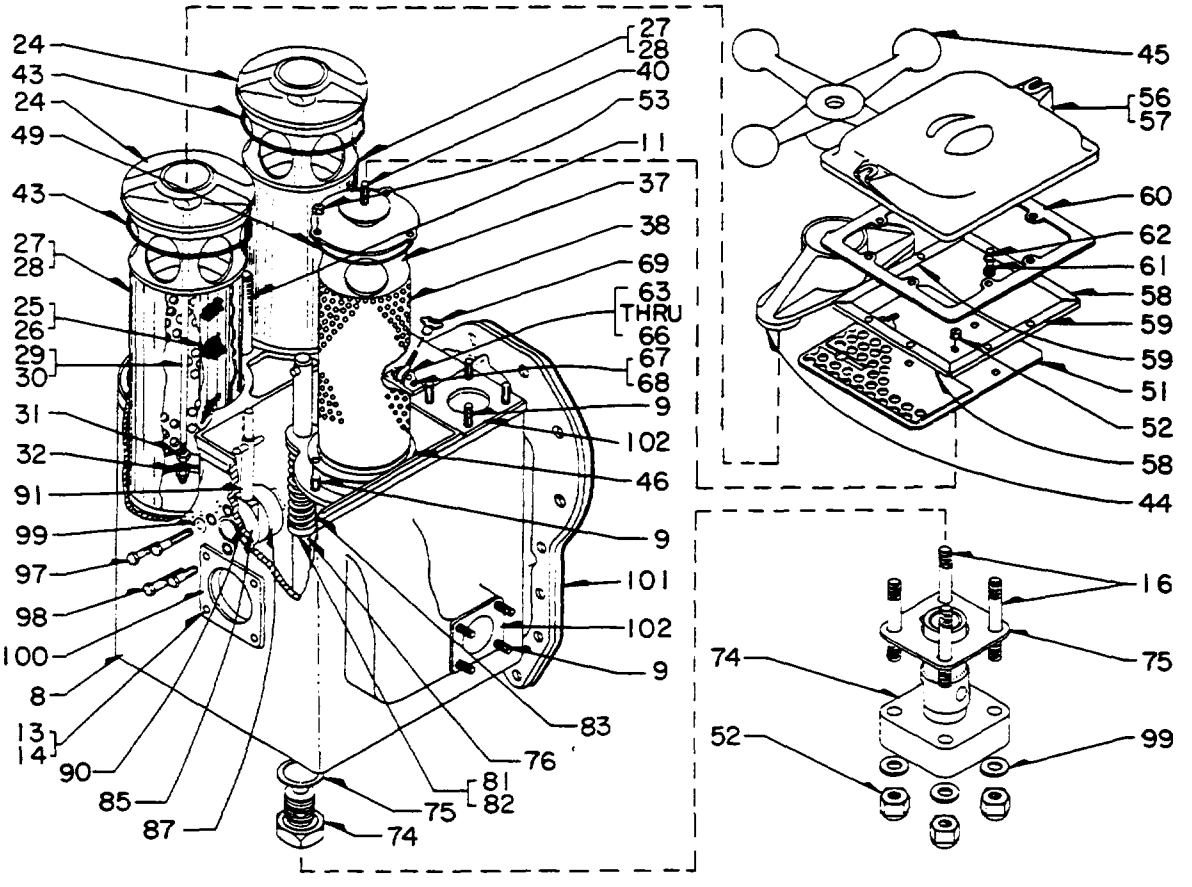


Ref. Nos. 4 and 5

PLATE A36-1

Parts List No. B38

PISTON COOLING AND PRESSURE PUMP

All 645 Engines
PLATE B38-1

Ref. No.	Part Number	Quantity Required								Description
		A	-	-	-	-	-	-	-	8-645E1 engines (Model SR11E1A only)
		-	B	-	-	-	-	-	-	8-645E1,E2,E6,E8 engines (Except Model SR11E1A)
		-	-	C	-	-	-	-	-	8-645E4,E4B,E5,E7,E7B,E7C and 12-645E1,E2,E6,E8 engines
		-	-	-	D	-	-	-	-	12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B and 16-645E1,E2, E6,E8 engines
		-	-	-	-	E	-	-	-	16-645E4,E5,E7,E9 engines
		-	-	-	-	-	F	-	-	16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
		-	-	-	-	-	-	G	-	20-645E4,E5,E7,E9 engines
		-	-	-	-	-	-	-	H	20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
1	8221309	1	-	-	-	-	-	-	-	PUMP ASM. .. Piston cooling and pressure
*2	8176033	-	1	-	-	-	-	-	-	PUMP ASM. .. Piston cooling and pressure
*3	8106919	-	-	1	-	-	-	-	-	PUMP ASM. .. Piston cooling and pressure - UTEX 8122947
*4	8084556	-	-	-	1	-	-	-	-	PUMP ASM. .. Piston cooling and pressure - UTEX 8122949
†5	8252844	-	-	-	-	1	-	-	-	PUMP ASM. .. Piston cooling and pressure - Replaced by 9330012 - UTEX Part No. 8296366
*6	9330012	-	-	-	-	-	1	-	-	PUMP ASM. .. Piston cooling and pressure - Replaces 8252844 - UTEX Part No. 8296366
*†7	8360554	-	-	-	-	-	-	1	-	PUMP ASM. .. Piston cooling and pressure - Replaced by 9330013 - UTEX Part No. 8427270
*8	9330013	-	-	-	-	-	-	-	1	PUMP ASM. .. Piston cooling and pressure - Replaces 8360544 - UTEX Part No. 8427270
9	8221310	1	-	-	-	-	-	-	-	BODY .. Pump - Rear
* 9	8176026	-	1	-	-	-	-	-	-	BODY .. Pump - Rear
* 9	8106920	-	-	1	-	-	-	-	-	BODY .. Pump - Rear
* 9	8084561	-	-	-	1	-	-	-	-	BODY .. Pump - Rear
9	8029458	-	-	-	-	1	1	-	-	BODY .. Pump - Rear
* 9	8360533	-	-	-	-	-	-	1	1	BODY .. Pump - Rear
10	8221312	1	-	-	-	-	-	-	-	BUSHING .. Rear body
*10	8039667	-	1	1	1	1	1	-	-	BUSHING .. Rear body
*10	8360532	-	-	-	-	-	-	1	1	BUSHING .. Rear body
11	8221316	1	-	-	-	-	-	-	-	BODY .. Pump - Front
*11	8029464	-	1	-	-	-	-	-	-	BODY .. Pump - Front
*11	8029457	-	-	1	-	-	-	-	-	BODY .. Pump - Front
*11	8029514	-	-	-	1	-	-	-	-	BODY .. Pump - Front
11	8029459	-	-	-	-	1	1	-	-	BODY .. Pump - Front
*11	8360536	-	-	-	-	-	-	1	1	BODY .. Pump - Front
12	8221318	1	-	-	-	-	-	-	-	BUSHING .. Front body
12	8039669	-	1	1	1	1	1	-	-	BUSHING .. Front body
*12	8360535	-	-	-	-	-	-	1	1	BUSHING .. Front body
13	8251622	-	-	-	-	1	1	-	-	BODY .. Pump - Center
14	8029144	2	2	2	2	2	2	2	2	PIN .. Dowel - 3/8 x 1-1/4
15	8028366	-	-	-	-	2	2	-	-	PIN .. Dowel - 3/8 x 7/8
16	8221320	1	-	-	-	-	-	-	-	COVER .. Pump - Formerly 8221300
16	8029562	-	1	1	1	1	1	-	-	COVER .. Pump
*16	8360537	-	-	-	-	-	-	1	1	COVER .. Pump

† *The center drive gear on lube oil pressure pumps 8252844 and 8360554 was formerly keyed to the drive shaft. Due to a change in design, the center drive gear is now attached to the rear drive gear by the use of two slotted spring pins. In addition, the center gear keyway on the drive shaft has been removed. If this new driveshaft (part numbers 9330010 for 16 cyl. pump and 9330011 for 20 cyl. pump) is to be used with the earlier design rear and center drive gears, these gears will have to be drilled to accept the required pins. Contact our Service Department for details regarding this modification. 8252844 and 8360544 pumps sent in on a unit exchange basis will be remanufactured to include the new design components.*

P.L. No. B38

PISTON COOLING AND PRESSURE PUMP

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	PUMP ASM. .. Piston cooling and pressure
17	8221319	1	-	-	-	-	-	-	-	GASKET .. Pump cover mounting
17	8029498	-	1	1	1	1	1	-	-	GASKET .. Pump cover mounting
*17	8360543	-	-	-	-	-	-	1	1	GASKET .. Pump cover mounting
18	8221314	1	-	-	-	-	-	-	-	SPACER .. Pump body
ϕ18	8029521	-	1	1	1	1	-	-	-	SPACER .. Pump body - With 2-9/16 dia. hole for collar
ϕ18	9330008	-	-	-	-	1	1	-	-	SPACER .. Pump body - With 3-1/16 dia. hole for collar
18	9330009	-	-	-	-	-	-	1	1	SPACER .. Pump body - Replaces 8360538 - Can be used with either 8360551 collar or 9330007 collar
19	8221315	1	-	-	-	-	-	-	-	COLLAR .. Gear spacing
ϕ19	8028884	-	1	1	1	1	-	-	-	COLLAR .. Gear spacing - 2-1/2 in. O.D.
ϕ19	9330006	-	-	-	-	1	1	-	-	COLLAR .. Gear spacing - 3 in. O.D.
*ϕ19	8360551	-	-	-	-	-	-	1	-	COLLAR .. Gear spacing - 2-3/4 in. O.D.
*ϕ19	9330007	-	-	-	-	-	-	1	1	COLLAR .. Gear spacing - 3 in. O.D.
20	8029034	2	2	2	2	3	3	-	-	GASKET .. Body and spacer
*20	8360539	-	-	-	-	-	-	2	2	GASKET .. Body and spacer
21	8221313	1	-	-	-	-	-	-	-	SHAFT .. Drive
*21	8176031	-	1	-	-	-	-	-	-	SHAFT .. Drive
*21	8106705	-	-	1	-	-	-	-	-	SHAFT .. Drive
*21	8084517	-	-	-	1	-	-	-	-	SHAFT .. Drive
21	8251661	-	-	-	-	1	-	-	-	SHAFT .. Drive - No longer available - Use 9330010 and (2) 456713 pins - See Note on Page 1
*21	9330010	-	-	-	-	-	1	-	-	SHAFT .. Drive
*21	8360540	-	-	-	-	-	-	1	-	SHAFT .. Drive - No longer available - Use 9330011 and (2) 456713 pins - See Note on Page 1
*21	9330011	-	-	-	-	-	-	-	1	SHAFT .. Drive
22	8029503	1	1	-	-	-	-	-	-	SHAFT .. Idler
*22	8029497	-	-	1	-	-	-	-	-	SHAFT .. Idler
*22	8084500	-	-	-	1	-	-	-	-	SHAFT .. Idler
22	8251623	-	-	-	-	1	1	-	-	SHAFT .. Idler
*22	8360541	-	-	-	-	-	-	1	1	SHAFT .. Idler
23	8176028	1	1	-	-	-	-	-	-	GEAR ASM .. Driven - Rear
*23	8106724	-	-	1	-	-	-	-	-	GEAR ASM. .. Driven - Rear
*23	8084508	-	-	-	1	-	-	-	-	GEAR ASM. .. Driven - Rear
23	8320057	-	-	-	-	1	1	-	-	GEAR ASM. .. Driven - Rear
*23	8360547	-	-	-	-	-	-	1	1	GEAR ASM. .. Driven - Rear
24	8176030	1	1	-	-	-	-	-	-	BUSHING .. Gear - Formerly 8176032
*24	8106723	-	-	1	-	-	-	-	-	BUSHING .. Gear
*24	8084503	-	-	-	1	-	-	-	-	BUSHING .. Gear
24	8318232	-	-	-	-	1	1	-	-	BUSHING .. Gear
*24	8360546	-	-	-	-	-	-	1	1	BUSHING .. Gear
25	8029463	1	1	-	-	-	-	-	-	GEAR ASM. .. Driven - Front
*25	8028869	-	-	1	-	-	-	-	-	GEAR ASM. .. Driven - Front
*25	8029492	-	-	-	1	-	-	-	-	GEAR ASM. .. Driven - Front - Formerly 8028492
25	8252365	-	-	-	-	1	1	-	-	GEAR ASM. .. Driven - Front
*25	8360549	-	-	-	-	-	-	1	1	GEAR ASM. .. Driven - Front
26	8029504	1	1	-	-	-	-	-	-	BUSHING .. Gear
*26	8028885	-	-	1	-	-	-	-	-	BUSHING .. Gear
*26	8029491	-	-	-	1	-	-	-	-	BUSHING .. Gear
26	8318232	-	-	-	-	1	1	-	-	BUSHING .. Gear
*26	8360546	-	-	-	-	-	-	1	1	BUSHING .. Gear

PISTON COOLING AND PRESSURE PUMP

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	PUMP .. Piston cooling and pressure
27	8320058	-	-	-	-	1	1	-	-	GEAR ASM. .. Driven - Center
*27	8360549	-	-	-	-	-	-	1	1	GEAR ASM. .. Driven - Center
28	8318232	-	-	-	-	1	1	-	-	BUSHING .. Gear
*28	8360546	-	-	-	-	-	-	1	1	BUSHING .. Gear
29	8176032	1	1	-	-	-	-	-	-	GEAR .. Drive - Rear
*29	8106721	-	-	1	-	-	-	-	-	GEAR .. Drive - Rear
*29	8084510	-	-	-	1	-	-	-	-	GEAR .. Drive - Rear
†29	8029522	-	-	-	-	1	-	-	-	GEAR .. Drive - Rear - Not available - Use 8485963
*29	8485963	-	-	-	-	-	1	-	-	GEAR .. Drive - Rear
*†29	8360544	-	-	-	-	-	-	1	-	GEAR .. Drive - Rear - Not available - Use 8485960
*29	8485960	-	-	-	-	-	-	-	1	GEAR .. Drive - Rear
30	8029531	1	1	-	-	-	-	-	-	GEAR .. Drive - Front
*30	8029037	-	-	1	-	-	-	-	-	GEAR .. Drive - Front
*30	8029533	-	-	-	1	-	-	-	-	GEAR .. Drive - Front
30	8252364	-	-	-	-	1	1	-	-	GEAR .. Drive - Front
*30	8360550	-	-	-	-	-	-	1	1	GEAR .. Drive - Front
†31	8029523	-	-	-	-	1	-	-	-	GEAR .. Drive - Center - Replaced by 9518047
*31	9518047	-	-	-	-	-	1	-	-	GEAR .. Drive - Center - Replaces 8485964 and 8029523
*†31	8360550	-	-	-	-	-	-	1	-	GEAR .. Drive - Center - For modified pump use 8485961
*31	8485961	-	-	-	-	-	-	-	1	GEAR .. Drive - Center - Formerly 8485962 gear asm.
32	117982	1	1	2	2	3	2	3	2	KEY .. Woodruff - 3/8 x 1-1/4
33	112139	1	1	-	-	-	-	-	-	KEY .. Woodruff - 1/4 x 7/8
*34	456713	-	-	-	-	-	2	-	2	PIN .. Slotted spring - 3/8 x 1 in. long
35	8035625	1	1	1	1	1	1	1	1	GEAR .. Spur - 80 tooth - Pump drive
36	8028329	4	4	4	4	4	4	4	4	BOLT .. Hex. head - 1/2 - 20 x 1-1/4 drilled
37	8458530	1	-	-	-	-	-	-	-	SLEEVE .. Driveshaft - Formerly required (2) - 8028880
37	8028880	-	1	1	1	1	1	-	-	SLEEVE .. Driveshaft
*37	8360542	-	-	-	-	-	-	1	1	SLEEVE .. Driveshaft
38	8081368	1	-	-	-	-	-	-	-	WASHER .. Special - 1-1/32 I.D. x 2-3/16 O.D. x 3/16
38	8384839	-	1	1	1	1	1	-	-	WASHER .. Special - 1-1/32 I.D. x 2-3/8 O.D. x 3/8
*38	8384840	-	-	-	-	-	-	1	1	WASHER .. Special - 1-5/32 I.D. x 2-15/32 O.D. x 3/8
39	8134735	1	1	1	1	1	1	-	-	NUT .. Lock - 1 - 14 hex.
*39	8358553	-	-	-	-	-	-	1	1	NUT .. Lock - 1 - 1/8 - 12 hex.
40	8081367	1	-	-	-	-	-	-	-	FLANGE .. Coupling
41	8081366	1	-	-	-	-	-	-	-	SHIELD .. Dust
42	9093702	1	-	-	-	-	-	-	-	SEAL .. O-Ring
43	8221321	1	-	-	-	-	-	-	-	SEAL .. Oil
44	8029495	1	1	1	1	1	1	1	1	BOLT .. Hex. head - Special 1/2 - 13 x 1-1/8 - Idler shaft locking
45	8029494	1	1	1	1	1	1	1	1	WASHER .. Copper - 1/2
46	8116738	As Required								WIRE .. Lock - 3/64 dia. x 500 ft.
47	8028313	1	1	1	1	1	1	-	-	BOLT .. Hex. head - 3/8 - 16 x 1 - Drilled
*47	8041206	-	-	-	-	-	-	1	1	BOLT .. Hex. head - 3/8 - 16 x 1-1/2 - Drilled
48	179839	2	4	4	4	4	4	-	-	BOLT .. Hex. head - 3/8 - 16 x 1
*48	179843	-	-	-	-	-	-	4	4	BOLT .. Hex. head - 3/8 - 16 x 1-1/2
49	179845	5	-	-	-	-	-	-	-	BOLT .. Hex. head - 3/8 - 16 x 1-3/4
49	179847	-	3	3	3	3	3	-	-	BOLT .. Hex. head - 3/8 - 16 x 2
*49	179848	-	-	-	-	-	-	3	3	BOLT .. Hex. head - 3/8 - 16 x 2-1/4

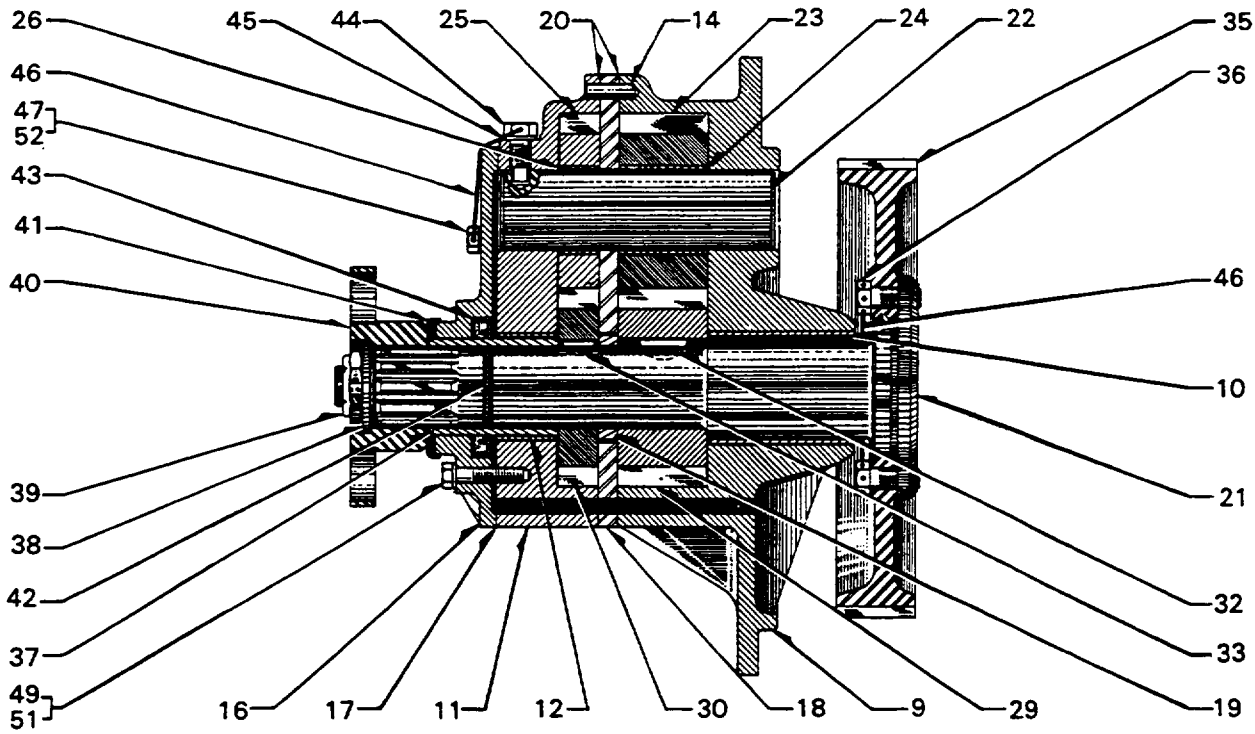
†*See Note on Page 1.*

P.L. No. B38

PISTON COOLING AND PRESSURE PUMP

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	PUMP ASM. .. Piston cooling and pressure
50	9412048	8	8	-	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 2-7/8
*50	9412049	-	-	4	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 3-1/8
*50	8028958	-	-	4	-	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 3-7/8
*50	179896	-	-	-	4	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 3-3/4
*50	179897	-	-	-	4	-	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 4
50	8294379	-	-	-	-	8	8	-	-	BOLT .. Hex. head - 1/2 - 13 x 7-1/4
*50	190270	-	-	-	-	-	-	8	8	BOLT .. Hex. head - 1/2 - 13 x 4-1/4
51	8029142	1	1	1	1	1	1	1	1	WASHER .. Copper - 3/8
52	103321	7	7	6	7	-	-	-	-	WASHER .. Lock - 3/8
52	6101225	-	-	-	-	7	7	7	7	WASHER .. Flat - Ground - 3/8
53	6101229	8	8	8	8	-	-	8	8	WASHER .. Flat - Ground - 1/2
53	8349503	-	-	-	-	8	8	-	-	WASHER .. Flat - 1/2 - Cadmium plated
*54	8028264	1	1	1	1	1	1	1	1	GASKET .. Pump mounting
*55	181432	10	10	10	10	10	10	10	10	BOLT .. Hex. head - 1/2 - 20 x 1-5/8 pump mounting
*55	6101229	10	10	10	10	10	10	10	10	WASHER .. Flat - Ground - 1/2
*57	8261166	1	1	-	1	-	-	-	-	KIT .. Gasket change out - See Parts List 99
*57	8210023	-	-	1	-	-	-	-	-	KIT .. Gasket change out - See Parts List 99
*57	8306356	-	-	-	-	1	1	-	-	KIT .. Gasket change out - See Parts List 99
*57	8375381	-	-	-	-	-	-	1	1	KIT .. Gasket change out - See Parts List 99

PISTON COOLING AND PRESSURE PUMP



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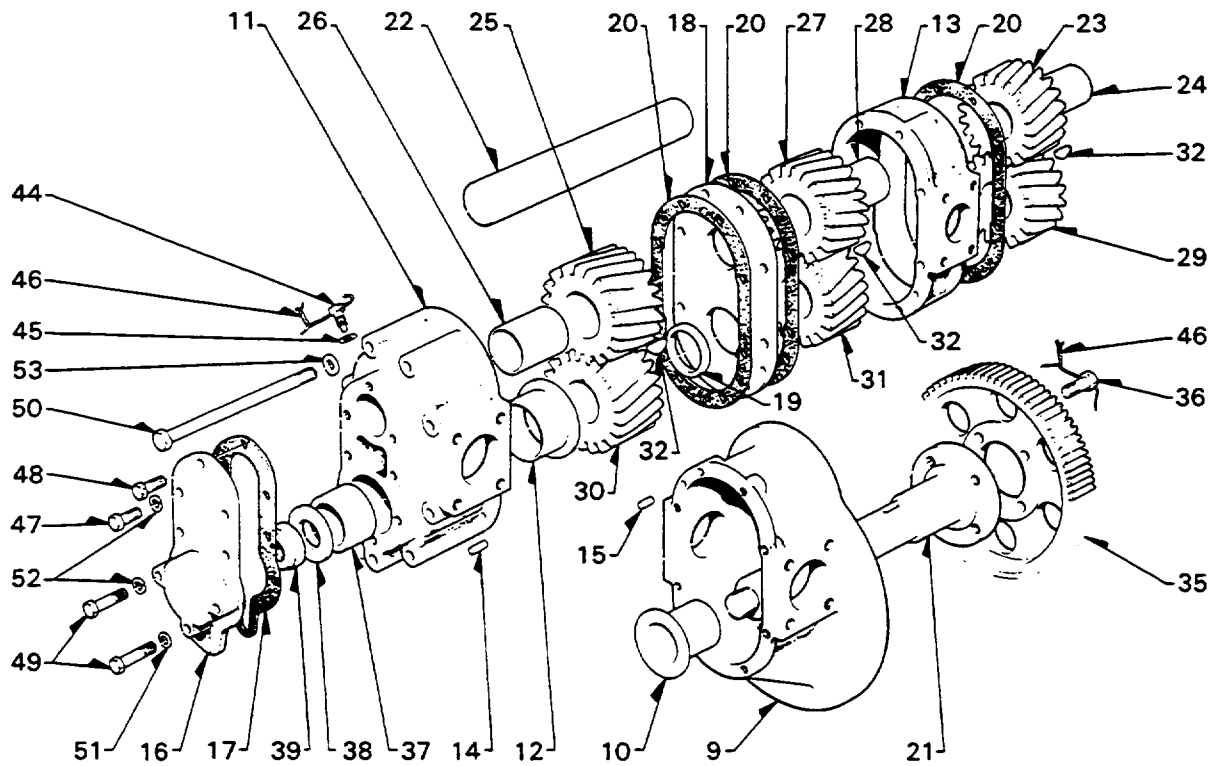
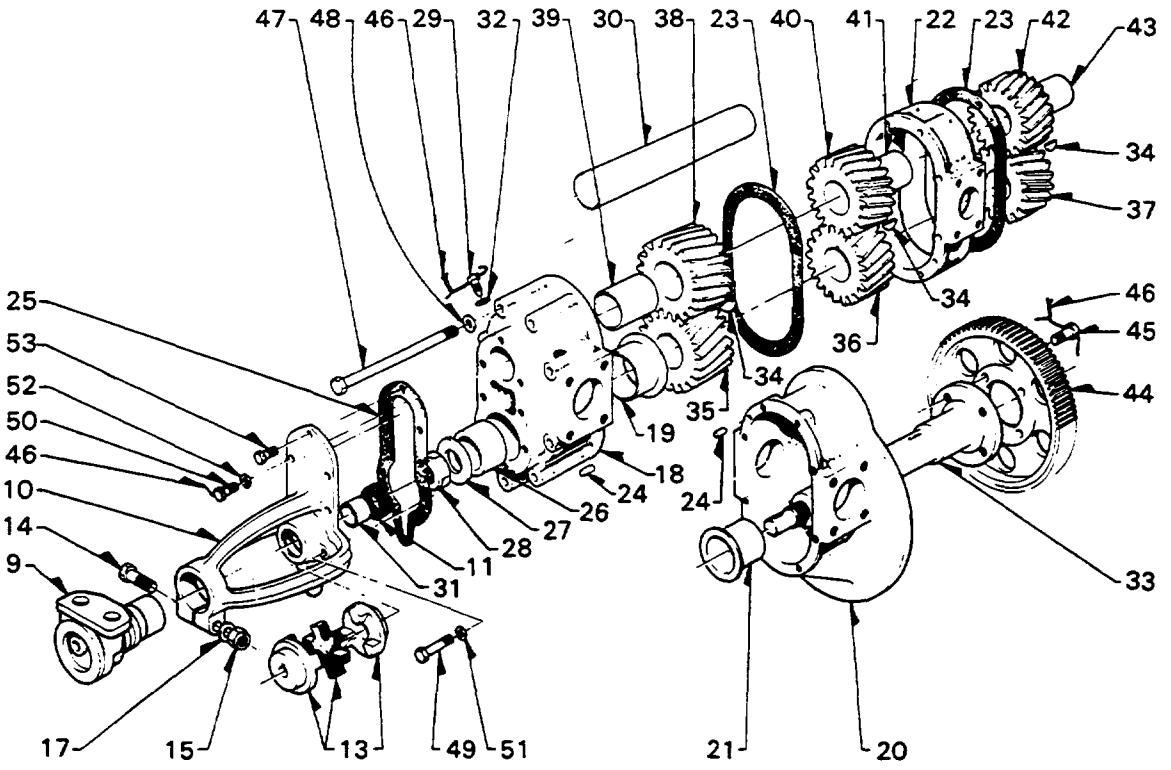


Ref. No. 5
PLATE B38-1

Parts List No. B40

LUBE OIL SCAVENGING AND FUEL OIL PUMP

All 645 Engines



Ref. No. 8
PLATE B40-1

Ref. No.	Part Number	Quantity Required								Description
		A	-	-	-	-	-	-	-	8-645E1,E2 engines } With threaded fuel
		-	B	-	-	-	-	-	-	8-645E5 and 12-645E1,E2 engines } pump connections
		-	-	C	-	-	-	-	-	12-645E5 and 16-645E1,E2 engines } (Applied to units
		-	-	-	D	-	-	-	-	16,20-645E4,E5 engines } prior to Sept. 1970)
		-	-	-	-	E	-	-	-	8-645E1,E2,E6,E8 engines
		-	-	-	-	-	F	-	-	8-645E4,E4B,E5,E7,E7B,E7C and 12-645E1,E2,E6,E8 engines
		-	-	-	-	-	-	G	-	12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B and 16-645E1,E2,E6,E8 engines
		-	-	-	-	-	-	-	H	16,20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
*1	8213579	1	-	-	-	-	-	-	-	PUMP ASM. .. Scavenging and fuel oil }
*2	8212728	-	1	-	-	-	-	-	-	PUMP ASM. .. Scavenging and fuel oil } With threaded fuel
*3	8212777	-	-	1	-	-	-	-	-	PUMP ASM. .. Scavenging and fuel oil } pump connections
*4	8252842	-	-	-	1	-	-	-	-	PUMP ASM. .. Scavenging and fuel oil }
										- Formerly 8252482
*5	8449658	-	-	-	-	1	-	-	-	PUMP ASM. .. Scavenging and fuel oil }
*6	8417810	-	-	-	-	-	1	-	-	PUMP ASM. .. Scavenging and fuel oil } With flanged fuel
*7	8417754	-	-	-	-	-	-	1	-	PUMP ASM. .. Scavenging and fuel oil } pump connections
8	8417074	-	-	-	-	-	-	-	1	PUMP ASM. .. Scavenging and fuel oil }
*9	8498154	1	-	-	-	-	-	-	-	PUMP .. Fuel - Replaces 8020257 (R.H. rotation engines) and 8102911 (L.H. rotation engines) - See Pages 5 and 7
*9	8080284	-	1	1	1	-	-	-	-	PUMP .. Fuel - See Page 4
9	8498099	-	-	-	-	1	1	-	-	PUMP .. Fuel - Replaces 8452409 (R.H. rotation engines) and 8432896 (L.H. rotation engines) - See Pages 6 and 7
9	8410219	-	-	-	-	-	-	1	1	PUMP .. Fuel - See Page 4

P.L. No. B40

LUBE OIL SCAVENGING AND FUEL OIL PUMP

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E1,E2,E6,E8 engines
		E	-	-	-	
		-	B	-	-	8-645E4,E4B,E5,E7,E7B,E7C and 12-645E1,E2,E6,E8 engines
		-	F	-	-	
		-	-	C	-	12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B and 16-645E1,E2,E6,E8 engines
		-	-	G	-	
		-	-	-	D	16,20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
		-	-	-	H	
-	----	1	1	1	1	PUMP ASM. .. Scavenging and fuel oil
10	8212755	1	1	1	1	BRACKET ASM. .. Fuel pump
11	8212767	1	1	1	1	SEAL .. Oil
*12	8028366	2	2	2	2	DOWEL .. Bracket locating
13	8077938	1	1	1	1	COUPLING .. Fuel pump shaft
14	181444	1	1	1	1	BOLT .. Fuel pump bracket - 1/2 - 20 x 3-1/2 hex. head
15	8032719	1	1	1	1	NUT .. Lock - 1/2 - 20 hex.
*16	106751	1	1	1	1	KEY .. Woodruff - 3/16 x 3/4 in. long
17	6101229	1	1	1	1	WASHER .. Flat - 1/2 - Flanged connection pump
18	8213581	1	-	-	-	HOUSING ASM. .. Pump }
18	8212775	-	1	-	-	HOUSING ASM. .. Pump } Front
18	8212754	-	-	1	1	HOUSING ASM. .. Pump }
19	8039669	1	1	1	1	BUSHING .. Housing
20	8029460	1	-	1	1	HOUSING ASM. .. Pump } Rear
20	8029458	-	1	-	-	HOUSING ASM. .. Pump }
21	8039667	1	1	1	1	BUSHING .. Housing
22	8251625	-	-	-	1	HOUSING .. Pump - Center
23	8029034	1	1	1	-	GASKET .. Front to rear housing mounting
23	8262754	-	-	-	2	GASKET .. Center housing mounting
24	8028366	2	2	2	4	DOWEL .. 3/8 x 7/8 in. long
25	8029498	1	1	1	1	GASKET .. Pump bracket to pump housing
26	8028880	1	1	1	1	SLEEVE .. Front housing
27	8384839	1	1	1	1	WASHER .. Special - 1-1/32 I.D. x 2-3/8 O.D. x 3/8
28	8134735	1	1	1	1	NUT .. Shaft - 1 - 14 hex.
29	8029495	1	1	1	1	BOLT .. Hex. head - Special 1/2 - 13 x 1-1/8 idler shaft locking
30	8029503	1	-	-	-	SHAFT .. Pump }
30	8029496	-	1	-	-	SHAFT .. Pump } Idler
30	8029511	-	-	1	-	SHAFT .. Pump }
30	8251763	-	-	-	1	SHAFT .. Pump }
31	8212753	1	1	1	1	BUSHING .. Fuel pump bracket
32	8029494	1	1	1	1	WASHER .. Copper - 1/2
33	8213580	1	-	-	-	SHAFT .. Pump drive - Threaded connection pump
33	8449615	1	-	-	-	SHAFT .. Pump drive - Flanged connection pump
33	8212727	-	1	-	-	SHAFT .. Pump drive
33	8212778	-	-	1	-	SHAFT .. Pump drive
33	8251979	-	-	-	1	SHAFT .. Pump drive
34	117982	1	2	2	3	KEY .. Shaft - 3/8 x 1-1/4 in. long
35	8029529	1	-	-	-	GEAR .. Drive }
35	8029523	-	1	-	-	GEAR .. Drive } Front
35	8029547	-	-	1	1	GEAR .. Drive }
36	8106721	-	-	-	1	GEAR .. Drive - Center
37	8029522	-	1	-	-	GEAR .. Drive } Rear
37	8029529	-	-	1	1	GEAR .. Drive }

The following components are applicable to threaded and flanged connection type scavenging pumps unless otherwise specified in the description column.

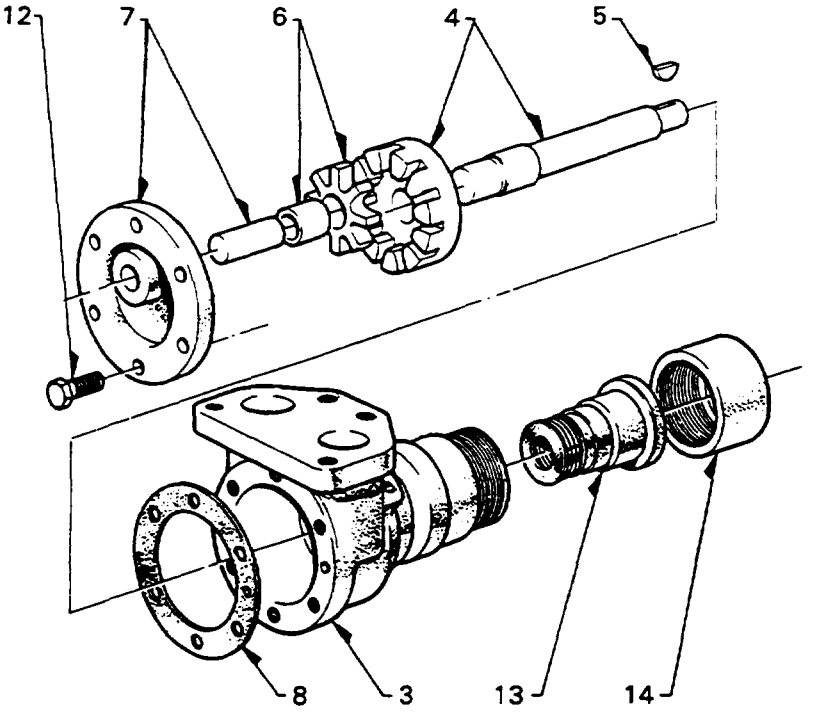
LUBE OIL SCAVENGING AND FUEL OIL PUMP

Ref. No.	Part Number	Quantity Required A E	B F	C G	D H	Description
						PUMP ASM. .. Scavenging and fuel oil
38	8029462	1	-	-	-	GEAR ASM. .. Driven }
38	8028972	-	1	-	-	GEAR ASM. .. Driven } Front
38	8029513	-	-	1	-	GEAR ASM. .. Driven }
38	8341916	-	-	-	1	GEAR ASM. .. Driven }
39	8029461	1	-	1	-	BUSHING .. Gear
39	8028883	-	1	-	-	BUSHING .. Gear
39	8340485	-	-	-	1	BUSHING .. Gear
40	8341917	-	-	-	1	GEAR ASM. .. Driven - Center
41	8340484	-	-	-	1	BUSHING .. Gear
42	8028868	-	1	-	-	GEAR ASM. .. Driven }
42	8029462	-	-	1	-	GEAR ASM. .. Driven } Rear
42	8341918	-	-	-	1	GEAR ASM. .. Driven }
43	8028883	-	1	-	-	BUSHING .. Gear
43	8029461	-	-	1	-	BUSHING .. Gear
43	8340485	-	-	-	1	BUSHING .. Gear
44	8035625	1	1	1	1	GEAR .. Pump drive
45	8028329	4	4	4	4	BOLT .. Gear to shaft - 1/2 - 20 x 1-1/4 hex. head
46	8116738	As Req.				WIRE .. Lock - 3/64 dia. - 500 ft. length
47	179884	8	-	-	-	BOLT .. Front housing mtg. - 1/2 - 13 x 1-3/8 hex. head
47	179897	-	8	-	-	BOLT .. Front housing mtg. - 1/2 - 13 x 4 hex. head
47	187152	-	-	8	-	BOLT .. Front housing mtg. - 1/2 - 13 x 5 hex. head
47	9424959	-	-	-	8	BOLT .. Front housing mtg. - 1/2 - 13 x 8-3/8 hex. head
*48	103323	8	8	8	-	WASHER .. Lock - 1/2 - Threaded connection pump
48	6101229	8	8	8	8	WASHER .. Plain - 1/2 - Flanged connection pump
49	179845	3	3	3	3	BOLT .. Bracket to front housing - 3/8 - 16 x 1-3/4 hex. head
50	8041206	1	-	1	1	BOLT .. Bracket to front housing - 3/8 - 16 x 1-1/2 hex. head drilled
50	8028313	-	1	-	-	BOLT .. Bracket to front housing - 3/8 - 16 x 1 hex. head drilled
51	103321	7	7	7	7	WASHER .. Lock - 3/8 - Threaded connection pump
51	6101225	7	7	7	7	WASHER .. Plain - 3/8 - Flanged connection pump
52	8029142	1	1	1	1	WASHER .. Plain - 3/8
53	179843	4	4	4	4	BOLT .. Bracket to front housing - 3/8 - 16 x 1-1/2 hex. head
*54	106958	-	1	1	-	KEY .. Woodruff - 1/16 x 1/2 in. long - Flanged connection pump
*55	8028264	1	1	1	1	GASKET .. Pump mounting
*56	181432	10	10	10	10	BOLT .. Pump mounting - 1/2 - 20 x 1-5/8 hex. head
*57	6101229	10	10	10	10	WASHER .. Plain - 1/2
†*58	8210308	1	-	-	-	GASKET KIT .. Change out - Scavenging oil pump }
†*58	8210019	-	1	-	-	GASKET KIT .. Change out - Scavenging oil pump } See
†*58	8210018	-	-	1	-	GASKET KIT .. Change out - Scavenging oil pump } Parts List 99
†*58	8306357	-	-	-	1	GASKET KIT .. Change out - Scavenging oil pump }

† Not applicable to E2 and E5 marine engines with "Y" type lube oil strainers. Refer to Parts List 34 for appropriate gaskets and seals.

P.L. No. B40

LUBE OIL SCAVENGING AND FUEL OIL PUMP
Fuel Oil Pump Assembly

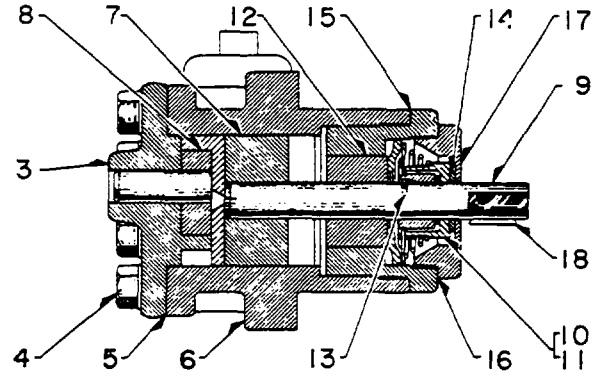


Ref. No. 2
PLATE B40-2

Ref. No.	Part Number	Qty. Req.		Description
*1	8080284	1	-	PUMP ASM. .. Fuel oil - Threaded connections - 3.6 G.P.M. @ 1200 R.P.M.
2	8410219	-	1	PUMP ASM. .. Fuel oil - Flanged connections - 3.6 G.P.M. @ 1200 R.P.M.
*3	9520998	1	-	CASING ASM. .. Includes bushing - Replaces 8118894
3	9520938	-	1	CASING ASM. .. Includes bushing - Replaces 8441194
4	8228322	1	1	ROTOR ASM. .. Includes rotor, shaft, and key
5	106958	1	1	KEY .. Woodruff - No. 1
†6	9521000	1	1	IDLER ASM. .. Includes bushing - Replaces 8118895
†7	9520999	1	1	HEAD ASM. .. Includes idler pin - Replaces 8118896
8	3278364	1	1	KIT .. Gasket - Head
*9	8088672	1	1	GASKET .. Head - .001 plastic
*10	8088673	1	1	GASKET .. Head - .003 plastic
*11	8082104	2	2	GASKET .. Head - .005 plastic
12	179795	6	6	BOLT .. Hex. head - 1/4 - 20 x 3/4 - Formerly 181311
13	8228321	1	1	SEAL .. Mechanical
14	8278579	1	1	NUT .. Packing

† The new design idler will not mate with the old style head, and the new style head will not mate with the old idler. Accordingly, when one of the old style components needs replacing, both old style components will have to be replaced with the new design parts.

LUBE OIL SCAVENGING AND FUEL OIL PUMP
Fuel Oil Pump Assembly - Threaded Connections

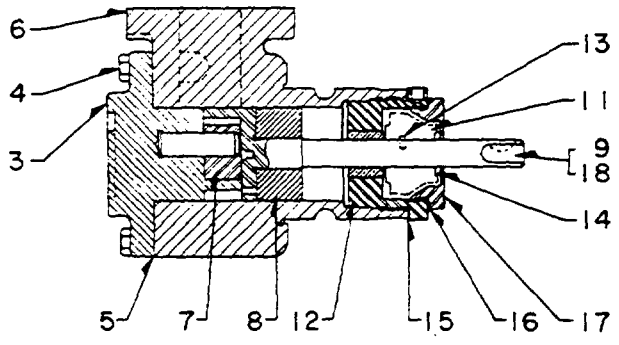


Ref. Nos. 1 and 2
PLATE B40-3

Ref. No.	Part Number	Qty. Req.		Description	
1	8020257	1	-	PUMP ASM. .. Fuel - 1L-CC-X75 - 1.7 G.P.M. @ 1200 R.P.M. - C.C.W. rotation	Replaced by 8498154 - See Page 7
2	8102911	-	1	PUMP ASM. .. Fuel - 1L-C-X75 - 1.7 G.P.M. @ 1200 R.P.M. - C.W. rotation	
3	8017801	1	1	HEAD .. Fuel pump - Includes idler pin	
4	179795	8	8	BOLT .. Head to body - 1/4 - 20 x 3/4 hex. head - Replaces 100109	
5	----	1	1	GASKET .. Fuel pump cover - Incl. are (1) .0005 in. th. and (1) .005 in. th. gasket	
6	8116541	1	-	BODY .. Fuel pump	
6	8116231	-	1	BODY .. Fuel pump	
7	8017806	1	1	BUSHING .. Shaft rotor end	
8	8017804	1	1	IDLER .. Fuel pump	
9	8017805	1	1	ROTOR .. Fuel pump - Includes shaft	
10	8062016	1	1	SEAL ASM. .. Oil	
11	8033798	1	1	SEAL .. Oil - Rotating parts	
12	8062018	1	1	SEAL .. Oil - Stationary parts	
13	8017817	1	1	PIN .. Drive - .165 in. lg. x .092 in. diameter	
14	8017818	1	1	WASHER .. Felt - Oil seal	
15	8017809	1	1	GASKET .. Seal to pump body	
16	8017823	1	1	GASKET .. Cap to seal	
17	8017822	1	1	CAP .. Housing to plug	
18	106958	1	1	KEY .. Woodruff - No. 1	

P.L. No. B40

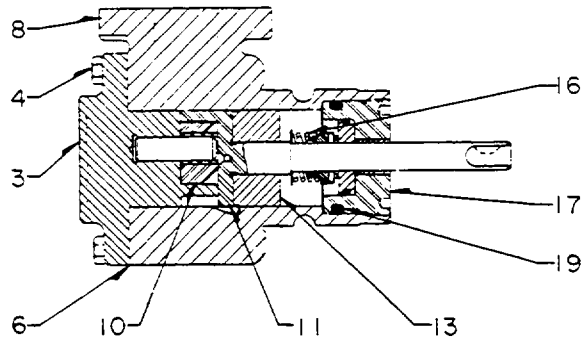
LUBE OIL SCAVENGING AND FUEL OIL PUMP
Fuel Oil Pump Assembly - Flanged Connections



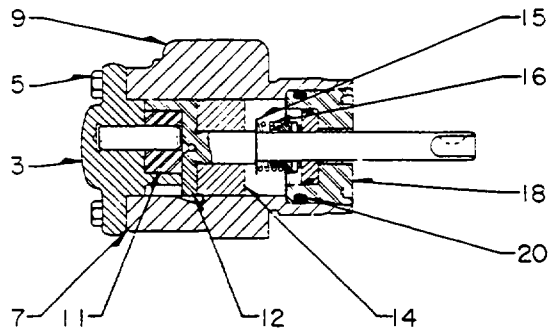
Ref. Nos. 1 and 2
PLATE B40-4

Ref. No.	Part Number	Qty. Req.		Description	
1	8432896	1	-	PUMP ASM. .. Fuel - 1L-C-6928 - 1.7 G.P.M. @ 1200 R.P.M. - C.W. rotation	Replaced by 8498099 - See Page 7
2	8452409	-	1	PUMP ASM. .. Fuel - 1L-CC-6928 - 1.7 G.P.M. @ 1200 R.P.M. - C.C.W. rotation	
3	8017801	1	1	HEAD .. Fuel pump - Includes idler pin	
4	179795	6	6	BOLT .. Head to body - 1/4 - 20 x 3/4 hex. head	
5	8453631	1	1	GASKET .. Fuel pump cover - Consists of two gaskets	
6	- - - -	1	1	HOUSING .. Fuel pump	
7	8453630	1	1	IDLER .. Fuel pump	
8	8453632	1	1	BUSHING .. Shaft rotor end	
9	8453633	1	1	ROTOR .. Fuel pump - Includes shaft	
*10	8062016	1	1	SEAL ASM. .. Oil	
11	8033798	1	1	SEAL .. Oil - Rotating parts	
12	8062018	1	1	SEAL .. Oil - Stationary parts	
13	8017817	1	1	PIN .. Drive - .165 in. long x .092 in. diameter	
14	8017818	1	1	WASHER .. Felt - Oil seal	
15	8017809	1	1	GASKET .. Seal to pump body	
16	8017823	1	1	GASKET .. Cap to seal	
17	8017822	1	1	CAP .. Housing to plug	
18	106958	1	1	KEY .. Woodruff - No. 1	

LUBE OIL SCAVENGING AND FUEL OIL PUMP
Fuel Oil Pump Assembly
Flanged and Threaded Connections



Ref. No. 1



Ref. No. 2

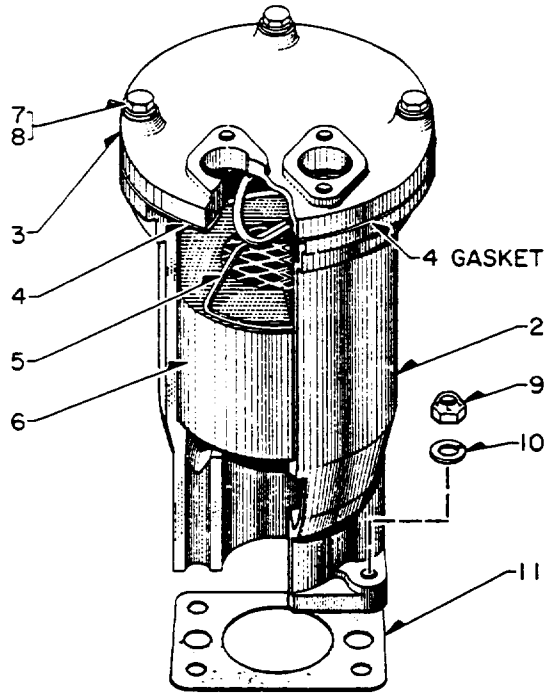
PLATE A40-5

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
1	8498099	1	-	PUMP ASM. .. Fuel - Flanged connection - 1LA-6928 - 1.7 G.P.M. @ 1200 R.P.M. - C.C.W. or C.W. rotation - Replaces 8432896 and 8452409
2	8498154	-	1	PUMP ASM. .. Fuel - Threaded connection - 1LA-X75 - 1.7 G.P.M. @ 1200 R.P.M. - C.C.W. or C.W. rotation - Replaces 8020257 and 8102911
3	8017801	1	1	HEAD .. Fuel pump - Includes idler pin
4	179795	6	-	BOLT .. Head to body - 1/4 - 20 x 3/4 hex. head
5	181311	-	8	BOLT .. Head to body - 1/4 - 20 x 5/8 hex. head
6	8453631	1	-	GASKET .. Fuel pump cover - Plastic
7	8027571	-	1	GASKET .. Fuel pump cover - Plastic
8	----	1	-	HOUSING .. Fuel pump
9	----	-	1	HOUSING .. Fuel pump
10	8017804	1	1	IDLER .. Fuel pump
11	----	1	-	ROTOR .. Fuel pump - Includes shaft
12	9516822	-	1	ROTOR .. Fuel pump - Includes shaft
13	8453632	1	-	BUSHING .. Rotor
14	----	-	1	BUSHING .. Rotor
15	9514144	-	1	RING .. Retaining
16	9089606	1	1	SEAL ASM. .. Pump
17	----	1	-	PLUG ASM. .. Housing
18	9514142	-	1	PLUG ASM. .. Housing
19	9511532	1	-	SEAL .. O-Ring - Plug to housing
20	9514143	-	1	SEAL .. O-Ring - Plug to housing

LUBE OIL SEPARATOR

Lube Oil Separator

8,12,16-645E1,E2,E6 and E8 Engines



Ref. No. 1

PLATE A42-1

Ref. No.	Part Number	Qty. Req.	Description
1	8173846	1	SEPARATOR ASSEMBLY .. Lube oil
2	8173847	1	HOUSING .. Oil separator
3	8173849	1	COVER .. Oil separator
4	8173851	1	GASKET .. Housing cover
5	8173848	1	SPRING .. Filter holder
6	8173850	1	FILTER .. Oil
7	181429	4	BOLT .. 1/2-20 x 1-1/4 hex. head
8	115551	4	WASHER .. Lock - 1/2
9	8032719	4	NUT .. Lock - 1/2-20 hex.
10	6101229	4	WASHER .. Plain - 1/2
11	8084670	1	GASKET .. Separator mounting
*12	----	1	SUPPORT ASM. .. Oil separator - See Page 6

P.L. No. B42

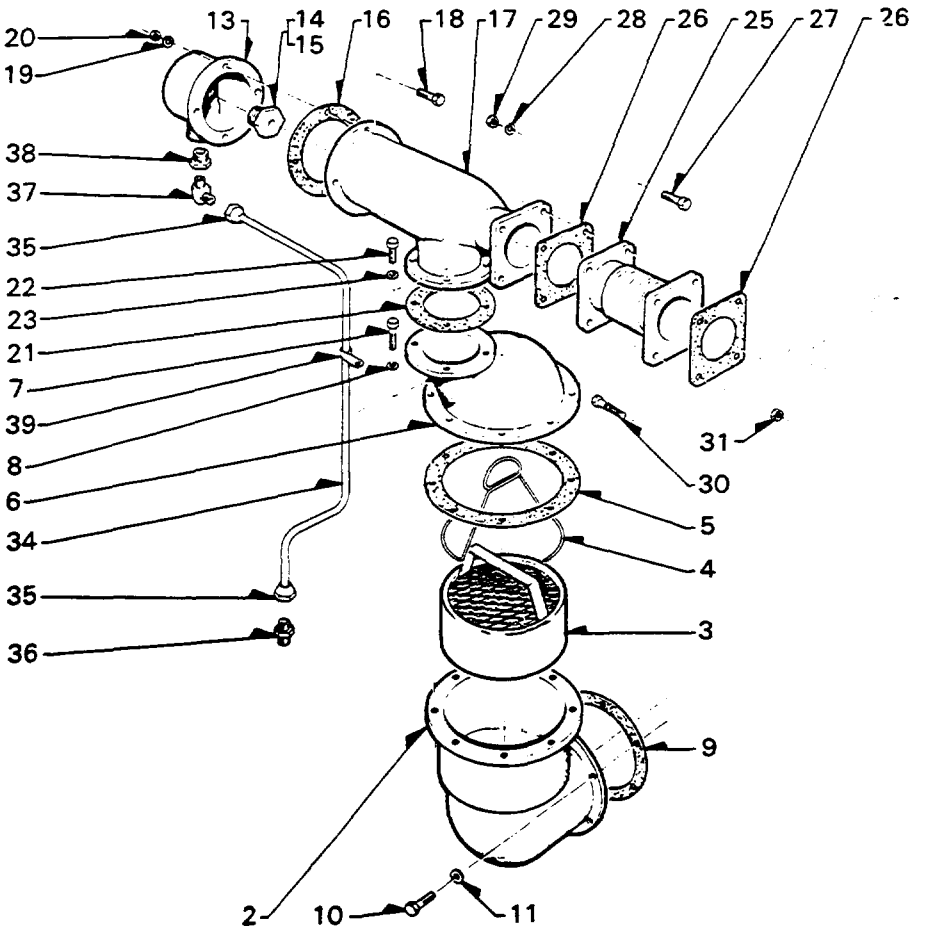
LUBE OIL SEPARATOR

Lube Oil Separator, Ejector, and Eductor Tube Assembly
All 645 Turbocharged Engines

PLATE B42-2

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	645 Engines with 8332584 separator
		-	B	-	645 Engines with 8448163 separator
		-	-	C	645 Engines with 8448163 separator and two-piece eductor tube arrangement
*1	8332584	1	-	-	SEPARATOR ASM. .. Lube oil - Replaced by 8448163
1	8448163	-	1	1	SEPARATOR ASM. .. Lube oil
2	8335768	1	1	1	HOUSING .. Separator
*3	8335767	1	-	-	ELEMENT .. Separator - With pull ring handle
3	8448162	-	1	1	ELEMENT .. Separator - With strap handle
*4	8335766	1	-	-	SPRING .. Element securing
4	8453237	-	1	1	SPRING .. Element securing
5	8335770	1	1	1	GASKET .. Cover
*6	8335765	1	-	-	COVER .. Separator
6	8448164	-	1	1	COVER .. Separator
7	9415838	8	8	8	BOLT .. Hex. head 3/8 - 16 x 1
8	120382	8	8	8	WASHER .. Lock - 3/8
9	8028760	1	1	1	GASKET .. Separator mounting
10	179885	6	6	6	BOLT .. Hex. head 1/2 - 13 x 1-1/2
11	6101229	6	6	6	WASHER .. Flat - 1/2
*12	8341909	1	1	1	EJECTOR ASM. .. Lube oil
13	8349293	1	1	1	END .. Ejector
14	8349291	1	1	1	NOZZLE .. Ejector
15	138517	1	1	1	WASHER .. Lock - Nozzle
16	8348835	1	1	1	GASKET .. End to chamber
17	8349292	1	1	1	CHAMBER .. Ejector
18	9415840	4	4	4	BOLT .. Hex. head 3/8 - 16 x 1-1/4
19	120382	4	4	4	WASHER .. Lock - 3/8
20	120377	4	4	4	NUT .. Hex. 3/8 - 16
21	8306958	1	1	1	GASKET .. Ejector mounting
22	179845	4	-	-	BOLT .. Hex. head 3/8 - 16 x 1-3/4
22	179841	-	4	4	BOLT .. Hex. head 3/8 - 16 x 1-1/4
23	6101225	4	4	4	WASHER .. Flat - 1/2
*24	102635	4	-	-	NUT .. Hex. 3/8 - 16
25	8341706	1	-	-	CONNECTION .. Flexible - 4.81 in. long
25	8448801	-	1	-	CONNECTION .. Flexible - 5.12 in. long
25	9085573	-	-	1	CONNECTION .. Flexible - 4.62 in. long
26	8271729	2	2	4	GASKET .. Flexible connection and eductor tubes
27	179841	4	4	4	BOLT .. Hex. head 3/8 - 16 x 1-1/4
28	6101225	4	4	4	WASHER .. Flat - 3/8
29	102635	4	4	4	NUT .. Hex. 3/8 - 16
30	181374	4	4	-	BOLT .. Hex. head 3/8 - 24 x 1-1/2 - Flex. connection to exhaust duct
30	181380	-	-	4	BOLT .. Hex. head 3/8 - 24 x 2-1/4 - Flex. conn. to eductor tubes to ex. duct
31	8289127	4	4	4	NUT .. Lock - 3/8 - 24
32	9502409	-	-	1	TUBE ASM. .. Eductor - Outer
33	9502412	-	-	1	TUBE ASM. .. Eductor - Inner
34	8098595	A.R.			TUBING .. Steel - Copper brazed - 1/2 O.D. x 20 ft.
35	120141	2	2	2	NUT .. Tube - 1/2 - 45° flare
36	118752	1	1	1	CONNECTOR .. 1/2 tube x 3/8 M.P.T.
37	8027437	2	2	2	ELBOW .. 90° - 1/2 tube x 1/2 M.P.T.
ϕ37	118757	2	2	2	ELBOW .. 90° - 1/2 tube x 3/8 M.P.T.
38	189065	2	2	2	BUSHING .. Reducing - 1 M.P.T. x 1/2 F.P.T.
ϕ38	189064	2	2	2	BUSHING .. Reducing - 1 M.P.T. x 3/8 F.P.T.
*39	3245596	1	1	1	CLIP .. Tube - Used when tube is clamped to separator cover
39	8449628	1	1	1	CLIP .. Tube - Used when tube is clamped to separator housing
*40	9081771	-	-	1	PIPE ASM. .. Flanged - 90° (12-645E4,E5,E7,E9 only) - Mounted between ejector and flexible connection

LUBE OIL SEPARATOR



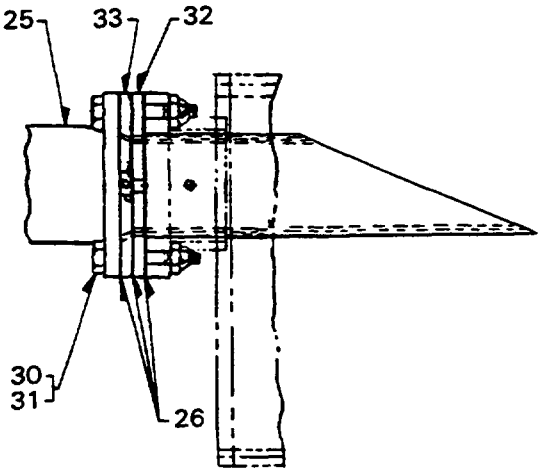


PLATE B42-2

P.L. No. B42

LUBE OIL SEPARATOR

Lube Oil Separator and Elector Assembly - Previous Design
16 and 20-645E4 Turbocharged Engines
MP36 and MP45 Units

PLATE A42-3

Ref. No.	Part Number	Qty. Req.	Description
1	8332584	1	SEPARATOR ASSEMBLY .. Lube oil - Replaced by 8448163 - See Page 2
2	8335768	1	HOUSING .. Oil separator
3	8335767	1	ELEMENT .. Oil separator
4	8335766	1	SPRING .. Element
5	8335770	1	GASKET .. Cover
6	8335765	1	COVER .. Oil separator
7	9415838	8	BOLT .. Cover mounting - 3/8 - 16 x 1 hex. head
8	120382	8	WASHER .. Lock - 3/8
9	8028760	1	GASKET .. Separator mounting
10	179885	6	BOLT .. Separator mounting - 1/2 - 13 x 1-1/2 hex. head
11	6101229	6	WASHER .. Plain - 1/2
12	8341909	1	EJECTOR ASSEMBLY .. Lube oil - See Page 2
13	8349293	1	END .. Ejector
14	8349292	1	CHAMBER .. Ejector
*15	8349291	1	NOZZLE .. Ejector end
*16	138517	1	WASHER .. Lock - External tooth - 1 inch - Ejector end nozzle
17	8348835	1	GASKET .. Ejector end to chamber
18	9415840	4	BOLT .. Ejector end to chamber - 1/8 - 16 x 1-1/4 hex. head
19	120382	4	WASHER .. Lock - 3/8
20	120377	4	NUT .. 3/8 - 16 hex.
21	8306958	1	GASKET .. Ejector mounting
22	179843	4	BOLT .. Ejector mounting - 3/8 - 16 x 1-1/2 hex. head
23	6101225	4	WASHER .. Plain - 3/8
24	102635	4	NUT .. 3/8 - 16 hex.
25	189065	1	BUSHING .. Reducing - 1 M.P.T. x 1/2 F.P.T.
26	8040322	1	CONNECTOR .. 5/8 tube x 3/4 M.P.T.
*27	119467	1	UNION .. 5/8 tube
28	109429	1	ELBOW .. 5/8 tube x 1/2 M.P.T. x 90°
29	8116729	A.R.	TUBING .. 5/8 in. O.D. x .049 wall copper 50 ft.
30	144308	4	NUT .. 5/8 tube
31	8364299	1	FLANGE .. Drain
32	8356239	1	GASKET .. Drain flange
33	181435	4	BOLT .. Flange mounting - 1/2 - 20 hex. head
34	6101229	4	WASHER .. Plain - 1/2
35	8061460	1	NIPPLE .. Close pipe - 3/4 M.P.T. x 3/4 solder - Brass
36	8045930	1	ELBOW .. Union - 3/4 solder
37	8133013	A.R.	TUBING .. 1.050 O.D. x .072 wall copper 20 ft.
38	8228849	1	TEE .. Pipe - 3/4 solder x 3/4 solder x 3/4 F.P.T.
39	8352687	1	CLIP .. Tube
40	8350137	A.R.	CLIP .. Tube
*41	179879	4	BOLT .. Clip mounting - 1/2 - 13 x 3/4 hex. head
*42	6101229	4	WASHER .. Plain - 1/2
43	8341706	1	CONNECTION .. Flexible
44	8271729	2	GASKET .. Connection mounting
45	179841	4	BOLT .. Connection mounting - 3/8 - 16 x 1-1/4 hex. head
46	181374	4	BOLT .. Connection mounting - 3/8 - 24 x 1-1/2 hex. head
47	6101225	4	WASHER .. Plain - 3/8
48	102635	4	NUT .. 3/8 - 16 hex.
49	8289127	4	NUT .. Lock - 3/8 - 24 hex.

8364591, 8366175

P.L. No. B42

LUBE OIL SEPARATOR

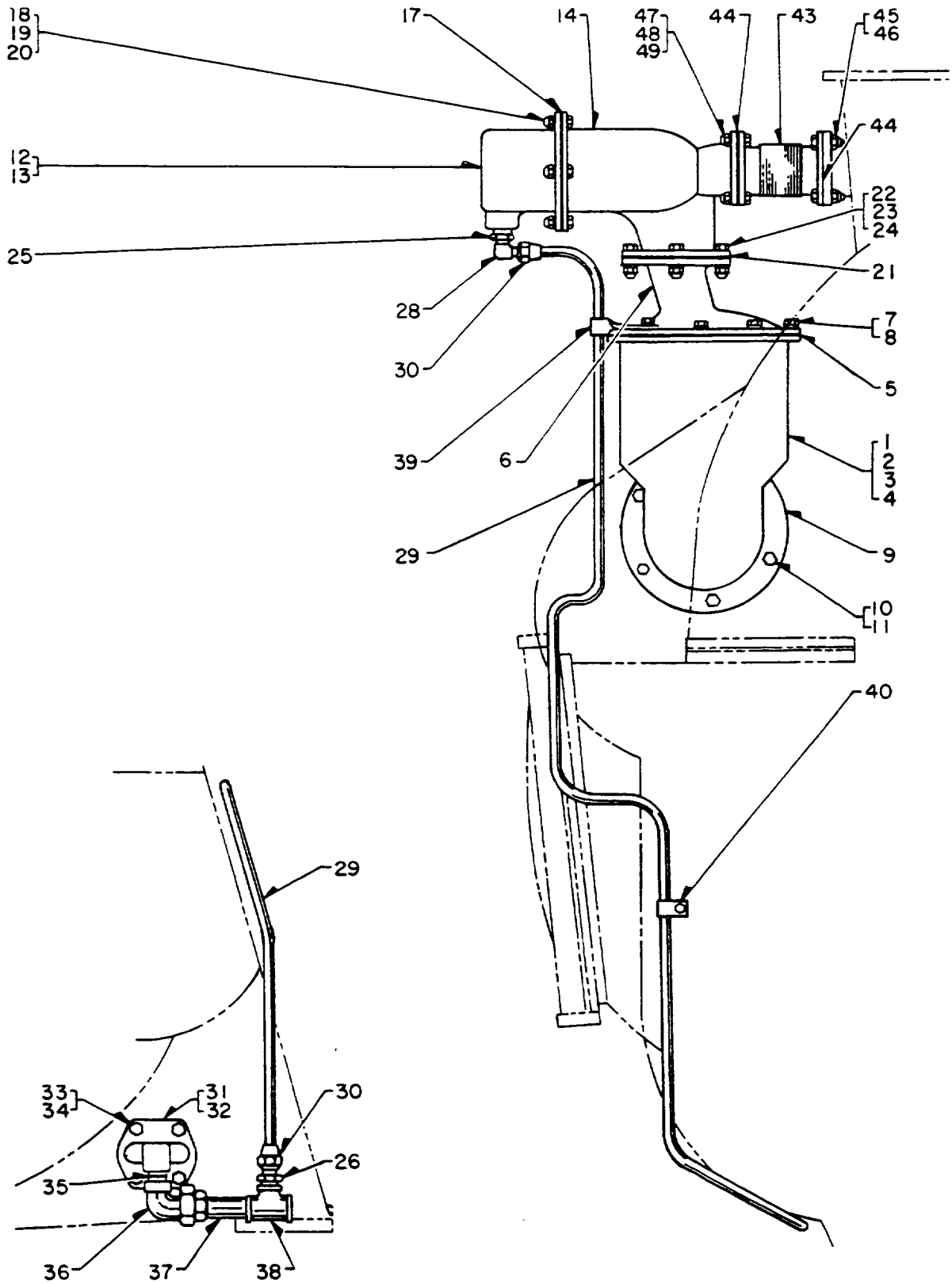


PLATE A42-3

P.L. No. B42

LUBE OIL SEPARATOR

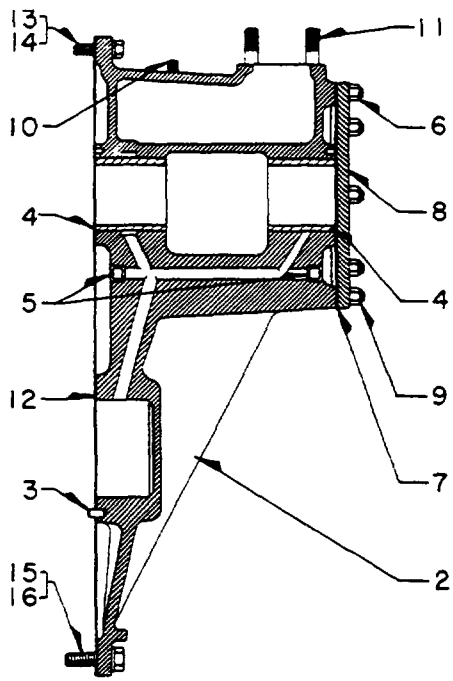
Lube Oil Separator Support and Cover Assembly

8,12,16,-645E1,E2,E6,E8 Engines

Ref. No.	Part Number	Qty. Req. A	Qty. Req. -	Description
		A	-	8,12,16-645E2,E6 engines - Right hand rotation
		-	B	8,12,16-645E1,E2,E6,E8 engines - Left hand rotation
†1	8332618	1	-	SUPPORT ASM. .. Oil separator
†1	8233171	-	1	SUPPORT ASM. .. Oil separator - Formerly 8232171
2	8239980	1	-	HOUSING .. Support } Not available - Use Ref. No. 1
2	8081397	-	1	HOUSING .. Support }

The following items Ref. Nos. 3 thru 18 are applicable to Columns A and B.

3	8028304	2	DOWEL .. Bushing and collar - 1/4 x 5/8 in. long
4	8233169	2	SLEEVE .. Shaft
5	8348618	2	PLUG .. Pipe - 1/4 M.P.T.
6	8035440	8	STUD .. Support cover - 3/8-16-24 x 1-7/8 in. lg. 8123048 .. .002 O.S. 8123049 .. .004 O.S. 8126932 .. .015 O.S. 8126933 .. .017 O.S. 8126934 .. .019 O.S.
7	8081365	1	GASKET .. Cover
8	8233170	1	COVER .. Rear
9	8032717	8	NUT .. Lock - 3/8-24 hex.
10	8029137	4	STUD .. Oil line - 3/8-16-24 x 1-3/4 in. long 8115306 .. .002 O.S. 8115307 .. .004 O.S. 8115308 .. .015 O.S. 8115309 .. .017 O.S. 8115310 .. .019 O.S.
11	8084871	4	STUD .. Oil separator - 1/2-13-20 x 2-7/16 in. lg. 8123046 .. .002 O.S. 8123047 .. .004 O.S. 8126979 .. .015 O.S. 8126980 .. .017 O.S. 8126981 .. .019 O.S.
12	8081398	1	GASKET .. Support mounting
13	181433	8	BOLT .. Support mounting - 1/2-20 x 1-3/4 hex. head
14	6101229	8	WASHER .. Plain - 1/2
15	8165628	6	BOLT .. Support mounting - 3/4-16 x 8-1/2 hex. head
16	8028733	6	WASHER .. Plain - 3/4
*17	181440	4	BOLT .. Support mounting - 1/2-20 x 2-1/2 hex. head
*18	6101229	4	WASHER .. Plain - 1/2



Ref. No. 1
PLATE B42-4

† For Models with Auxiliary Generators, See Parts List 62.

COOLING SYSTEM

Water Manifold Bracket Application
16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B Engines

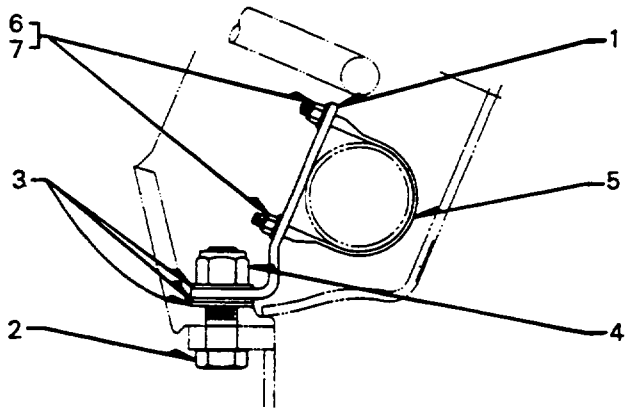


PLATE B44-1

Ref. No.	Part Number	Qty. Req.	Description

This additional bracket support arrangement has been applied to 16-645 turbocharged engines since February, 1977. The items listed below are also available as a kit for application to 16-645 turbocharged engines manufactured without this arrangement. Contact our Service Department for complete details. Quantities shown are for one engine assembly.

1	9312008	2	BRACKET .. Support - Water manifold
2	273045	2	BOLT .. Hex. head - 1 - 14 x 3-1/4
3	131019	6	WASHER .. Plain - 1 inch
4	8032724	2	NUT .. Lock - 1 - 14 hex.
5	8347343	2	STRAP .. Saddle
6	8032717	4	NUT .. Lock - 3/8 - 24 hex.
7	103341	4	WASHER .. Plain - 3/8
*8	9326240	1	KIT .. Water manifold support - Contains Ref. Nos. 1 thru 8 in the quantities shown - See Note above

P.L. No. B44

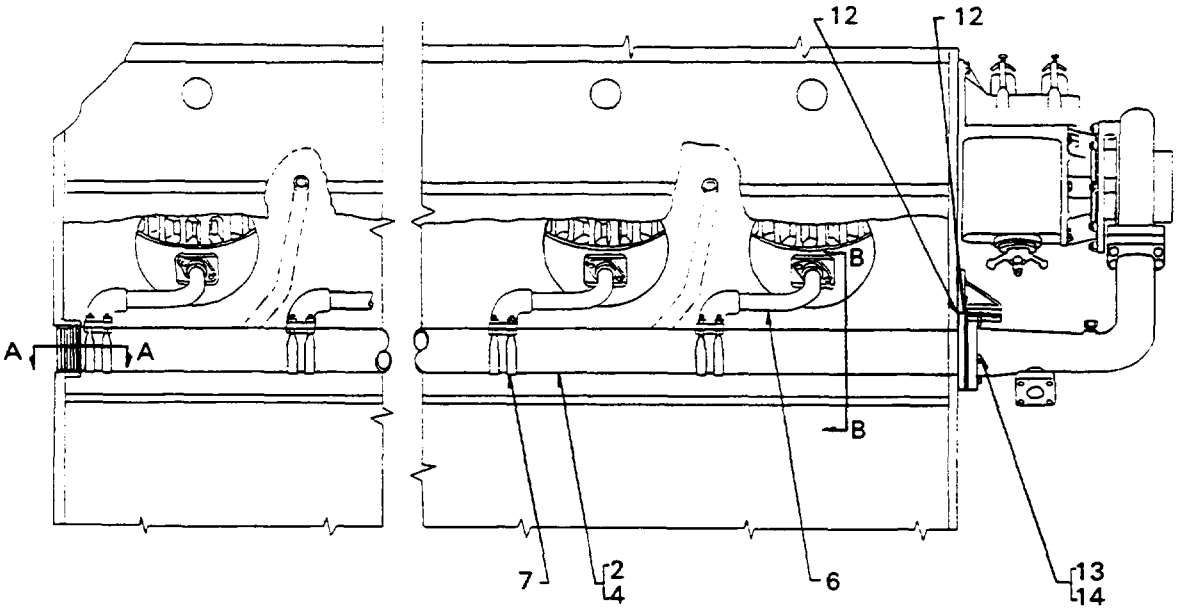
COOLING SYSTEM
Water Manifold Application
All 645 Engines

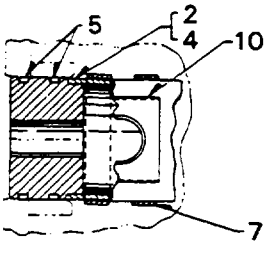
PLATE B44-2

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	-	-	-	-	8-645E4,E4B,E5,E6,E7,E7B,E7C engines
		-	-	C	-	-	-	-	12-645E1,E2,E6,E8 engines
		-	-	-	D	-	-	-	12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B engines
		-	-	-	-	E	-	-	16-645E1,E2,E6,E8 engines
		-	-	-	-	-	F	-	16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
		-	-	-	-	-	-	G	20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
Current Design Manifold - With 3.370 In. Reduced Diameter Insert (Since June, 1971)									
*1	8461266	1	-	-	-	-	-	-	MANIFOLD .. Water
*1	8461119	-	1	-	-	-	-	-	MANIFOLD .. Water
*1	8461268	-	-	1	-	-	-	-	MANIFOLD .. Water
*1	8461121	-	-	-	1	-	-	-	MANIFOLD .. Water } Left Bank
*1	8461270	-	-	-	-	1	-	-	MANIFOLD .. Water
*1	8441949	-	-	-	-	-	1	-	MANIFOLD .. Water
*1	8433303	-	-	-	-	-	-	1	MANIFOLD .. Water
2	8461265	1	-	-	-	-	-	-	MANIFOLD .. Water
2	8461118	-	1	-	-	-	-	-	MANIFOLD .. Water
2	8461267	-	-	1	-	-	-	-	MANIFOLD .. Water
2	8461120	-	-	-	1	-	-	-	MANIFOLD .. Water } Right Bank
2	8461269	-	-	-	-	1	-	-	MANIFOLD .. Water
2	8441950	-	-	-	-	-	1	-	MANIFOLD .. Water
2	8433304	-	-	-	-	-	-	1	MANIFOLD .. Water
Previous Design Manifold - With 3.557 In. Diameter Insert									
*3	8360130	1	-	-	-	-	-	-	MANIFOLD .. Water
*3	8405965	-	1	-	-	-	-	-	MANIFOLD .. Water
*3	8360123	-	-	1	-	-	-	-	MANIFOLD .. Water
*3	8368309	-	-	-	1	-	-	-	MANIFOLD .. Water } Left Bank
*3	8360511	-	-	-	-	1	-	-	MANIFOLD .. Water
*3	8347147	-	-	-	-	-	1	-	MANIFOLD .. Water
*3	8360563	-	-	-	-	-	-	1	MANIFOLD .. Water
4	8360131	1	-	-	-	-	-	-	MANIFOLD .. Water
4	8405966	-	1	-	-	-	-	-	MANIFOLD .. Water
4	8360124	-	-	1	-	-	-	-	MANIFOLD .. Water
4	8368308	-	-	-	1	-	-	-	MANIFOLD .. Water } Right Bank
4	8360512	-	-	-	-	1	-	-	MANIFOLD .. Water
4	8347146	-	-	-	-	-	1	-	MANIFOLD .. Water
4	8360562	-	-	-	-	-	-	1	MANIFOLD .. Water
5	8433272	4	4	4	4	4	4	4	SEAL .. Water - Applied to 3.370 in. dia. manifold insert
5	8347415	4	4	4	4	4	4	4	SEAL .. Water - Applied to 3.557 in. dia. manifold insert
6	9093027	8	8	12	12	16	16	20	TUBE ASM. .. Water inlet - Replaces 8347340
†7	8347343	16	16	24	24	32	32	40	STRAP .. Saddle - 16 cyl. engines see page 1
8	8032717	32	32	48	48	64	64	80	NUT .. Lock - 3/8 - 24 hex.
9	8226964	16	16	24	24	32	32	40	BOLT ASM. .. Includes lockwasher - 3/8 - 16 x 1-1/8
10	8142354	8	8	12	12	16	16	20	GASKET .. Manifold to water inlet tube
11	8305815	8	8	12	12	16	16	20	SEAL .. Cylinder liner to water inlet tube
12	8347416	4	4	4	4	4	4	4	GASKET .. Manifold to crankcase and inlet elbow
13	181436	8	8	8	8	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
14	6101229	8	8	8	8	8	8	8	WASHER .. Flat - 1/2
15	----	-	-	-	-	-	-	-	ELBOW .. Water outlet - See Parts List 06

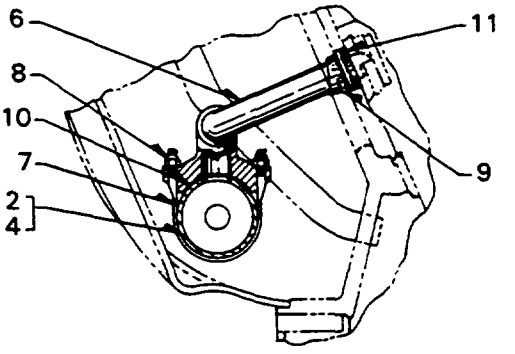
†16-645 turbocharged engines currently have additional manifold support applications - See Page 1.

COOLING SYSTEM





SECTION A-A

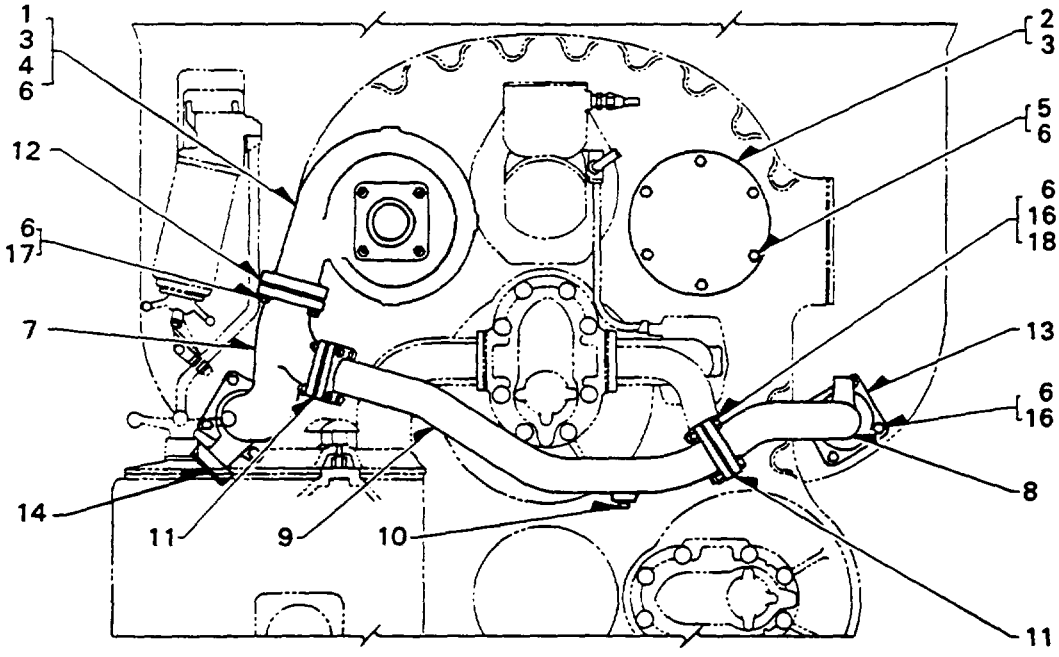


SECTION B-B

PLATE B44-2

P.L. No. B44

COOLING SYSTEM
Fresh Water Pump Application
8-645E1,E8; 8-645E2,E6 L.H. Rotation and 8-645E2 R.H. Rotation Engines

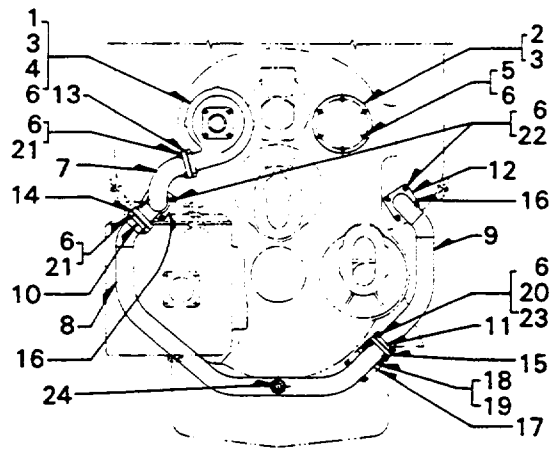


Right Bank PLATE B44-3 Left Bank

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	8-645E1,E8 engines
		-	B	-	8-645E2,E6 engines - Left hand rotation
		-	-	C	8-645E2 engines - Right hand rotation
1	8058625	1	1	-	PUMP ASM. .. Water } See Parts List 46
1	8240648	-	-	1	PUMP ASM. .. Water } See Parts List 46
2	8028338	1	1	1	COVER .. Blind
3	8028760	2	2	2	GASKET .. Pump and blind cover
4	181432	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	181433	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
6	6101229	32	32	32	WASHER .. Flat - 1/2
7	8371301	1	-	-	ELBOW .. Water inlet - R. bank - Used on SR11E1 models with low water detector
7	8360379	1	-	-	ELBOW .. Water inlet - Right bank
7	8365197	-	1	-	ELBOW .. Water inlet - Right bank
7	8365037	-	-	1	ELBOW .. Water inlet - Right bank
8	8360474	1	1	1	ELBOW .. Water inlet - Left bank
9	8118419	1	1	-	PIPE .. Intermediate
9	8246615	-	-	1	PIPE .. Intermediate
10	103868	1	1	1	PLUG .. Pipe - 1/2 M.P.T.
11	8029163	2	2	2	GASKET .. Intermediate pipe
12	8029149	1	1	1	GASKET .. Pump to elbow
13	8347416	2	2	2	GASKET .. Inlet elbows to water manifolds - Right and left banks
14	8029469	1	-	-	GASKET .. Drain line
ϕ*15	8268162	1	-	-	WELL .. Thermometer } Applied to Ref. No. 7
ϕ*15	112578	-	1	1	PLUG .. Pipe - 1/4 M.P.T. } Applied to Ref. No. 7
16	181436	16	16	16	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
17	179887	4	4	4	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
18	8032719	8	8	8	NUT .. Lock - 1/2 - 20 hex.

8359614, 8365210, 8365138

COOLING SYSTEM
Fresh Water Pump Application
8-645E6 Engines - Right Hand Rotation



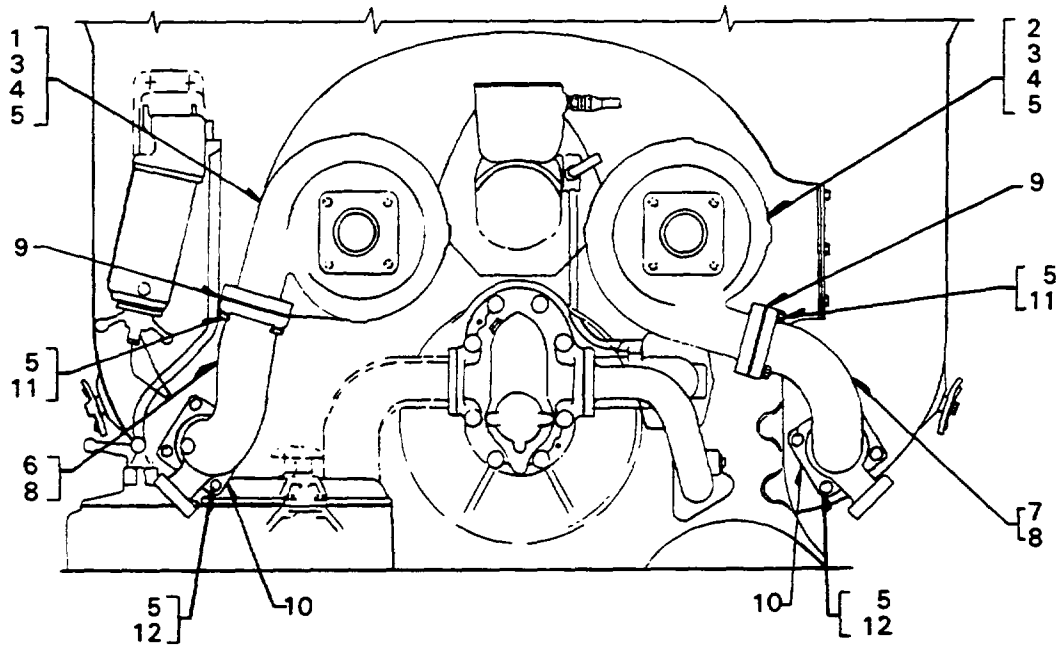
Right Bank PLATE B44-4 Left Bank

Ref. No.	Part Number	Qty. Req.	Description
1	8240648	1	PUMP ASM. .. Water - See Parts List 46
2	8028338	1	COVER .. Blind
3	8028760	2	GASKET .. Pump and blind cover
4	181432	6	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	181433	6	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
6	6101229	32	WASHER .. Flat - 1/2
7	8363811	1	ELBOW .. Water inlet
8	8452450	1	PIPE .. Intermediate - Includes lower flange only
9	8452388	1	PIPE .. Water inlet - Does not include flanges
10	8419118	1	FLANGE .. Pipe - Welded to Ref. No. 8 at assembly
11	8408832	1	FLANGE .. Pipe - Welded to Ref. No. 9 at assembly
12	8452334	1	FLANGE .. Pipe - Welded to Ref. No. 9 at assembly
13	8029149	1	GASKET .. Pump to elbow
14	8326233	1	GASKET .. Elbow to flange
15	8408783	1	GASKET .. Pipe to flange
16	8347416	2	GASKET .. Elbow and flange to water manifold
17	8452519	1	BRACKET .. Pipe support
18	103343	2	WASHER .. Plain - 1/2
19	181435	2	BOLT .. Hex. head - 1/2 - 20 x 2
20	181440	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/2
21	179887	8	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
22	181436	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
23	8032719	4	NUT .. Lock - 1/2 - 20 hex.
24	106642	1	PLUG .. Pipe - 1-1/4 M.P.T.
ϕ*25	112578	1	PLUG .. Pipe - 1/4 M.P.T. - Applied to water inlet elbow (Ref. No. 7)
ϕ*25	8268162	1	WELL .. Thermometer - Formerly applied to water inlet elbow (Ref. No. 7)

8452389

P.L. No. B44

COOLING SYSTEM
Fresh Water Pump Application
12,16-645E1,E2,E6,E8 Engines

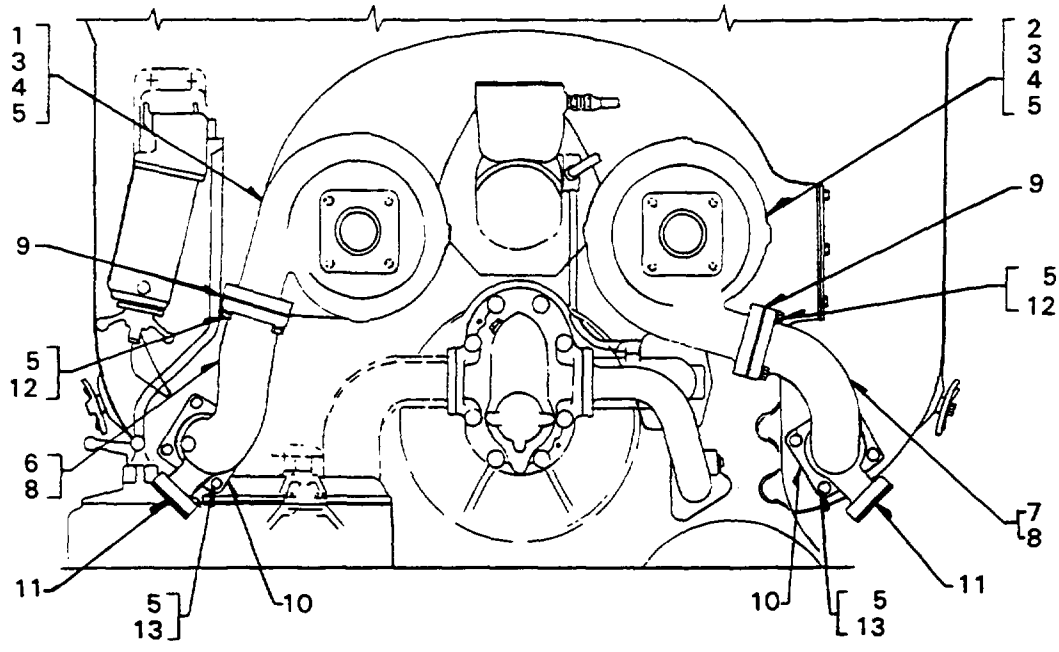


Right Bank PLATE B44-5 Left Bank

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	12,16-645E1,E8 engines
		-	B	-	12,16-645E2,E6 engines - Left hand rotation
		-	-	C	12,16-645E2,E6 engines - Right hand rotation
1	8058625	1	1	-	PUMP ASM. .. Water } Right Bank - See Parts List 46
1	8240648	-	-	1	PUMP ASM. .. Water
2	8058624	1	1	-	PUMP ASM. .. Water } Left Bank - See Parts List 46
2	8240497	-	-	1	PUMP ASM. .. Water
3	8028760	2	2	2	GASKET .. Pump mounting
4	181432	12	12	12	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	6101229	28	28	28	WASHER .. Flat - 1/2
6	8349063	1	-	-	ELBOW .. Water inlet } Right Bank
6	8363665	-	1	-	ELBOW .. Water inlet
6	8363811	-	-	1	ELBOW .. Water inlet
7	8349064	1	-	-	ELBOW .. Water inlet } Left Bank
7	8363664	-	1	-	ELBOW .. Water inlet
7	8363812	-	-	1	ELBOW .. Water inlet
ϕ8	8268162	1	1	1	WELL .. Thermometer - Applied to Ref. No. 6
ϕ8	112578	2	2	2	PLUG .. Pipe - 1/4 M.P.T. - Applied to Ref. Nos. 6 and 7
9	8029149	2	2	2	GASKET .. Pumps to elbows
10	8347416	2	2	2	GASKET .. Elbows to water manifolds
11	179887	8	8	8	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
12	181436	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4

8359354, 8360586, 8365338

COOLING SYSTEM
Fresh Water Pump Application
8,12,16,20-645E4,E4B; 12,16,20-645E9,E9B; 16,20-645E10B Engines - L.H. Rotation



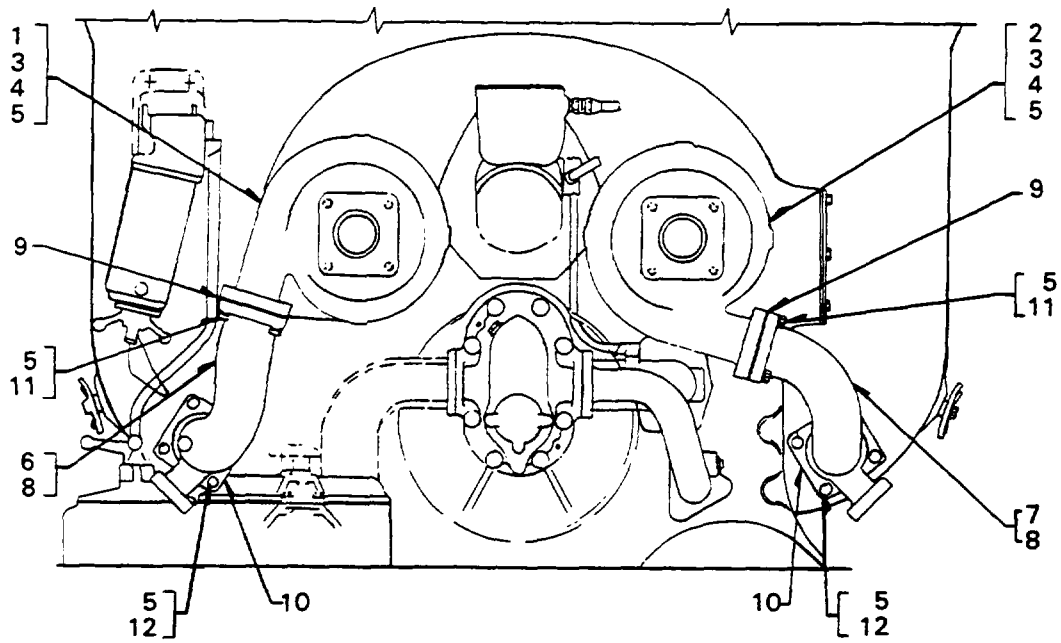
Right Bank PLATE B44-6 Left Bank

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E4,E4B engines - Left hand rotation
		-	B	-	-	12-645E4,E4B,E9,E9B engines - Left hand rotation
		-	-	C	-	16-645E4,E4B,E9,E9B,E10B engines - Left hand rotation
		-	-	-	D	20-645E4,E4B,E9,E9B,E10B engines - Left hand rotation
1	8058625	1	-	-	-	PUMP ASM. .. Water
1	8269664	-	1	-	-	PUMP ASM. .. Water } Right Bank - See Parts List 46
1	9530406	-	-	1	1	PUMP ASM. .. Water - Replaces 8249002
2	8058624	1	-	-	-	PUMP ASM. .. Water
2	9336390	-	1	-	-	PUMP ASM. .. Water - Formerly 8269638 } Left Bank - See Parts List 46
2	9530407	-	-	1	1	PUMP ASM. .. Water - Replaces 9320244 (Formerly 8347607)
3	8028760	2	2	2	2	GASKET .. Pump mounting
4	181432	12	12	12	12	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	6101229	28	28	28	28	WASHER .. Flat - 1/2
6	8349063	1	1	-	-	ELBOW .. Water inlet } Right Bank
6	8346547	-	-	1	1	ELBOW .. Water inlet
7	8349064	1	1	-	-	ELBOW .. Water inlet } Left Bank
7	8346691	-	-	1	1	ELBOW .. Water inlet
ϕ8	8268162	1	1	1	1	WELL .. Thermometer - Applied to Ref. No. 6
ϕ8	112578	2	2	2	2	PLUG .. Pipe - 1/4 M.P.T. - Applied to Ref. Nos. 6 and 7
9	8029149	2	2	-	-	GASKET .. Pumps to elbows
9	8347417	-	-	2	2	GASKET .. Pumps to elbows
10	8347416	2	2	2	2	GASKET .. Elbows to water manifolds
+11	8029469	2	2	2	2	GASKET .. Drain lines
12	179887	8	8	4	4	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
12	181440	-	-	4	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/2
13	181436	8	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
*14	8032719	-	-	4	4	NUT .. Lock - 1/2 - 20 hex. - Formerly 8032179

8480071, 8395959, 8347507, 8347033

P.L. No. B44

COOLING SYSTEM
Fresh Water Pump Application
8,12,16,20-645E5,E7,E7B,E7C Engines - L.H. Rotation

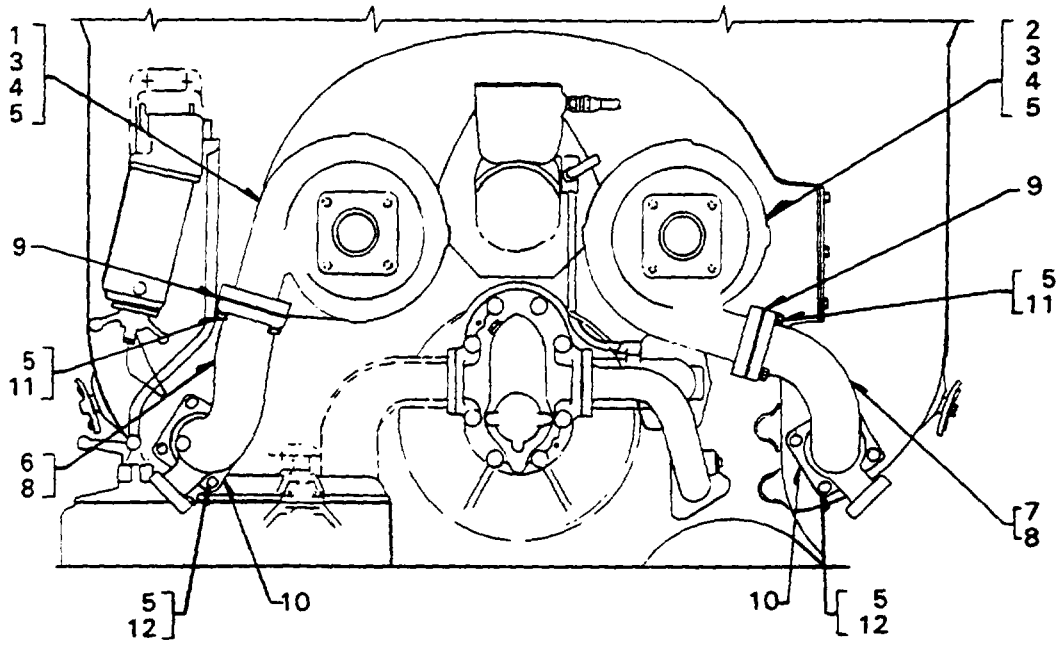


Right Bank PLATE B44-7 Left Bank

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E5,E7,E7B,E7C engines - Left hand rotation
		-	B	-	-	12-645E5,E7,E7B,E7C engines - Left hand rotation
		-	-	C	-	16-645E5,E7,E7B,E7C engines - Left hand rotation
		-	-	-	D	20-645E5,E7,E7B,E7C engines - Left hand rotation
1	8058625	1	-	-	-	PUMP ASM. .. Water
1	8269664	-	1	-	-	PUMP ASM. .. Water } Right Bank - See Parts List 46
1	9530406	-	-	1	1	PUMP ASM. .. Water - Replaces 8249002
2	8058624	1	-	-	-	PUMP ASM. .. Water
2	8269638	-	1	-	-	PUMP ASM. .. Water } Left Bank - See Parts List 46
2	8347607	-	-	1	1	PUMP ASM. .. Water - Formerly 9530407
3	8028760	2	2	2	2	GASKET .. Pump mounting
4	181432	12	12	12	12	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	6101229	28	28	28	28	WASHER .. Flat - 1/2
6	8363665	1	1	-	-	ELBOW .. Water inlet } Right Bank
6	8363231	-	-	1	1	ELBOW .. Water inlet
7	8363664	1	1	-	-	ELBOW .. Water inlet } Left Bank
7	8363230	-	-	1	1	ELBOW .. Water inlet
ø8	8268162	1	1	1	1	WELL .. Thermometer - Applied to Ref. No. 6
ø8	112578	2	2	2	2	PLUG .. Pipe - 1/4 M.P.T. - Applied to Ref. No. 6 and 7
9	8029149	2	2	-	-	GASKET .. Pumps to elbows
9	8347417	-	-	2	2	GASKET .. Pumps to elbows
10	8347416	2	2	2	2	GASKET .. Elbows to water manifolds
11	179887	8	8	4	4	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
11	181440	-	-	4	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/2
12	181436	8	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
*13	8032719	-	-	4	4	NUT .. Lock - 1/2 - 20 hex.

8429612, 8368794, 8364835, 8370432

COOLING SYSTEM
Fresh Water Pump Application
8-645E5,E7,E7B; 12,16,20-645E4,E4B,E5,E7,E7B,E7C Engines - R.H. Rotation



Right Bank PLATE B44-8 Left Bank

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	8-645E5,E7,E7B engines - Right hand rotation
		-	B	-	12-645E4,E5,E7,E7B,E7C engines - Right hand rotation
		-	-	C	16,20-645E4,E4B,E5,E7,E7B,E7C engines - Right hand rotation
1	8240648	1	-	-	PUMP ASM. .. Water
1	8324588	-	1	-	PUMP ASM. .. Water } Right Bank - See Parts List 46
1	8364236	-	-	1	PUMP ASM. .. Water
2	8240497	1	-	-	PUMP ASM. .. Water
2	8324589	-	1	-	PUMP ASM. .. Water } Left Bank - See Parts List 46
2	8364237	-	-	1	PUMP ASM. .. Water
3	8028760	2	2	2	GASKET .. Pump mounting
4	181432	12	12	12	BOLT .. Hex. head - 1/2 - 20 x 1-5/8
5	6101229	28	28	28	WASHER .. Flat - 1/2
6	8363811	1	1	-	ELBOW .. Water inlet } Right Bank
6	8363903	-	-	1	ELBOW .. Water inlet
7	8363812	1	1	1	ELBOW .. Water inlet } Left Bank
7	8363902	-	-	1	ELBOW .. Water inlet
ϕ8	8268162	1	1	1	WELL .. Thermometer - Applied to Ref. No. 6
ϕ8	112578	2	2	2	PLUG .. Pipe - 1/4 M.P.T. - Applied to Ref. Nos. 6 and 7
9	8029149	2	2	-	GASKET .. Pumps to elbows
9	8347417	-	-	2	GASKET .. Pumps to elbows - Formerly 8347414
10	8347416	2	2	2	GASKET .. Elbows to water manifolds
11	179887	8	8	4	BOLT .. Hex. head - 1/2 - 13 x 1-3/4
11	181440	-	-	4	BOLT .. Hex. head - 1/2 - 20 x 2-1/2
12	181436	8	8	8	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
*13	8032719	-	-	4	NUT .. Lock - 1/2 - 20 hex.

8421359, 8368531, 8364830, 8374033

P.L. No. B44

COOLING SYSTEM
Engine Mounted Raw Water Pump Application
8,12,16-645E2,E6; 8,12,16,20-645E5; 12,16-645E7,E7B; 20-645E7B Engines
PLATE B44-9

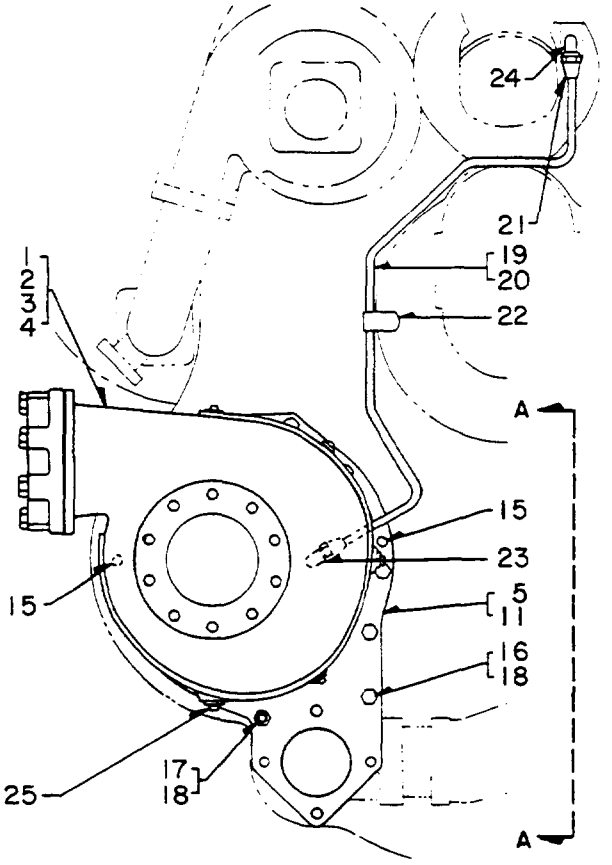
For Engine Belt Driven Raw Water Pump Application See Catalog 361, P.L. 1230.

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645E2,E6 engines - R.H. rotation
		-	B	-	-	8-645E2,E6 engines - L.H. rotation
		-	-	C	-	8,12,16,20-645E5; 12,16-645E7,E7B engines - R.H. rotation
		-	-	-	D	8,12,16,20-645E5, 12,16-645E2,E6,E7,E7B; 20-645E7B engines - L.H. rotation
1	3326546	1	-	-	-	PUMP ASM. .. Raw water }
1	3325410	-	1	-	-	PUMP ASM. .. Raw water } See Parts List 46
1	3325409	-	-	1	-	PUMP ASM. .. Raw water }
1	3325408	-	-	-	1	PUMP ASM. .. Raw water }

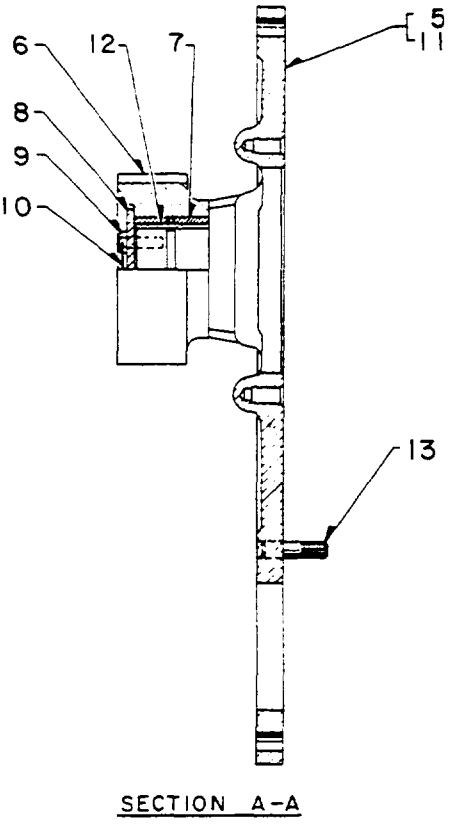
The following items Ref. Nos. 2 thru 28 are applicable to Columns A thru D.

2	3323210	1	GASKET .. Pump mounting
3	179885	6	BOLT .. Pump mounting - 1/2 - 13 x 1-1/2 hex. head
4	6101229	6	WASHER .. Plain - 1/2
5	3323404	1	ADAPTER ASM. .. Pump
6	3323281	1	GEAR .. Idler - 39 teeth
7	3323279	1	BUSHING .. Idler gear
8	3323207	1	PLATE .. Retainer
9	8306530	3	BOLT .. 3/8 - 16 x 7/8 hex. head drilled
10	8116738	A.R.	WIRE .. Lock - 3/64 dia. - 500 ft. length
11	3323211	1	BRACKET ASM. .. Water pump and idler gear
12	3323280	1	SLEEVE .. Idler shaft
13	3252090	1	STUD .. 1/2 - 13 - 20 x 1-13/16 in. long
14	8080850	1	GASKET .. Adapter to accessory drive housing
15	8236004	2	DOWEL .. 1/2 x 1-9/16 in. long - 5/16 - 24 tapped end
			8236005 .. .005 O.S.
			8236006 .. .010 O.S.
			8236007 .. .015 O.S.
16	181433	10	BOLT .. Adapter mounting - 1/2 - 20 x 1-3/4 hex. head
17	103028	1	NUT .. 1/2 - 20 hex.
18	6101229	11	WASHER .. Plain - 1/2
19	8242556	1	TUBE ASM. .. Lube oil supply
20	8098594	A.R.	TUBING .. 3/8 O.D. x .028 in. wall - Copper brazed steel - 20 ft.
21	118539	2	NUT .. 3/8 tube
22	8296013	1	CLIP .. Tube mounting
23	118755	1	ELBOW .. 3/8 tube x 1/4 M.P.T.
24	8039169	1	ELBOW .. 3/8 tube x 3/8 M.P.T.
25	112304	4	PLUG .. Pipe - 3/8 M.P.T.
*26	8383236	1	PLATE .. Orifice - 9 in. O.D. x 1-3/4 I.D. - 8-645E2,E6 engines
*26	8383235	1	PLATE .. Orifice - 10 in. O.D. x 2-1/4 I.D. - All other engines
*27	3323836	1	COVER ASM. .. Blind - Applied in place of raw water pump
*28	3252090	1	STUD .. 1/2 - 13 - 20 x 1-13/16 in. long
*29	8348619	1	PLUG .. Pipe - 3/8 M.P.T. square socket - Applied to Ref. No. 27

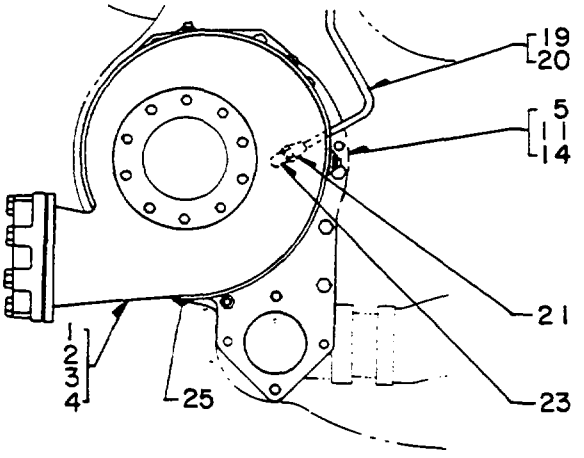
COOLING SYSTEM



Right Hand Engine Rotation



Pump Adapter



Left Hand Engine Rotation

PLATE B44-9

P.L. No. B44

COOLING SYSTEM
Companion Flanges
8,12,16-645E2,E6; 8,12,16,20-645E5; 12,16,20-645E7,E7B Engines

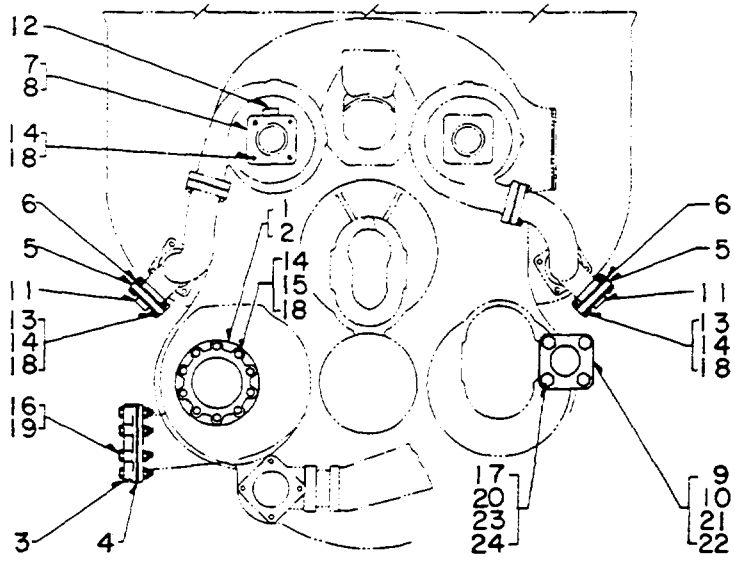
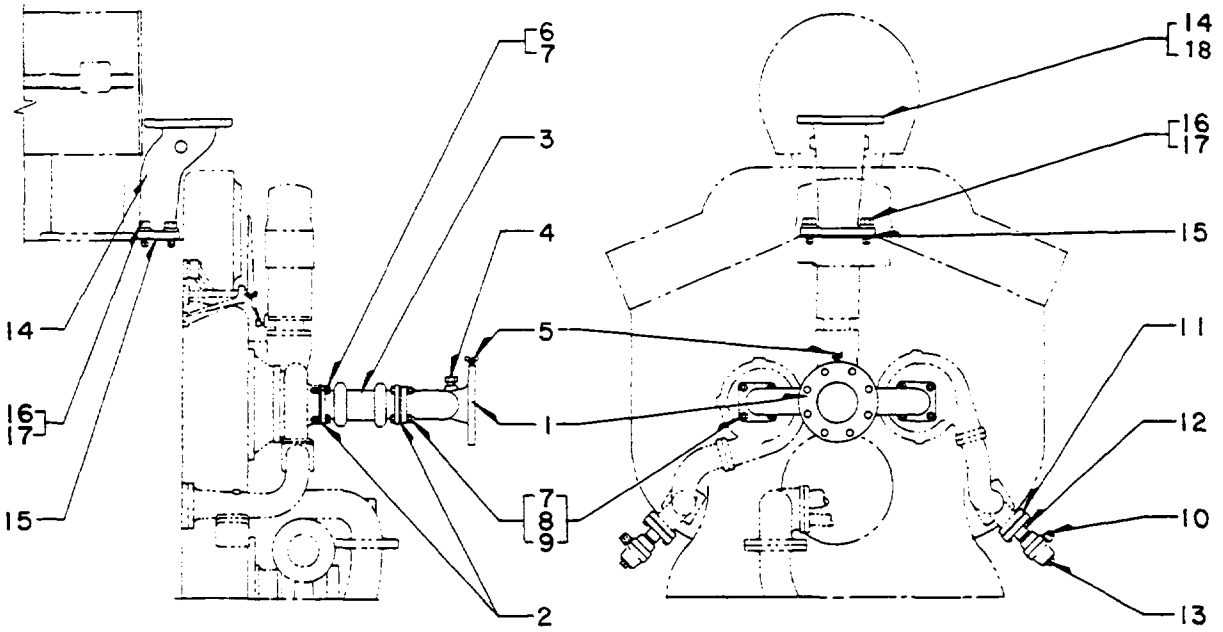


PLATE B44-10

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	8-645E2,E6 engines
		-	B	-	8-645E5, 12-645E2,E5 and 16-645E2 engines
		-	-	C	12,16-645E6,E7,E7B; 16,20-645E5; 20-645E7,E7B engines
1	3313292	1	-	-	FLANGE .. Suction } Raw water pump
1	8322574	-	1	1	FLANGE .. Suction } Raw water pump
2	3232214	1	-	-	GASKET .. Suction flange mounting
2	3306447	-	1	1	GASKET .. Suction flange mounting
3	3306481	1	-	-	FLANGE .. Discharge } Raw water pump
3	8322576	-	1	1	FLANGE .. Discharge } Raw water pump
4	3306484	1	-	-	GASKET .. Discharge flange mounting
4	3242958	-	1	1	GASKET .. Discharge flange mounting
5	8326194	1	2	-	FLANGE .. Water drain
5	8365003	-	-	2	FLANGE .. Water drain
6	8326233	1	2	-	GASKET .. Flange mounting
6	8366785	-	-	2	GASKET .. Flange mounting - Replaces 8347468
7	3324336	1	-	-	FLANGE .. Water inlet
8	8366787	1	-	-	GASKET .. Flange mounting - Replaces 8354344
9	3324337	1	-	-	FLANGE .. Scavenging pump
10	3324335	1	-	-	GASKET .. Flange mounting
11	186481	1	2	-	PLUG .. Pipe - 2-1/2 M.P.T.
11	186920	-	-	2	PLUG .. Pipe - 3-1/2 M.P.T.
12	103647	1	-	-	COCK .. Drain - 1/4 M.P.T.
13	179887	4	8	-	BOLT .. 1/2 - 13 x 1-3/4 hex. head
14	179889	12	-	8	BOLT .. 1/2 - 13 x 2 hex. head
15	179890	-	10	10	BOLT .. 1/2 - 13 x 2-1/4 hex. head
16	179892	6	8	8	BOLT .. 1/2 - 13 x 2-3/4 hex. head
17	271566	4	-	-	BOLT .. 5/8 - 11 x 3 hex. head
18	6101229	16	18	18	WASHER .. Plain - 1/2
19	8032745	6	8	8	NUT .. Lock - 1/2 - 13 hex.
20	8032747	4	-	-	NUT .. Lock - 5/8 - 11 hex.
The following items are applicable to 8-645E5 and 12-645E2 R and L engines after March, 1971.					
21	3323873	-	1	-	FLANGE .. Scavenging pump
22	3323879	-	1	-	GASKET .. Scavenging pump flange mounting
23	271566	-	4	-	BOLT .. 5/8 - 11 x 3 hex. head
24	8032747	-	4	-	NUT .. Lock - 5/8 - 11 hex.

COOLING SYSTEM
Water Inlet, Outlet and Drain Piping
8,12-645E2,E5,E6,E7,E7B,E7C; 16-645E2,E6; 16,20-645E5,E7,E7B,E7C Engines



Side View Accessory Drive End

PLATE B44-11

Ref. No.	Part Number	Qty. Req.		Description
		A	-	8,12-645E2,E5,E6,E7,E7B,E7C and 16-645E2,E6 engines
		-	B	16,20-645E5,E7,E7B,E7C engines
1	3324014	1	-	HEADER .. Water inlet - 10 in. O.D. dia. flange - 8 holes
1	8363209	-	1	HEADER .. Water inlet - 11 in. O.D. dia flange - 8 holes
2	8366787	4	-	GASKET .. Header and coupling mounting
2	8366785	-	4	GASKET .. Header and coupling mounting
3	8268280	2	-	COUPLING ASM. .. Flanged - 3 in. I.P.S.
3	8347788	-	2	COUPLING ASM. .. flanged - 4 in. I.P.S.
4	8326564	1	1	SOCKET .. Separable
5	103647	1	1	COCK .. Drain - 1/4 M.P.T.
6	179883	8	-	BOLT .. Flange to water pump - 1/2 - 13 x 1-1/4 hex. head
6	179885	-	8	BOLT .. Flange to water pump - 1/2 - 13 x 1-1/2 hex. head
7	179889	8	8	BOLT .. Header to flange - 1/2 - 13 x 2 hex. head
8	6101229	16	16	WASHER .. Plain - 1/2
9	102637	8	8	NUT .. 1/2 - 13 hex.
10	8354227	2	2	VALVE .. Ball cock - 1-1/4 F.P.T.
11	8449105	1	-	FLANGE .. Valve mounting
11	8449106	-	1	FLANGE .. Valve mounting
12	8153236	1	1	NIPPLE .. Pipe - 1-1/4 M.P.T. x 2-1/2 in. long
13	106642	1	1	PLUG .. Pipe - 1-1/4 M.P.T.
14	8370361	1	-	ADAPTER .. Water outlet - 9 in. dia. top flange
14	8363280	-	1	ADAPTER .. Water outlet - 11 in. dia. top flange
15	8347756	1	1	GASKET .. Adapter mounting
16	272563	4	4	BOLT .. Adapter mounting - 1 - 14 x 2-1/4 hex. head
17	103348	4	4	WASHER .. Plain - 1 in.
18	8207818	-	1	GASKET .. Adapter

P.L. No. B44

COOLING SYSTEM
Water Drain Piping
12-645E4; 16,20-645E4,E4B Engines - R.H. Rotating
8,12,16,20-645E7,E7B,E7C; 16-645E6 Engines

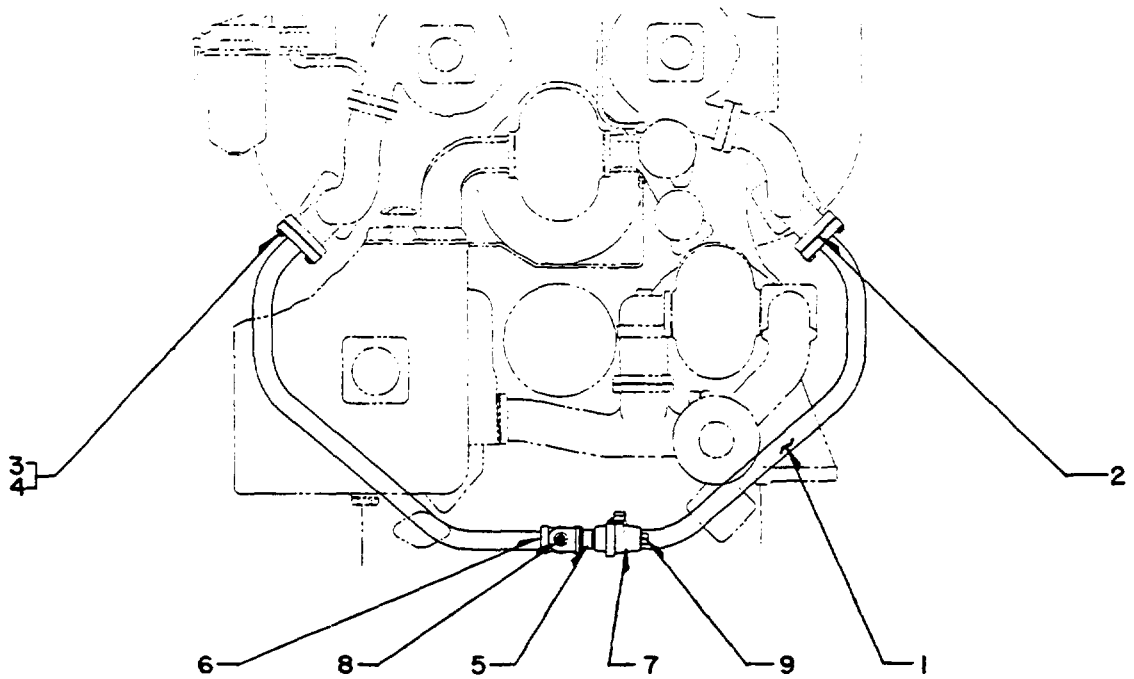


PLATE A44-12

Ref. No.	Part Number	Qty. Req.		Description
		A	-	8,12-645E7,E7B,E7C; 16-645E6; R12-645E4 engines
		-	B	R16, 20-645E4,E4B; 16,20-645E7,E7B,E7C engines
1	8449107	1	-	PIPE ASM. .. Water drain
1	8449108	-	1	PIPE ASM. .. Water drain
2	8326233	2	-	GASKET .. Pipe mounting
2	8366785	-	2	GASKET .. Pipe mounting
3	179887	8	8	BOLT .. Pipe mounting - 1/2 - 13 x 1-3/4 hex. head
4	6101229	8	8	WASHER .. Plain - 1/2
5	8060976	2	2	NIPPLE .. Short pipe - 1-1/4 M.P.T.
6	9558592	1	1	TEE .. Reducing pipe - Malleable iron - Formerly 189417 - Brass
7	8354227	1	1	VALVE .. Ball - 1-1/4 F.P.T.
8	103868	1	1	PLUG .. Pipe - 1/2 M.P.T. square head
9	106642	1	1	PLUG .. Pipe - 1-1/4 M.P.T. square head

8449122, 8449123

COOLING SYSTEM
Aftercooler Piping
645 Turbocharged Engines

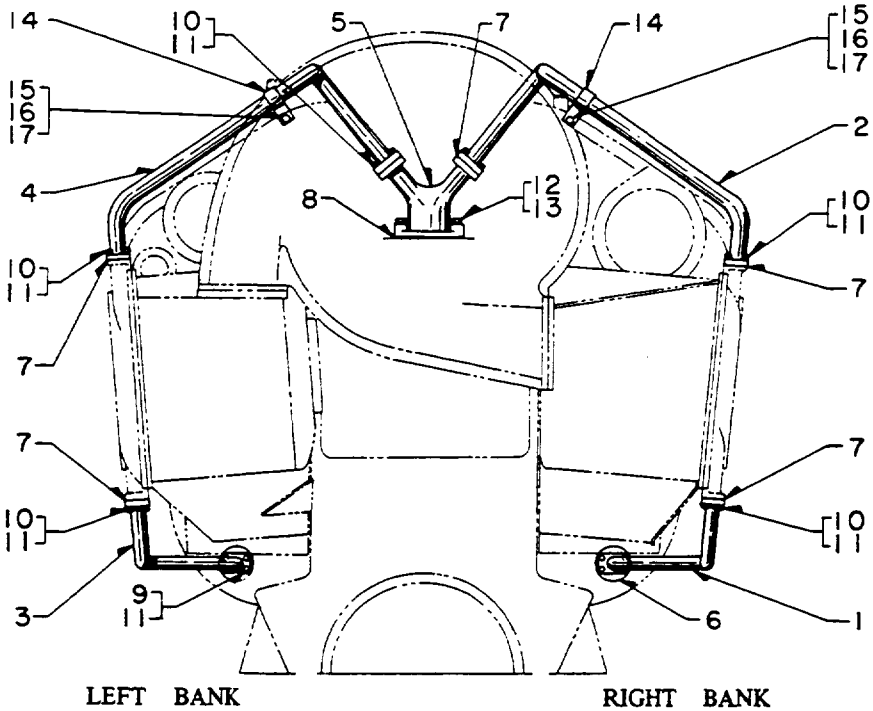


PLATE A44-13

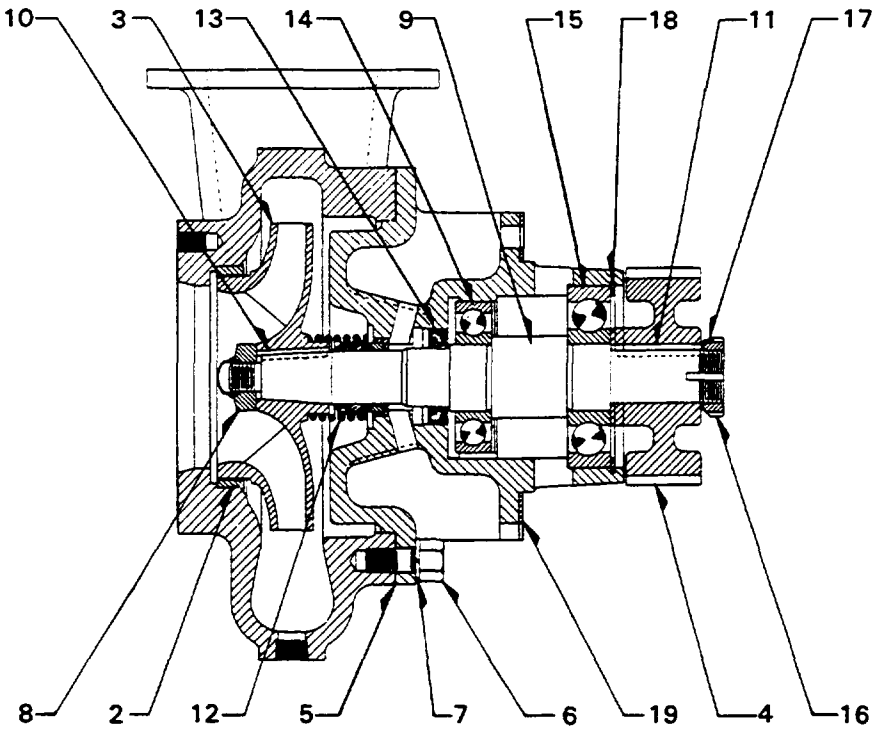
Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
		A	-	8,12-645E4,E4B,E5,E7,E7B,E7C engines
		-	B	16,20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
1	8347397	1	-	PIPE ASM. .. Water inlet
1	8352554	-	1	PIPE ASM. .. Water inlet } Right Bank
2	8326019	1	-	PIPE ASM. .. Water discharge
2	8352552	-	1	PIPE ASM. .. Water discharge
3	8347398	1	-	PIPE ASM. .. Water inlet
3	8352553	-	1	PIPE ASM. .. Water inlet } Left Bank
4	8326020	1	-	PIPE ASM. .. Water discharge
4	8352551	-	1	PIPE ASM. .. Water discharge

The following items Ref. Nos. 5 thru 18 are applicable to Columns A and B.

5	8289021	1	FLANGE .. "Y" - Water discharge
6	8347396	2	GASKET .. Manifold to water inlet pipe
7	8289171	6	GASKET .. Water inlet and discharge pipe to aftercooler
8	8070513	1	GASKET .. "Y" flange mounting
9	181374	8	BOLT .. 3/8 - 24 x 1-1/2 hex. head
10	179843	24	BOLT .. 3/8-16 x 1-1/2 hex. head
11	6101225	32	WASHER .. Plain - 3/8
12	271749	4	BOLT .. 5/8 - 18 x 2-1/4 hex. head
13	6101233	4	WASHER .. Plain - 5/8
14	9082050	2	CLAMP .. Pipe - Water discharge pipe - Formerly 8289492
15	6101229	2	WASHER .. Plain - 1/2
16	8032719	2	NUT .. Lock - 1/2 - 20 hex. - Formerly applied
17	181431	2	BOLT .. 1/2 - 20 x 1-1/2 hex. head
*18	8260114	2	WASHER .. Plain - 1/2

Parts List No. B46

WATER PUMPS
Raw Water Pump Assembly



Ref. No. 1
PLATE B46-1

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
1	3326546	1	-	-	-	PUMP ASM. .. Raw water }
1	3325410	-	1	-	-	PUMP ASM. .. Raw water } See Page 10, Parts List 44 For
1	3325409	-	-	1	-	PUMP ASM. .. Raw water } Engine Model Applications
1	3325408	-	-	-	1	PUMP ASM. .. Raw water }
2		1	1	-	-	RING .. Casing - Formerly 3342377
2	3343457	-	-	1	1	RING .. Casing
3	9507325	1	-	-	-	IMPELLER .. Pump
3	3325412	-	1	-	-	IMPELLER .. Pump
3	3343966	-	-	1	-	IMPELLER .. Pump
3	3343965	-	-	-	1	IMPELLER .. Pump
4	3323282	1	1	1	1	GEAR .. Drive - 39 tooth
5	3342498	1	1	1	1	GASKET .. Casing to housing
6	271588	8	8	8	8	BOLT .. Hex. head 5/8 - 11 x 1-1/2
7	103325	8	8	8	8	WASHER .. Lock - 5/8
8	3344563	1	1	1	1	NUT .. Lock - Impeller
9	3325411	1	1	1	1	SHAFT .. Pump - Formerly 3326030 (included keys)
10	3343471	1	1	1	1	KEY .. Shaft to impeller
11	3324582	1	1	1	1	KEY .. Shaft to gear
12	3344545	1	1	1	1	KIT .. Seal - Replaces 3344901
13	3344553	1	1	1	1	SEAL .. Oil
14	3371683	1	1	1	1	BEARING .. Impeller end
15	3324583	1	1	1	1	BEARING .. Gear end
16	127710	1	1	1	1	NUT .. Lock - Bearing type No. 7
17	127687	1	1	1	1	WASHER .. Lock - Bearing type No. 7
18	9413391	1	1	1	1	RING .. Snap
+ 19	3323210	1	1	1	1	GASKET .. Pump mounting
+*20	179885	6	6	6	6	BOLT .. Hex. head 1/2 - 13 x 1-1/2 pump mounting
+*21	6101229	6	6	6	6	WASHER .. Flat - 1/2

P.L. No. B46

WATER PUMPS
Fresh Water Pump Assemblies
Reference Chart
PLATE B46-2

NOTE: See Parts List No. 44 for specific engine model applications.

Ref. No.	Water Pump Part No.	Engine Location	UTEX Part No.	Replaced By	Ref. 17 Housing Part No.	Ref. 19 Impeller Part No.	Ref. 53 Name Plate Part No.
1	8058624	Left Bank	8122874	- - - -	8354382	8060008	8288613
2	8058625	Right Bank	8122879	- - - -	8354382	8060008	8288612
3	8240497	Left Bank	8447743	- - - -	8354741	8239872	8340849
4	8240648	Right Bank	9095787	- - - -	8354741	8239872	8340850
5	8269638	Left Bank	8296347	- - - -	8276222	8269566	8288611
6	8269664	Right Bank	8296348	- - - -	8276222	8269566	8288610
7	8324589	Left Bank	9568892	- - - -	8324587	8324434	8324741
8	8324588	Right Bank	9568891	- - - -	8324587	8324434	8324742
9	8347607	Left Bank	8379237		8250143	8248248	8347719
10	8249002	Right Bank	8379236	9530406	8250143	8248248	8347718
11	8364237	Left Bank	8494898	- - - -	8364334	8362760	8364243
12	8364236	Right Bank	8494899	- - - -	8364334	8362760	8364242
13	9320244	Left Bank	9332825	9530407	9320243	8248248	9321310
14	9336390	Left Bank	9503461	- - - -	9336389	8269566	9336410
15	9530407	Left Bank	9332825	- - - -	9320243	8248248	9536187
16	9530406	Right Bank	8379236	- - - -	8250143	8248248	9536186

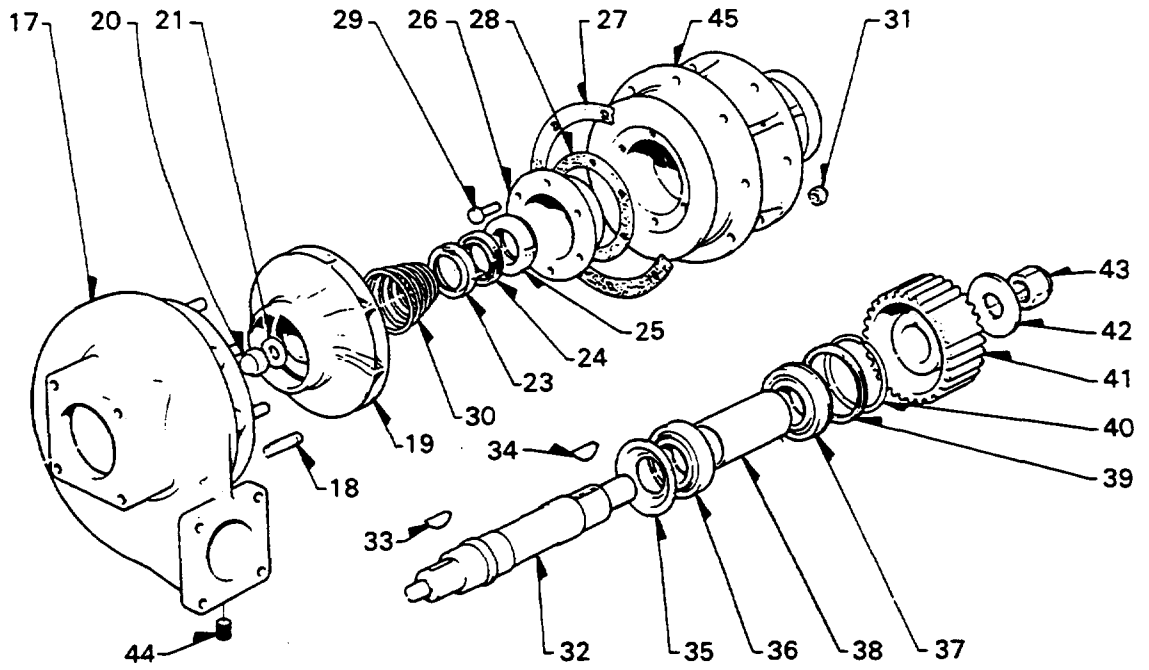
The following Components are applicable to all the Fresh Water Pumps listed above unless specifically noted in the Description Column.

Ref. No.	Part Number	Qty. Req.	Description
-	- - - -	1	PUMP ASM. .. Fresh water - See chart above
17	- - - -	1	HOUSING ASM. .. Pump - See chart above
18	8035102	8	STUD .. Housing 1/2 - 13 x 1/2 - 20 x 2-1/8 in. long - Standard pitch dia. 8115301 .. .002 O.S. 8115303 .. .015 O.S. 8115305 .. .019 O.S. 8115302 .. .004 O.S. 8115304 .. .017 O.S.
19	- - - -	1	IMPELLER .. Pump - See chart above
20	8028724	1	NUT .. Lock 5/8 - 18 hex.
21	8028730	1	WASHER .. Flat - 5/8
*22	9580758	1	KIT .. Seal - Replaces 8404507, 9544892
23	9529473	1	RETAINER .. Seal
24	9526863	1	SEAL .. Outer - Replaces 9083462
25	9529199	1	SEAL .. Inner - Carbon - Replaces 8398612
26	8052224	1	BUSHING .. Stationary
27	8209776	1	GASKET .. Housing to support
28	8370885	1	GASKET .. Support to bushing
29	9543448	6	BOLT .. Hex. head - Special 5/16 - 18 x 7/8 with nylon insert

WATER PUMPS

Ref. No.	Part Number	Qty. Req.	Description	
-	----	1	PUMP ASM. .. Fresh water	
30	8055346	1	SPRING .. Seal retainer	
31	8032719	8	NUT .. Lock 1/2 - 20 hex.	
32	8052246	1	SHAFT .. Pump	
33	103909	1	KEY .. Woodruff - Shaft to impeller	
34	108627	1	KEY .. Woodruff - Shaft to gear	
35	8042969	1	SLINGER .. Water	
†36	908415	1	BEARING .. Ball - Impeller end - Replaces 908377, 908168, and 954240	*See Note*
†37	908410	1	BEARING .. Ball - Gear end - Replaces 908378, 908169, and 954241	*See Note*
38	9532762	1	SPACER .. Bearing - Replaces 8042970	
39	8042973	1	RING .. Retaining	
40	8370886	1	RING .. Snap	
41	8042976	1	GEAR .. Drive - 37 tooth	
42	8042977	1	WASHER .. Special - 1 inch	
43	8032724	1	NUT .. Lock 1 - 14 hex. - Replaces 8449544	
44	8348618	A.R.	PLUG .. Pipe 1/4 M.P.T. - Not applied to all pumps	
45	8329900	1	SUPPORT ASM. .. Housing - Replaces 8042963 - See Ref. Nos. 48, 49, 50	
*46	9312705	1	SPRING .. Housing	
*47	273703	1	PIN .. Roll 1/8 x 1-3/8	
*48	8042971	1	FELT .. Lubricator - Used on 8042963 support only	
*49	8353988	1	PAD .. Lubricator - Used on 8042963 support only	
*50	8004889	1	CUP .. Oil - Used on 8042963 support only	
*51	8048482	1	RING .. Wear - Formerly used on housings 8354741 and 8354382	
*52	114358	4	SCREW .. Wear ring 1/4 - 20 x 1-1/8	
*53	----	1	NAME PLATE .. Pump - Lists EMD pump part number - See chart	
*54	40000927	1	KIT .. Pump repair - Contains seal kit (Ref. 22) and bearings (Ref. 36 and 37) - Replaces 9547683	

† It is strongly recommended to replace both bearings when replacing either of the previous style bearings.

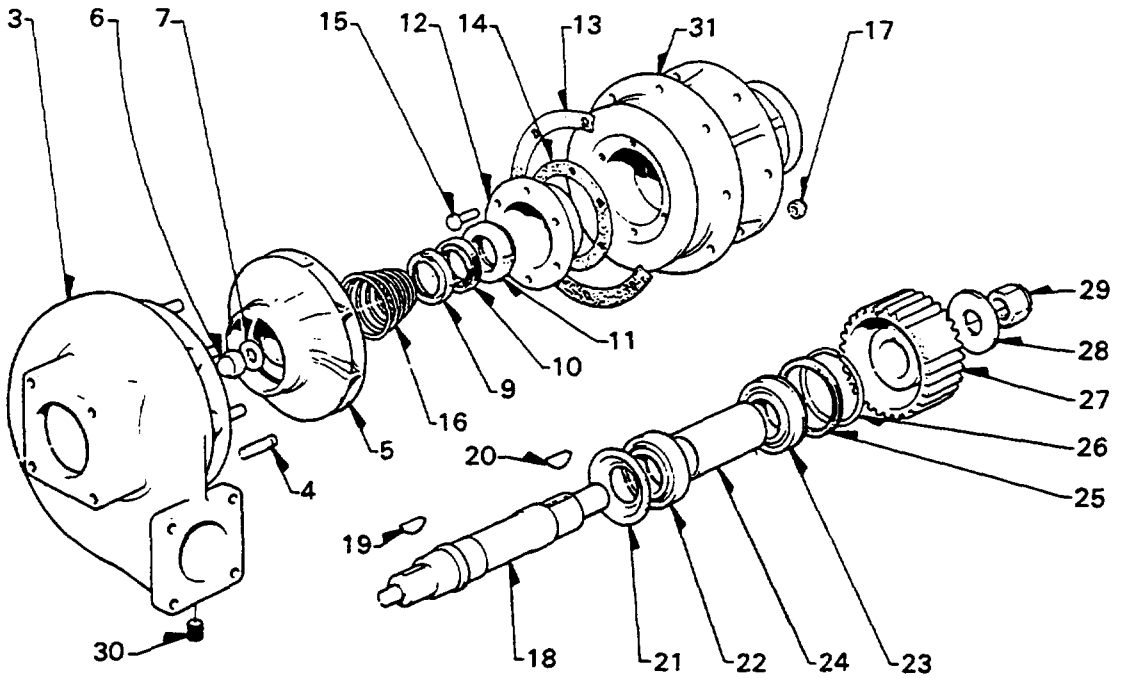


Ref. 1 thru 16
PLATE B46-2

P.L. No. B46

WATER PUMPS

Fresh Water Pump Assemblies
20-645F4B Engine - 750 RPM Operation



Ref. No. 1 and 2
PLATE B46-3

Ref. No.	Part Number	Qty. Req.		Description
1	9553050	1	-	PUMP ASSEMBLY .. Fresh water - Left bank
2	9553049	-	1	PUMP ASSEMBLY .. Fresh water - Right bank

Unless otherwise indicated, the following components are applicable to both above pump assemblies.

3	9320243	1	HOUSING ASM. .. Pump - Applicable to 9553050 pump
3	8250143	1	HOUSING ASM. .. Pump - Applicable to 9553049 pump
4	8035102	8	STUD .. Housing - 1/2-13 x 1/2 - 20 x 2-1/8 in. long - Std. pitch dia. 8115301 .. .002 O.S. 8115303 .. .015 O.S. 8115305 .. .019 O.S. 8115302 .. .004 O.S. 8115304 .. .017 O.S.
5	8248248	1	IMPELLER .. Pump
6	8028724	1	NUT .. Lock 5/8-18 hex.
7	8028730	1	WASHER .. Flat - 5/8
*8	9580758	1	KIT .. Seal - Replaces 9544892
9	9529473	1	RETAINER .. Seal - Replaces 8342485
10	9526863	1	SEAL .. Outer - Formerly 9529863
11	9529199	1	SEAL .. Inner
12	8052224	1	BUSHING .. Stationary
13	8209776	1	GASKET .. Housing to support
14	9570647	1	GASKET .. Support to bushing - Replaces 8370885
15	9543448	6	BOLT .. Hex. head - Special 5/16-18 x 7/8 with nylon insert - Replaces 9417962
16	8055346	1	SPRING .. Seal retainer
17	8032719	8	NUT .. Lock 1/2-20 hex.
18	8052246	1	SHAFT .. Pump
19	103909	1	KEY .. Woodruff - Shaft to impeller
20	108627	1	KEY .. Woodruff - Shaft to gear
21	8042969	1	SLINGER .. Water

WATER PUMPS

Ref. No.	Part Number	Qty. Req.	Description
	----	1	PUMP ASSEMBLY .. Fresh water
22	908415	1	BEARING .. Ball - Impeller end
23	908410	1	BEARING .. Ball - Gear end
24	9532762	1	SPACER .. Bearing
25	8042973	1	RING .. Retaining
26	8370886	1	RING .. Snap
27	9552142	1	GEAR .. Drive - 35 tooth
28	8042977	1	WASHER .. Special - 1 inch
29	8032724	1	NUT .. Lock 1-14 hex.
30	8348618	2	PLUG .. Pipe 1/4 M.P.T.
31	8329900	1	SUPPORT ASM. .. Housing
*32	9312705	1	SPRING .. Housing
*33	273703	1	PIN .. Roll 1/8 x 1-3/8
*34	145372	2	SCREW .. Round head - No. 4 x 1/4 metallic drive
*35	9553259	1	NAME PLATE .. Pump - Lists EMD part number - Applicable to 9553050 pump
*35	9553258	1	NAME PLATE .. Pump - Lists EMD part number - Applicable to 9553049 pump
36	9547683	1	KIT .. Pump repair - Contains seal kit (Ref. No. 8) and bearings (Ref. No. 22 and 23)

Parts List No. B48

FUEL OIL PIPING

Fuel Oil Manifold and Injector Fuel Oil Lines
All 645 Engines

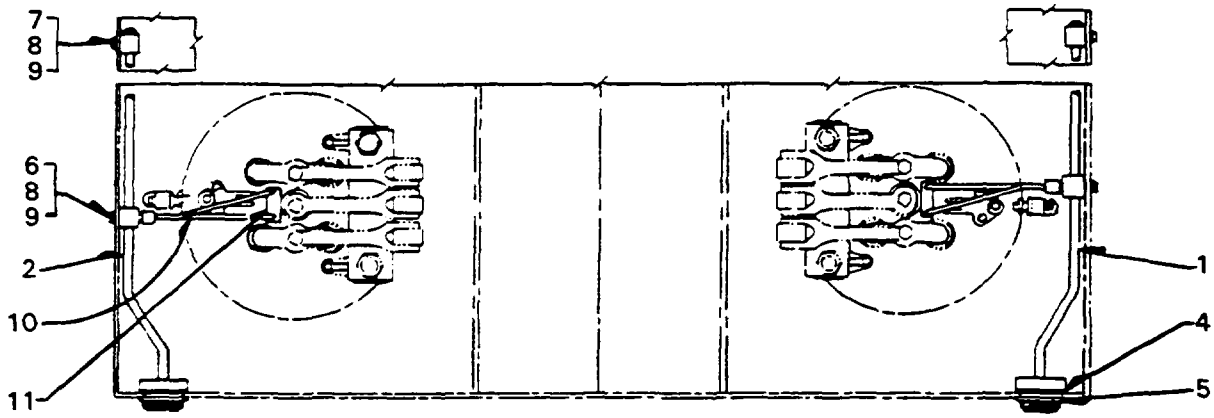


PLATE B48-1

Ref. No.	Part Number	Quantity Required				Description
		A	-	-	-	8-645 engines
		-	B	-	-	12-645 engines
		-	-	C	-	16-645 engines
		-	-	-	D	20-645 engines
1	8194740	1	-	-	-	MANIFOLD ASM. .. Fuel line (Left bank) (Supply and Drain)
1	8194742	-	1	-	-	MANIFOLD ASM. .. Fuel line (Left bank) (Supply and Drain)
1	8163892	-	-	1	-	MANIFOLD ASM. .. Fuel line (Left bank) (Supply and Drain)
1	8360876	-	-	-	1	MANIFOLD ASM. .. Fuel line (Left bank) (Supply and Drain)
2	8194741	1	-	-	-	MANIFOLD ASM. .. Fuel line (Right bank) (Supply and Drain)
2	8194743	-	1	-	-	MANIFOLD ASM. .. Fuel line (Right bank) (Supply and Drain)
2	8163891	-	-	1	-	MANIFOLD ASM. .. Fuel line (Right bank) (Supply and Drain)
2	8360877	-	-	-	1	MANIFOLD ASM. .. Fuel line (Right bank) (Supply and Drain)
*3	143980	4	4	4	4	PLUG .. Pipe - 3/8 M.P.T. square head
4	8165276	2	2	2	2	GASKET .. Manifold mounting
5	8165289	2	2	2	2	NUT .. Manifold mounting - 2-12 hex.
6	181407	8	12	16	20	BOLT .. Manifold mtg. - 7/16 - 20 x 2-1/4 hex. head
7	181395	2	2	2	2	BOLT .. Manifold mtg. - 7/16 - 20 x 1 hex. head
8	116104	10	14	18	22	WASHER .. Plain - 7/16 - Copper
9	103342	10	14	18	22	WASHER .. Plain - 7/16 - Steel
10	8160209	8	12	16	20	LINE ASM. .. Fuel oil - Manifold to injector
11	8032718	8	12	16	20	NUT .. Lock - 7/16 - 20 hex.

8247054, 8241995, 8241969, 8374034

P.L. No. B48

FUEL OIL PIPING

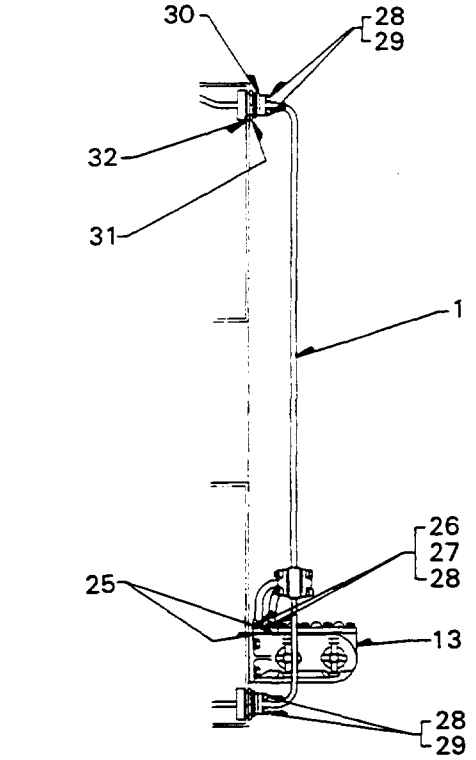
Twin Spin-On Fuel Oil Piping (Formerly Viscose)
8-645E1,E4,E4B; 12-645E1,E4,E4B; 16-645E1,E4,E4B,E10B; 20-645E4,E4B,E10B Industrial Engines

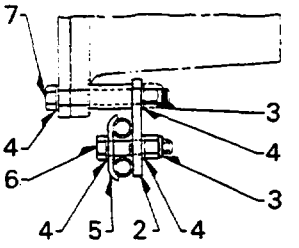
PLATE B48-2

Ref. No.	Part Number	Qty. Req.	Description
1	8160140	1	MANIFOLD ASM. .. Fuel oil
2	9538460	2	BRACKET .. Manifold mounting
3	8032717	4	NUT .. Lock - 3/8 - 24 hex.
4	6101225	8	WASHER .. Flat - 3/8
5	8029197	2	CLIP .. Mounting
6	181377	2	BOLT .. Hex. head - 3/8 - 24 x 1-3/4
7	181385	2	BOLT .. Hex. head - 3/8 - 24 x 3
			Former applications only used Ref. Nos. 3 and 5 on existing studs
8	8215900	1	TUBE ASM. .. Return - Manifold to filter
9	8215901	1	TUBE ASM. .. Supply - Filter to manifold
10	8104300	2	GASKET .. Tube to manifold
11	186309	2	BOLT .. Tube to manifold - 3/8 - 24 x 3-1/4
12	8032717	2	NUT .. Lock - 3/8 - 24 hex.
13	8479355	1	FILTER ASM. .. Fuel - Twin spin-on - Replaces 8427284 (Viscose) 8427284 replaced 8311184 (Viscose) - See Parts List 50
14	181428	2	BOLT .. Filter mounting - 1/2 - 20 x 1-1/8 hex. head
15	103323	2	WASHER .. Lock - 1/2
16	8347993	1	TUBE ASM. .. Fuel oil supply and drain
17	8104455	1	BRACKET .. Tube
18	8104456	1	CLAMP .. Bracket
19	181338	2	BOLT .. Bracket mounting - 5/16 - 24 x 7/8 hex. head
20	6101223	2	WASHER .. Flat - 5/16
21	181341	5	BOLT .. 5/16 - 24 x 1-1/4 hex. head
22	103320	5	WASHER .. Lock - 5/16
23	103340	4	WASHER .. Plain - 5/16
24	8104292	1	GASKET .. Ref. No. 16 to filter asm.
25	8104276	2	GASKET .. Ref. Nos. 8 and 9 to filter asm.
26	179840	8	BOLT .. 3/8 - 16 x 1-1/8 hex. head
27	103341	8	WASHER .. Plain - 3/8
28	103321	12	WASHER .. Lock - 3/8
29	181361	4	BOLT .. 3/8 - 24 x 7/8 hex. head
30	8160114	2	GASKET .. Manifold
31	8165289	2	NUT .. Special - 2-12 hex.
32	8165276	2	GASKET .. Inside frame

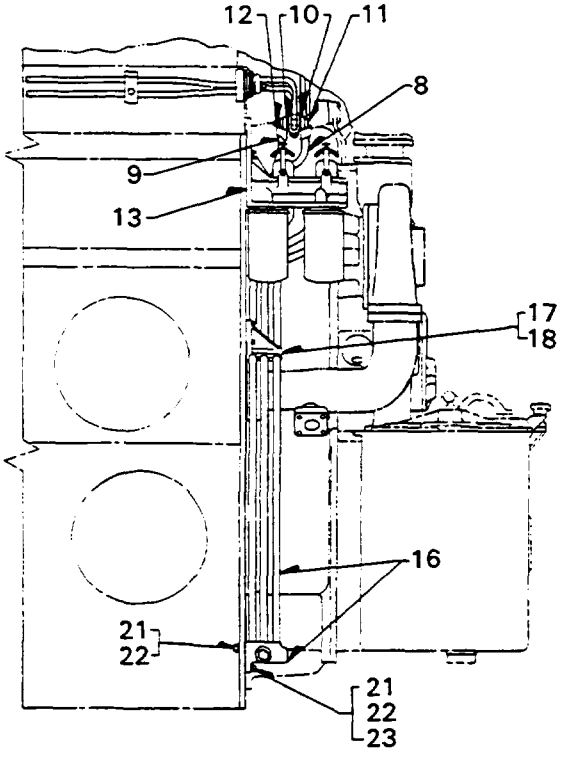
See Page 1

FUEL OIL PIPING





SECTION A-A



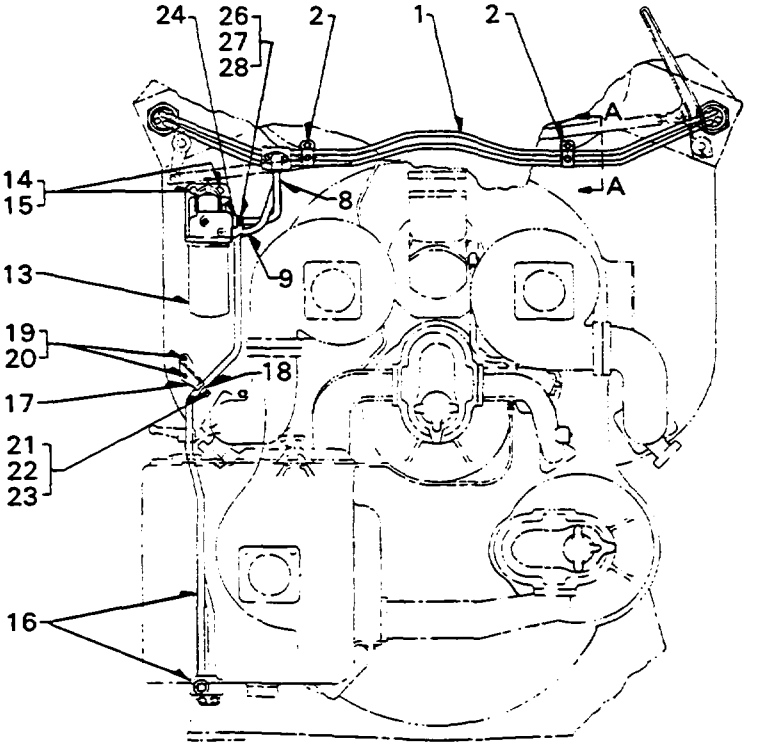


PLATE B48-2

P.L. No. B48

FUEL OIL PIPING

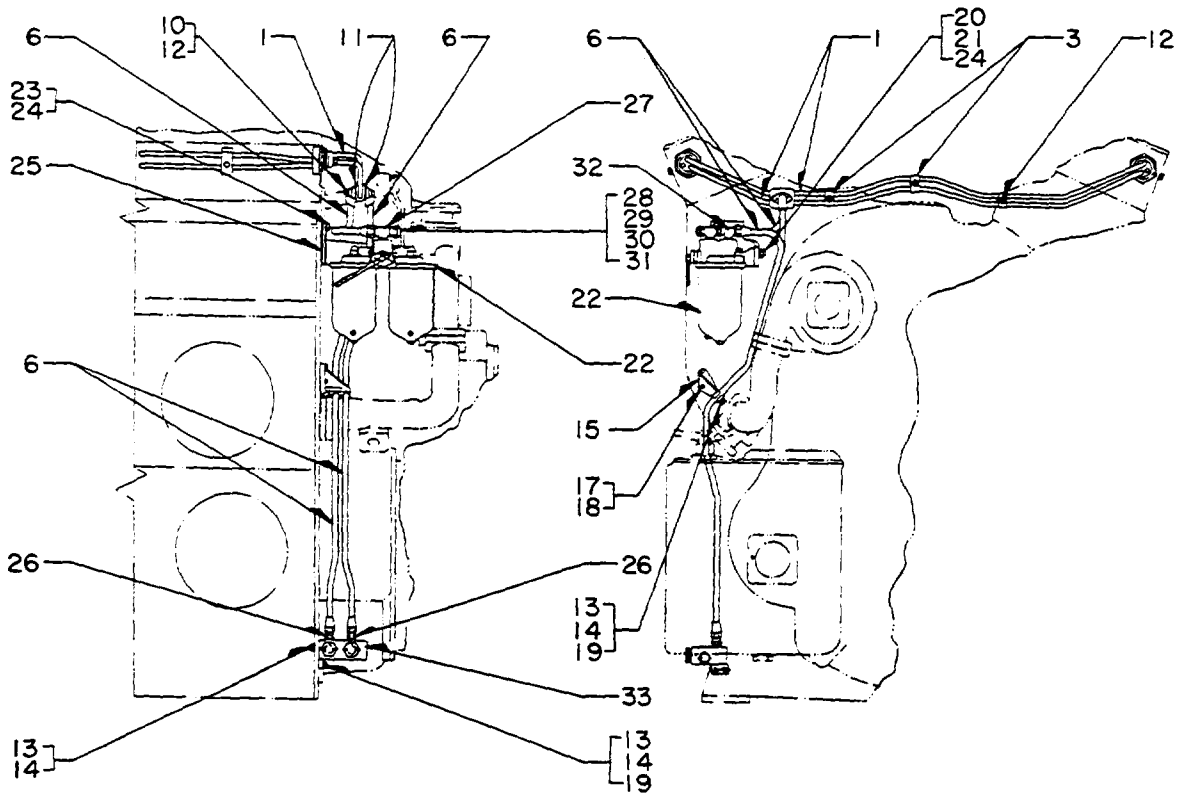
Duplex Fuel Oil Filter Piping
12,16-645E1 and 12,16,20-645E4 Engines

PLATE A48-3

Ref. No.	Part Number	Qty. Req.		Description
		A	-	12,16-645E1 and 12,16,20-645E4 engines
		-	B	20-645E4 engines (Model 999-20)
1	8160140	1	-	MANIFOLD ASM. .. Accessory end
1	8409864	-	1	MANIFOLD ASM. .. Accessory end - Formerly 8160140
*2	103878	2	2	PLUG .. Pipe - 1/4 M.P.T. - Used for shipping only
3	8029197	3	3	CLIP .. Manifold mounting
4	181361	4	4	BOLT .. Manifold mounting - 3/8 - 24 x 7/8 hex. head
5	103321	4	4	WASHER .. Lock - 3/8
6	8098596	A.R.		TUBING .. Steel - Copper brazed - 5/8 O.D. x .035 wall x 20 ft.
7	116488	1	1	NUT .. 5/8 tube - Long style
8	144308	3	3	NUT .. 5/8 tube - Short style
9	8104332	2	2	FLANGE .. Tube
10	186309	2	2	BOLT .. Tube assembly to filter - 3/8 - 24 x 3-1/4 hex. head
11	8104300	2	2	GASKET .. Tube assembly blocks to manifold
12	8032717	5	5	NUT .. Lock - 3/8-24 hex.
13	181341	5	5	BOLT .. Tube assembly mounting - 5/16-24 x 1-1/4 hex. head
14	103320	5	5	WASHER .. Lock - 5/16
15	8104455	1	1	BRACKET ASSEMBLY .. Supply and drain tube
16	8104456	1	1	CLAMP .. Bracket
17	181338	2	2	BOLT .. Bracket mounting - 5/16-24 x 7/8 hex. head
18	6101223	2	2	WASHER .. Plain - 5/16
19	103349	4	4	WASHER .. Plain - 11/32 I.D. x 11/16 O.D. x 1/16 in. thick
20	181433	2	2	BOLT .. 1/2 - 20 x 1-3/4 hex. head
21	103028	2	2	NUT .. 1/2 - 20 hex.
22	3317989	1	1	FILTER ASSEMBLY .. Fuel oil - Duplex - See Parts List 50
23	181428	2	2	BOLT .. Filter mounting - 1/2 - 20 x 1-1/8 hex. head
24	103323	4	4	WASHER .. Lock - 1/2
25	8276874	1	1	BRACKET .. Fuel oil filter
26	116487	2	2	CONNECTOR .. 5/8 tube x 1/2 M.P.T.
27	144293	1	-	TEE .. 5/8 tube x 5/8 tube x 1/2 M.P.T.
27	142364	-	1	TEE .. 1/2 x 3/18 x 1/2 F.P.T.
28	8104821	1	-	GASKET .. Cap - 5/8 tube
29	8104822	1	-	CAP .. 5/8 tube
30	103879	-	1	PLUG .. Pipe - 3/8 M.P.T.
31	8409989	-	1	VALVE .. Check - 1/2 M.P.T. - Operating pressure 3000 P.S.I.
32	109429	1	1	ELBOW .. Oil filter - 1/2 F.P.T. - 5/8 tube
33	8298495	1	1	VALVE ASSEMBLY .. Relief - Fuel supply and drain
*34	8322623	1	1	VALVE .. Relief - 10 P.S.I.
*35	8297957	1	1	VALVE .. Relief - 60 P.S.I.
*36	8298461	2	2	WASHER .. Plug - 1-9/32 I.D. x 1-3/4 O.D.
*37	8298462	2	2	PLUG .. Valve
*38	8060963	-	1	NIPPLE .. 1/2 M.P.T. x 1-1/8 in. long
*39	8060973	-	1	NIPPLE .. 1/2 M.P.T. x 1-1/2 in. long
*40	144283	-	1	ELBOW .. 5/8 pipe x 1/2 M.P.T.

8390873, 8379779, 8395654

FUEL OIL PIPING



SIDE VIEW END VIEW

PLATE A48-3

P.L. No. B48

FUEL OIL PIPING

Duplex Fuel Oil Filter Piping With Previous Threaded Type Pump Connections 8,12,16-645E2,E5 and 20-645E5 Engines

PLATES A48-4 and 5

Ref. No.	Part Number	Quantity Required A	B	C	D	E	F	G	H	Description	
		A	-	-	-	-	-	-	-	8-645E2 RR and RL	Right Hand Construction Engines
		-	B	-	-	-	-	-	-	8-645E5 and 12-645E2 RR and RL	
		-	-	C	-	-	-	-	-	12-645E5 and 16-645E2 RR and RL	
		-	-	-	D	-	-	-	-	16-645E5 and 20-645E5 RR and RL	
		-	-	-	-	E	-	-	-	8-645E2 L and R	Left Hand Construction Engines
		-	-	-	-	-	F	-	-	8-645E5 and 12-645E2 L and R	
		-	-	-	-	-	-	G	-	12-645E5 and 16-645E2 L and R	
		-	-	-	-	-	-	-	H	16-645E5 and 20-645E5 L and R	
1	8334048	1	-	-	-	-	-	-	-	PIPE ASM. .. 60 in. long - RR engines	Fuel Pump Supply
1	3326649	1	-	-	-	-	-	-	-	PIPE ASM. .. 61 in. long - RL engines	
1	3325184	-	1	-	-	-	-	-	-	PIPE ASM. .. 63 in. long - RR engines	
1	3324651	-	1	-	-	-	-	-	-	PIPE ASM. .. 63 in. long - RL engines	
1	3323780	-	-	1	-	-	-	-	-	PIPE ASM. .. 65 in. long - RR engines	
1	3323769	-	-	1	-	-	-	-	-	PIPE ASM. .. 65 in. long - RL engines	
1	3328559	-	-	-	1	-	-	-	-	PIPE ASM. .. 68 in. long - RR engines	
1	8325797	-	-	-	1	-	-	-	-	PIPE ASM. .. 68 in. long - RL engines	
1	3324146	-	-	-	-	1	-	-	-	PIPE ASM. .. 38 in. long - LL, L engines	
1	3326648	-	-	-	-	1	-	-	-	PIPE ASM. .. 37 in. long - LR, R engines	
1	3323701	-	-	-	-	-	1	-	-	PIPE ASM. .. 41 in. long - LL, L engines	
1	3324646	-	-	-	-	-	1	-	-	PIPE ASM. .. 41 in. long - LR, R engines	
1	3323698	-	-	-	-	-	-	1	-	PIPE ASM. .. 43 in. long - LL, L engines	
1	3326794	-	-	-	-	-	-	1	-	PIPE ASM. .. 42 in. long - LR, R engines	
1	3328557	-	-	-	-	-	-	-	1	PIPE ASM. .. 46 in. long - LL, L engines	
1	8325799	-	-	-	-	-	-	-	1	PIPE ASM. .. 46 in. long - LR, R engines	
2	8334066	1	-	-	-	-	-	-	-	PIPE ASM. .. 73 in. long - RR engines	Fuel Pump Discharge
2	3326651	1	-	-	-	-	-	-	-	PIPE ASM. .. 72 in. long - RL engines	
2	3325183	-	1	-	-	-	-	-	-	PIPE ASM. .. 71 in. long - RR engines	
2	3324648	-	1	-	-	-	-	-	-	PIPE ASM. .. 71 in. long - RL engines	
2	3323778	-	-	1	-	-	-	-	-	PIPE ASM. .. 73 in. long - RR engines	
2	3323771	-	-	1	-	-	-	-	-	PIPE ASM. .. 74 in. long - RL engines	
2	3328560	-	-	-	1	-	-	-	-	PIPE ASM. .. 86 in. long - RR engines	
2	8325796	-	-	-	1	-	-	-	-	PIPE ASM. .. 77 in. long - RL engines	
2	3324148	-	-	-	-	1	-	-	-	PIPE ASM. .. 42 in. long - LL, L engines	
2	3326650	-	-	-	-	1	-	-	-	PIPE ASM. .. 42 in. long - LR, R engines	
2	3323723	-	-	-	-	-	1	-	-	PIPE ASM. .. 45 in. long - LL, L engines	
2	3324653	-	-	-	-	-	1	-	-	PIPE ASM. .. 46 in. long - LR, R engines	
2	3323725	-	-	-	-	-	-	1	-	PIPE ASM. .. 46 in. long - LL, L engines	
2	3326513	-	-	-	-	-	-	1	-	PIPE ASM. .. 48 in. long - LR, R engines	
2	3328558	-	-	-	-	-	-	-	1	PIPE ASM. .. 47 in. long - LL, L engines	
2	8325798	-	-	-	-	-	-	-	1	PIPE ASM. .. 51 in. long - LR, R engines	
3	8116832	As Required								PIPE .. 3/8 wrought steel x 20 ft.	

The following items Ref. Nos. 4 thru 65, are applicable to Columns A thru H unless otherwise specified.

Ref. No.	Part Number	Quantity Required	Description
4	3323514	3	FLANGE .. Fuel oil supply and priming pump
5	3323761	5	GASKET .. Flange mounting
6	3323703	1	MANIFOLD ASM. .. Fuel oil cross over
7	3323518	1	BLOCK .. Manifold - Left bank
8	3323519	1	BLOCK .. Manifold - Right bank
9	3323768	3	CLIP .. Manifold mounting
10	3323521	1	COVER .. Fuel oil man. - Right bank - Right hand const. engines
10	3323520	1	COVER .. Fuel oil man. - Left bank - Left hand construction engines
*11	3323622	1	COVER .. Fuel oil man. - Left bank on R.H. const. engines and right bank on L.H. const. engines
12	8160114	3	GASKET .. Cover and manifold mounting
13	3323759	1	GASKET .. Cover to manifold
14	144046	2	BUSHING .. Reducing - 1/2 M.P.T. x 3/8 F.P.T.
15	3212386	2	TAILPIECE .. 3/8 M.P.T.

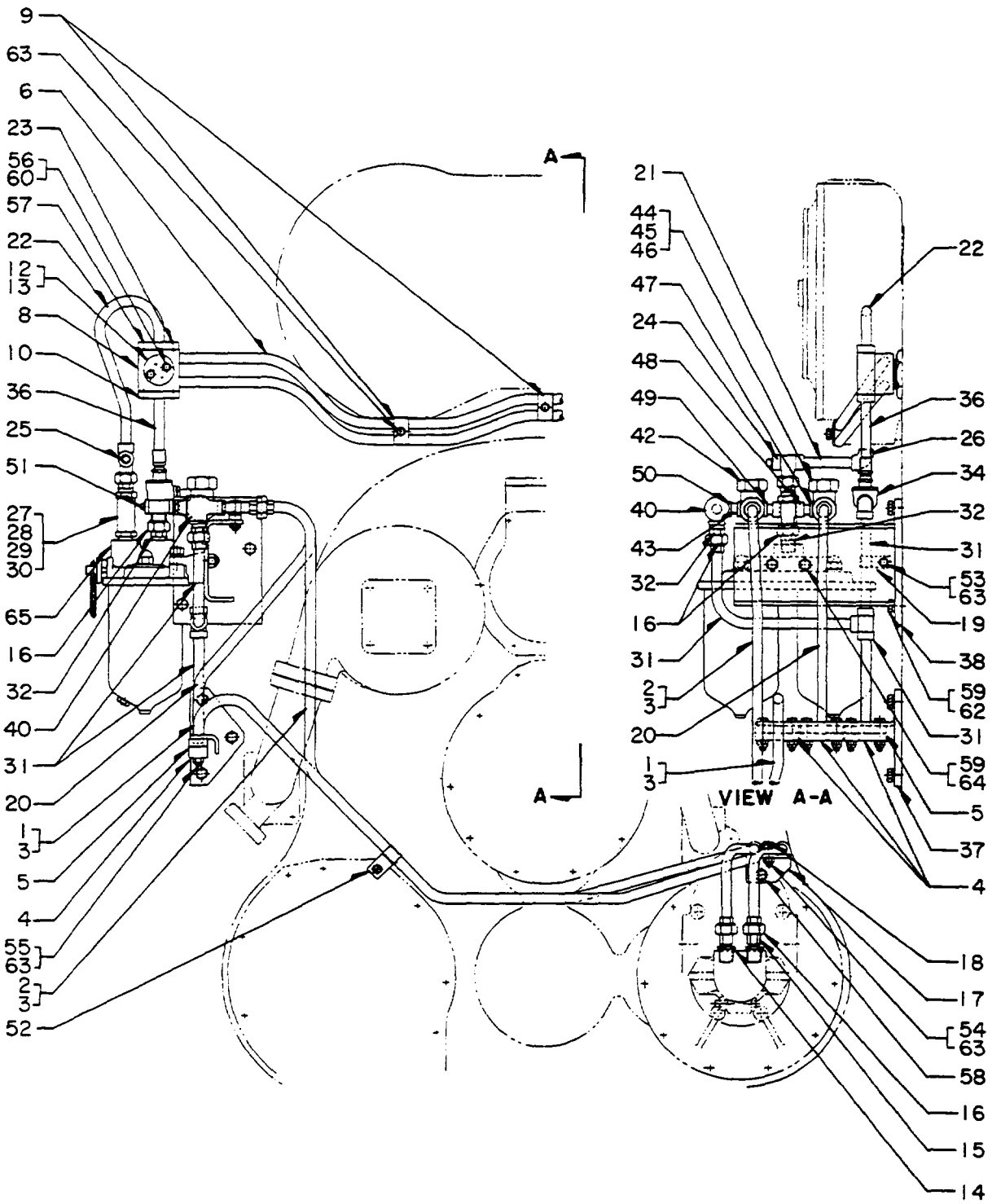
FUEL OIL PIPING

P.L. No. B48

Ref. No.	Part Number	Qty. Req.		Description
		A-H		8,12,16-645E2,E5 and 20-645E5 engines
16	3212378	4		RING .. 3/8 union
17	3324497	1		BRACKET .. Supply and discharge pipe support - Applicable to 8-645E2 eng. only
17	3323491	1		BRACKET .. Supply and discharge pipe support
18	3257162	1		CLIP .. Tube mounting
19	3323767	4		CLIP .. Tube mounting
20	3323755	1		PIPE ASM. .. Priming pump to fuel oil filter - R.H. const. engines
20	3323694	1		PIPE ASM. .. Priming pump to fuel oil filter - L.H. const. engines
21	8395265	1	-	PIPE ASM. .. Fuel oil filter to manifold - R.H. const. engines
21	8393248	-	1	PIPE ASM. .. Fuel oil filter to manifold - L.H. const. engines
22	8395264	1	-	PIPE ASM. .. Manifold to filter
22	8393242	-	1	PIPE ASM. .. Manifold to filter
23	3323512	1	1	FLANGE .. Pipe
24	3323731	1	1	TEE .. 3/8 F.P.T. - With threadpiece
25	8348619	1	1	PLUG .. Pipe - 3/8 M.P.T.
26	8185024	1	1	ELBOW .. 3/8 socket weld
27	8393241	1	1	PIPE ASM. .. Fuel oil filter manifold
28	8393125	1	1	VALVE .. Check - 1/2 M.P.T. x 1/2 F.P.T.
29	3212378	1	1	RING .. 3/8 union
30	3301135	1	1	TAILPIECE .. 1/2 M.P.T.
31	3323757	1		PIPE ASM. .. Injector bleed - Right hand const. engines
31	3323720	1		PIPE ASM. .. Injector bleed - Left hand const. engines
32	3301135	2		TAILPIECE .. 1/2 M.P.T.
33	8060963	1		NIPPLE .. Pipe - 1/2 M.P.T. x 1-1/8 in. long - L.H. const. engines only
34	3324657	1		VALVE .. Pressure relief - 15 P.S.I.
*35	3327357	1		GASKET .. Valve cap
36	3327009	1		PIPE ASM. .. Injector bleed - Appl. to 8-645E5 and 12-645E2 right hand const. engines only
36	3324659	1		PIPE ASM. .. Injector bleed
37	3323493	1		BRACKET .. Lower - Fuel oil lines
38	3323680	1		BRACKET .. Upper - Fuel oil lines - R.H. const. engines
38	3323492	1		BRACKET .. Upper - Fuel oil lines - L.H. const. engines
39	3323490	1		SPACER .. Bracket
40	3323859	1		VALVE .. Pressure relief - 60 P.S.I.
*41	3327357	1		GASKET .. Valve cap
42	3323751	1	-	VALVE ASM. .. Fuel oil check - Right hand const. engines
42	3323750	-	1	VALVE ASM. .. Fuel oil check - Left hand const. engines
43	8116832	A.R.		PIPE .. 3/8 wrought steel - 20 ft.
44	3323661	2	2	VALVE .. 3/8 check
45	3212378	2	2	RING .. 3/8 union formerly 3312378
46	3212379	2	2	TAILPIECE .. 3/8 weld formerly 3312375
47	8185024	1	1	ELBOW .. 3/8 weld
48	3323729	1	1	TEE .. 3/8 braze x 3/8 union
49	8276401	1	1	TEE .. 3/8 weld
50	8331154	1	1	TEE .. 3/8 F.P.T. x 3/8 weld
51	103879	1		PLUG .. Pipe - 3/8 M.P.T.
52	3324516	1		CLIP .. Supply and discharge pipe mtg. - R.H. const. engines only
53	181364	1		BOLT .. 3/8-24 x 1 hex. head
54	181374	3		BOLT .. 3/8 - 24 x 1-1/2 hex. head
55	181379	8		BOLT .. 3/8 - 24 x 2 hex. head
56	181385	2		BOLT .. 3/8 - 24 x 3 hex. head
57	186315	2		BOLT .. 3/8 - 24 x 4-1/2 hex. head
58	179886	1		BOLT .. 1/2 - 13 x 1-5/8 hex. head - Columns A and E only
58	190270	A.R.		BOLT .. 1/2 - 13 x 4-1/4 hex. head - Columns B and F only
58	189787	A.R.		BOLT .. 1/2 - 13 x 5-1/4 hex. head - Columns C and G only
58	193031	A.R.		BOLT .. 1/2 - 13 x 8-3/4 hex. head - Columns D and H only
59	181431	8		BOLT .. 1/2 - 20 x 1-1/2 hex. head
60	103321	4		WASHER .. Lock - 3/8
61	103343	1		WASHER .. Plain - 1/2 - Appl. to L.H. construction engines only
62	103323	6		WASHER .. Lock - 1/2
63	8032717	15		NUT .. Lock - 3/8 - 24 hex.
64	8032719	2		NUT .. Lock - 1/2 - 20 hex.
65	3317989	1		FILTER ASM. .. Duplex - See Parts List 50

P.L. No. B48

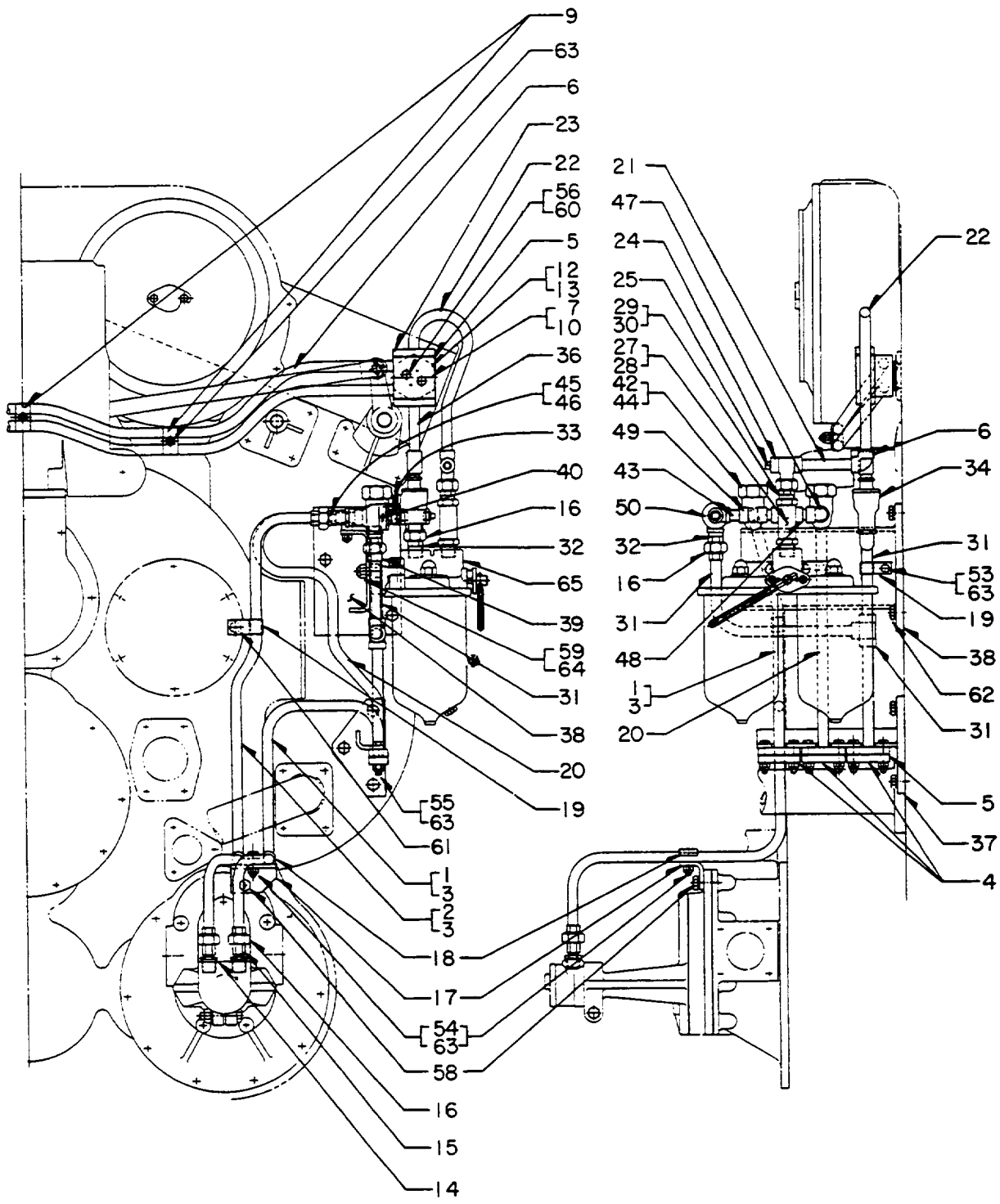
FUEL OIL PIPING



Right Hand Construction Engines

PLATE A48-4

FUEL OIL PIPING



Left Hand Construction Engines

PLATE A48-5

P.L. No. B48

FUEL OIL PIPING
Duplex Fuel Oil Filter Piping With Flanged Pump Connections
12-645E6,E7; 16-645E6,E7; 20-645E7 Engines

PLATES A48-6

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	12-645E6 left hand rotation
		-	B	-	-	-	12-645E7 and 16-645E6 left hand rotation
		-	-	C	-	-	16-645E6 right hand rotation
		-	-	-	D	-	16,20-645E7 left hand rotation
		-	-	-	-	E	16,20-645E7 right hand rotation
1	8416607	1	1	1	1	1	FILTER ASM. .. Fuel - Duplex - Replaced by 8451532 Filter With Twin Spin-On Elements - See Parts List 50
2	3386761	2	2	2	2	2	ELEMENT .. Filter - Bolt on type
3	8432366	1	1	1	1	1	MANIFOLD ASM. .. Fuel filter and piping - See Page 18
4	8419432	1	-	-	-	-	PIPE ASM. .. Fuel pump discharge
5	8422764	-	1	-	-	-	PIPE ASM. .. Fuel pump discharge
6	8431381	-	-	1	-	-	PIPE ASM. .. Fuel pump discharge
7	8418871	-	-	-	1	-	PIPE ASM. .. Fuel pump discharge
8	8418806	-	-	-	-	1	PIPE ASM. .. Fuel pump dicharge
9	8419434	1	-	-	-	-	PIPE ASM. .. Fuel pump supply
10	8422763	-	1	-	-	-	PIPE ASM. .. Fuel pump supply
11	8431382	-	-	1	-	-	PIPE ASM. .. Fuel pump supply
12	8418986	-	-	-	1	-	PIPE ASM. .. Fuel pump supply
13	8417546	-	-	-	-	1	PIPE ASM. .. Fuel pump supply

The Following Components Are Applicable To All The Models Listed Above

14	8417966	1	PIPE ASM. .. To top of manifold
15	8417827	1	PIPE ASM. .. To side of manifold
16	8417531	1	MANIFOLD ASM. .. Fuel crossover
17	3323491	1	BRACKET .. Pipe support
18	3257162	1	CLIP .. Pipe mounting
19	8426889	2	GASKET .. Pipe to fuel pump
20	8417792	3	FLANGE .. Manifold drain
21	8387785	9	GASKET .. Flange to manifold
*22	8348619	1	PLUG .. Pipe 3/8 N.P.T.
23	127887	1	ELBOW .. 90° - 1/4 tube x 3/8 N.P.T.
24	8060970	1	NIPPLE .. Pipe - 1/8 N.P.T. x 1-1/2 in. long
25	8060974	1	NIPPLE .. Pipe - 3/4 N.P.T. x 2 in. long - Extra heavy
26	8119871	1	NIPPLE .. Pipe - 3/4 N.P.T. x 3-1/2 in. long
27	8095035	1	NIPPLE .. Pipe - 3/4 N.P.T. x 5 in. long
28	8156823	3	ELBOW .. 90° - 5/8 tube x 3/4 N.P.T.
29	8417441	1	BRACKET .. Manifold mounting
30	8160114	2	GASKET .. Supply line to crossover manifold
31	3323768	3	CLIP .. Manifold mounting
32	8387784	1	GASKET .. Manifold block to supply block
33	8432465	1	PIPE ASM. .. Fuel supply and return
34	179839	4	BOLT .. Hex. head - 3/8 - 16 x 1
35	179841	18	BOLT .. Hex. head - 3/8 - 16 x 1-1/4
36	179843	12	BOLT .. Hex. head - 3/8 - 16 x 1-1/2
37	179849	4	BOLT .. Hex. head - 3/8 - 16 x 2-1/2
38	179850	3	BOLT .. Hex. head - 3/8 - 16 x 2-3/4
39	181374	1	BOLT .. Hex. head - 3/8 - 24 x 1-1/2
40	181377	4	BOLT .. Hex. head - 3/8 - 24 x 1-3/4
41	179881	4	BOLT .. Hex. head - 1/2 - 13 x 1
42	179883	3	BOLT .. Hex. head - 1/2 - 13 x 1-1/4
43	193031	2	BOLT .. Hex. head - 1/2 - 13 x 8-3/4
44	6101225	47	WASHER .. Flat - 3/8
45	6101229	7	WASHER .. Flat - 1/2
46	8032717	4	NUT .. Lock - 3/8 - 24 hex.

P.L. No. B48

FUEL OIL PIPING

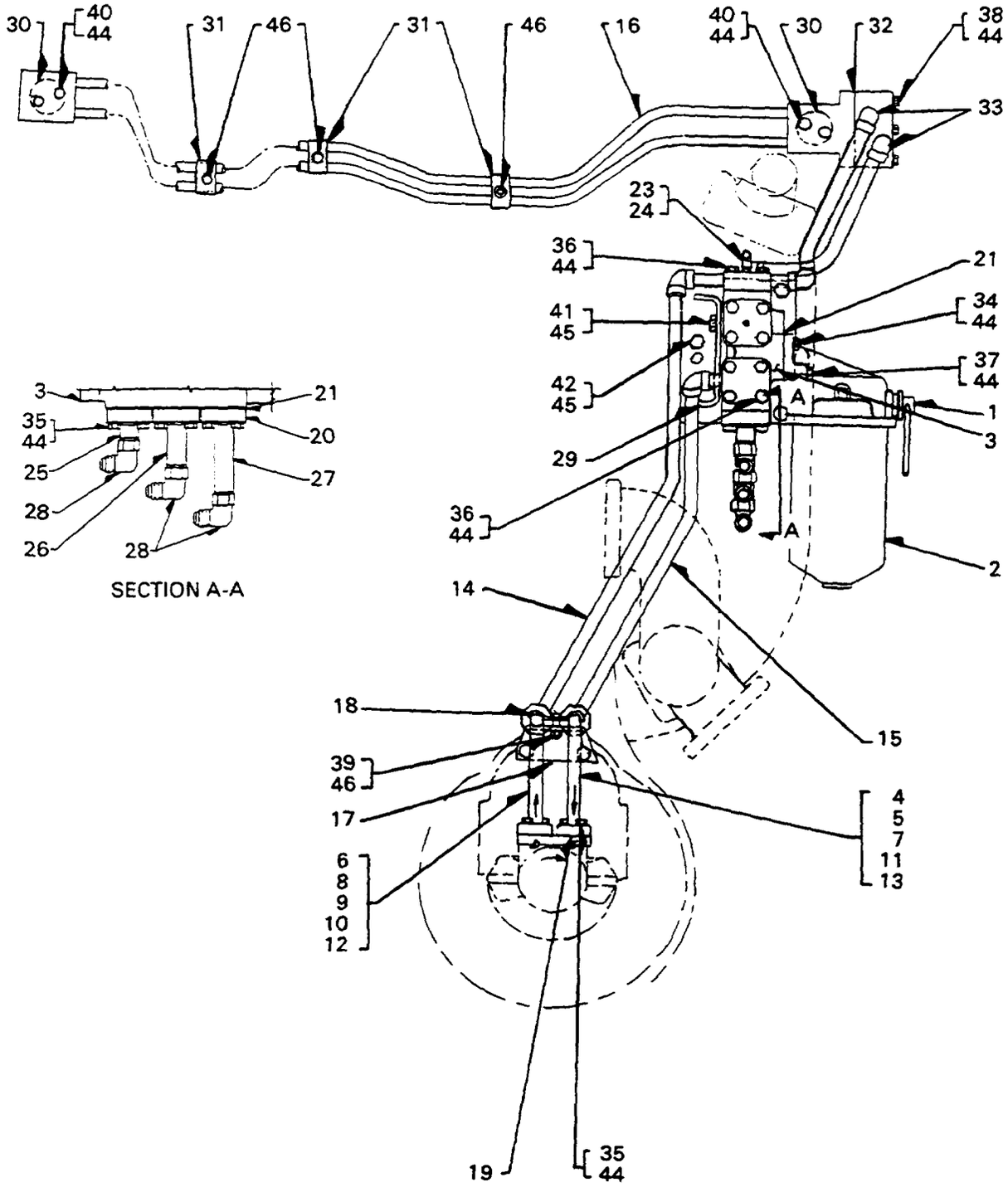


PLATE B48-6

P.L. No. B48

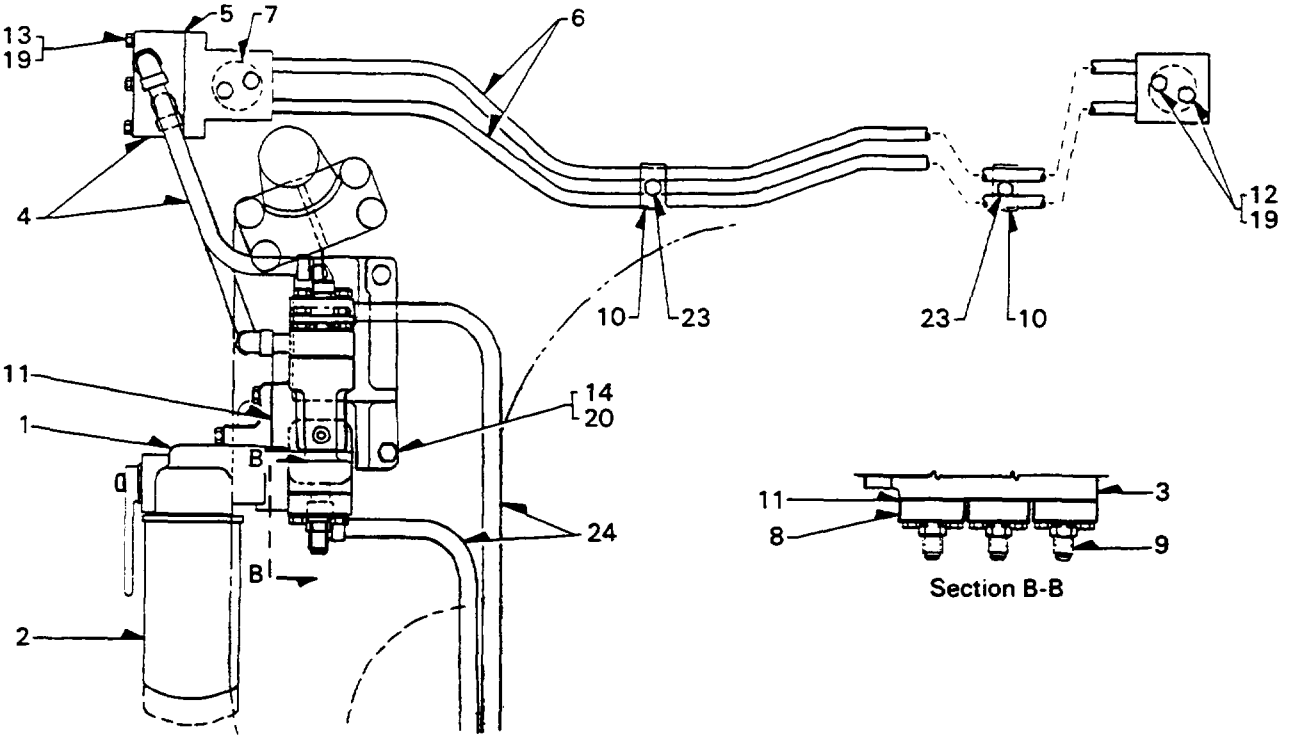
FUEL OIL PIPING
Duplex Fuel Filter Piping
8-645E2,E5,E6,E7,E7B,E7C
12-645E2,E5,E6,E7,E7B,E7C
16-645E2,E5,E6,E7,E7B,E7C
20-645E5,E7,E7B,E7C Engines

PLATE B48-7

Ref. No.	Part Number	Qty. Req.	Description
1	8451532	1	FILTER ASM. .. Fuel - Duplex - Replaces 8416607 - See Parts List 50
2	8423132	2	ELEMENT .. Filter - Spin on
3	8482337	1	MANIFOLD ASM. .. Fuel filter and piping - Replaces 8432366 - See Page 18
4	8432387	1	PIPE ASM. .. Includes block and flanges
5	8387784	1	GASKET .. Pipe asm. to fuel supply manifold
6	8419674	1	MANIFOLD ASM. .. Fuel supply
7	8160114	2	GASKET .. Fuel supply manifold
8	8417792	3	FLANGE .. Manifold drain
9	8040322	3	CONNECTOR .. 5/8 tube x 3/4 N.P.T.
10	3323768	2	CLIP .. Fuel supply manifold
11	8387785	9	GASKET .. Filter and flange mounting
12	181377	4	BOLT .. Hex. head - 3/8 - 24 x 1-3/4
13	179850	3	BOLT .. Hex. head - 3/8 - 16 x 2-3/4
14	9434219	3	BOLT .. Hex. head - 1/2 - 20 x 1-1/4 Nylock
15	179841	20	BOLT .. Hex. head - 3/8 - 16 x 1-1/4
16	179839	4	BOLT .. Hex. head - 3/8 - 16 x 1
17	179849	4	BOLT .. Hex. head - 3/8 - 16 x 2-1/2
18	179843	8	BOLT .. Hex. head - 3/8 - 16 x 1-1/2
19	6101225	43	WASHER .. Flat - 3/8
20	6101229	3	WASHER .. Flat - 1/2
22	8348619	1	PLUG .. Pipe - 3/8 square socket
23	8032717	2	NUT .. 3/8 - 16 hex. - Self locking
24	----	-	FUEL PUMP PIPING .. See Page 14

FUEL OIL PIPING

P.L. No. B48



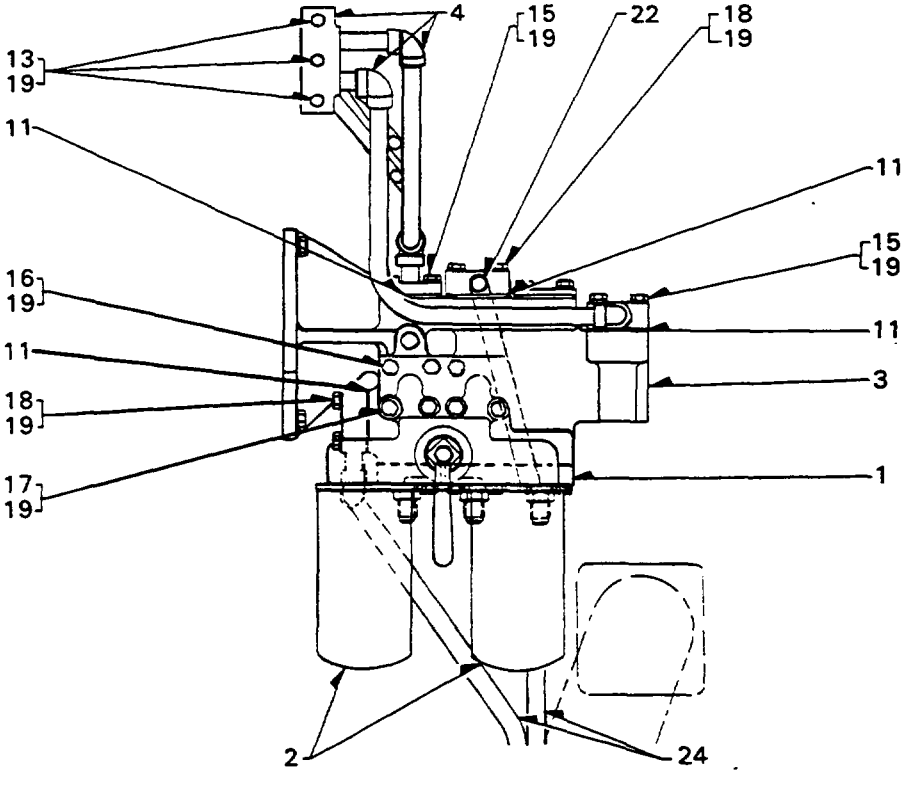


PLATE B48-7

P.L. No. B48

FUEL OIL PIPING
Fuel Filter Manifold To Fuel Pump
8,12,16-645E2,E5,E6,E7,E7B,E7C
20-645E5,E7,E7B,E7C Engines

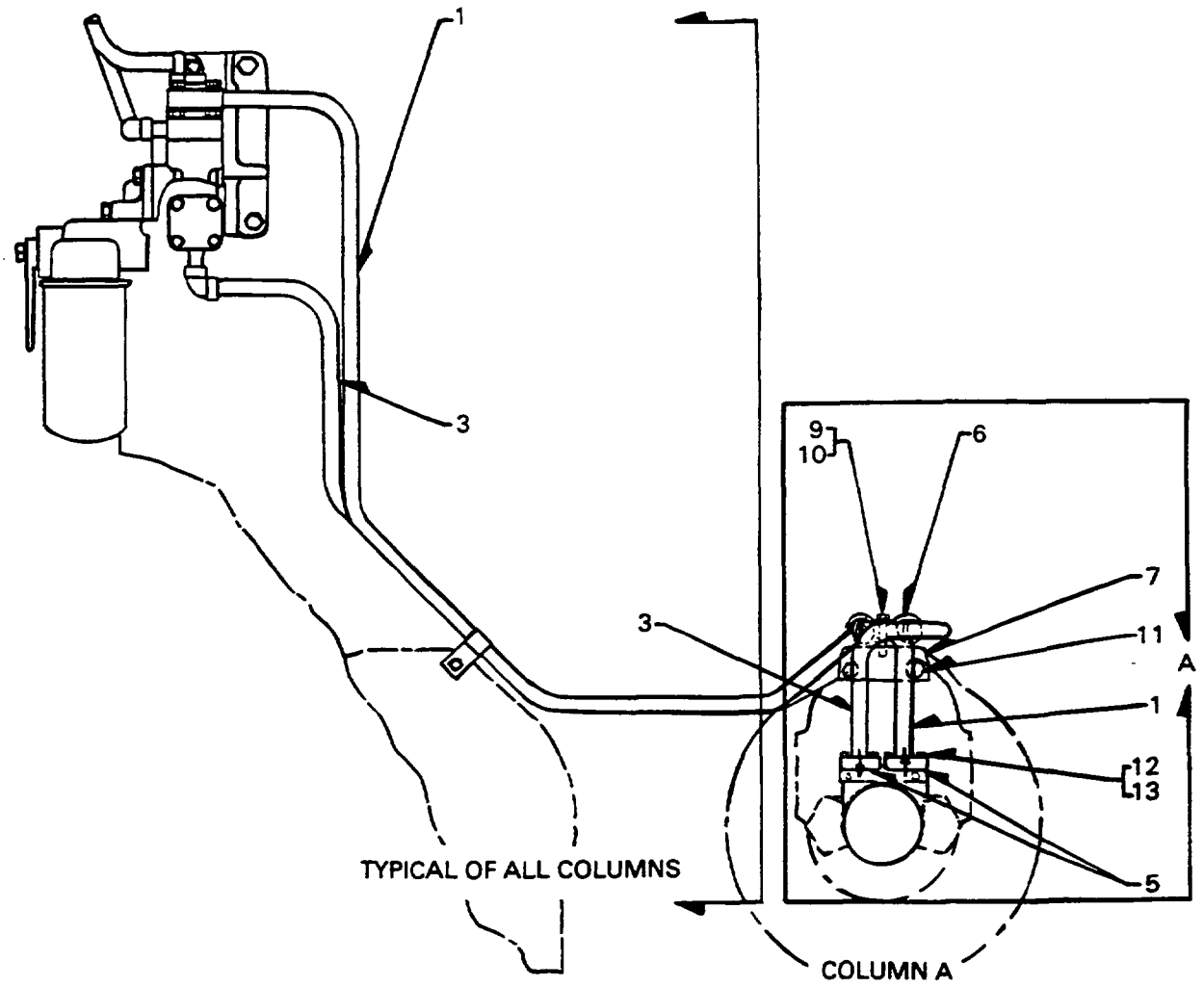
PLATE B48-8

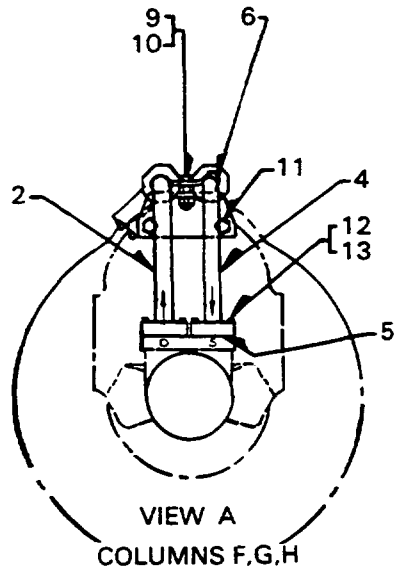
Ref. No.	Part Number	Quantity Required								Description	
		A	-	-	-	-	-	-	-	8-645E2,E6	Left-Hand Rotation
		-	B	-	-	-	-	-	-	8-645E5,E7,E7B,E7C and 12-645E2,E6	
		-	-	C	-	-	-	-	-	12-645E5,E7,E7B,E7C and 16-645E2,E6	
		-	-	-	D	-	-	-	-	16,20-645E5,E7,E7B,E7C	
		-	-	-	-	-	-	-	-		
		-	-	-	-	E	-	-	-	8-645E2,E6	Right-Hand Rotation
		-	-	-	-	-	F	-	-	8-645E5,E7,E7B,E7C and 12-645E2,E6	
		-	-	-	-	-	-	G	-	12-645E5,E7,E7B,E7C and 16-645E2,E6	
		-	-	-	-	-	-	-	H	16,20-645E5,E7,E7B,E7C	
†1	8449758	1	-	-	-	-	-	-	-	PIPE ASM. .. Pump to manifold	Fuel Pump Discharge
1	8488930	-	1	1	-	-	1	1	-	PIPE ASM. .. Manifold mounted	
1	8498493	-	-	-	1	-	-	-	1	PIPE ASM. .. Manifold mounted	
†1	8451288	-	-	-	-	1	-	-	-	PIPE ASM. .. Pump to manifold	
2	8488868	-	1	-	-	-	-	-	-	PIPE ASM. .. Pump mounted	
2	8488870	-	-	1	-	-	-	-	-	PIPE ASM. .. Pump mounted	
2	8488878	-	-	-	1	-	-	-	-	PIPE ASM. .. Pump mounted	
2	8488862	-	-	-	-	-	1	-	-	PIPE ASM. .. Pump mounted	
2	8488864	-	-	-	-	-	-	1	-	PIPE ASM. .. Pump mounted - Replaces 8431381	
2	8488866	-	-	-	-	-	-	-	1	PIPE ASM. .. Pump mounted	
†3	8449764	1	-	-	-	-	-	-	-	PIPE ASM. .. Manifold to pump	Fuel Pump Supply
3	8419842	-	1	1	1	-	1	1	1	PIPE ASM. .. Manifold mounted	
†3	8451283	-	-	-	-	1	-	-	-	PIPE ASM. .. Manifold to pump	
4	8488874	-	1	-	-	-	-	-	-	PIPE ASM. .. Pump mounted	
4	8488876	-	-	1	-	-	-	-	-	PIPE ASM. .. Pump mounted	
4	8488872	-	-	-	1	-	-	-	-	PIPE ASM. .. Pump mounted	
4	8451326	-	-	-	-	-	1	-	-	PIPE ASM. .. Pump mounted - Formerly 8451236	
4	8431382	-	-	-	-	-	-	1	-	PIPE ASM. .. Pump mounted	
4	8417546	-	-	-	-	-	-	-	1	PIPE ASM. .. Pump mounted	
5	8426889	2	2	2	2	2	2	2	2	GASKET .. Pipe asm. to pump	
6	8137709	1	-	-	-	1	-	-	-	CLIP .. Tube	
6	3257162	-	1	1	1	-	1	1	1	CLIP .. Tube - Formerly 3257152	
7	8451178	1	-	-	-	1	-	-	-	BRACKET .. Clip mounting	
7	3323491	-	1	1	1	-	1	1	1	BRACKET .. Clip mounting	
8	3324516	1	1	1	1	1	1	1	1	CLIP .. Tube	
9	179822	1	-	-	-	1	-	-	-	BOLT .. Hex. head 5/16 - 18 x 1-1/2	
9	181374	-	1	1	1	-	1	1	1	BOLT .. Hex. head 3/8 - 24 x 1-1/2	
10	103320	1	-	-	-	1	-	-	-	WASHER .. Flat - 5/16	
10	8032717	-	1	1	1	-	1	1	1	NUT .. Lock - 3/8 - 24	
11	179886	2	-	-	-	2	-	-	-	BOLT .. Hex. head - 1/2 - 13 x 1-5/8	Former Applications Used 193031
11	189787	-	-	-	2	-	-	2	-	BOLT .. Hex. head - 1/2 - 13 x 5-1/4	
11	190270	-	-	2	-	-	2	-	-	BOLT .. Hex. head - 1/2 - 13 x 4-1/4	
11	193031	-	2	-	-	-	-	-	2	BOLT .. Hex. head - 1/2 - 13 x 8-3/4	
12	179841	4	4	4	4	4	4	4	4	BOLT .. Hex. head	
13	6101225	4	4	4	4	4	4	4	4	WASHER .. Flat - 3/8	

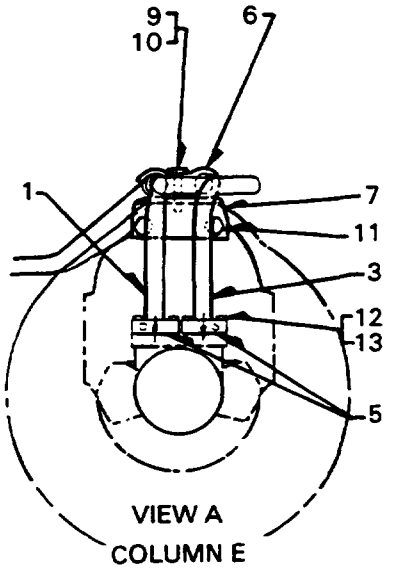
†8 Cylinder Roots Blown Engines Have A Single Welded Pipe Assembly From The Fuel Filter Manifold To The Fuel Pump.

8451210, 8417004, 8431315, 8451211, 8449765, 8418134, 8431427, 8446239

FUEL OIL PIPING







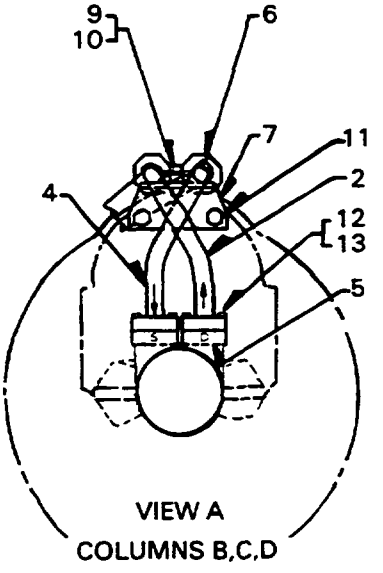


PLATE B48-8

P.L. No. B48

FUEL OIL PIPING
Duplex Fuel Filter Piping - Spin On Elements
8,12,16,20-645E4,E4B; 8,12,16-645E8; 12,16,20-645E9,E9B; Engines

PLATE B48-9

Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	8-645E4,E4B and 12-645E8 engines
		-	B	-	-	-	-	8-645E8 engines
		-	-	C	-	-	-	12-645E4 engines
		-	-	-	D	-	-	12-645E4B,E9,E9B and 16-645E8 engines
		-	-	-	-	E	-	16,20-645E4 engines
		-	-	-	-	-	F	16,20-645E4B,E9,E9B engines
1	8465105	1	-	-	-	-	-	PIPE ASM. .. Pump to manifold pipe
1	8482439	-	1	-	-	-	-	PIPE ASM. .. Pump to manifold pipe
1	9310376	-	-	1	-	-	-	PIPE ASM. .. Pump to manifold pipe
1	8461346	-	-	-	1	-	-	PIPE ASM. .. Pump to manifold pipe
1	8461311	-	-	-	-	1	-	PIPE ASM. .. Pump to manifold pipe
1	8461211	-	-	-	-	-	1	PIPE ASM. .. Pump to manifold pipe

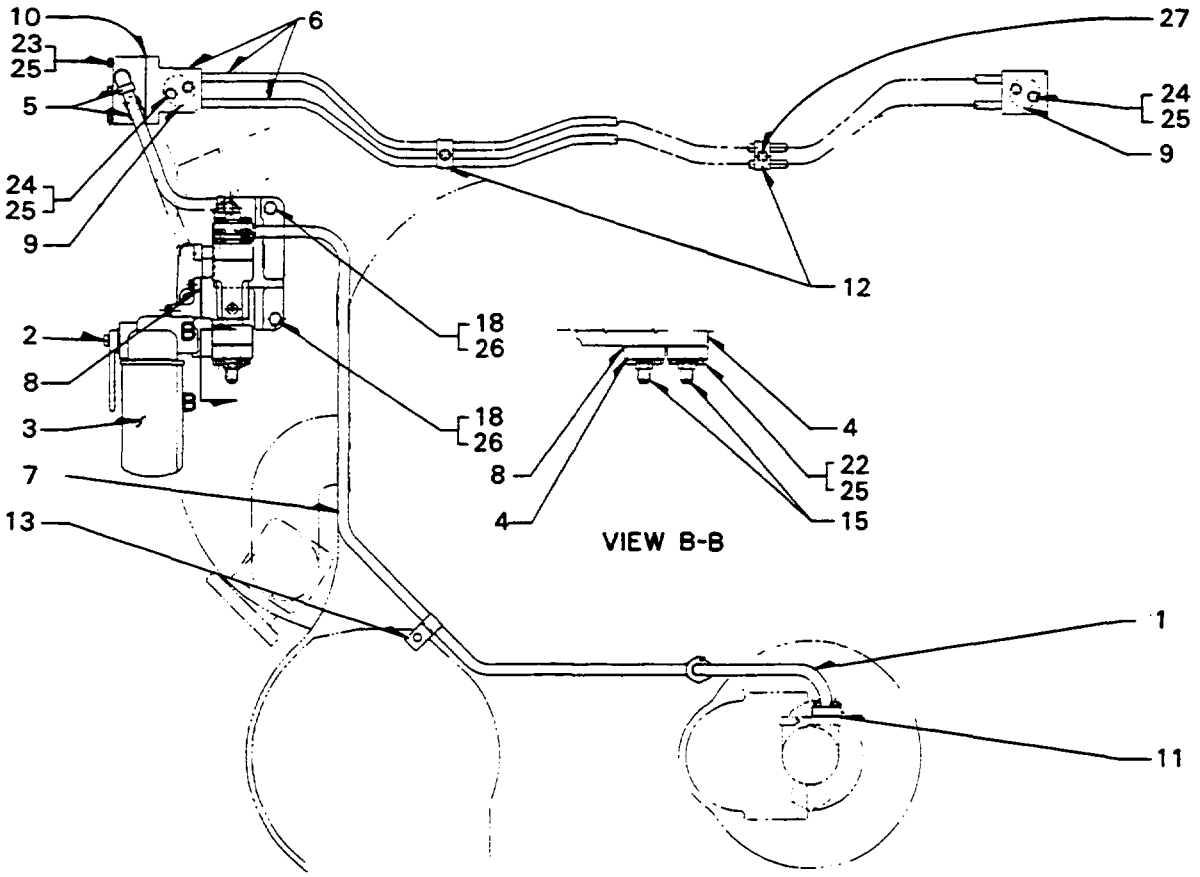
The following components are applicable to all the engine models listed above unless otherwise specified.

2	8451532	1	FILTER ASM. .. Fuel - Duplex - See Parts List 50
3	8423132	2	ELEMENT .. Filter - Spin on
4	8482337	1	MANIFOLD .. Fuel filter - See Page 18
5	8432387	1	PIPE ASM. .. Fuel manifold to crossover manifold
6	8419674	1	MANIFOLD ASM. .. Fuel crossover
7	8461209	1	PIPE ASM. .. Manifold to pump mounted pipe
8	8387785	7	GASKET .. Manifold
9	8160114	2	GASKET .. Fuel crossover manifold
10	8387784	1	GASKET .. Pipe block to manifold block
11	8426889	1	GASKET .. Fuel pump to pipe flange
12	3323768	2	CLIP .. Pipe - Manifold mounting - Qty. 3 for 8-645E8
13	3323767	1	CLIP .. Pipe
14	8417792	2	FLANGE .. Manifold drain
15	8040322	2	CONNECTOR .. Manifold drain - 5/8 tube x 3/4 N.P.T.
16	8348619	1	PLUG .. Pipe - 3/8 N.P.T.
*17	179847	2	BOLT .. Hex. head - 3/8 - 16 x 2 used on 8-645E8 engines only
18	9434219	3	BOLT .. Hex. head - 1/2 - 20 x 1-1/4 Nylock
19	179849	4	BOLT .. Hex. head - 3/8 - 16 x 2-1/2
20	179839	4	BOLT .. Hex. head - 3/8 - 16 x 1
21	179843	4	BOLT .. Hex. head - 3/8 - 16 x 1-1/2
22	179841	18	BOLT .. Hex. head - 3/8 - 16 x 1-1/4
23	179850	3	BOLT .. Hex. head - 3/8 - 16 x 2-3/4
24	181377	4	BOLT .. Hex. head - 3/8 - 24 x 1-3/4
25	6101225	37	WASHER .. Flat - 3/8
26	6101229	3	WASHER .. Flat - 1/2
27	8032717	2	NUT .. Lock - 3/8 - 16 hex. - Qty. 3 for 8-645E8

8468590

P.L. No. B48

FUEL OIL PIPING



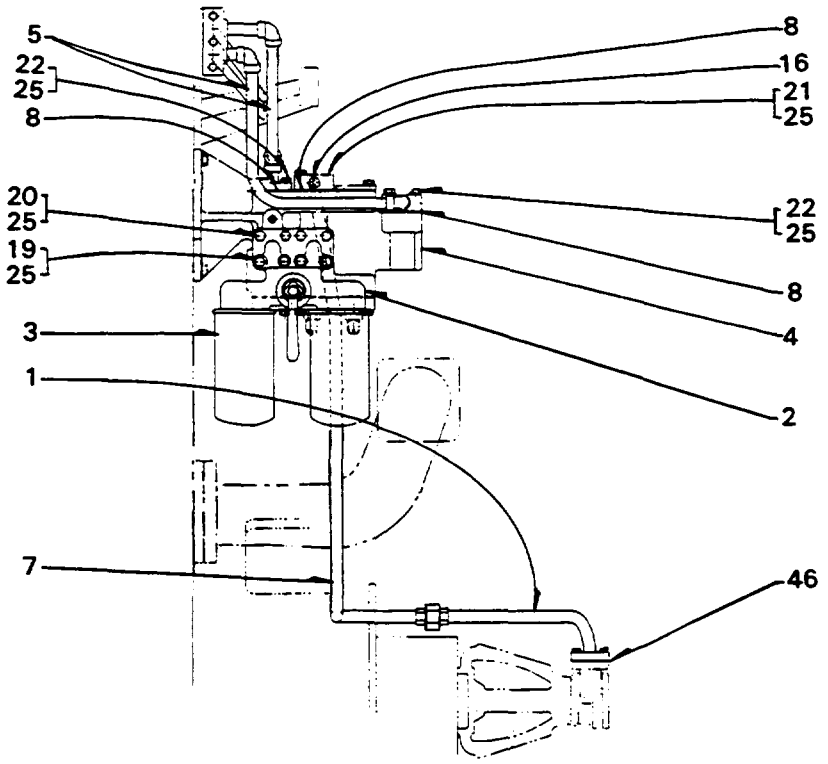
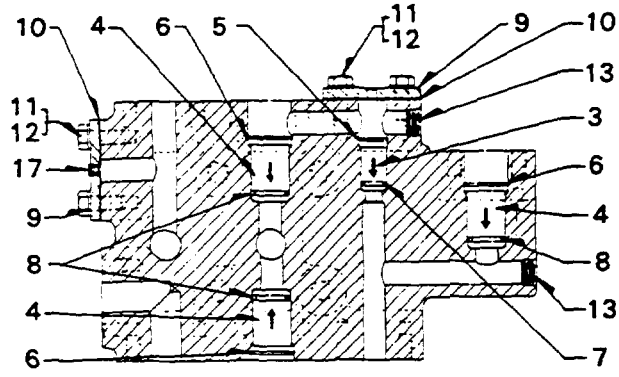


PLATE B48-9

P.L. No. B48

FUEL OIL PIPING
Fuel Manifold and Valve Assembly
All 645 Engines



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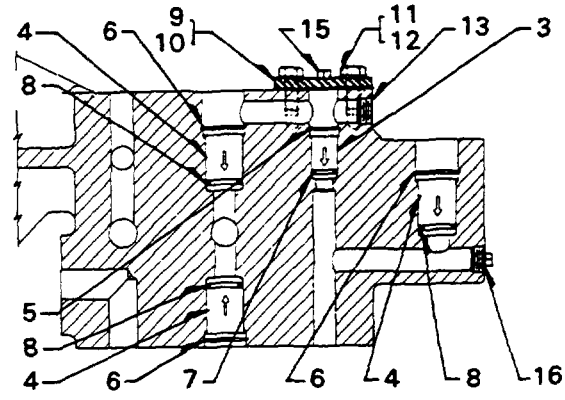


Ref. No. 2
(Sectioned Through)

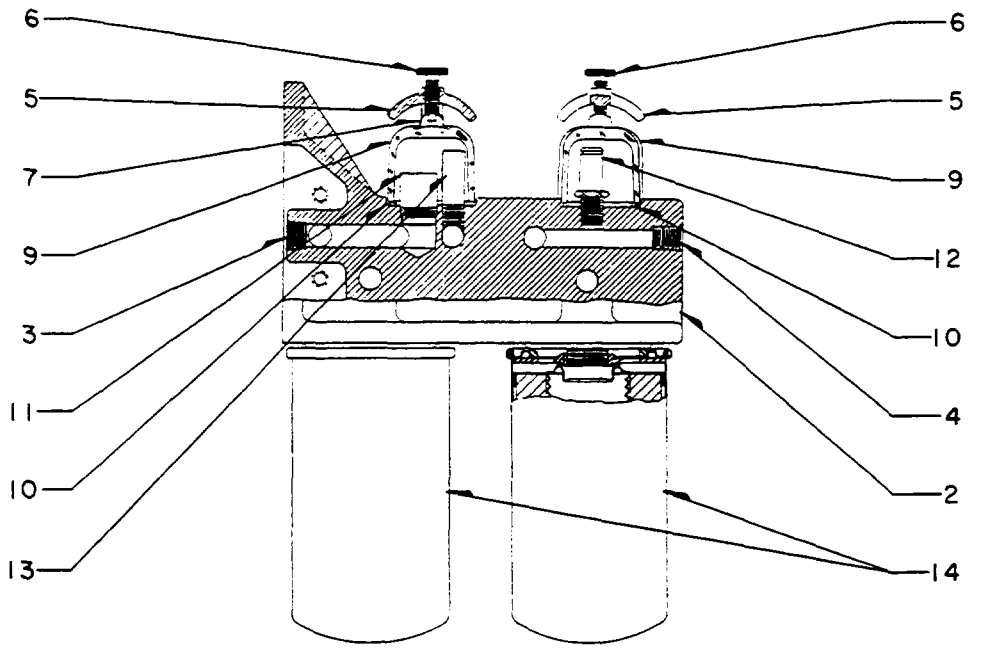
PLATE A48-10

Ref. No.	Part Number	Qty. Req.		Description
†1	8432366	1	-	MANIFOLD ASM. .. Fuel - Replaced by 8482337
†2	8482337	-	1	MANIFOLD ASM. .. Fuel - With integral mounting bracket
3	8432311	1	1	VALVE .. Check - 65 P.S.I.
4	8429687	3	3	VALVE .. Check - 10 P.S.I.
5	274416	1	1	RETAINER .. Check valve
6	9413377	3	3	RETAINER .. Check valve
7	8387837	1	1	SEAL .. O-Ring
8	8388642	3	3	SEAL .. O-Ring
9	8416428	2	1	FLANGE .. Blind
10	8387785	2	1	GASKET .. Flange
11	179838	8	4	BOLT .. Hex. head - 3/8 - 16 x 7/8
12	6101225	8	4	WASHER .. Flat - 3/8
13	8348619	3	3	PLUG .. Pipe - 3/8 p.t. - Square socket
14	103878	1	1	PLUG .. Pipe - 1/4 p.t. - Square socket
15	103877	-	1	PLUG .. Pipe - 1/8 p.t. - Square head
16	103879	-	1	PLUG .. Pipe - 1/4 p.t. - Square head
17	8348617	1	-	PLUG .. Pipe - 1/8 p.t. - Square socket

† *See Pages 10,12, and 16 for Applicable Fuel Oil Systems.*

FUEL OIL FILTER

Spin-On Fuel Oil Filter Assembly
8-645E,E1,E4,E4B; 12-645E1,E4,E4B;
16-645E1,E4,E4B,E10B; 20-645E4,E4B,E10B Engines



Ref. No. 1
PLATE B50-1

Ref. No.	Part Number	Qty. Req.	Description
1	8479355	1	FILTER ASSEMBLY .. Fuel oil - Spin-on - Replaces 8311184 and 8427284
2	8479301	1	BODY .. Fuel filter
3	8348619	4	PLUG .. Pipe - 3/8 M.P.T. square socket
4	8348618	1	PLUG .. Pipe - 1/4 M.P.T. square socket
5	8104467	2	CLEVIS ASSEMBLY .. Filter bowl
6	8104170	2	SCREW .. Thumb
7	854005	2	SEAT .. Thumb screw
* 8	102828	4	SCREW .. Set - Clevis to filter body - 5/16-18 x 1/2 slotted
9	8361381	2	BOWL .. Glass - Oil sight
10	8104055	2	GASKET .. Bowl to filter
11	8427318	1	VALVE .. Relief - 5 pounds/square inch
12	8297957	1	VALVE .. Relief - 60 pounds/square inch
13	8104057	1	PIPE .. Stand
14	8423132	2	ELEMENT .. Fuel filter - Spin-on
*ϕ15	8488653	2	CONNECTOR .. Fuel filter element - 1-12-UNF-2A threaded both ends - Applied as a repair to filter bodies manufactured prior to 1978. See W.S. 19456 for details on filter body rework
*ϕ15	9502226	2	CONNECTOR .. Fuel filter element - 1-12-UNF-2A threaded one End and 7/8-14 UNF-2A threaded opposite end - Applicable To filter bodies manufactured since January, 1978

P.L. No. B50

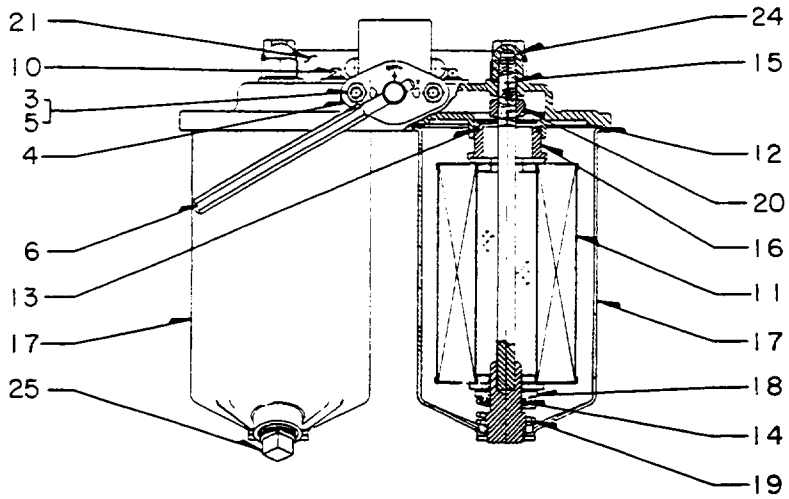
FUEL OIL FILTER

Duplex and Twin Spin-On Filter Assemblies
8-645E2,E4,E4B,E5,E6,E7,E7B,E7C,E8; 12-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B;
16-645E1,E2,E4,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B; 20-645E4,E5,E7,E7B,E7C,E9,E9B Engines

PLATE A50-2

Ref. No.	Part Number	No. Req.		Description
FILTER ASSEMBLY .. Fuel Oil - Duplex - Canister Type				
		A	-	8-645E2,E5,12,16-645E1,E2,E4,E5 and 20-645E4,E5 engines
		-	B	12,16-645E6,E7 and 20-645E7 engines
1	3317989	1	-	FILTER ASSEMBLY .. Fuel oil - Duplex - Threaded connections
2	8416607	-	1	FILTER ASSEMBLY .. Fuel oil - Duplex - Flanged connections - Replaced by 8451532
3	8291329	2	2	STUD .. Gland - 5-16-18-24 x 1-1/2 in. long
4	8291332	1	1	GLAND .. Stuffing box
5	103025	2	2	NUT .. Stud - 5/16 - 24 hex.
6	8291333	1	1	HANDLE .. Control valve
*7	8132600	1	1	PACKING .. Stuffing box
*8	8291331	1	1	RING .. Retaining
*9	113177	1	1	PLUG .. Pipe - 3/4 M.P.T.
10	103877	4	-	PLUG .. Pipe - 1/8 M.P.T.
11	3386761	2	2	ELEMENT ASSEMBLY .. Fuel oil filter
12	3319541	2	2	GASKET .. Case - Formerly 3319451
13	3319538	2	2	GASKET .. O-Ring - Upper guide bushing
14	3319539	2	2	GASKET .. O-Ring - Lower guide bushing
15	8283413	2	2	GASKET .. Retaining bar nut
16	3383982	2	2	BUSHING ASSEMBLY .. Upper - Includes guide
17	8418677	2	2	CASE ASSEMBLY .. Filter - Includes center rod
18	3383984	2	2	BUSHING .. Lower
19	3319540	2	2	SPRING .. Element retaining
20	115774	2	2	NUT .. Element retaining - 1/2 - 13 hex. - Formerly 3383983
21	5190568	1	-	BRACKET .. Filter mounting
*22	179881	2	-	BOLT .. Bracket mounting - 1/2 - 13 x 1 hex. head
*23	103323	2	-	WASHER .. Lock - 1/2
24	8291330	2	2	NUT .. Retaining bar - 1/2 - 13 acorn
25	113177	2	2	PLUG .. Drain - 3/4 M.P.T. - 3317989 filter formerly used (2) 3322741 drain plugs and (2) 8283414 drain plug gaskets
FILTER ASSEMBLY .. Fuel Oil - Duplex - Twin Spin-On Type				
				8,12,16-645E2,E4,E4B,E5,E6,E7,E7B,E7C,E8;12,16-645E9,E9B 20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B Engines
26	8451532	1		FILTER ASSEMBLY .. Fuel oil - Twin spin-on - Replaces 8416607
27	8453879	1		HEAD ASSEMBLY .. Fuel oil filter
28	8457521	1		WRENCH .. Control valve
29		1		PIN .. Roll - Wrench stop
30	138201	1		SCREW .. Cap - 1/4 - 20 x 3/4 hex. socket head
31		1		WASHER .. Lock
32		1		WASHER .. Plain
33	8453124	1		COCK .. Plug
34	8156982	2		O-Ring .. Plug cock seal - 1 I.D. x 1-1/4 O.D.
35	8453125	1		NUT .. Retaining - Plug cock - 1-3/8 - 12 thread - Slotted
36		1		PLUG .. Pipe
37	8453126	2		UNION .. Reducing - 3/4 - 16 M.P.T. x 1 - 12 M.P.T. - 1 in. long
38	8423132	2		ELEMENT .. Fuel oil filter

FUEL OIL FILTER



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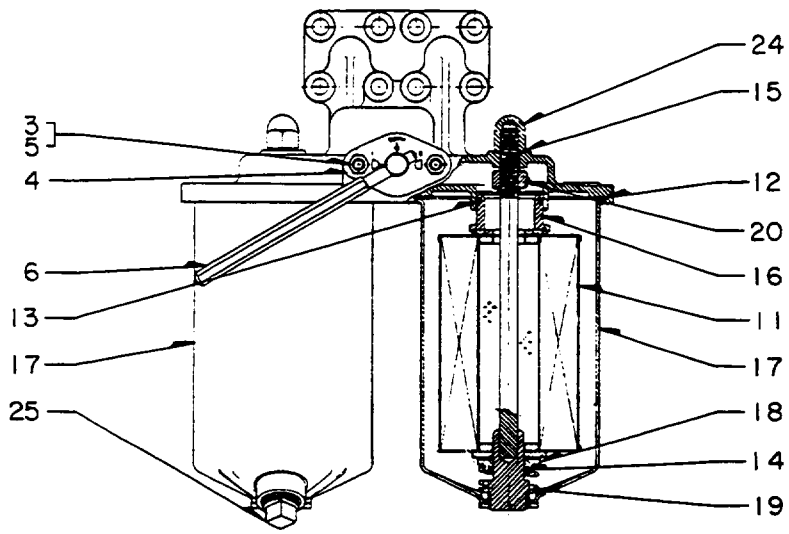

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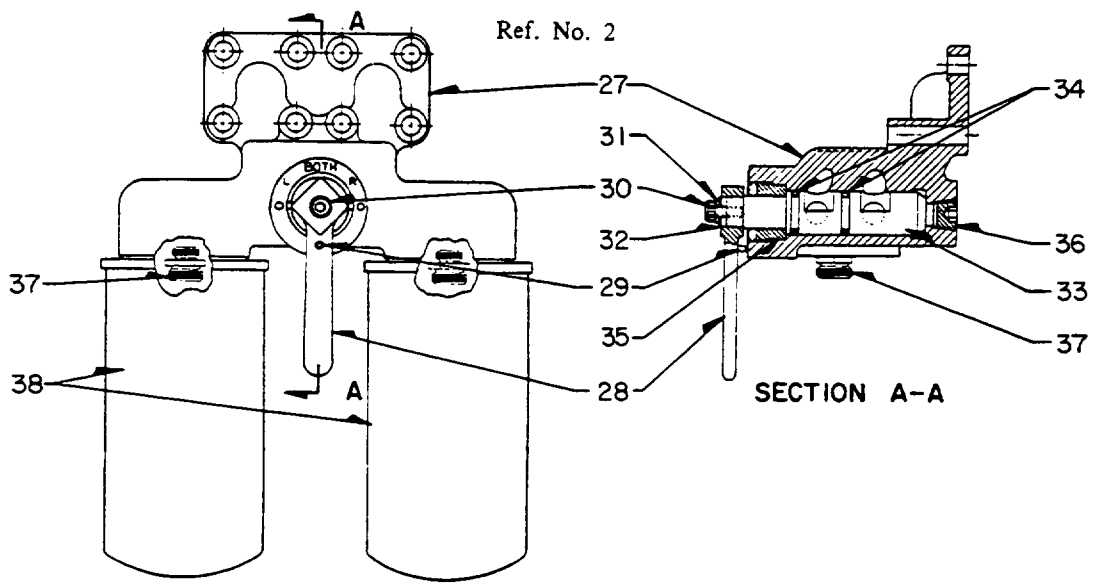


Ref. No. 26

PLATE A50-2

P.L. No. B50

FUEL OIL FILTER

Viscose Fuel Oil Filter Assembly
8,12,16-645E1 and 8,12,16,20-645E4 Industrial Engines

PLATE B50-3

Ref. No.	Part Number	Qty. Req.		Description
1	8311184	A	-	FILTER ASSEMBLY .. Fuel oil - Replaced by 8427284
*2	8427284	-	B	FILTER ASSEMBLY .. Fuel oil - Replaces 8311184 and replaced by 8479355 - See Page 1

† Fuel filter bodies 8299059 and 8427285 are no longer available. When replacement of 8299059 body is required, recommend ordering 1-8479301 body, 2-8423132 element, and 1-8427318 relief valve. When replacement of 8427285 body is required, recommend ordering 1-8479301 body and 2-8423132 element.

†3	8299059	1	-	BODY .. Fuel filter - No longer available - See above note
†4	8427285	-	1	BODY .. Fuel filter - No longer available - See above note
*5	126045	2	-	PLUG .. Pipe - 3/8 M.P.T. square socket - Headless
*6	8348619	-	3	PLUG .. Pipe - 3/8 M.P.T. square socket head
7	143997	2	-	PLUG .. Pipe - 1/4 M.P.T. square socket - Headless
*8	8348618	-	1	PLUG .. Pipe - 1/2 M.P.T. square socket head
9	8104467	2	2	CLEVIS ASSEMBLY .. Filter bowl
10	8104170	2	2	SCREW .. Thumb
11	854005	2	2	SEAT .. Thumb screw
*12	102828	4	4	SCREW .. Set - Clevis to filter - 5/16 - 18 x 1/2 slotted - Headless
13	8361381	2	2	BOWL .. Glass - Oil sight
14	8104055	2	2	GASKET .. Bowl to filter body
15	8322623	1	-	VALVE .. Relief - 10 P.S.I.G. cracking pressure
†*16	8427318	-	1	VALVE .. Relief - 5 P.S.I.G. cracking presure - Formerly 10 P.S.I.G.
17	8297957	1	1	VALVE .. Relief - 60 P.S.I.G.
18	8104057	1	1	PIPE .. Stand
19	8311121	1	1	HOUSING .. Fuel filter
20	125688	1	1	COCK .. Drain - 1/4 M.P.T.
21	8124184	1	1	RING .. Snap - Handwheel lock
22	8214352	1	1	HANDWHEEL
23	8214342	1	1	WASHER .. Spherical
24	8311120	1	1	STUD .. Housing to body - 3/4 - 10 - 16 x 12-3/16 in. long
25	8177030	2	2	SEAL .. Housing to body
26	8299457	2	2	CARTRIDGE .. Fuel filter - 8 in. long - Viscose

See Page 6 for viscose to twin spin-on filter conversion.

P.L. No. B50

FUEL OIL FILTER

Ref. No. 1
PLATE B50-3

P.L. No. B50

FUEL OIL FILTER

Filter Conversion

8,12,16-645E1 and 8,12,16,20-645E4 Engines

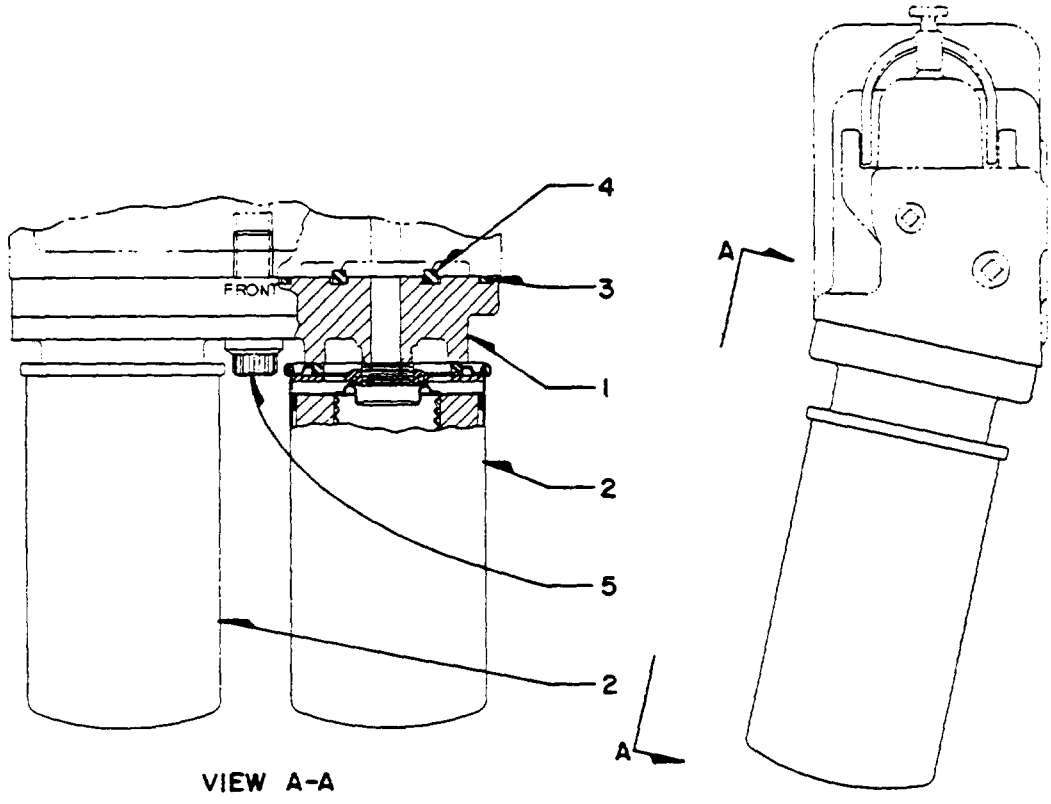


PLATE B50-4

Ref. No.	Part Number	Qty. Req.	Description
FILTER CONVERSION .. Viscose to Twin Spin-On Filters			
Filter conversion applicable to 8311184 and 8427284 filter assemblies			
1	8488615	1	ADAPTER .. Fuel filter
2	8423132	2	FILTER .. Fuel - Spin-on
3	8177030	2	SEAL .. Adapter to body - Outer
4	8488622	2	SEAL .. Adapter to body - Inner
5	9436065	1	BOLT .. Adapter to body - 3/4 - 10 x 2 Type C flanged - 12 point

Parts List No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME

Round Top Inside Frame Corner Design Applied To Engines With Flame Arrestor Safety Handhole Covers

PLATE B54-1

Ref. No.	Part Number	Quantity Required Per Engine							Description
		A	-	-	-	-	-	-	8-645E2,E6,E8 engines
		-	B	-	-	-	-	-	8-645E5,E7,E7B,E7C engines
		-	-	C	-	-	-	-	12-645E2,E6,E8 engines
		-	-	-	D	-	-	-	12-645E5,E7,E7B,E7C,E9,E9B engines
		-	-	-	-	E	-	-	16-645E2,E6,E8 engines
		-	-	-	-	-	F	-	16-645E4B,E5,E7,E7B,E7C,E9,E9B engines
		-	-	-	-	-	-	G	20-645E4B,E5,E7,E7B,E7C,E9,E9B engines

Application of the following cylinder head cover and support frame assemblies requires that new flame arrestor safety hand hole covers 8499419 also be installed on the engine. See Parts List 04. Refer to M.I. 9608, Rev. A or contact our Service Department for details.

1	8499105	1	1	-	-	-	-	-	FRAME ASM. .. Cover and support
1	9081703	-	-	1	-	-	-	-	FRAME ASM. .. Cover and support
1	9081296	-	-	-	1	-	-	-	FRAME ASM. .. Cover and support
1	9080780	-	-	-	-	1	-	-	FRAME ASM. .. Cover and support
1	8499457	-	-	-	-	-	1	-	FRAME ASM. .. Cover and support
1	8499844	-	-	-	-	-	-	1	FRAME ASM. .. Cover and support
2	8499119	1	-	-	-	-	-	-	FRAME ASM. .. Cover and support
2	9080628	-	1	-	-	-	-	-	FRAME ASM. .. Cover and support
2	9081702	-	-	1	-	-	-	-	FRAME ASM. .. Cover and support
2	9081295	-	-	-	1	-	-	-	FRAME ASM. .. Cover and support
2	9080781	-	-	-	-	1	-	-	FRAME ASM. .. Cover and support
2	8499456	-	-	-	-	-	1	-	FRAME ASM. .. Cover and support
2	8499825	-	-	-	-	-	-	1	FRAME ASM. .. Cover and support
3	8498895	8	8	14	14	18	18	22	LATCH ASM. .. Cover - Hinge
4	8498896	10	10	16	16	20	20	24	LATCH ASM. .. Cover - Clamp
5	9094557	2	2	2	2	2	2	2	LATCH ASM. .. Cover - Hinge - See Page 11
6	8168865	8	8	14	14	18	18	22	BRACKET .. Hinge pin
7	8498829	8	8	10	10	18	18	22	PAD .. Latch mounting
8	181317	16	16	20	20	36	36	44	BOLT .. Hex. head 1/4 - 28 x 1-1/4
*9	9318075	-	-	8	8	-	-	-	SCREW .. Socket head 1/4 - 28 x 1/2 - Latches to welded pads
10	181313	20	20	32	32	40	40	48	BOLT .. Hex. head 1/4 - 28 x 3/4
11	116102	36	36	52	52	76	76	92	WASHER .. Plain - 1/4
12	8032715	18	18	26	26	38	38	46	NUT .. Lock 1/4 - 28 Hex.
13	436591	20	20	32	32	40	40	48	SCREW .. Pan head - No. 10 - 32 x 7/8
14	446186	20	20	32	32	40	40	48	WASHER .. PLAIN - No. 10
15	8032813	20	20	32	32	40	40	48	NUT .. Lock - No. 10 - 32 hex
16	8202278	2	2	4	4	4	4	4	SUPPORT .. Cover - Spring loaded - See Page 11
17	181360	4	4	8	8	8	8	8	BOLT .. Hex. head 3/8 - 24 x 3/4
18	116103	4	4	8	8	8	8	8	WASHER .. Plain - 3/8
19	8194923	As Required							SPACER .. Shim - .0625 thick - Used with Ref. 6
20	8098593	As Required							TUBING .. Steel - 1/4 O.D. x 20 ft.
21	116452	2	2	2	2	2	2	2	NUT .. Tube - 1/4 - Replaces 118537
*22	8160443	2	1	2	1	2	1	1	ELBOW .. Tube - 90°
*23	272131	2	1	2	1	2	1	1	NUT .. Jam 7/16 - 20 hex
24	8173802	4	5	5	6	7	8	11	CLAMP .. Tube
25	8388600	-	-	2	2	-	-	-	SUPPORT .. Center - 12 cyl. engines only
26	8388273	-	-	4	4	-	-	-	GASKET .. Support mounting
27	138203	-	-	4	4	-	-	-	SCREW .. Socket head cap 1/4 - 20 x 1-1/4
28	138201	-	-	4	4	-	-	-	SCREW .. Socket head cap 1/4 - 20 x 3/4
29	6101221	-	-	8	8	-	-	-	WASHER .. Flat - 1/4
*30	6532324	6	6	6	6	6	6	6	NUT .. Spline - 1/4 - 28
31	9087069	2	2	-	-	4	4	-	COVER ASM. .. Cylinder head
31	9087070	-	-	2	2	-	-	-	COVER ASM. .. Cylinder head - LF & RR
31	9087071	-	-	2	2	-	-	-	COVER ASM. .. Cylinder head - RF & LR
31	9087068	-	-	-	-	-	-	4	COVER ASM. .. Cylinder head

Left Bank

Right Bank

Right Bank Only

See Page 8

8499017, 9081858, 9080784, 8499691
9083318, 9081856, 8499455

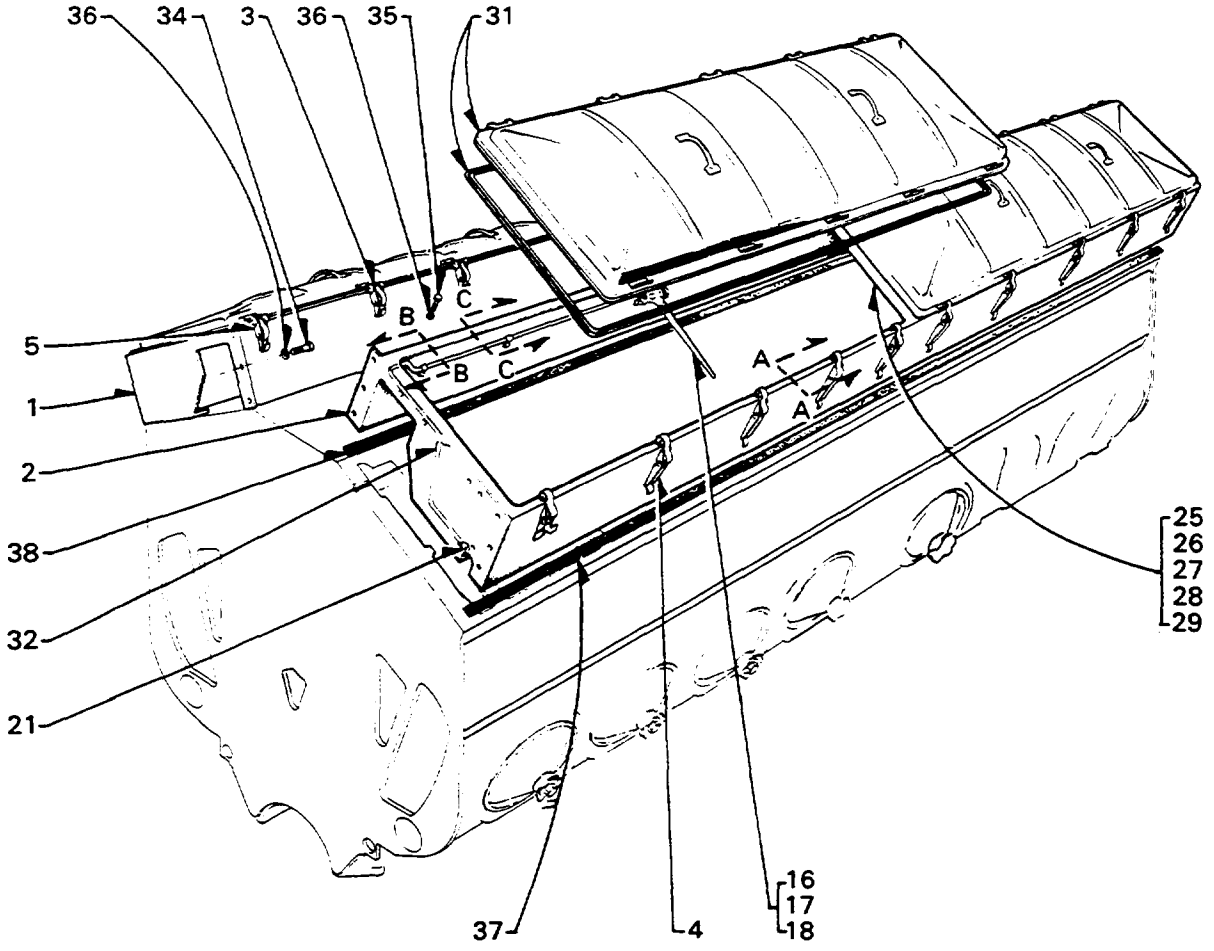
P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME

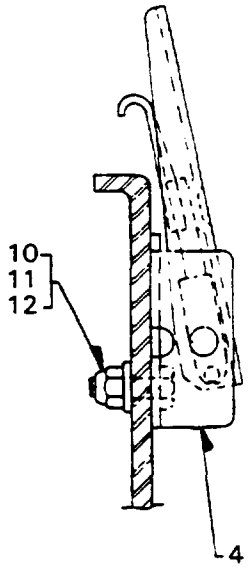
Ref. No.	Part Number	Quantity Required Per Engine							Description
		A	B	C	D	E	F	G	
32	8332127	-	1	-	1	-	1	1	CLAMP .. Oil line - Camshaft drive end
*33	181370	14	14	14	14	14	14	14	BOLT .. Hex. head 3/8 - 24 x 1-1/4 - Frame to accessory drive end
34	181365	22	22	22	22	22	22	22	BOLT .. Hex. head 3/8 - 24 x 1-1/8 - Frame to camshaft drive end
35	454911	78	78	110	110	150	150	182	BOLT .. Hex. head 3/8 - 24 x 3/4 - Frame to crankcase
36	9509486	114	114	146	146	186	186	218	WASHER .. Hardened - 1/8 thick - Formerly 8373316 - 1/16 thick
37	8470793	2	2	-	-	-	-	-	GASKET .. Frame to crankcase } Outer
37	8470795	-	-	2	2	-	-	-	GASKET .. Frame to crankcase
37	8470797	-	-	-	-	2	2	-	GASKET .. Frame to crankcase
38	8470799	-	-	-	-	-	-	2	GASKET .. Frame to crankcase
38	8470794	2	2	-	-	-	-	-	GASKET .. Frame to crankcase } Inner
38	8470796	-	-	2	2	-	-	-	GASKET .. Frame to crankcase
38	8470798	-	-	-	-	2	2	-	GASKET .. Frame to crankcase
38	8470800	-	-	-	-	-	-	2	GASKET .. Frame to crankcase
*39	8425724	As Required							GREASE .. Silicon - 8 oz. - Cover seal to frame
*40	9087944	1	1	-	-	-	-	-	KIT .. Gasket and cover seal } See Parts List 99
*40	9087945	-	-	1	1	-	-	-	KIT .. Gasket and cover seal
*40	9087946	-	-	-	-	1	1	-	KIT .. Gasket and cover seal
*40	9087947	-	-	-	-	-	-	1	KIT .. Gasket and cover seal

P.L. No. 54

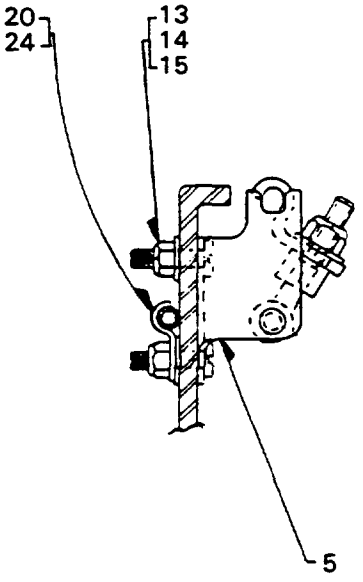
CYLINDER HEAD COVER AND SUPPORT FRAME



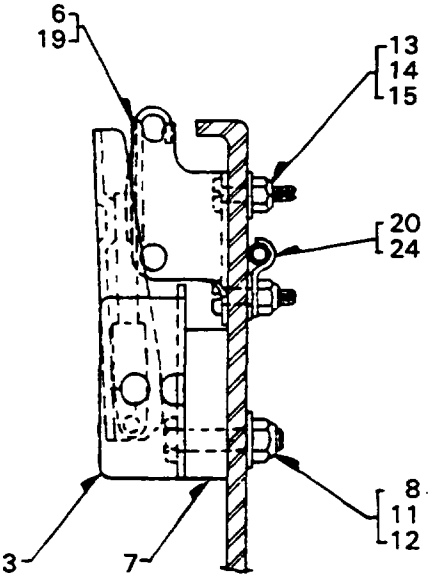
Camshaft Drive End



Section A-A



Section B-B



Section C-C

PLATE B54-1

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME
Rounded Top Inside Frame Corner Design
Applied To Engines Without Flame Arrestor Safety Handhole Covers

PLATE B54-2

Ref. No.	Part Number	Quantity Required Per Engine							Description
		A	-	-	-	-	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	-	-	-	-	8-645E4,E4B,E5,E7 engines
		-	-	C	-	-	-	-	12-645E1,E2,E6,E8 engines
		-	-	-	D	-	-	-	12-645E4,E4B,E5,E7,E9 engines
		-	-	-	-	E	-	-	16-645E1,E2,E6,E8 engines
		-	-	-	-	-	F	-	16-645E4,E4B,E5,E7,E9,E10B engines
		-	-	-	-	-	-	G	20-645E4,E4B,E5,E7,E9,E10B engines
1	8391516	1	1	-	-	-	-	-	FRAME ASM. .. Replaces 9318547
1	8389114	-	-	1	-	-	-	-	FRAME ASM. .. Cover and support
1	8388422	-	-	-	1	-	-	-	FRAME ASM. .. Cover and support
1	8391035	-	-	-	-	1	-	-	FRAME ASM. .. Cover and support
1	8377675	-	-	-	-	-	1	-	FRAME ASM. .. Cover and support
1	8374137	-	-	-	-	-	-	1	FRAME ASM. .. Cover and support
2	8391517	1	-	-	-	-	-	-	FRAME ASM. .. Cover and support
2	8407420	-	1	-	-	-	-	-	FRAME ASM. .. Cover and support
2	8389113	-	-	1	-	-	-	-	FRAME ASM. .. Cover and support
2	8388423	-	-	-	1	-	-	-	FRAME ASM. .. Cover and support
2	8391034	-	-	-	-	1	-	-	FRAME ASM. .. Cover and support
2	8377674	-	-	-	-	-	1	-	FRAME ASM. .. Cover and support
2	8374138	-	-	-	-	-	-	1	FRAME ASM. .. Cover and support
*3	6532324	6	6	6	6	6	6	6	NUT .. Spline 1/4 - 28
4	8168871	10	9	16	15	20	19	23	LATCH ASM. .. Cover - Clamp
5	8168872	9	8	16	14	20	18	22	LATCH ASM. .. Cover - Hinge
6	9094557	1	2	-	2	-	2	2	LATCH ASM. .. Cover - Hinge - R&L banks - See Page 11
7	8366616	-	1	-	1	-	1	1	LATCH ASM. .. Cover - Clamp - Right bank only
8	436591	40	40	64	64	80	80	96	SCREW .. Pan head No. 10 - 32 x 7/8 - Replaces 100767
9	8032813	40	40	64	64	80	80	96	NUT .. Lock No. 10 - 32 Hex.
10	446186	40	40	64	64	80	80	96	WASHER .. Plain - No. 10
11	8202278	2	2	4	4	4	4	4	SUPPORT ASM. .. Cover - Spring loaded - See Page 11
12	181360	4	4	8	8	8	8	8	BOLT .. Hex. head 3/8 - 24 x 3/4
13	116103	4	4	8	8	8	8	8	WASHER .. Flat - 3/8
14	8388600	-	-	2	2	-	-	-	SUPPORT ASM. .. Cover
15	8388273	-	-	4	4	-	-	-	GASKET .. Support mounting
16	138201	-	-	4	4	-	-	-	SCREW .. Socket head cap 1/4 - 20 x 3/4
17	138203	-	-	4	4	-	-	-	SCREW .. Socket head cap 1/4 - 20 x 1-1/4
18	6101221	-	-	8	8	-	-	-	WASHER .. Flat - 1/4
19	8098593	As Required							TUBING .. Steel - 1/4 O.D. x 20 ft.
20	116452	2	2	2	2	2	2	2	NUT .. Tube - 1/4 - Replaces 118537
*21	8160443	2	1	2	1	2	1	1	ELBOW .. 90°
*22	272131	2	1	2	1	2	1	1	NUT .. Jam 7/16 - 20 Hex.
23	8173802	4	5	5	6	7	8	11	CLAMP .. Tube - 1/4
24	8194923	As Required							SPACER .. Shim - .0625 thick - Used with Ref. 5
25	8470793	2	2	-	-	-	-	-	GASKET .. Frame to crankcase
25	8470795	-	-	2	2	-	-	-	GASKET .. Frame to crankcase
25	8470797	-	-	-	-	2	2	-	GASKET .. Frame to crankcase
25	8470799	-	-	-	-	-	-	2	GASKET .. Frame to crankcase
26	8470794	2	2	-	-	-	-	-	GASKET .. Frame to crankcase
26	8470796	-	-	2	2	-	-	-	GASKET .. Frame to crankcase
26	8470798	-	-	-	-	2	2	-	GASKET .. Frame to crankcase
26	8470800	-	-	-	-	-	-	2	GASKET .. Frame to crankcase
*27	181370	14	14	14	14	14	14	14	BOLT .. Hex. head 3/8 - 24 x 1-1/4 frame to accessory drive end
28	181365	22	22	22	22	22	22	22	BOLT .. Hex. head 3/8 - 24 x 1-1/8 frame to camshaft drive end
29	454911	78	78	110	110	150	150	182	BOLT .. Hex. head 3/8 - 24 x 3/4 frame to crankcase
30	9509486	114	114	146	146	186	186	218	WASHER .. Hardened - 1/8 inch thick - Formerly 8373316 - 1/16 thick
31	8487945	2	2	-	-	4	4	-	COVER ASM. .. Cylinder head
31	8487963	-	-	4	4	-	-	-	COVER ASM. .. Cylinder head
31	8487961	-	-	-	-	-	-	4	COVER ASM. .. Cylinder head

Left Bank

Right Bank

See Page 11

Right Bank Only

Outer

Inner

See Page 9

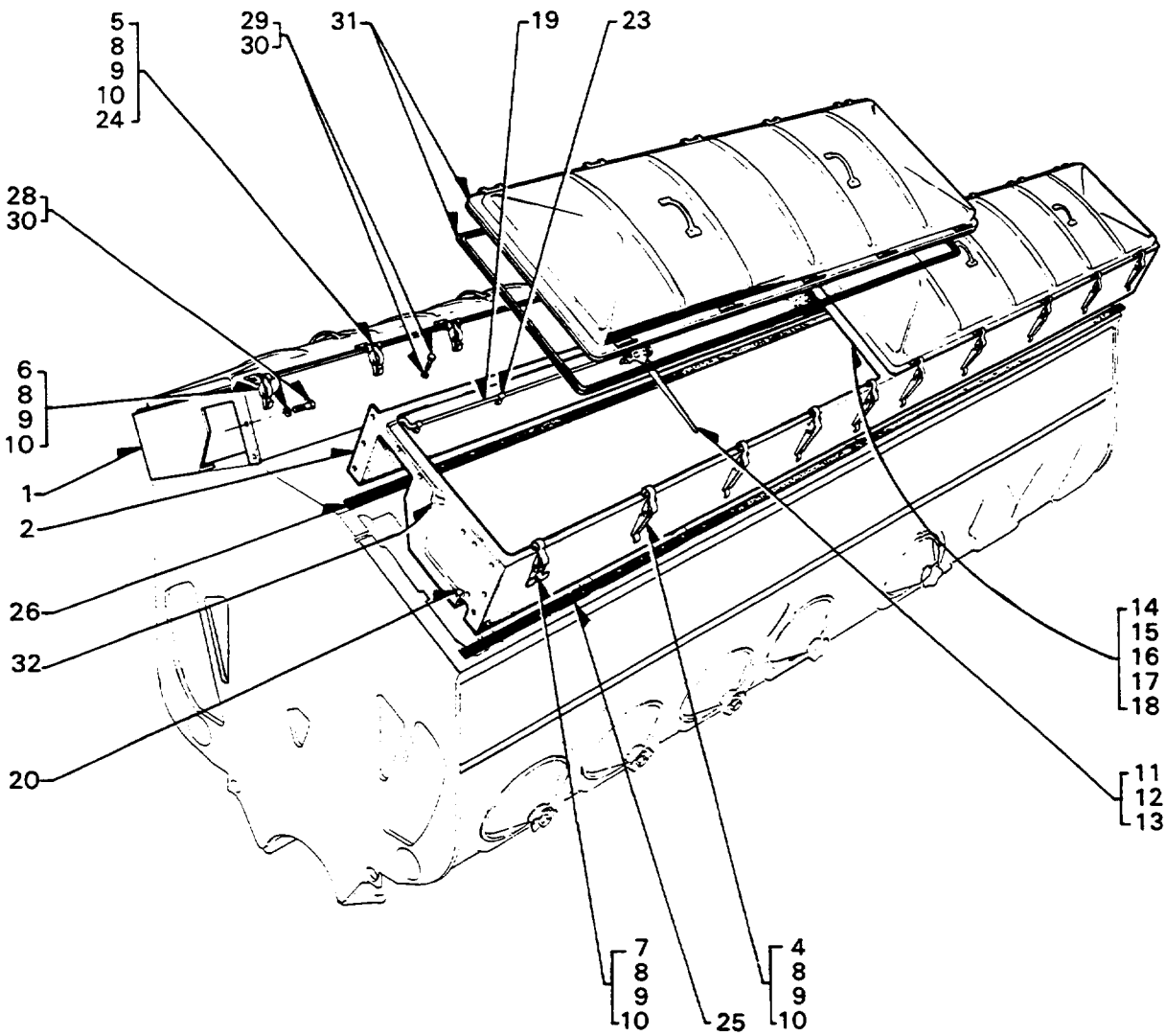
8391666, 8389117, 8391049, 8374281 8407421, 8388620, 8378367

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME

Ref. No.	Part Number	Quantity Required							Description
		A	B	C	D	E	F	G	
31	8332127	-	1	-	1	-	1	1	CLAMP .. Tube - Oil pressure line - Camshaft drive end
*32	9087944	1	1	-	-	-	-	-	KIT .. Gasket and cover seal
*32	9087945	-	-	1	1	-	-	-	KIT .. Gasket and cover seal
*32	9087946	-	-	-	-	1	1	-	KIT .. Gasket and cover seal
*32	9087947	-	-	-	-	-	-	1	KIT .. Gasket and cover seal
*33	8245724	As Required							GREASE .. Silicon - 8 oz. tube - Cover seal to frame

See P.L. 99



CAMSHAFT DRIVE END

PLATE B54-2

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME
Previous Design Square Top Inside Frame Corners

PLATE B54-3

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	8-645E1,E2 engines
		-	B	-	-	-	12-645E1,E2 engines
		-	-	C	-	-	12-645E5 engines
		-	-	-	D	-	16-645E1,E2 engines
		-	-	-	-	E	16-645E4,E5 engines

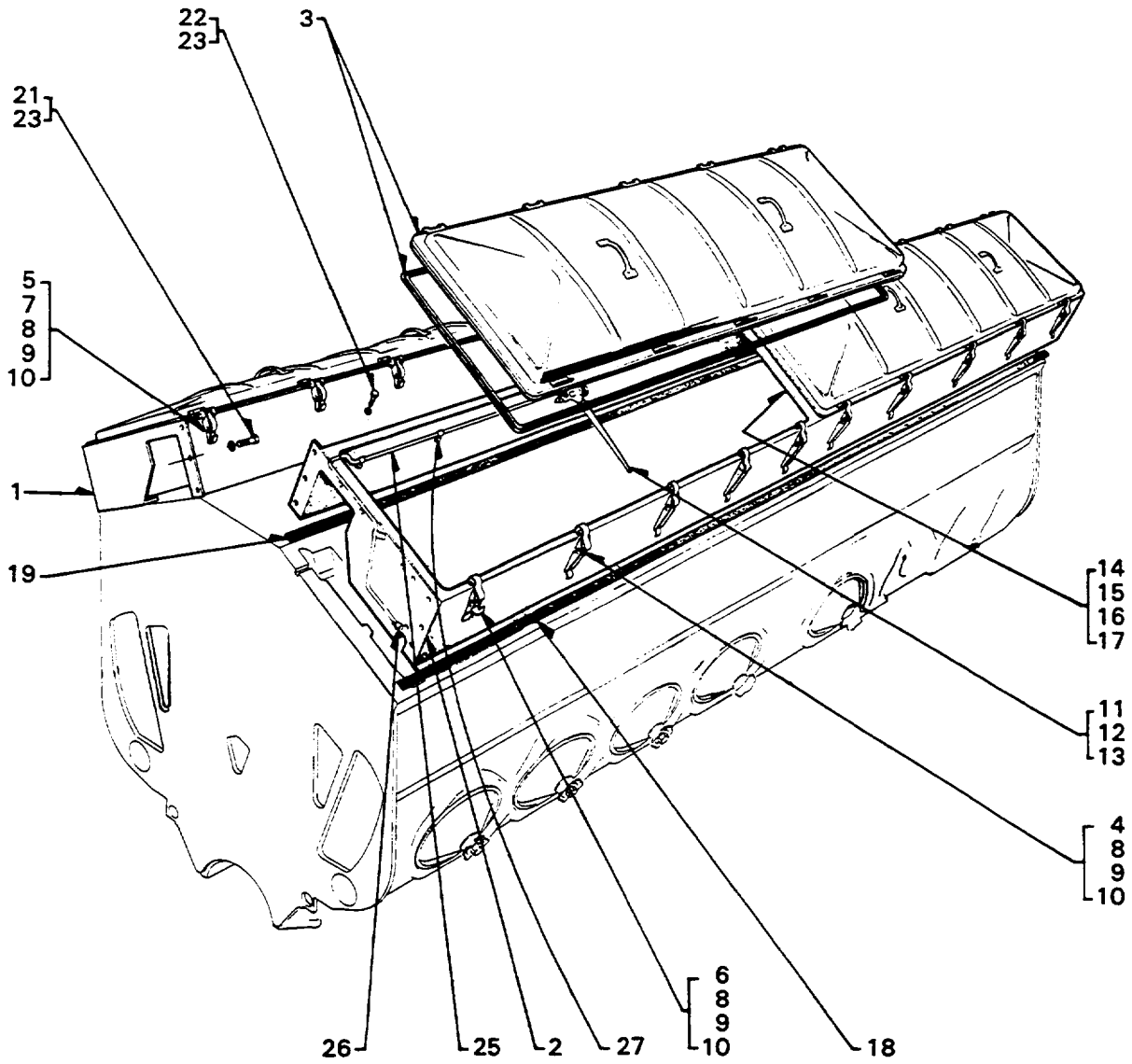
Cylinder top deck frames with square top inside corners are no longer available. When replacement frames are required, the current design frames with round top inside corners and covers are recommended as replacement. Covers applied to either design frames are not interchangeable. See Pages 1 through 5.

1	----	1	1	1	1	1	FRAME ASM. .. Support - Left bank } *No Longer Available*
2	----	1	1	1	1	1	FRAME ASM. .. Support - Right bank }
3	8244709	2	-	-	4	4	COVER ASM. .. Cylinder head } See Page 10
3	8244708	-	4	4	-	-	COVER ASM. .. Cylinder head }
4	8168871	10	16	15	20	19	LATCH ASM. .. Cover - Clip } See Page 11
5	8168872	10	16	16	20	20	LATCH ASM. .. Cover - Hinge }
6	8366616	-	-	1	-	1	LATCH ASM. .. Cover - Clip (right bank)
7	8194923	As Required					SPACER .. Shim - .0625 thick - Used with Ref. 5
8	436591	40	64	64	80	80	SCREW .. Pan head No. 10 - 32 x 7/8 - Formerly 100766 and 100767
9	446186	40	64	64	80	80	WASHER .. Flat No. 10
10	8032813	40	64	64	80	80	NUT .. Lock No. 10 - 32 hex.
11	8202278	2	4	4	4	4	SUPPORT ASM. .. Cover - Spring loaded - See Page 11
12	181360	4	8	8	8	8	BOLT .. Hex. head 3/8 - 24 x 3/4
13	116103	4	8	8	8	8	WASHER .. Plain - 3/8
14	8177564	-	2	2	-	-	CHANNEL .. Center support
15	8177567	-	4	4	-	-	GASKET .. Frame to channel
16	6532324	-	8	8	-	-	NUT .. Spline 1/4 - 28
17	138213	-	8	8	-	-	SCREW .. Socket head cap 1/4 - 28 x 1-1/4
18	8470793	2	-	-	-	-	GASKET .. Frame to crankcase } Outer
18	8470795	-	2	2	-	-	GASKET .. Frame to crankcase }
18	8470797	-	-	-	2	2	GASKET .. Frame to crankcase }
19	8470794	2	-	-	-	-	GASKET .. Frame to crankcase } Inner
19	8470796	-	2	2	-	-	GASKET .. Frame to crankcase }
19	8470798	-	-	-	2	2	GASKET .. Frame to crankcase }
*20	181370	14	14	14	14	14	BOLT .. Hex. head 3/8 - 24 x 1-1/4 - Frame to accessory drive end
21	181365	22	22	22	22	22	BOLT .. Hex. head 3/8 - 24 x 1-1/8 - Frame to camshaft drive end
22	454911	78	110	110	150	150	BOLT .. Hex. head 3/8 - 24 x 3/4 - Frame to crankcase
23	9509486	114	146	146	186	186	WASHER .. Hardened - 1/8 inch thick - Formerly 8373316 - 1/16 thick
*24	6532324	6	6	6	6	6	NUT .. Spline 1/4 - 28
25	8098593	As Required					TUBING .. Steel - Copper brazed - 1/4 O.D. x 20 ft. - Applied to right bank
26	116452	2	2	2	2	2	NUT .. Tube - 1/4 replaces 118537
27	8173802	4	5	6	7	8	CLAMP .. Tube
*28	8160443	2	2	1	2	1	ELBOW .. 90°
*29	272131	2	2	1	2	1	NUT .. Hex. 7/16 - 20
*30	8425724	As Required					GREASE .. Silicon - Frame to cover seal - 8 oz. tube
*31	8271650	1	-	-	-	-	KIT .. Gasket and cover seal } See Parts List 99
*31	8271651	-	1	1	-	-	KIT .. Gasket and cover seal }
*31	8271649	-	-	-	1	1	KIT .. Gasket and cover seal }

8178157, 8177572, 8320679, 8160727, 8332065

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME



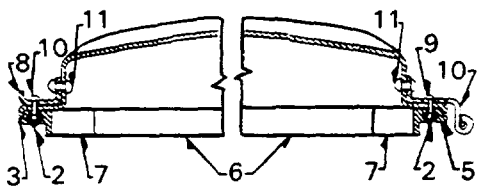
Camshaft Drive End

PLATE B54-3

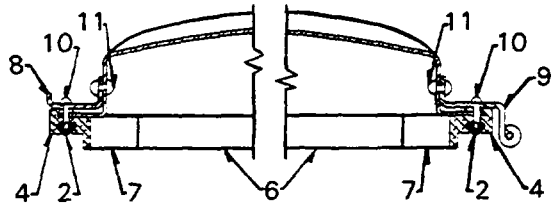
P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME

Cover Assemblies Applied To Engines With Flame Arrestor Safety Handhole Covers



Ref. No. 1 (Aluminum)



Ref. No. 1 (Steel)

PLATE B54-4

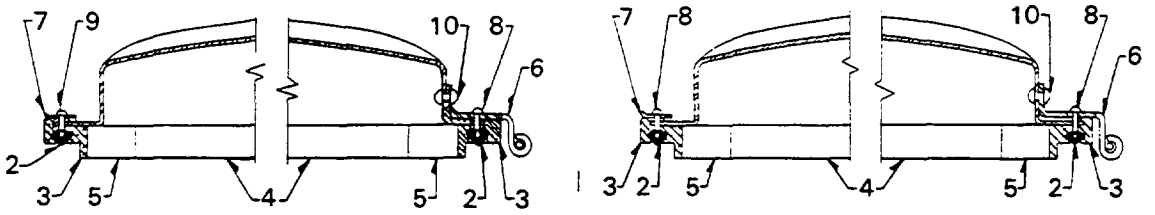
In early 1982, the cover material was changed from aluminum to coated steel. The aluminum covers are no longer available, but are listed below for service parts reference.

Ref. No.	Part Number	Quantity Required								Description
†1	9087069	1	-	-	-	-	-	-	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	9087069	-	1	-	-	-	-	-	-	COVER ASM. .. Cylinder head - Coated steel
†1	9087070	-	-	1	-	-	-	-	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	9087070	-	-	-	1	-	-	-	-	COVER ASM. .. Cylinder head - Coated steel
†1	9087071	-	-	-	-	1	-	-	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	9087071	-	-	-	-	-	1	-	-	COVER ASM. .. Cylinder head - Coated steel
†1	9087068	-	-	-	-	-	-	1	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	9087068	-	-	-	-	-	-	-	1	COVER ASM. .. Cylinder head - Coated steel
2	9087073	1	1	-	-	-	-	-	-	KIT .. Seal - Cover
2	9087074	-	-	1	1	1	1	-	-	KIT .. Seal - Cover
2	9087072	-	-	-	-	-	-	1	1	KIT .. Seal - Cover
3	8377496	1	-	-	-	-	-	-	-	RETAINER .. Seal - Hook clamp side
3	8388280	-	-	1	-	1	-	-	-	RETAINER .. Seal - Hook clamp side
3	8373043	-	-	-	-	-	-	1	-	RETAINER .. Seal - Hook clamp side
4	9544760	-	2	-	-	-	-	-	-	RETAINER .. Seal - Sides
4	9548214	-	-	-	2	-	2	-	-	RETAINER .. Seal - Sides
4	9547406	-	-	-	-	-	-	-	2	RETAINER .. Seal - Sides
5	8498933	1	-	-	-	-	-	-	-	RETAINER .. Seal - Hinge side
5	9081816	-	-	1	-	-	-	-	-	RETAINER .. Seal - Hinge side
5	9081799	-	-	-	-	1	-	-	-	RETAINER .. Seal - Hinge side
5	9080302	-	-	-	-	-	-	1	-	RETAINER .. Seal - Hinge side
6	8373627	2	-	2	-	2	-	2	-	RETAINER .. Seal - End
6	9535490	-	2	-	2	-	2	-	2	RETAINER .. Seal - End
7	8373137	4	-	4	-	4	-	4	-	RETAINER .. Seal - Corner
7	9535491	-	4	-	4	-	4	-	4	RETAINER .. Seal - Corner
8	8498932	5	-	4	-	4	-	6	-	HOOK .. Clamp
8	9537842	-	5	-	4	-	4	-	6	HOOK .. Clamp
9	8373440	5	-	4	-	4	-	6	-	HINGE ASM. .. Cover
9	9535492	-	5	-	4	-	4	-	6	HINGE ASM. .. Cover
10	9402383	20	-	16	-	16	-	24	-	RIVET .. Counter sunk head - 1/8 x 9/16
10	9440188	-	20	-	16	-	16	-	24	RIVET .. Flat head - 1/8 x 5/8
11	101843	20	-	16	-	16	-	24	-	RIVET .. Round head - 3/16 x 7/16
11	101890	-	20	-	16	-	16	-	24	RIVET .. Round head - 3/16 x 3/8
*12	9402381	46	-	39	-	39	-	52	-	RIVET .. Countersunk head - 1/8 x 7/16 - Cover to retainers
*12	9440189	-	26	-	23	-	23	-	28	RIVET .. Flat head - 1/8 x 1/2 - Cover to retainers
*13	8291069	1	-	1	-	1	-	1	-	HANDLE .. Not available - No longer applied
*14	8210618	AR	-	AR	-	AR	-	AR	-	SEALER .. Cover to retainers - 1 quart can
*14	9531766	-	AR	-	AR	-	AR	-	AR	SEALER .. Cover to retainers - 10.5 ounce tube
*15	8245724	As Required								GREASE .. Silicon - Seal - 8 ounce tube

†*For engine model application - See Page 1.*

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME
Cover Assemblies Applied To Engines Without Flame Arrestor Safety Handhole Covers



Ref. No. 1 (Aluminum) Ref. No. 1 (Steel)

PLATE A54-5

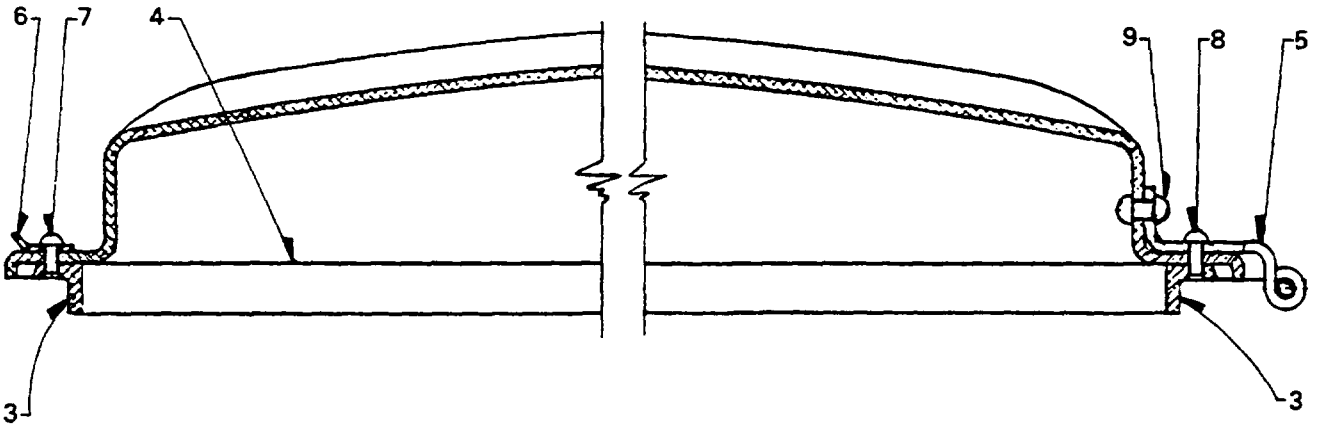
In early 1982, the cover material was changed from aluminum to coated steel. The aluminum covers are no longer available, but are listed below for service parts reference.

Ref. No.	Part Number	Quantity Required						Description
†1	8487945	1	-	-	-	-	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	8487945	-	1	-	-	-	-	COVER ASM. .. Cylinder head - Coated steel
†1	8487963	-	-	1	-	-	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	8487963	-	-	-	1	-	-	COVER ASM. .. Cylinder head - Coated steel
†1	8487961	-	-	-	-	1	-	COVER ASM. .. Cylinder head - Aluminum - Not available
†1	8487961	-	-	-	-	-	1	COVER ASM. .. Cylinder head - Coated steel
2	9087073	1	1	-	-	-	-	KIT .. Seal - Cover
2	9087074	-	-	1	1	-	-	KIT .. Seal - Cover
2	9087072	-	-	-	-	1	1	KIT .. Seal - Cover
3	8377496	2	-	-	-	-	-	RETAINER .. Seal - Side
3	9544760	-	2	-	-	-	-	RETAINER .. Seal - Side
3	8388280	-	-	2	-	-	-	RETAINER .. Seal - Side
3	9548214	-	-	-	2	-	-	RETAINER .. Seal - Side
3	8373043	-	-	-	-	2	-	RETAINER .. Seal - Side
3	9547406	-	-	-	-	-	2	RETAINER .. Seal - Side
4	8373627	2	-	2	-	2	-	RETAINER .. Seal - End
4	9535490	-	2	-	2	-	2	RETAINER .. Seal - End
5	8373137	4	-	4	-	4	-	RETAINER .. Seal - Corner
5	9535491	-	4	-	4	-	4	RETAINER .. Seal - Corner
6	8373440	5	-	4	-	6	-	HINGE ASM. .. Cover
6	9535492	-	5	-	4	-	6	HINGE ASM. .. Cover
7	8373603	5	-	4	-	6	-	HOOK .. Clamp
7	9535570	-	5	-	4	-	6	HOOK .. Clamp
8	9402383	10	-	8	-	12	-	RIVET .. Countersunk head - 1/8 x 9/16
8	9440188	-	20	-	16	-	24	RIVET .. Flat head - 1/8 x 5/8
9	9402382	10	-	8	-	12	-	RIVET .. Countersunk head - 1/8 x 1/2
10	101843	10	-	8	-	12	-	RIVET .. Round head - 3/16 x 7/16
10	101890	-	10	-	8	-	12	RIVET .. Round head - 3/16 x 3/8
*11	9402381	44	-	38	-	48	-	RIVET .. Countersunk head - 1/8 x 7/16 - Cover to retainers
*11	9440189	-	24	-	22	-	26	RIVET .. Flat head - 1/8 x 1/2 - Cover to retainers
*12	8291069	2	-	2	-	2	-	HANDLE .. No longer applied - No longer available
*13	101843	8	-	8	-	8	-	RIVET .. Round head - 3/16 x 7/16 - Handle to cover
*14	8210618	AR	-	AR	-	AR	-	SEALER .. Cover to retainers - 1 quart can
*14	9531766	-	AR	-	AR	-	AR	SEALER .. Cover to retainers - 10.5 ounce tube
*15	8245724	As Required						GREASE .. Silicon - Seal - 8 ounce tube

† For engine model application - See Page 4.

P.L. No. B54

CYLINDER HEAD COVER AND SUPPORT FRAME
Previous Design Cover Assembly
For Square Inside Corner Frame Assembly



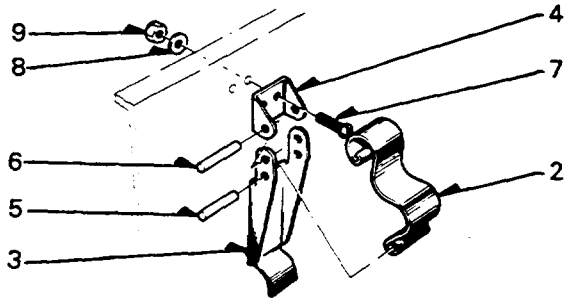
Ref. 1 - Cross Section
PLATE A54-6

Ref. No.	Part Number	Qty. Req.		Description
1	8244709	1	-	COVER ASM. .. Cylinder head } For Engine Model Application - See Page 6
1	8244708	-	1	COVER ASM. .. Cylinder head }
*2	8271623	1	-	SEAL .. Cover - 16 ft. long
*2	8271624	-	1	SEAL .. Cover - 13 ft. long
3	8208158	2	-	RETAINER .. Cover seal - Side
3	8208484	-	2	RETAINER .. Cover seal - Side
4	8208159	2	2	RETAINER .. Cover seal - End
5	8208157	5	4	HINGE ASM. .. Cover
6	8208156	5	4	HOOK .. Clamp
7	9402383	10	8	RIVET .. Countersunk head - 1/8 x 9/16 - Hook clamp to cover and retainer
8	9402384	10	8	RIVET .. Countersunk head - 1/8 x 5/8 - Hinge to cover and retainer
9	101843	10	8	RIVET .. Round head - 3/16 x 7/16 - Hinge to cover
*10	9402382	42	36	RIVET .. Countersunk head - 1/8 x 1/2 - Cover to retainers
*11	8031902	2	2	HANDLE .. No longer applied - Not available
*12	101843	8	8	RIVET .. Round head - 3/16 x 7/16 - Handle to cover
*13	8210618	A.R.		SEALER .. Cover to retainer - 1 quart can
*14	8425724	A.R.		GREASE .. Silicon - Cover seal to frame - 8 oz. tube

P.L. No. B54

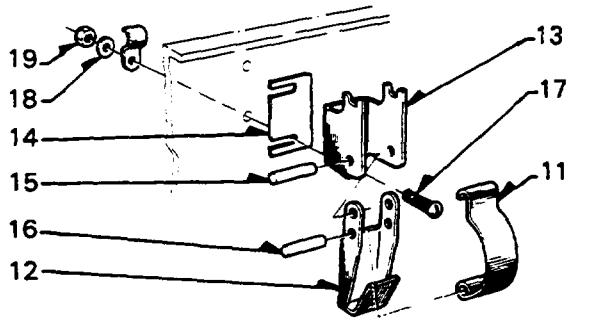
CYLINDER HEAD COVER AND SUPPORT FRAME
Cover Latches and Support Assembly

Ref. No.	Part Number	Qty. Req.	Description
1	8168871	1	LATCH ASM. .. Clamp
2	8168866	1	SPRING .. Clamping
3	8168864	1	ARM .. Latch
4	8168867	1	BRACKET .. Mounting
5	8172823	1	PIN .. 7/32 x 1.160
6	8172822	1	PIN .. 7/32 x 1.430
7	436591	2	SCREW .. Pan hd. - No. 10 - 32 x 7/8
8	446186	2	WASHER .. Plain - No. 10
9	8032813	2	NUT .. Lock - No. 10 - 32 hex.



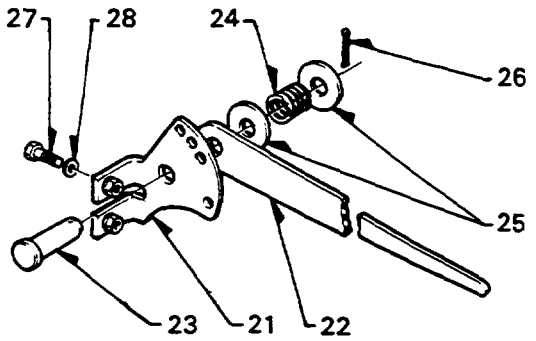
Ref. No. 1

10	8168872	1	LATCH ASM. .. Hinge
11	8168868	1	SPRING .. Hinge pin clamping
12	8222016	1	ARM .. Latch
13	8168865	1	BRACKET .. Mounting
14	8194923	AR	SPACER .. Shim - .0625 thick
15	8172823	1	PIN .. 7/32 x 1.160
16	8172822	1	PIN .. 7/32 x 1.430
17	436591	2	SCREW .. Pan hd. - No. 10 - 32 x 7/8
18	446186	2	WASHER .. Plain - No. 10
19	8032813	2	NUT .. Lock - No. 10 - 32 hex.



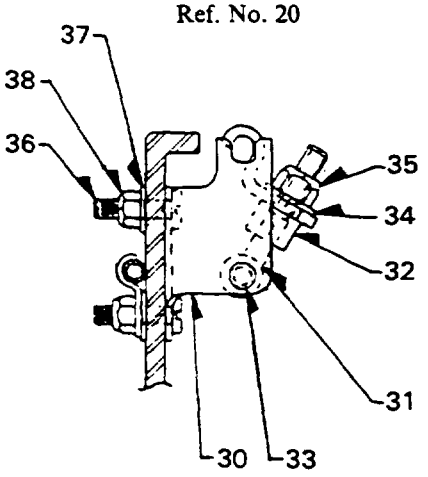
Ref. No. 10

20	8202278	1	SUPPORT ASM. .. Cover
21	8202277	1	BRACKET .. Mounting
22	8202275	1	ARM .. Support
23	114788	1	PIN .. Clevis
24	8202272	1	SPRING .. Torsion
25	103345	2	WASHER .. Plain - 5/8
26	103385	1	PIN .. Cotter - 1/8 x 1
27	181361	2	BOLT .. Hex. head 3/8 - 24 x 7/8 - Formerly 181360
28	116103	2	WASHER .. Flat - 3/8



Ref. No. 20

29	9094557	1	LATCH ASM. .. Hinge
30	8168865	1	BRACKET .. Mounting
31	9094559	1	HINGE .. Includes threaded rod
32	9094541	1	LATCH .. Clamping
33	8172822	1	PIN .. 7/32 x 1.430
34	103339	1	WASHER .. Plain - 1/4
35	9416509	1	NUT .. Lock - 1/4 - 20 hex.
36	436591	2	SCREW .. Pan hd. - No. 10 - 32 x 7/8
37	446186	2	WASHER .. Plain - No. 10
38	8032813	2	NUT .. Lock - No. 10 - 32 hex.



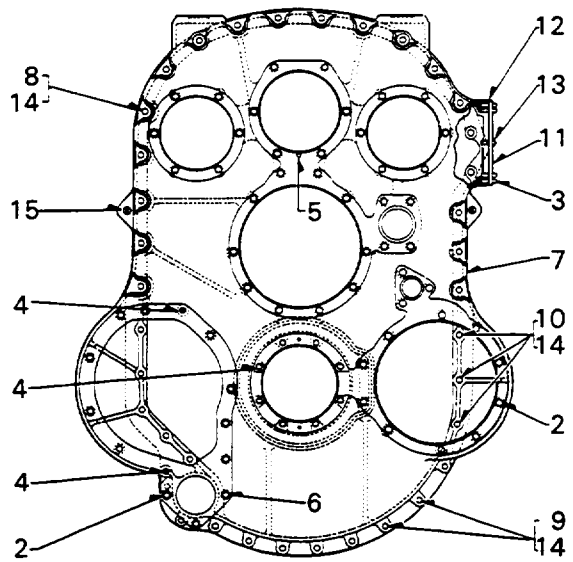
Ref. No. 29

PLATE A54-7

Parts List No. B58

ACCESSORY DRIVE HOUSING ASSEMBLY

Applied To Engines With Bottom Drain Overspeed Trip Housings

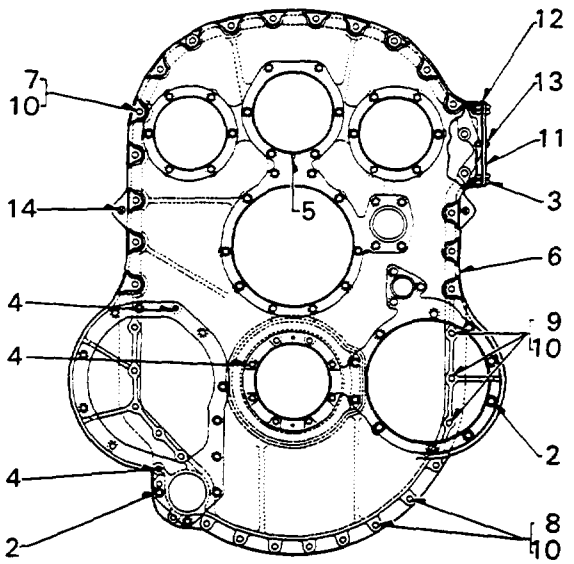


Ref. No. 1
PLATE B58-1

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	8,12,16-645E1,E8; 8,12,16,20-645E4,E4B; 12,16,20-645E9,E9B; and 16,20-645E10B left hand rotation engines
		-	B	-	8,12,16-645E2,E6; 8,12,16,20-645E5,E7,E7B; 8-645E7C L.H. rotation engines
		-	-	C	8,12,16-645E2,E6; 8,12,16,20-645E5,E7,E7B; 12,16,20-645E4; and 16,20-645E4B right hand rotation engines
1	8159742	1	-	-	HOUSING ASM. .. Accessory drive - L.H. rotation engines
1	8464918	-	1	-	HOUSING ASM. .. Accessory drive - L.H. rotation engines - Replaces 8242544
1	8464917	-	-	1	HOUSING ASM. .. Accessory drive - R.H. rotation engines - Replaces 8242542
2	8081581-	57	58	58	NUT .. Spline - 1/2 - 20
3	8084872	8	8	8	STUD .. 5/16 - 18 x 5/16 - 24 x 1-1/2 in. long - Standard pitch dia. 8123044 .. .002 O.S. 8126982 .. .015 O.S. 8123045 .. .004 O.S. 8126983 .. .017 O.S.
4	8084871	10	9	9	STUD .. 1/2 - 13 x 1/2 - 20 x 2-7/16 in. long - Standard pitch dia. 8123046 .. .002 O.S. 8126979 .. .015 O.S. 8123047 .. .004 O.S. 8126980 .. .017 O.S.
5	8028366	1	1	1	PIN .. Dowel - .3750 x 7/8 in. long
6	8455297	-	1	1	STUD .. 1/2 - 20 x 1/2 - 20 x 3 - Formerly applied
7	8084665	1	1	1	GASKET .. Accessory drive housing to crankcase
8	181446	17	17	17	BOLT .. Hex. head 1/2 - 20 x 4 } Housing To Crankcase
9	181435	10	10	10	BOLT .. Hex. head 1/2 - 20 x 2 } Housing To Crankcase
10	181433	10	10	10	BOLT .. Hex. head 1/2 - 20 x 1-3/4 } Housing To Crankcase
11	8084661	1	1	1	COVER .. Blind - Not applied to engines with safety shutdown devices
12	8084685	1	1	1	GASKET .. Blind cover
13	8032716	8	8	8	NUT .. Lock 5/16 - 24 hex.
14	6101229	37	37	37	WASHER .. Flat - 1/2
15	8028740	2	2	2	PIN .. Dowel - Locating - .7500 dia. x 1-1/2 in. long 8168835 .. .005 O.S. 8168836 .. .010 O.S. 8168837 .. .015 O.S.
*16	8084863	1	1	1	COVER .. Blind - Applied to engines without accessory drive
*17	8028763	1	1	1	GASKET .. Blind cover
*18	6101229	8	8	8	WASHER .. Flat - 1/2
*19	8032719	8	8	8	NUT .. Lock 1/2 - 20 hex.

P.L. No. B58

ACCESSORY DRIVE HOUSING ASSEMBLY
Applied To Engines With Rear Drain Overspeed Trip Housings



Ref. No. 1
PLATE B58-2

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	12,16-645E1,E8; 12,16,20-645E4,E4B,E9,E9B; 16,20-645E10B L.H. rotation engines
		-	B	-	12,16-645E2,E6; 12,16,20-645E5,E7,E7B,E7C left hand rotation engines
		-	-	C	12,16-645E2,E6; 12,16,20-645E4,E5,E7,E7B,E7C; 16,20-645E4B R.H. rotation engines
1	9531364	1	-	-	HOUSING ASM. .. Accessory drive - L.H. rotation industrial engines
1	9531366	-	1	-	HOUSING ASM. .. Accessory drive - L.H. rotation marine engines
1	9531365	-	-	1	HOUSING ASM. .. Accessory drive - R.H. rotation engines
2	8081581	57	58	58	NUT .. Spline 1/2 - 20
3	8084872	8	8	8	STUD .. 5/16 - 18 x 5/16 - 24 x 1-1/2 in. long - Standard pitch dia. 8123044 .. .002 O.S. 8126982 .. .015 O.S. 8123045 .. .004 O.S. 8126983 .. .017 O.S.
4	8084871	10	9	9	STUD .. 1/2 - 13 x 1/2 - 20 x 2-7/16 8123046 .. .002 O.S. 8126979 .. .015 O.S. 8123047 .. .004 O.S. 8126980 .. .017 O.S.
5	8028366	1	1	1	PIN .. Dowel - .3750 x 7/8 in. long
6	8084665	1	1	1	GASKET .. Accessory drive housing to crankcase
7	181446	17	17	17	BOLT .. Hex. head 1/2 - 20 x 4 } Housing To Crankcase
8	181435	10	10	10	BOLT .. Hex. head 1/2 - 20 x 2 } Housing To Crankcase
9	181433	10	10	10	BOLT .. Hex. head 1/2 - 20 x 1-3/4 } Housing To Crankcase
10	6101229	37	37	37	WASHER .. Flat - 1/2
11	8084661	1	1	1	COVER .. Blind - Not applied to engines with safety shutdown devices
12	8084685	1	1	1	GASKET .. Blind cover
13	8032716	8	8	8	NUT .. Lock 5/16 - 24 hex.
14	8028740	2	2	2	PIN .. Dowel - Locating - .7500 dia. x 1-1/2 in. long 8168835 .. .005 O.S. 8168836 .. .010 O.S. 8168837 .. .015 O.S.
*15	8084863	1	1	1	COVER .. Blind - Applied to engines without accessory drive
*16	8028763	1	1	1	GASKET .. Blind cover
*17	6101229	8	8	8	WASHER .. Flat - 1/2
*18	8032719	8	8	8	NUT .. Lock 1/20 - 20 hex.

Parts List No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY

Low Water Safety Shutdown Valve Application
16-645E4 Engine (Model S16E4)

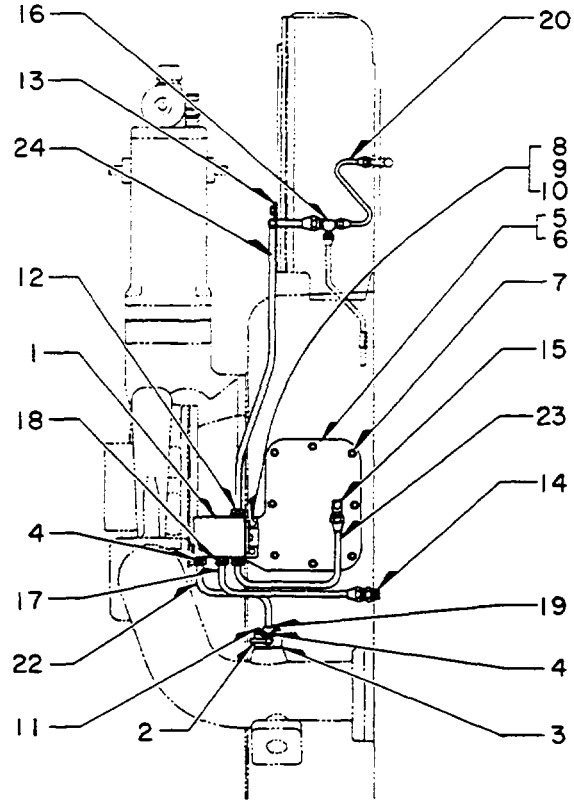
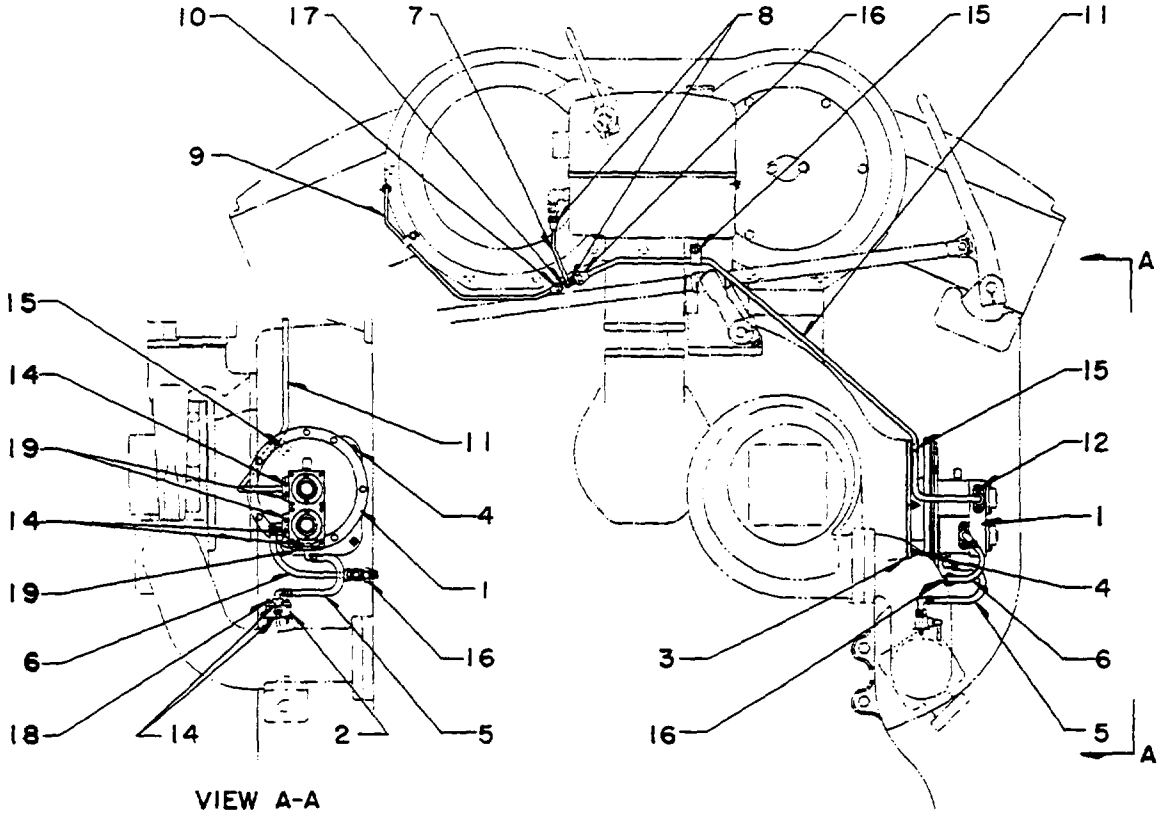


PLATE A59-1

Ref. No.	Part Number	Qty. Req.	Description
1	8447342	1	VALVE ASM. .. Low water safety shutdown - Replaces 8358537 - See Page 13
2	8412324	1	VALVE ASM. .. Cutoff - See Page 14 - Formerly 8337318
3	8025988	1	GASKET .. Valve mounting
4	8342588	5	SEAL .. O-Ring - Tube flange and valve mounting
5	8344750	1	COVER .. Valve mounting
6	8084685	1	GASKET .. Cover mounting
7	8032716	8	NUT .. Lock - 5/16 - 24 hex.
8	179841	2	BOLT .. Valve mounting - 3/8 - 16 x 1-1/4 hex. head
9	103341	2	WASHER .. Plain - 3/8
10	8032743	2	NUT .. Lock - 3/8 - 16 hex.
11	147115	2	SCREW .. No. 10 - 24 x 1-1/2 hex. socket head
12	186542	8	SCREW .. No. 10 - 24 x 1/2 hex. socket head
13	3306485	2	CLAMP .. Tube
14	8040313	1	CONNECTOR .. 3/8 tube x 3/8 M.P.T.
15	118755	1	ELBOW .. 3/8 tube x 1/4 M.P.T.
16	8040370	1	TEE .. 1/4 x 3/8 x 1/4 tube
17	8365336	1	TUBE ASM. .. Cutoff valve to safety valve
18	8333798	1	FLANGE .. Tube
19	8344881	1	FLANGE .. Tube
20	8354159	1	TUBE ASM. .. Oil pressure line
*21	116452	2	NUT .. 1/4 tube
22	8355242	1	TUBE ASM. .. Safety valve to crankcase
23	8344752	1	TUBE ASM. .. Safety valve to cover
24	8357971	1	TUBE ASM. .. Oil pressure line
*25	8333798	3	FLANGE .. Tube } Applied to Ref. Nos. 22, 23, and 24
*26	121758	3	NUT .. 3/8 tube } Applied to Ref. Nos. 22, 23, and 24

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Low Water and Crankcase Pressure Detector Application
8-645E1 Engine (Model SR11E1)



VIEW A-A

PLATE A59-2

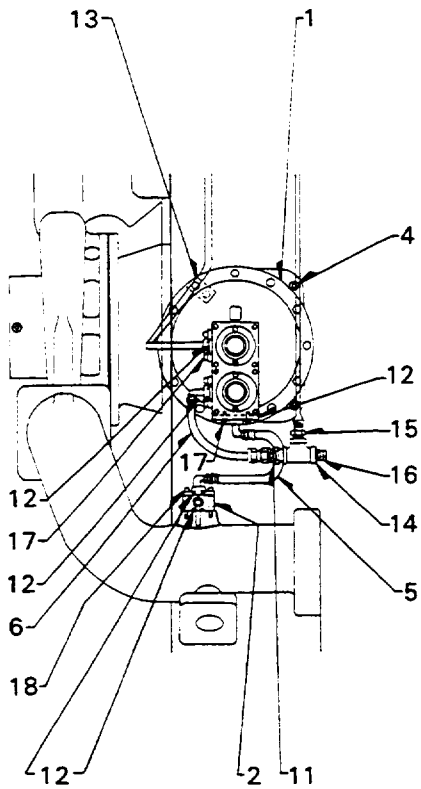
Ref. No.	Part Number	Qty. Req.	Description
1	8464678	1	DETECTOR ASM. .. Low water and crankcase pressure - Replaces 8358538 and 8428395 - See Page 10
†2	8412324	1	VALVE ASM. .. Cut-off - Formerly 8337318 - See Page 14
3	8084685	1	GASKET .. Detector to accessory drive housing
4	8032716	8	NUT .. Lock - 5/16 - 24 hex.
†5	8477002	1	HOSE ASM. .. Detector to cut-off valve - Includes flanges - Replaces 8412290 tube
6	8491460	1	HOSE ASM. .. Detector to accessory end of crankcase - Includes flange end and tube connector nut end - Replaces 8340583
7	8385172	1	TUBE ASM. .. Governor to oil pressure line
8	116452	2	NUT .. 1/4 tube
9	8385173	1	TUBE ASM. .. Oil pressure line to governor
10	116452	2	NUT .. 1/4 tube
11	8385171	1	TUBE ASM. .. Oil pressure line to detector
12	8333798	1	FLANGE .. Tube mounting
13	121758	1	NUT .. 3/8 tube
†14	8342588	5	SEAL .. O-Ring - Flange and valve mounting
15	3204128	2	CLAMP .. Tube mounting
†16	8040313	1	CONNECTOR .. Tube - 3/8 tube x 3/8 M.P.T. - Formerly 8039169 elbow applied to 8340583 tube asm.
17	8040370	1	TEE .. 3/8 tube x 1/4 tube x 1/4 tube
18	147115	2	SCREW .. Valve mounting - 10 - 24 x 1-1/2 hex. socket head
19	186542	6	SCREW .. Tube mounting - 10 - 24 x 1/2 hex. socket head

† Material required for conversion from previous test valve system to low water cut-off.

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY

Low Water and Crankcase Pressure Detector Application
8-645E1, 12-645E1, 16-645E1, 12-645E4B Engines



VIEW A-A

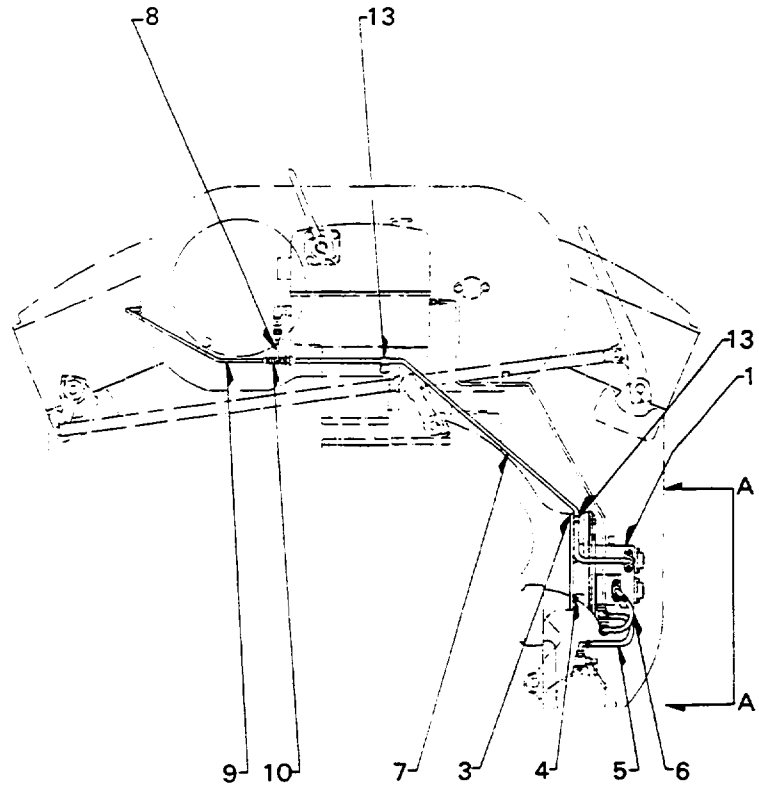


PLATE B59-3

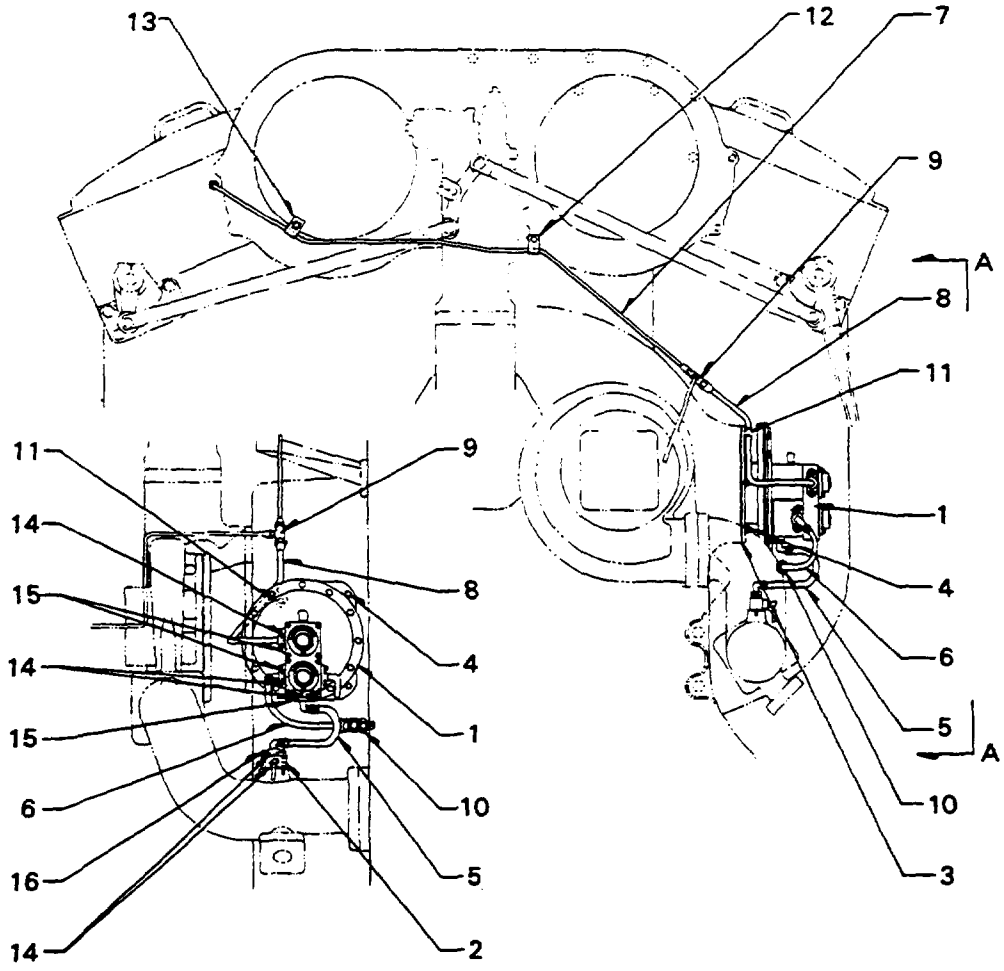
Ref. No.	Part Number	Qty. Req.	Description
1	----	1	DETECTOR ASM. .. Low water and crankcase pressure 8464678 - Roots Blown engines 8428395 - Turbocharged engines } See Page 10
†2	8412324	1	VALVE ASM. .. Cut-off - Formerly 8337318 - See Page 14
3	8084685	1	GASKET .. Detector to accessory drive housing
4	8032716	8	NUT .. Lock - 5/16 - 24 hex.
†5	8477002	1	HOSE ASM. .. Detector to cut-off valve - Includes flanges - Replaces 8412290 tube
6	8491460	1	HOSE ASM. .. Detector to crankcase - Includes flange and nut - Replaces 8340583
7	9524785	1	TUBE ASM. .. Includes one flange (8333798) and one 3/8 tube nut (121758)
8	9524851	1	TUBE ASM. .. Includes two 1/4 tube nuts (118537)
9	9524852	1	TUBE ASM. .. Includes two 1/4 tube nuts
10	8040370	1	TEE .. 3/8 tube x 1/4 tube x 1/4 tube
†11	8040313	1	CONNECTOR .. 3/8 tube x 3/8 M.P.T.
†12	8342588	5	SEAL .. O-Ring - Flange and valve mounting
13	3204128	2	CLAMP .. Tube mounting
14	120279	1	TEE .. Pipe 3/8 F.P.T. - Turbocharged engines only
15	116436	1	CONNECTOR .. 1/4 tube x 1/4 P.T. - Turbocharged engines only
16	8060964	1	NIPPLE .. 3/8 close - Turbocharged engines only
17	186542	6	SCREW .. Flange mounting - 10 - 24 x 1/2 socket head
18	147115	2	SCREW .. Valve mounting - 10 - 24 x 1-1/2 socket head

† Material required to convert from previous test valve system to low water cut-off.

8348793, 8368196

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Low Water and Crankcase Pressure Detector Application
12,16-645E1; 12-16,20-645E4 Engines



VIEW A-A

PLATE B59-4

Ref. No.	Part Number	Qty. Req.	Description
1	8464678	1	DETECTOR ASM. .. Low water and crankcase pressure - Roots blown } See Page 10
1	8428395	1	DETECTOR ASM. .. Low water and crankcase pressure - Turbocharged } See Page 10
†2	8412324	1	VALVE ASM. .. Cut-off - Formerly 8337318 - See Page 14
3	8084685	1	GASKET .. Detector to accessory drive housing
4	8032716	8	NUT .. Lock - 5/16 - 24 hex.
†5	8477002	1	HOSE ASM. .. Detector to cut-off valve - Includes flanges - Replaces 8412290 tube
6	8491460	1	HOSE ASM. .. Detector to crankcase - Includes flanges
7	8369365	1	TUBE ASM. .. Includes two 1/4 tube nuts - (118537)
8	8369366	1	TUBE ASM. .. Includes one flange - (8333798) and one 3/8 tube nut - (121758)
9	8040370	1	TEE .. 3/8 tube x 1/4 tube x 1/4 tube
†10	8040313	1	CONNECTOR .. 3/8 tube x 3/8 MPT - Formerly 8039169 - Elbow
11	3306485	1	CLAMP .. Tube mounting
12	8118841	1	CLAMP .. Tube mounting
13	3247504	1	CLAMP .. Tube mounting
†14	8342588	5	SEAL .. O-Ring - Flange and valve mounting
15	186542	6	SCREW .. Flange mounting - 10 - 24 x 1/2 socket head
16	147115	2	SCREW .. Valve mounting - 10 - 24 x 1-1/2 socket head

† *Material required for conversion from previous test valve system to low water cut-off.*

8398760

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Crankcase Pressure Detector Application
8-645E1,E4,E4B; 12-645E1,E4,E4B; 16-645E1,E4,E4B; 20-645E4,E4B Engines

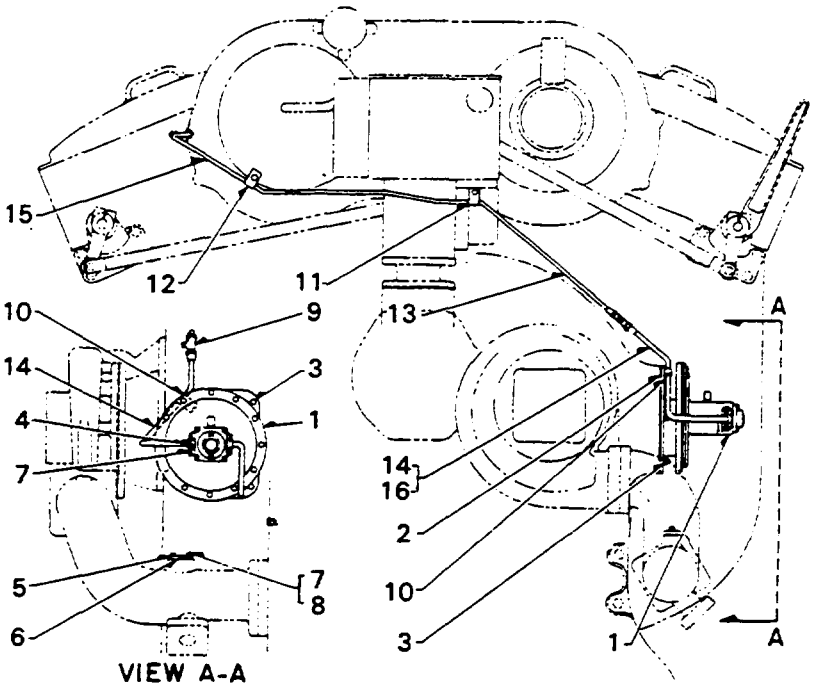


PLATE B59-5

Ref. No.	Part Number	Qty. Req.	Description
1	8370362	1	DETECTOR ASM. .. Crankcase pressure - See Page 12
2	8084685	1	GASKET .. Detector mounting
3	8032716	8	NUT .. Lock - 5/16 - 24 hex.
4	8342588	1	SEAL .. O-Ring - Flange mounting
5	8349424	1	FLANGE .. Blind
6	8025988	1	GASKET .. Blind flange
7	186542	4	SCREW .. No. 10 - 24 x 1/2 socket head
8	106260	2	WASHER .. Flat - No. 10
9	8040370	1	TEE .. 3/8 tube x 1/4 tube x 1/4 tube
10	3306485	1	CLAMP .. Tube mounting
11	8118841	2	CLAMP .. Tube mounting
12	3247504	1	CLAMP .. Tube mounting

Due to the two different styles of overspeed trip housings, there are two different oil line configurations. Use "STYLE A" for bottom oil drain type housings, and "STYLE B" for rear oil drain type housings.

13	8369365	1	TUBE ASM. .. Oil line - Includes two 1/4 tube nuts - 118537	Style A
14	8369366	1	TUBE ASM. .. Oil line - Includes one 3/8 tube nut - 121758 and one flange - 8333798	Style A
*15	9524658	1	TUBE ASM. .. Oil line - Includes two 1/4 tube nuts - 118537	Style B
*16	9525496	1	TUBE ASM. .. Oil line - Includes one 3/8 tube nut - 121758 and one flange - 8333798	Style B

8369397, 9524662

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Crankcase Pressure Detector and Mounting
8-645E2,E5,E6,E7; 12-645E2,E5,E6,E7; 16-645E2,E5,E6,E7; 20-645E5,E7 Engines

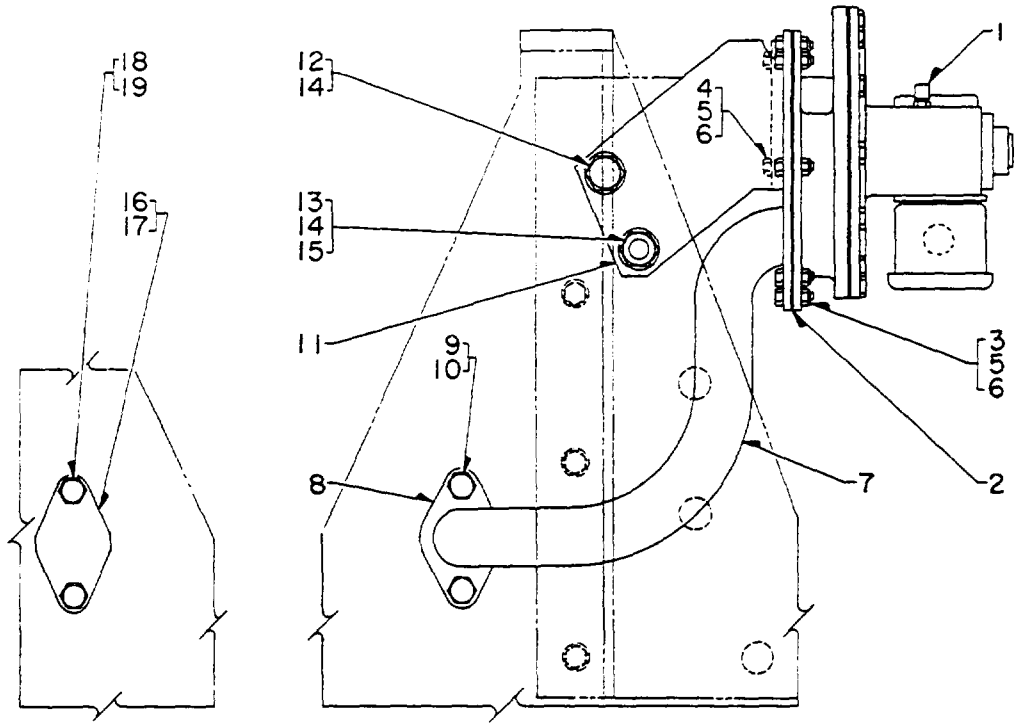


PLATE B59-6

Ref. No.	Part Number	Qty. Req.	Description
1	8362040	1	DETECTOR ASM. .. Engine crankcase pressure - See Page 9
2	8084685	1	GASKET .. Detector mounting
3	181341	6	BOLT .. Detector mounting - 5/16 - 24 x 1-1/4 hex. head
4	181343	2	BOLT .. Detector mounting - 5/16 - 24 x 1-1/2 hex. head
5	6101223	8	WASHER .. Flat - 5/16
6	8032716	8	NUT .. Lock - 5/16 - 24 hex.
7	8363077	1	PIPE ASM. .. Detector to oil pan - Previous right hand construction engines
7	8363079	1	PIPE ASM. .. Detector to oil pan - Previous left hand construction engines
8	3300794	1	GASKET .. Pipe to oil pan
9	181435	2	BOLT .. Pipe to oil pan - 1/2 - 20 x 2 hex. head
10	6101229	2	WASHER .. Flat - 1/2
11	8377412	1	BRACKET .. Detector mounting - Previous right hand construction engines
11	8377411	1	BRACKET .. Detector mounting - Previous left hand construction engines
12	271579	1	BOLT .. Bracket mounting - 5/8 - 18 x 1 hex. head
13	271585	1	BOLT .. Bracket mounting - 5/8 - 18 x 1-3/4 hex. head
14	6101233	2	WASHER .. Flat - 5/8
15	114498	1	NUT .. Lock - 5/8 - 18 hex.
16	8048967	1	FLANGE .. Blind - Left bank camshaft drive end
17	3231284	1	GASKET .. Flange mounting
18	181433	2	BOLT .. Flange mounting - 1/2 - 20 x 1-3/4 hex. head
19	6101229	2	WASHER .. Flat - 1/2

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Crankcase Pressure Detector Application
8-645E2,E4B,E5,E6,E7,E7B,E8; 12-645E2,E5,E6,E7,E7B,E7C,E8,E9,E9B;
16-645E1,E2,E4B,E5,E6,E7,E7B,E7C,E8,E9,E9B,E10B; 20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B; Engines

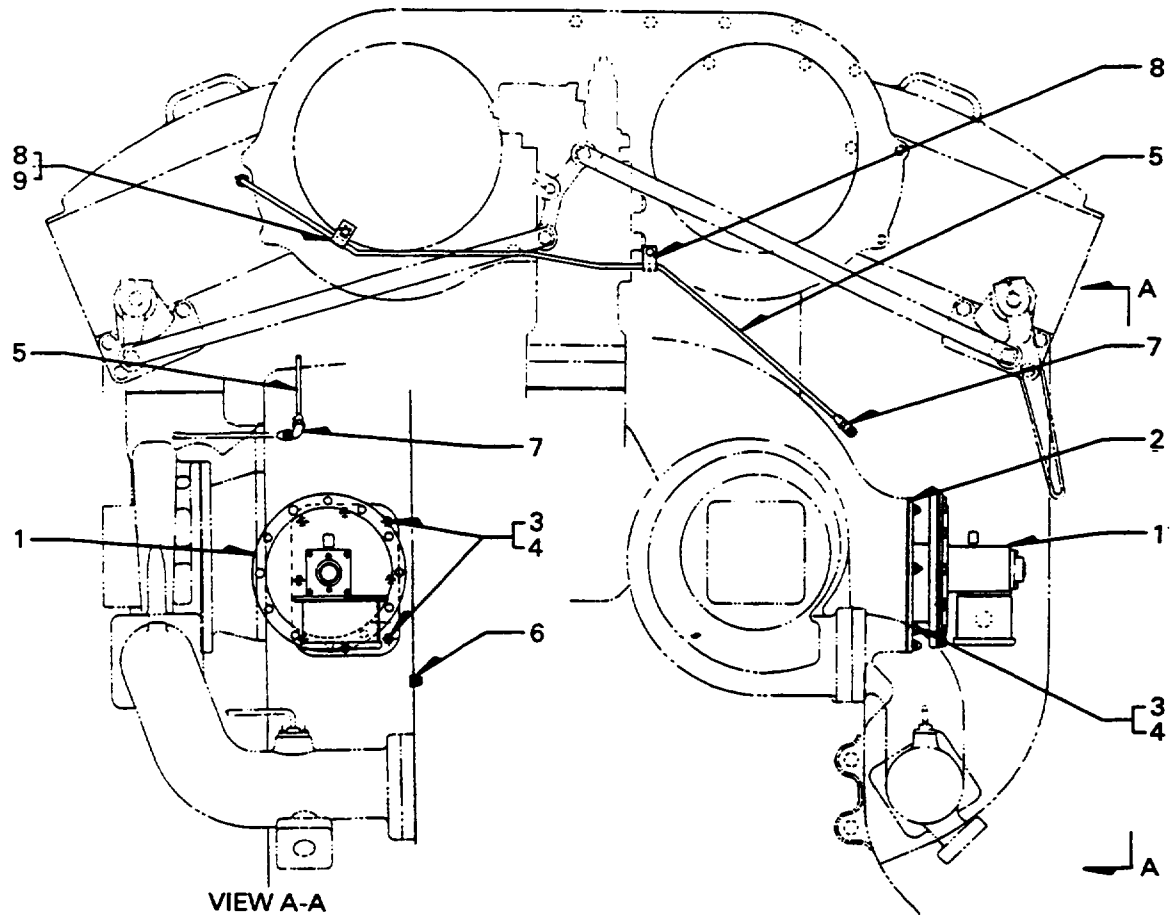


PLATE B59-7

Ref. No.	Part Number	Qty. Req.	Description
1	8362040	1	DETECTOR ASM. .. Crankcase pressure - See Page 9
2	8084685	1	GASKET .. Detector mounting
3	8032716	8	NUT .. Lock - 5/16 - 24 hex.
4	6101223	8	WASHER .. Plain - 5/16
5	8369365	1	TUBE ASM. .. Oil pressure line - Includes two 1/4 tube nuts - 118537
*†5	9524658	1	TUBE ASM. .. Oil pressure line - For clearance around OST housing
6	8348619	1	PLUG .. Pipe - 3/8 M.P.T. square socket
7	118810	1	ELBOW .. 1/4 tube
ϕ8	8118841	A.R.	CLAMP .. Tube mounting - 13/32 I.D. hole - 2 required on current applications - 1 required on early applications
ϕ9	3247504	1	CLAMP .. Tube mounting - 17/32 I.D. hole - Required on early applications only
*10	9554006	1	DEFLECTOR ASM. .. Pressure detector - Applied to those units having fast start systems - Application requires 2 - 8084685 gaskets

† Applied to engines with rear oil drain OST housing.

8400131 D, 9524784, M1156

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Low Water and Crankcase Pressure Detector Application
16-645E4 Engine (Model MP36)

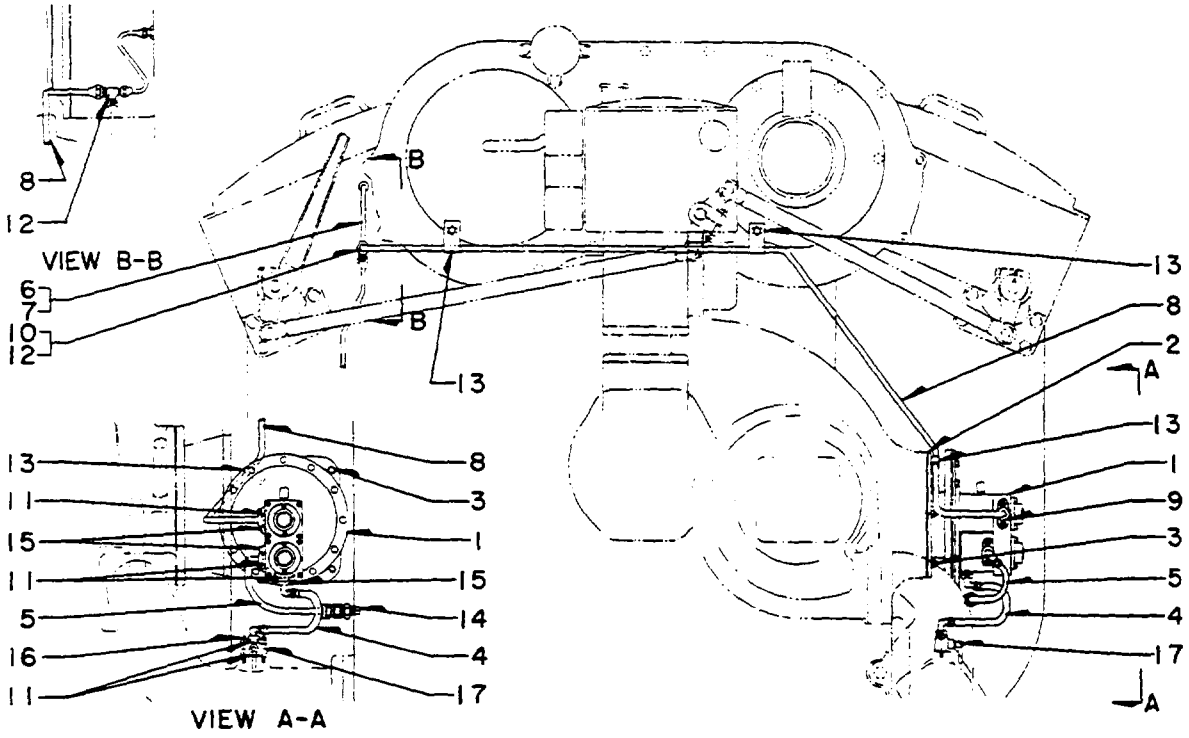


PLATE B59-8

Ref. No.	Part Number	Qty. Req.	Description
1	8428395	1	DETECTOR ASM. .. Low water and crankcase pressure - Replaces 8358538 - See Page 10
2	8084685	1	GASKET .. Detector to accessory drive housing
3	8032716	8	NUT .. Lock - 5/16 - 24 hex.
4	8477002	1	HOSE ASM. .. Detector to cut-off valve - Includes flanges - Formerly 8348604 tube asm.
5	8491460	1	HOSE ASM. .. Detector to accessory end of crankcase - Includes flange end and tube connector nut end - Formerly 8340583
6	8354159	1	TUBE ASM. .. Oil pressure line
7	116452	2	NUT .. 1/4 tube
8	8354157	1	TUBE ASM. .. Oil pressure line to detector
9	8333798	1	FLANGE .. Tube mounting
10	121758	1	NUT .. 3/8 tube
11	8342588	5	SEAL .. O-Ring - Flange and valve mounting
12	8040370	1	TEE .. 3/8 tube x 1/4 tube x 1/4 tube
13	3306485	3	CLAMP .. Tube mounting
14	8040313	1	CONNECTOR .. Tube - 3/8 tube x 3/8 M.P.T. - Formerly 8039169 elbow applied to 8340583 tube asm.
15	186542	6	SCREW .. Tube mounting - 10 - 24 x 1/2 hex. socket head
16	147115	2	SCREW .. Valve mounting - 10 - 24 x 1-1/2 hex. socket head
17	8412324	1	VALVE ASM. .. Cut-off - Formerly 8337318 - See Page 14

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Crankcase Pressure Detector Assembly

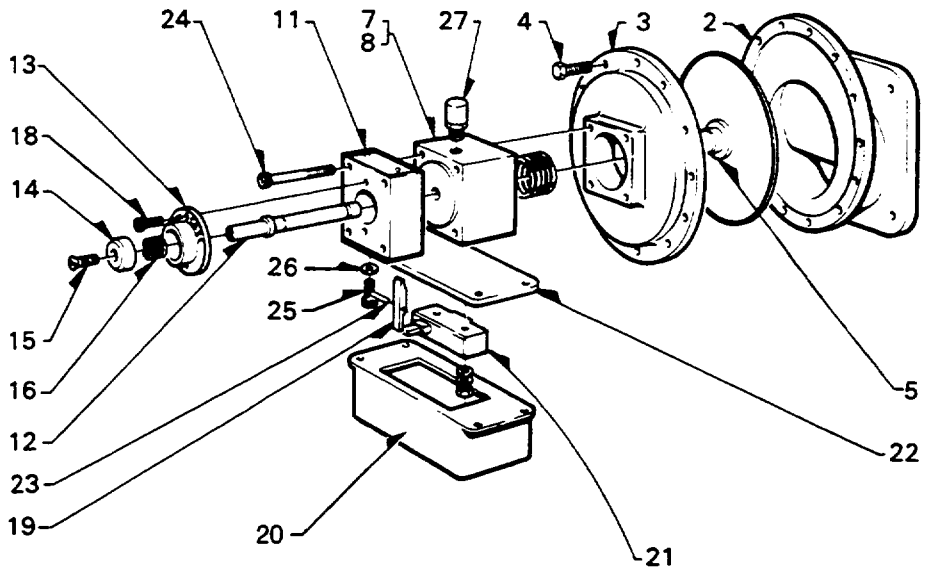


PLATE B59-9

Ref. No.	Part Number	Qty. Req.	Description
1	8362040	1	DETECTOR ASM. .. Crankcase positive pressure
2	8338736	1	HOUSING .. Cover plate
3	8475817	1	COVER ASM. .. Housing
4	179796	12	BOLT .. Hex. head - 1/4 - 20 x 7/8
5	8338719	1	CAGE .. Ball
*6	8344789	3	SCREW .. No. 6 - 32 x 1/4 button head
7	8437172	1	HOUSING ASM. .. Ball retainer
8	8333991	1	RETAINER .. Ball
*9	8338711	1	SEAL .. O-Ring - Outer dia.
*10	8340349	1	SEAL .. O-Ring - Inner dia.
11	8475937	1	HOUSING .. Stem - Replaces 8370609
12	8355600	1	STEM .. Actuating
13	8338721	1	FLANGE .. Stem guide
14	8338722	1	BUTTON .. Reset
15	8370605	1	SCREW .. Flat head socket - 10 - 32 x 1/2
16	8372528	1	SPRING .. Reset button
*17	8388376	1	TAG .. Nameplate "Crankcase"
18	189132	2	SCREW .. Socket head - 10 - 24 x 5/8
19	8370606	1	LEVER .. Switch
†20	8475936	1	BOX .. Terminal - Replaces 8370608 - See Note
†21	8475932	1	SWITCH .. Micro - For units built after August 1972, or units which have been converted with kit 8491316 - See Note
†22	8475933	1	PLATE .. Switch and lever mounting - Replaces 8370607 - See Note
23	455478	1	PIN .. Roll - 1/16 x 1/2
24	9424029	4	SCREW .. Socket head cap - 1/4 - 20 x 3-1/4
25	191209	2	SCREW .. Socket head cap - 10 - 24 x 3/8 - For Ref. No. 22
26	115545	2	WASHER .. Lock - No. 10
27	8338723	1	FITTING .. Vent
28	8379503	1	KIT .. Repair - Contains all necessary seals, balls, springs, gaskets, and diaphragm
†*29	8491316	1	KIT .. Conversion - For units built before August 1972
*30	9554006	1	DEFLECTOR .. Oil
*31	9570696	2	GASKET .. Deflector

† Detector 8362040 was redesigned in August 1972. This redesign affected the micro-switch, mounting plate, and terminal box; these components of the old design detector are no longer available. Therefore, if any of those components need replacement, it will be necessary to convert to the new design detector with Kit 8491316.

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Low Water and Crankcase Pressure Detector Assembly

PLATE B59-10

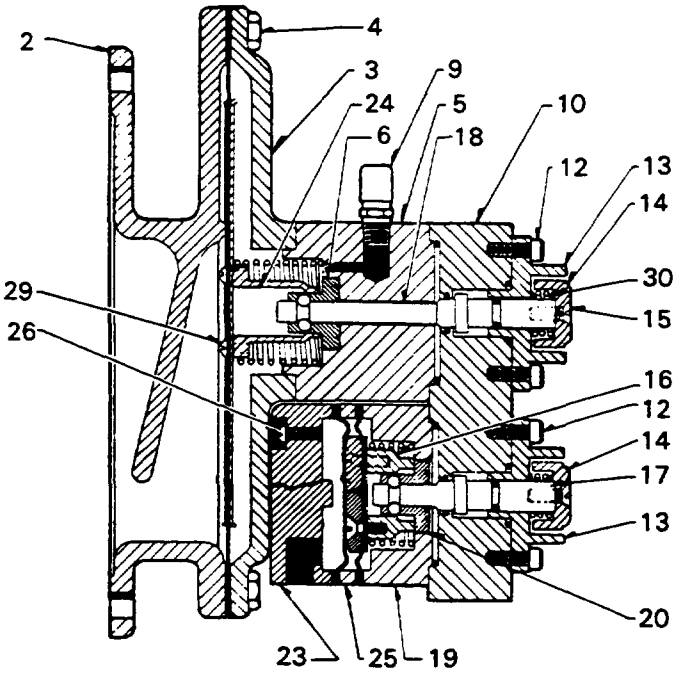
Ref. No.	Part Number	Qty. Req. A	B	C	Description
1	8358538	1	-	-	DETECTOR ASM. .. No longer available - Use 8464678 or 8428395
1	8464678	-	1	-	DETECTOR ASM. .. 3:1 ratio - For Roots Blown engines only
1	8428395	-	-	1	DETECTOR ASM. .. 1:1 ratio - For turbocharged engines only
2	8338736	1	1	1	HOUSING .. Mounting and cover
3	8475817	1	1	1	COVER ASM. .. Includes anchor block
4	179796	12	12	12	BOLT .. Hex. head - 1/4 - 20 x 7/8
5	8437172	1	1	1	HOUSING ASM. .. Ball retainer - Crankcase pressure
6	8333991	1	1	1	RETAINER .. Ball
*7	8338711	1	1	1	SEAL .. O-Ring - Outer dia.
*8	8340349	1	1	1	SEAL .. O-Ring - Inner dia.
9	8338723	1	1	1	FITTING .. Vent
10	8392325	1	1	1	HOUSING .. Governor oil
11	9424029	4	4	4	SCREW .. Socket head cap - 1/4 - 20 x 3-1/4
12	189132	4	4	4	SCREW .. Socket head cap - 10 - 24 x 5/8
13	8338721	2	2	2	FLANGE .. Guide
14	8338722	2	2	2	BUTTON .. Reset
15	8370605	2	2	2	SCREW .. Socket head cap - 10 - 32 x 1/2
16	8338725	1	1	1	CAP .. Ball
17	8347071	1	1	1	STEM .. Reset - Low water
18	8355600	1	1	1	STEM .. Reset - Crankcase pressure
19	8431121	1	1	1	HOUSING ASM. .. Ball retainer - Low water
20	8333991	1	1	1	RETAINER .. Ball
*21	8338711	1	1	1	SEAL .. O-Ring - Outer dia.
*22	8340349	1	1	1	SEAL .. O-Ring - Inner dia.
23	8388510	1	-	1	PLATE .. Bottom
23	8478181	-	1	-	PLATE .. Bottom
24	8338719	1	1	1	CAGE .. Ball
25	8431176	1	-	-	SPACER .. Diaphragm
25	8475250	-	1	-	SPACER .. Diaphragm
25	8431223	-	-	1	SPACER .. Diaphragm
26	138202	4	4	4	SCREW .. Socket head cap - 1/4 - 20 x 1
27	138203	4	4	4	SCREW .. Socket head cap - 1/4 - 20 x 1-1/4
*28	8388377	2	2	2	CAP .. Dust protector - Reset button
29	8344789	3	3	3	SCREW .. No. 10 - 32 x 1/2 - Cage mounting
30	8372528	2	2	2	SPRING .. Reset button
31	8388376	1	1	1	TAG .. Identification - "Crankcase" - Formerly 8338376
32	8388375	1	1	1	TAG .. Identification - "Low Water" - Formerly 8338375
33	8338734	1	1	1	TUBE ASM. .. Flanged
*34		1	1	1	SEAL .. O-Ring - Tube asm.
35	186542	4	4	4	SCREW .. Socket head cap - 10 - 24 x 1/2

†REPAIR AND CONVERSION KITS

*36	8467306	KIT.. Repair of entire detector - 8428395 - Can also be used to convert 8358538 to 8428395 detector
*37	8469591	KIT .. For conversion of low water portion of detector to 3:1 ratio - Applied to 8358538 and 8428395 detectors only
*38	8469590	KIT .. Repair low water portion of 8464678 detector
*39	8430364	KIT .. Repair water portion of 8428395 detector
*40	8379503	KIT .. Repair crankcase portion of 8358538, 8428395, and 8464678 detectors
*41	9535868	KIT .. Repair of entire detector - 8464678

†Above kits include all necessary diaphragms, gaskets, seals, balls, springs, and screws.

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY



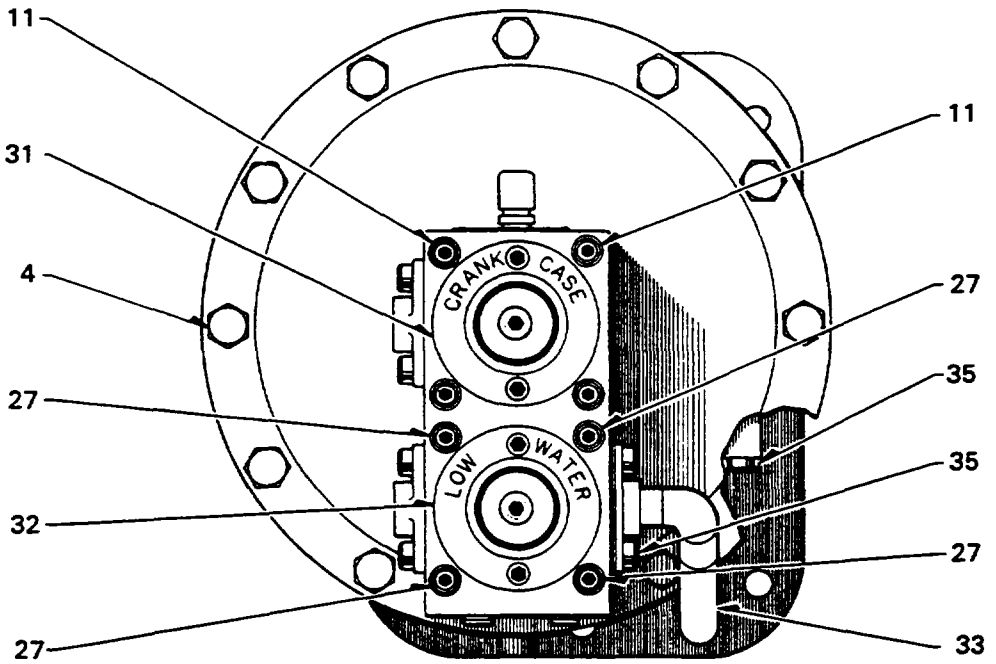


PLATE B59-10

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Crankcase Pressure Detector Assembly

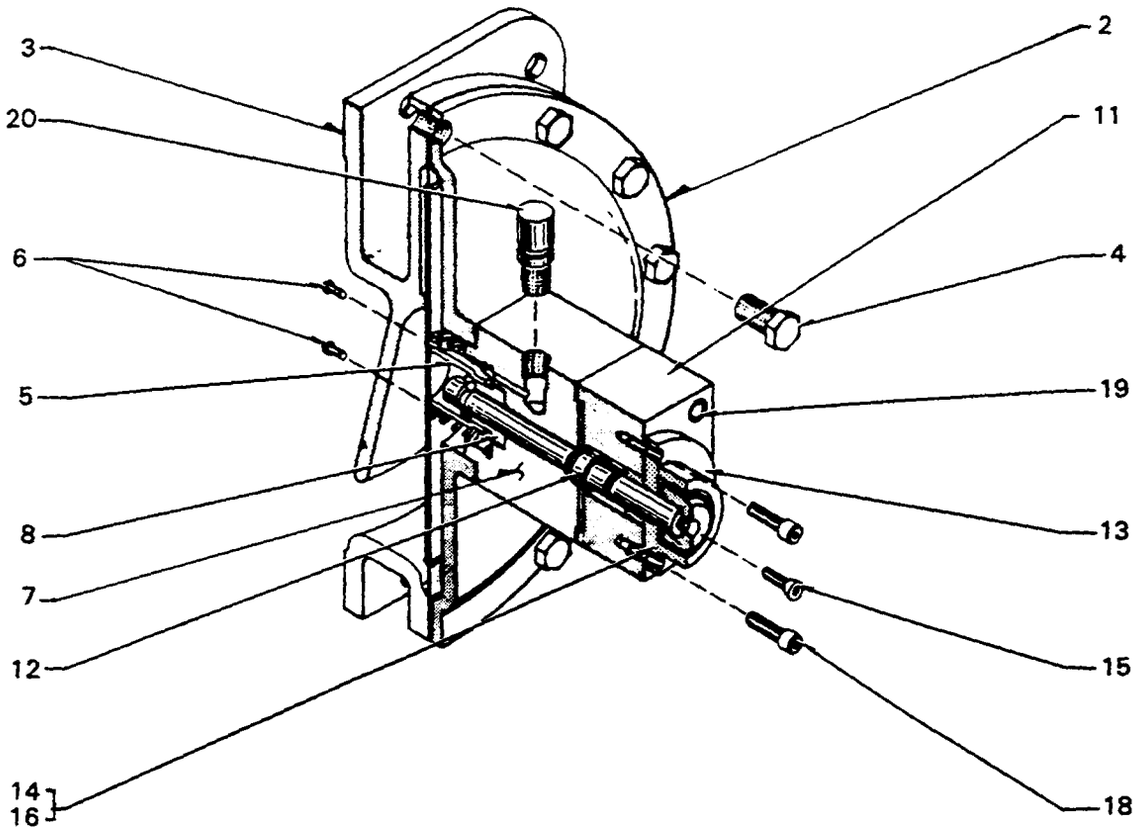
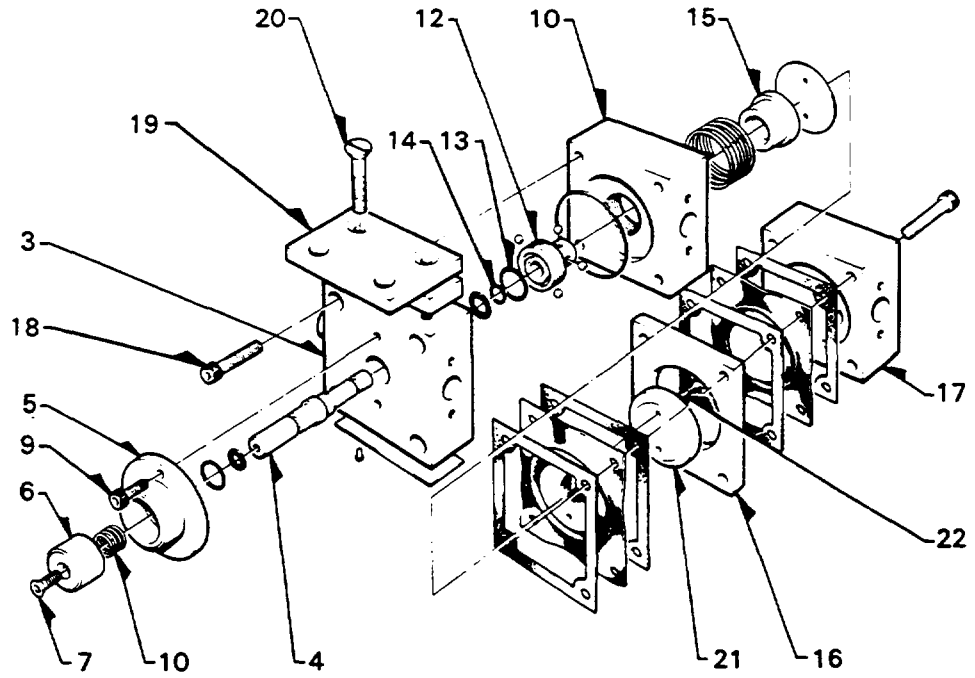


PLATE B59-11

Ref. No.	Part Number	Qty. Req.	Description
1	8370362	1	DETECTOR ASM. .. Crankcase positive pressure
2	8475817	1	COVER ASM. .. Housing
3	8338736	1	HOUSING .. Detector
4	179796	12	BOLT .. Hex. head - 1/4 - 20 x 7/8
5	8338719	1	CAGE .. Ball
6	8344789	2	SCREW .. Button head No. 6 - 32 x 1/4
7	8437172	1	HOUSING ASM. .. Ball retainer
8	8333991	1	RETAINER .. Ball
*9	8338711	1	SEAL .. O-Ring - Outer dia.
*10	8340349	1	SEAL .. O-Ring - Inner dia.
11	9562628	1	HOUSING .. Governor oil
12	8355600	1	STEM .. Reset
13	8338721	1	FLANGE .. Guide
14	8338722	1	BUTTON .. Reset
15	8370605	1	SCREW .. Socket head cap - Flat head - No. 10 - 32 x 1/2
16	8372528	1	SPRING .. Reset button
*17	8388376	1	TAG .. Identification - "Crankcase"
18	189132	2	SCREW .. Socket head cap - 10 - 24 x 5/8
19	9424029	4	SCREW .. Socket head cap - 1/4 - 20 x 3-1/4
20	8338723	1	FITTING .. Vent
*21	9562629	1	TUBE ASM. .. Flanged
*22	186542	4	SCREW .. Socket head cap - 10 - 24 x 1/2
23	8379503	1	KIT .. Repair - Includes all necessary seals, springs, balls, screws, and diaphragm

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Low Water Safety Shutdown Valve Assembly



Ref. No. 2
PLATE B59-12

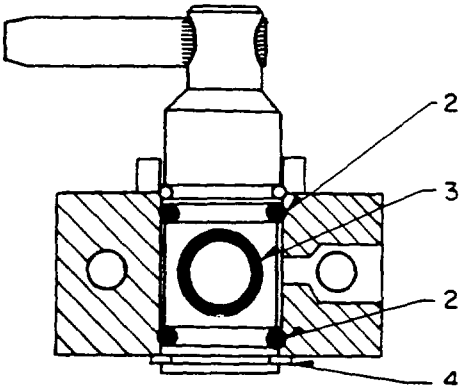
Ref. No.	Part Number	Qty. Req.		Description
*†1	8358537	1	-	VALVE ASM. .. Low water safety shutdown - Replaced by 8447342
2	8447342	-	1	VALVE ASM. .. Low water safety shutdown - Replaces 8358537
3		-	1	HOUSING .. Governor oil
4	8347071	1	1	STEM .. Reset
5	8338721	1	1	FLANGE .. Guide
6	8338722	1	1	BUTTON .. Reset
7	8370605	1	1	SCREW .. Socket head cap - 10 - 32 x 1/2
*8	8388375	-	1	TAG .. Identification - "Crankcase"
9	189132	2	2	SCREW .. Socket head cap - 10 - 24 x 5/8
10	8372528	1	1	SPRING .. Reset button
11	8431123	1	1	HOUSING ASM. .. Ball retainer
12	8333991	1	1	RETAINER .. Ball
13	8338711	1	1	SEAL .. O-Ring
14	8340349	1	1	SEAL .. O-Ring
15	8338725	1	1	CAP .. Ball
16	8431176	1	-	SPACER .. Housing
16	8431223	-	1	SPACER .. Housing
17	8388510	1	1	PLATE .. Bottom
18	138202	8	8	SCREW .. Socket head cap - 1/4 - 20 x 1
19		1	1	PLATE .. Mounting
20		2	2	SCREW .. Flat head - 1/4 - 20 x 1
21	8333993	1	1	SPACER .. Diaphragm
22	8355601	3	3	SCREW .. Spacer mounting

† *Valve assembly 8358537 should be upgraded to 8447342 by applying 8467305 conversion kit. When device is upgraded 8467305 kit is no longer required. Use 8430364 repair kit for all future requirements. Kits include all necessary diaphragms, gaskets, O-rings, balls and springs.*

†*23	8467305	1	-	KIT .. Conversion - Replaces 8360005 and 8446604
†*24	8430364	1	1	KIT .. Repair

P.L. No. B59

ENGINE CRANKCASE PRESSURE DETECTOR ASSEMBLY
Cut-Off Valve Assembly



Ref. No. 1

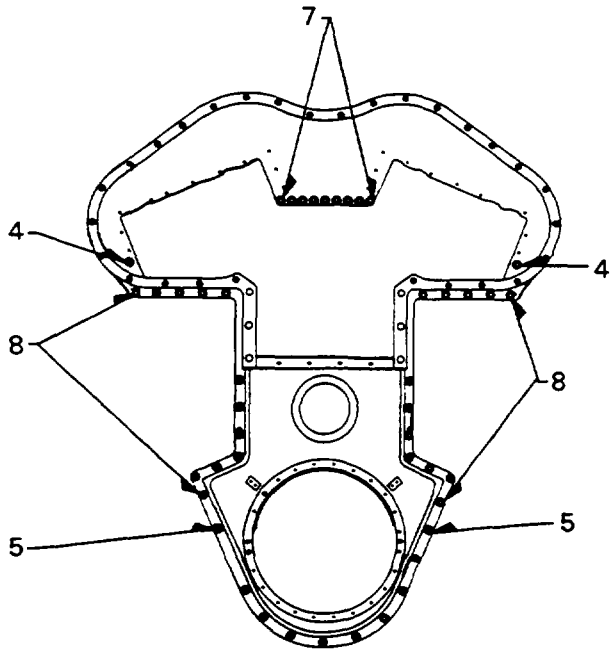
PLATE A59-13

Ref. No.	Part Number	Qty. Req.		Description
1	8337318	1	-	VALVE ASM. .. Cut-off - No longer available - Use 8412324
1	8412324	-	1	VALVE ASM. .. Cut-off

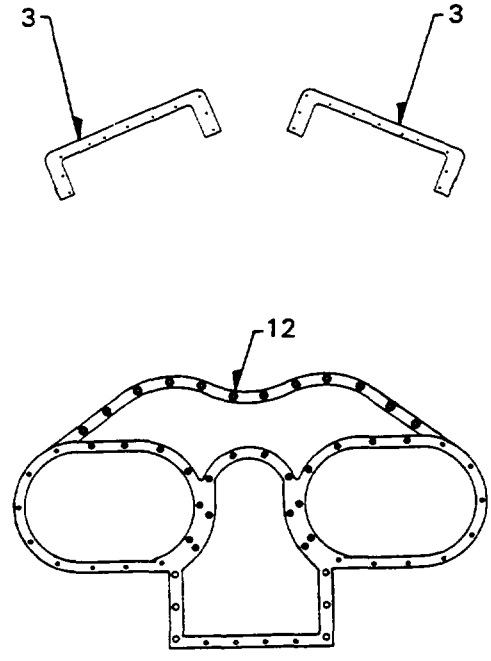
The following component parts are applicable to both valves listed above.

2	8341539	2	SEAL .. O-Ring
3	8341538	1	SEAL .. O-Ring
4	9422422	1	RING .. Retaining

CAMSHAFT DRIVE HOUSING AND COVER



Ref. No. 1



Ref. No. 10

PLATE B60-1

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E6,E8 and 16-645E1,E2,E6,E8 Engines
		-	B	-	12-645E1,E2,E6,E8 Engines
		-	-	C	8-645E4,E4B,E5,E7,E7B,E7C; 12-645E4,E4B,E5,E7,E7B,E7C,E9,E9B 16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B; 20-645E4,E4B,E5,E7,E7B E7C,E9,E9B,E10B
1	8174616	1	-	-	HOUSING ASM. .. Camshaft drive
*1	8174751	-	1	-	HOUSING ASM. .. Camshaft drive
*1	8366877	-	-	1	HOUSING ASM. .. Camshaft drive
*2	8081380	1	1	1	GASKET .. Housing to crankcase
ϕ3	9507085	2	2	2	GASKET .. Housing to cylinder head cover support frame - Optional to 8081380 (Ref. No. 2) when servicing the support frame only
4	8028329	2	2	2	BOLT .. Hex. head - Drilled 1/2 - 20 x 1-1/4 housing to crankcase
5	181433	11	11	11	BOLT .. Hex. head 1/2 - 20 x 1-3/4 housing to crankcase
6	8028369	2	2	2	DOWEL .. Locating .500 dia. x 1-1/8 long 8115099 .. .505 dia. 8115100 .. .510 dia. 8115101 .. .515 dia.
7	8407428	9	9	9	BOLT .. Hex. head - Drilled 1/2 - 20 x 1 housing to crankcase
8	181429	24	24	24	BOLT .. Hex. head 1/2 - 20 x 1-1/4 housing to crankcase
*9	8116738	As Req.			WIRE .. Lock 3/64 dia. x 500 ft.
10	8175446	1	-	-	COVER .. Camshaft drive housing
10	8175436	-	1	-	COVER .. Camshaft drive housing
*11	8185923	1	-	-	GASKET .. Cover to housing
*11	8451659	-	1	-	GASKET .. Cover to housing - Replaces 8185583
12	181431	12	12	-	BOLT .. Hex. head 1/2 - 20 x 1-1/2 cover to housing
†*13	8175731	1	1	1	RETAINER .. Oil - Replaces 8175730
*14	8175858	1	1	1	GASKET .. Oil retainer
*15	181370	24	24	24	BOLT .. Hex. head 3/8 - 24 x 1-1/4
*16	6101225	24	24	24	WASHER .. Flat - 3/8
*17	8366747	As Req.			COMPOUND .. Sealing - Silicon rubber - 12 oz. cartridge - Used with Ref. 3

†8048965 retainer dowels previously furnished in 8175730 retainer assembly are no longer required. Use 8175731 retainer only.

Parts List No. B62

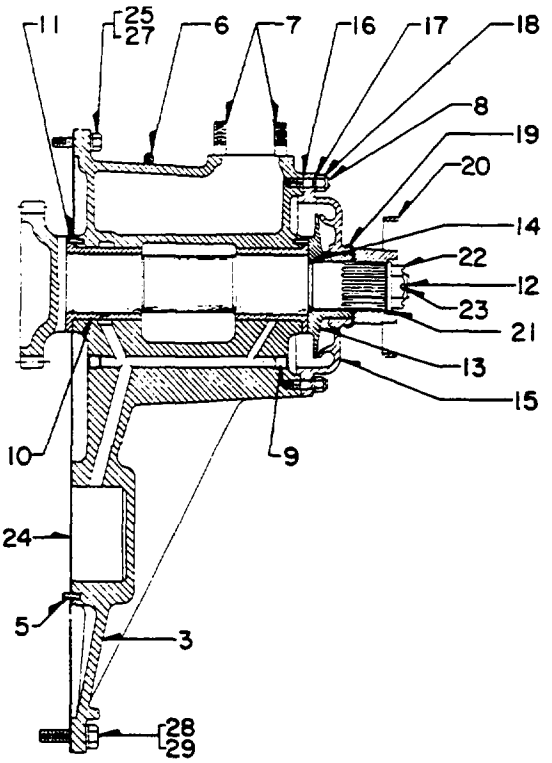
AUXILIARY GENERATOR DRIVE ASSEMBLY

8,12,16-645E1,E8 and 12,16-645E2,E6 Engines

Ref. No.	Part Number	Qty. Req.		Description
		A	-	Left Hand Rotation Engines
		-	B	Right Hand Rotation Engines
1	8084664	1	-	DRIVE ASM. .. Auxiliary
2	8242608	-	1	DRIVE ASM. .. Auxiliary
3	8081399	1	-	HOUSING ASM. .. Drive
*4	8242607	-	1	HOUSING ASM. .. Drive

The following items Ref. Nos. 5 thru 29 are applicable to both Ref. Nos. 1 and 2.

5	8028304	2	DOWEL .. 1/4 x 5/8 in. lg.
6	8029137	4	STUD .. 3/8 - 16 - 24 x 1-3/4 in. long 8115306 .. .002 O.S. 8115307 .. .004 O.S. 8115308 .. .015 O.S. 8115309 .. .017 O.S. 8115310 .. .019 O.S.
7	8084871	4	STUD .. 1/2 - 13 - 20 x 2-7/16 in. long 8123046 .. .002 O.S. 8123047 .. .004 O.S. 8126979 .. .015 O.S. 8126980 .. .017 O.S. 8126981 .. .019 O.S.
8	8035440	8	STUD .. 3/8 - 16 - 24 x 1-7/8 in. long 8123048 .. .002 O.S. 8123049 .. .004 O.S. 8126932 .. .015 O.S. 8126933 .. .017 O.S. 8126934 .. .019 O.S.
9	8348618	2	PLUG .. Pipe - 1/4 M.P.T.
†10	8392348	2	BUSHING .. Thrust - Stamped to read - "ROOTS" - Unfinished I.D. x 3.001 O.D. 8443829 - 3.006 O.D. 8443830 - 3.011 O.D.
11	8392166	2	DOWEL .. 1/8 x 5/8 in. lg.



Ref. Nos. 1 and 2
PLATE A62-1

† Auxiliary generator drive housing 8081399 and 8242607 Ref. Nos. 3 and 4 requires rework, when 8392348 Bushing and 8392166 Dowel pin is applied in place of former Bushing 8081361, by removing the 1/4 inch Dowel at the 12:00 o'clock position and reaming a .1235 + .0000/.0005 hole in the 9:00 o'clock position for the front bearing and the 3:00 o'clock position for the rear bearing. Thrust Bushings must be line bored after installing in the housing.

12	8081362	1	SHAFT .. Drive - Includes 26T gear
13	8081363	1	SLINGER .. Oil
14	8308292	1	SEAL .. Oil slinger
15	8081027	1	COVER .. Rear
16	8081365	1	GASKET .. Cover
17	6101225	8	WASHER .. Plain - 3/8
18	8032717	8	NUT .. Lock - 3/8-24 hex.
19	8081366	1	SHIELD .. Dust
20	8081367	1	FLANGE .. Coupling
21	8081368	1	WASHER .. 1-1/32 I.D. x 2-3/16 O.D.
22	8081369	1	NUT .. 1/4 hex. slotted
23	119209	1	PIN .. Cotter - 1/8 x 1-5/8 in. long
24	8081398	1	GASKET .. Drive to camshaft drive cover
25	181433	8	BOLT .. 1/2-20 x 1-3/4 hex. head
*26	181440	4	BOLT .. 1/2-20 x 2-1/2 hex. head
27	6101229	12	WASHER .. Plain - 1/2
28	8165628	6	BOLT .. 3/4-16 x 8-1/2 hex. head
29	8028733	6	WASHER .. Plain - 3/4

P.L. No. B62

AUXILIARY GENERATOR DRIVE ASSEMBLY

8,12,16,20-645E4,E4B,E7,E7B,E7C;12,16,20-645E5,E9,E9B;16,20-645E10B Engines

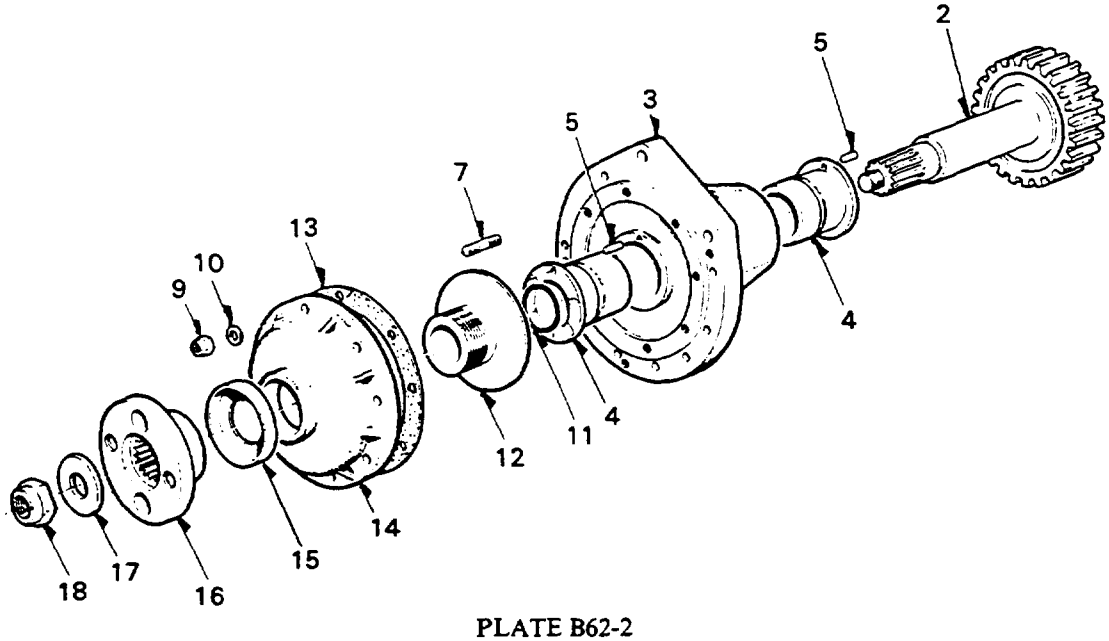


PLATE B62-2

Ref. No.	Part Number	Qt. Req.		Description
1	8460738	1	-	DRIVE ASM. .. Auxiliary generator - Replaces 8261196
1	8261196	-	1	DRIVE ASM. .. Auxiliary generator - Replaced by 8460738
2	8460533	1	-	SHAFT .. Drive - Includes gear
2	8260651	-	1	SHAFT .. Drive - Includes gear
3	8261201	1	1	HOUSING ASM. .. Support
4	8379914	2	2	BUSHING .. Thrust - Stamped "Turbo" - Unfinished I.D. x 3.001 O.D. 8443827 .. 3.006 O.D. 8443828 .. 3.011 O.D. *NOTE: Thrust bushings must be line bored to finished size I.D. after installing in housing*
5	8028304	2	2	PIN .. Dowel - 1/4 x 5/8
* 6	444687	2	2	PLUG .. Pipe - 1/8 M.P.T.
7	8273101	8	8	STUD .. Cover - No longer applied - See Ref. No. 7
* 8	179839	8	8	BOLT .. Hex. head - 3/8 - 16 x 1 - Replaces previous stud and nut arrangement
9	8032717	8	8	NUT .. Lock - 3/8 - 24 hex. - No longer applied - See Ref. No. 7
10	6101225	8	8	WASHER .. Flat - 3/8
11	8308292	1	1	SEAL .. Oil
12	8081363	1	1	SLINGER .. Oil
13	8081365	1	1	GASKET .. Cover
14	8460317	1	-	COVER .. Drive
14	8081027	-	1	COVER .. Drive
15	8081366	1	1	SHIELD .. Dust
16	8460316	1	-	COUPLING .. Flanged
16	8081367	-	1	COUPLING .. Flanged
17	8081368	1	1	WASHER .. Hardened
18	8134735	1	-	NUT .. Lock - 1-14 hex.
18	8081369	-	1	NUT .. Hex. - 1-14
*19	103389	-	1	PIN .. Cotter 1/8 x 2
*20	8261200	1	1	GASKET .. Drive mounting
*21	186339	2	2	BOLT .. Hex. head 1/2 - 20 x 5-1/4
*22	6101229	2	2	WASHER .. Flat - 1/2
*23	179845	9	9	BOLT .. Hex. head - 3/8 - 16 x 1-3/4
*24	6101225	9	9	WASHER .. Flat - 3/8

Parts List No. B64

GOVERNOR ASSEMBLY

Model LSG-10 Automatic Load Sensing
16-645E4 Industrial Engine - Model MP36
PLATES A64-1 thru A64-5

Ref. No.	Part Number	Qty. Req.			Description
GOVERNOR ASSEMBLY .. Engine					
1	8301942	A	-	-	GOVERNOR ASSEMBLY .. Engine - Automatic load sensing - LSG-10 - Unit Exchange number 8296346
2	8314272	-	B	-	GOVERNOR ASSEMBLY .. Engine - Automatic load sensing - LSG-10 with 3 position fuel limiter - Unit Exchange number 8382988
3	8330586	-	B	-	GOVERNOR ASSEMBLY .. Engine - Automatic load sensing - LSG-10 with 3 position fuel limiter - Unit Exchange number 8413957
4	8339612	-	B	-	GOVERNOR ASSEMBLY .. Engine - Automatic load sensing - LSG-10 with 3 position fuel limiter - Unit Exchange number 8413956
5	8358442	-	-	C	GOVERNOR ASSEMBLY .. Engine - Automatic load sensing - LSG-10 - Same as 8314272 except for 3 position fuel limiter - Unit Exchange number 8382743
Reference Numbers 6 thru 12 Not Used.					
13	8149658	1	1	1	BASE .. Governor
14	8149696	1	1	1	SHAFT .. Drive
15	8062007	1	1	1	RETAINER .. Bearing
16	8149695	1	1	1	SEAL .. Oil
17	8149697	1	1	1	RETAINER .. Oil seal
18		1	1	1	BEARING .. Ball - Drive shaft - Formerly 954298
19	8149677	1	1	1	RING .. Snap
20	8113929	3	3	3	BOLT .. Retainer to base
21	8288663	A.R.			WIRE .. Lock - .026 - Available 500 ft. length
22	8149679	1	1	1	GASKET .. Retainer to case
23	8152068	1	1	1	SEAL .. Oil - Case to base
24		8	8	8	WASHER .. Lock - 5/16 - Formerly 120379
25		8	8	8	BOLT .. Case to base - 5/16 - 18 x 1 hex. head - Formerly 179818
26	8328445	4	4	4	PIN .. Dowel - Case to base - 1/4 x 3/4 in. long
26A		1	1	1	BOLT .. 5/16 - 24 x 2-1/4 hex. head - Formerly 181622
CASE ASSEMBLY .. Power					
28	8298832	1	-	1	CASE ASSEMBLY .. Power
*29	8318046	-	1	-	CASE ASSEMBLY .. Power
30	8149470	1	1	1	STUD .. Idler
31		6	6	6	PLUG .. Pipe - 1/8 - 27 socket head - Formerly 444687
32	9409954	1	1	1	PLUG .. Pipe - 1/16 M.P.T. hex. socket - Replaces 8134425
33	8113672	2	2	2	PIN .. Dowel - Case to column
34	9413465	4	4	4	RING .. Snap
35	8149471	2	2	2	SPRING .. Accumulator - Large
36	8057784	2	2	2	SPRING .. Accumulator - Small
37	8149469	2	2	2	PISTON .. Accumulator
38	8148474	2	2	2	SEAT .. Spring - Retainer
39	8201045	2	2	2	PLUG .. Ball check
40	8118445	1	1	1	COCK .. Drain - 1/8 M.P.T.
41	8298836	1	1	1	PLUG .. Magnetic
GAUGE .. Oil					
42	9328197	1	1	1	GAUGE .. Oil level - Replaces 8113998
42	8113998	1	1	1	GAUGE .. Oil level - Replaces 9328197
43	8319674	2	2	2	O-RING .. Housing - .359 I.D. x .500 O.D. x .067 thick
*43	8350082	2	2	2	GASKET .. Housing - .312 I.D. x .535 O.D. x .068 thick - Applied to optional design gauge
44	8131381	1	1	1	GLASS .. Sight
*46	8319675	1	1	1	CAP .. Gauge
47	8113999	1	1	1	ELBOW .. Oil gauge

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
CYLINDER ASSEMBLY .. Power					
*48	8270553	1	1	1	CYLINDER ASSEMBLY .. Power
49	8444377	1	1	1	O-RING .. Formerly 8270594
50	8270595	1	1	1	PIN .. Piston link
51	8270596	1	1	1	SPRING .. Power cylinder
52		1	1	1	RING .. Snap - Formerly 274867
53	8270597	1	1	1	PLUG .. Power cylinder
54	8270598	1	1	1	CYLINDER .. Power
55	8270599	1	1	1	ROD .. Piston
56	8270600	1	1	1	PISTON .. Power
57	8270601	1	1	1	SEAL .. Power cylinder
58		4	4	4	SCREW .. Power cylinder - 3/8 - 16 x 1 hex. socket head - Formerly 138242
59	8152079	4	4	4	WASHER .. Lock - 3/8
60	8270574	1	1	1	GASKET .. Power cylinder to case
GEAR ASSEMBLY .. Pilot Valve Bushing					
61	8270549	1	1	1	GEAR ASSEMBLY .. Pilot valve bushing
62	8152069	1	1	1	GEAR .. Drive
63	8152070	1	1	1	GEAR .. Idler
64	8328446	1	1	1	PIN .. Dowel - Column to case
65	8113870	1	1	1	GASKET .. Column to case
66	8113869	2	2	2	GASKET .. Transfer hold
PLUNGER .. Pilot Valve					
67	8270581	1	1	1	PLUNGER .. Pilot valve
68	8270561	1	1	1	PIN .. Relay beam
69	8270585	1	1	1	SPRING .. Pilot valve
LEVER ASSEMBLY .. Terminal					
70	8292512	-	-	1	LEVER ASSEMBLY .. Terminal
70	8451276	1	1	-	LEVER ASSEMBLY .. Terminal
71	8270593	1	1	1	INSERT .. Thread
72	8284091	1	1	1	INSERT .. Thread - Formerly applied
73	9415981	1	1	1	SCREW .. Set
74	8288650	1	-	-	PIN .. Terminal lever
74	8323434	-	1	1	PIN .. Terminal lever
SHAFT .. Terminal					
75	8291459	1	1	1	SHAFT .. Terminal
76	8291456	2	2	2	POINTER .. Fuel position
77	8291455	2	2	2	SEAL .. Oil - Terminal shaft bearing
78	9416801	2	2	2	BEARING .. Terminal shaft
79	9413435	2	2	2	RING .. Snap - Terminal shaft
80	8270591	1	1	1	PLATE .. Dial - Right hand
82		2	2	2	SCREW .. Plate mounting - 6 - 32 x 1/4 truss head - Cross recess - Formerly 273808
83		2	2	2	BOLT .. 5/16 - 24 x 1 hex. - Formerly 181608
CAM .. Rack Switch					
85	8306059	1	-	-	CAM .. Rack switch
86	8421924	1	-	-	BRACKET .. Rack switch - Formerly 8306058
87	8306057	1	-	-	BRACKER .. Adjusting switch
88		2	-	-	SCREW .. Bracket mounting - 8 - 32 x 5/16 fil. head - Slotted - Formerly 131958
89		2	-	-	WASHER .. Lock - No. 8 - Formerly 106496

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
90	8421922	1	-	-	SWITCH .. Micro - Formerly 8306056
91		2	-	-	SCREW .. Switch mounting - No. 6 - 32 x 1 - Formerly 8291478 and 131919
92		2	-	-	WASHER .. Lock - No. 6
93	9415671	2	-	-	SCREW .. Bracket mounting
94		2	-	-	WASHER .. Lock - No. 10 - Formerly 120217
95	8306055	1	1	1	SCREW .. Set - 5/16 - 24 x 1-1/16 - Slotted - Headless
*96	8421923	1	-	-	ACTUATOR .. Switch
Reference Numbers 97 thru 99 Not Used.					
*100	8323432	-	1	1	BRACKET ASSEMBLY .. Switch
*101		-	4	4	SCREW .. No. 8 - 32 x 5/8 fillister head - Formerly 131974
*102	8422389	-	4	4	WASHER .. 130 I.D. x .438 O.D. x .032 in. thick - Formerly applied
103	8323436	-	1	1	BLOCK ASSEMBLY .. Switch adjusting
*104	8270728	-	1	1	INSERT .. Thread
105	8270566	-	2	2	SWITCH .. Micro - Includes roller - Replaces 8340124
106	8323442	-	1	1	BRACKET .. Switch
*107	8355852	-	2	2	GASKET .. Insulating - Switch - Replaces 8323437
108	8323438	-	1	1	PLUNGER .. Switch - Low load
109	8323441	-	1	1	PLUNGER .. Switch - High load
*110	8323439	-	2	2	PLATE .. Plunger guide
111	8323440	-	1	1	SHIM .. Switch bracket
112		-	4	4	WASHER .. Lock - No. 8 - Formerly 106496
*113		-	2	2	SCREW .. Bracket - mounting - No. 10 - 32 x 1/2 hex. head - Formerly 431942
*114		-	2	2	WASHER .. Lock - No. 10 - Formerly 120217
115	8270552	1	1	1	SHAFT ASSEMBLY .. Control
116		2	2	2	BEARING .. Ball - Control shaft - Formerly 954330
117		2	2	2	SCREW .. No. 10 - 32 x 3/4 hex. socket head - Formerly 147118
118		2	2	2	WASHER .. Lock - No. 10 - Formerly 120217
119	8270575	1	1	1	BEAM .. Relay
120	8288658	1	1	1	PIN .. Guide
121	8298837	1	1	1	ROLLER .. Relay beam
122	8298835	1	1	1	PIN .. Roller retaining
123	8345616	-	1	-	MOTOR ASSEMBLY .. Governor - Governors 8330586 and 8339612
123	8295658	1	1	1	MOTOR ASSEMBLY .. Governor - Except governors 8330586 and 8339612
124	8069891	1	1	1	KNOB .. Adjusting
125		1	1	1	SCREW .. Set - Knob - No. 10 - 32 x 9/16 - Formerly 140855
126	8192136	2	2	2	PIN .. Dowel
127	8075907	2	2	2	NUT .. Knurled screw - No. 10 - 32
*128	8295659	1	1	1	MOTOR .. Governor
ϕ*128A	8331981	1	1	1	COIL .. Clutch control - Used in motors shipped before 7-1-66
ϕ*128B	8387142	1	1	1	COIL .. Clutch control - Used in motors shipped after 7-1-66
*128C	8270566	1	1	1	SWITCH .. Micro
*128D	8301042	1	1	1	SCREW .. Shear - Roller
*128E	8328980	1	1	1	PIN .. Roller drive
*128F		2	2	2	WASHER - No. 4 internal tooth - Formerly 116042
*128G		2	2	2	SCREW .. No. 4 - 40 x 5/8 round head - Slotted - Formerly 132651
*128H		4	4	4	WASHER .. Plain - 1/8 I.D. x 5/16 O.D. - Formerly 221416
*129J	8328978	1	1	1	CLIP .. Wire
*128K	8328979	1	1	1	CLIP .. Wire
*128L	8328981	1	1	1	SCREW .. Clip mounting
129	8345617	-	2	-	CAM .. Micro switch - Governors 8330586 and 8339612
129	8270752	2	2	2	CAM .. Micro switch - Except governors 8330586 and 8339612
130	8270755	1	1	1	SPACER .. Bushing - Adjusting knob
131	8298801	1	1	1	WASHER ASSEMBLY .. Seal
132	8298862	3	3	3	SPRING .. Seal
133		2	2	2	SCREW .. No. 10 - 32 x 7/8 cap - Formerly 147118 and 193250
*134		2	2	2	WASHER .. Lock - No. 10 - Formerly 106497
135	8270559	2	2	2	PIN .. Dowel - 1/8 x 9/16 in. long
135A		6	6	6	BOLT .. Motor mounting - 1/4 - 28 x 3/4 hex. head - Formerly 181566
135B		6	6	6	WASHER .. Lock - 1/4 - Formerly 120380

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
					GOVERNOR .. Automatic load sensing
	BALL HEAD ASSEMBLY				
*136	8298838	1	1	1	BALL HEAD ASSEMBLY .. Governor
138	8298844	1	1	1	PLATE ASSEMBLY .. Drive
139	8298847	1	1	1	SPRING .. Drive
140	8270694	2	2	2	ARM ASSEMBLY .. Ball
141	8270695	2	2	2	PIN .. Ball arm
143	8270696	1	1	1	RING .. Retaining
145	8270698	2	2	2	SPRING .. Plunger
148	8298845	1	1	1	BALL HEAD
149	8270701	2	2	2	PLUNGER .. Ball head
150	8459241	1	1	1	BEARING .. Ball arm - Formerly 9413588
151	8270688	1	1	1	PINION .. Pilot valve
152	8452365	1	1	1	SPRING .. Speeder - Formerly 8302666
	PLUNGER .. Pilot Valve				
153	8270640	1	1	1	PLUNGER .. Pilot valve
154	8270643	1	1	1	BUSHING .. Pilot valve
155	8270639	1	1	1	BUSHING .. Compensating
156	9413362	1	1	1	RING .. Snap - No. 43 - .438 bore diameter
157	9413466	1	1	1	RING .. Snap - No. 62 - .625 bore diameter
158	8291465	1	1	1	BEARING .. Thrust
159	8270641	1	1	1	SEAT .. Speeder spring
160	8270642	2	2	2	NUT .. Pilot valve plunger
161	8270655	1	1	1	ROD .. Pilot valve - Formerly applied
161A	8270686	1	1	1	ORIFICE .. No. 76 hole x 1/4 in. long
161B	8444617	1	1	1	O-RING .. Seal - Replaces 8223697
	STRIP ASSEMBLY .. Bi-Metal				
162	8288655	1	1	1	STRIP ASSEMBLY .. Bi-metal
	PLUG .. Buffer				
163	8298842	1	1	1	PLUG .. Buffer
164	9417421	1	1	1	RING .. Snap
165	8270616	1	1	1	O-RING
166	8288657	2	2	2	SPRING .. Buffer piston
168	8270648	1	1	1	PISTON .. Buffer
169	8270674	1	1	1	PLUG .. Case
170	8061664	4	4	4	DOWEL .. Pin
171	9409966	7	7	7	PLUG .. Pipe - 1/16 M.P.T. hex. socket head
	VALVE .. Needle				
172	8270668	1	1	1	VALVE .. Needle
173	8247158	1	1	1	O-RING .. Needle valve - Replaces 8430050
	VALVE ASSEMBLY .. Solenoid				
174	8469587	2	2	2	VALVE ASSEMBLY .. Solenoid - Replaces 8328484
175	9320081	1	1	1	COIL .. And housing - Replaces 8328485
*176	8315096	1	1	1	PLUNGER .. Valves } Formerly applied
*177	8316317	1	1	1	ORIFICE .. Valve } Formerly applied
178	8270746	2	2	2	WASHER .. Fibre - Solenoid valve mounting
179	8270743	2	2	2	WASHER .. Lock - Special

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
					GOVERNOR .. Automatic load sensing
PISTON ASSEMBLY .. Speed Setting					
*180	8270734	1	1	1	PISTON ASSEMBLY .. Speed setting
181	8130451	1	1	1	PIN .. Drive-Lok
182	8270747	1	1	1	INSERT .. Thread
183	8270742	1	1	1	CYLINDER .. High speed stop
184	9415960	3	3	3	SCREW .. Cylinder mounting - 10 - 32 x 1-3/8 hex. socket head
185	8270741	1	1	1	SCREW .. Adjusting - High speed stop
186	8129778	1	1	1	NUT .. Stop - 5/16 - 24 hex.
187	8288661	1	1	1	INSERT .. Thread
188		1	1	1	RING .. Snap - Formerly 274418
189	8440164	1	1	1	SCREW .. Set - No. 10 - 32 x 1-3/4 in. long - Hex. socket head - Formerly 9413472
190	8288649	1	1	1	PIN .. Piston to speed control strap
191	8270737	1	1	1	SPRING .. Idle - Speed setting piston - Long
192	8270738	1	1	1	SPRING .. Idle - Speed setting piston - Short
193	8270744	1	1	1	PISTON .. Idle speed setting
194	8270745	1	1	1	O-RING .. Piston
195	9098533	2	2	2	O-RING .. Formerly 8156971 - Replaces 8355581
196	9414477	1	1	1	RING .. Snap - Idle speed setting piston
197	8270740	1	1	1	PLUG .. Piston - Idle speed setting
198	8270733	1	1	1	STRAP ASSEMBLY .. Speed control
199	8270564	1	1	-	WASHER .. Strap
200	8398933	1	1	1	SPRING .. Shutdown - Replaces 8270583
201	8270689	2	2	2	PLUG .. Dowel
202		1	1	1	SCREW .. Drive - Spring holding - No. 6 x 1/4 in. long - Formerly 145373
203	9415959	3	3	3	SCREW .. 10 - 32 x 1-1/8 hex. socket head
*204		1	1	1	SCREW .. 6 - 32 x 1/2 round head - Slotted - Formerly 132705
*205		1	1	1	SCREW .. 6 - 32 x 3/8 round head - Slotted - Formerly 132697
*206		2	2	2	WASHER .. Lock No. 6 internal tooth - Formerly 115543
207	8270588	1	1	-	SCREW .. 1/4 - 28 x 1-1/4 hex. head - Drilled
208	8270589	1	1	-	SPRING .. Coil
209		1	1	-	WASHER .. Plain - Copper - 1/4 - Formerly 446186
210	8270587	1	1	-	NUT .. Stop - 1/4 - 28 hex.
BRACKET ASSEMBLY .. Transducer Clamp					
*211	8270605	1	1	1	BRACKET ASSEMBLY .. Transducer clamp
212		1	1	1	PIN .. Spring - 1/16 dia. x 1/4 in. long - Formerly 456340
213	8270702	1	1	1	BRACKET .. Transducer clamp
214	8270636	1	1	1	SCREW .. Mounting - Lower spring seat
215	8270682	1	1	1	SEAT .. Lower spring
216	8270646	1	1	1	SEAT .. Adjusting spring
217	8270633	1	1	1	SPRING .. Transducer restoring
218	8270634	1	1	1	SPRING .. Support - Transducer pilot valve
TRANSDUCER ASSEMBLY					
220	8298839	1	1	1	TRANSDUCER ASSEMBLY
221	8270729	1	1	1	RETAINER ASSEMBLY .. Coil } Formerly applied
224	8270732	1	1	1	PLATE .. Magnetic } Formerly applied
225	8270681	1	1	1	WASHER .. Magnet loading spring - Formerly quantity 2 required
226	8270659	1	1	1	RETAINER .. Coil - Top
VALVE .. Pilot - Load Sensing					
227	8270658	1	1	1	VALVE .. Pilot - Load sensing
228	8270657	1	1	1	GEAR .. Pilot valve
229	8270666	1	1	1	BUSHING .. Pilot valve
230		1	1	1	RING .. Retaining - Formerly 274994
231	8270638	1	1	1	PLUG .. Pilot valve

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
					GOVERNOR .. Automatic load sensing
GEAR ASSEMBLY .. Idler					
232	8288656	1	1	1	GEAR ASSEMBLY .. Idler
233	8270703	1	1	1	BUSHING
234	8289239	1	1	1	STUD .. Idler gear
SLEEVE ASSEMBLY .. Relief Valve					
235	8270610	1	1	1	SLEEVE ASSEMBLY .. Relief valve
236	8270618	1	1	1	O-RING .. Relief valve sleeve
237	8270625	1	1	1	PIN .. Relief valve
238	8270670	1	1	1	BUSHING .. Relief valve
239	8270669	1	1	1	PLUNGER .. Relief valve
240	8270632	1	1	1	SPRING .. Relief valve
241	8270613	1	1	1	PLATE .. Eccentric clamping
LEVER .. Load Servo Restoring					
242	8306060	1	1	1	LEVER .. Load servo restoring
243	8270676	1	1	1	PIN .. Eccentric
244		3	3	3	SCREW .. Plate mounting - 10 - 32 x 1/2 hex. head - Formerly 431942
245		3	3	3	WASHER .. Lock - No. 10 - Formerly 120217
246	8284081	3	3	3	WASHER .. .380 O.D.
247	8270630	1	1	1	SPRING .. Loading - Transducer lever
248		1	1	1	SCREW .. No. 10 - 32 x 1-3/4 hex. head - Formerly 147122
249	8270621	1	1	1	PIN .. Transducer lever
250		2	2	2	PIN .. Cotter - 1/32 x 1/4 in. long - Formerly 435883
251	8270661	1	1	1	LINK .. Load sensing servo piston
252		1	1	1	PIN .. Cotter - 1/16 x 3/8 in. long - Formerly 119981
253	8319689	1	1	1	WASHER .. Speed droop link pin - Formerly 8270627
254	8270660	1	1	1	PIN .. Load sensing servo
254A		2	2	2	SCREW .. 10 - 32 x 3/8 hex. head - Formerly 179451
255	8270626	1	1	1	PIN .. Link - Load sensing servo
256	8270671	1	1	1	PISTON .. Load sensing servo
257	9413283	1	1	1	PIN .. Roll
258	8270687	1	1	1	BASE
259	8298843	1	1	1	CASE
260		1	1	1	SCREW .. Case to base - No. 10 - 32 x 7/8 hex. socket head - Formerly 193250
261		3	3	3	SCREW .. Case to base - No. 10 - 32 x 1/2 hex. socket head - Formerly 187828
262		6	6	6	PLUG .. Pipe - 1/8 M.P.T. - Hex. socket - Formerly 444687
263	8270689	1	1	1	PLUG .. Base - .126 dia. x .187 long
264	8307375	4	4	4	VALVE ASSEMBLY .. Check
265	8270620	1	1	1	PIN .. Restoring lever
LEVER .. Transducer					
266	8270665	1	1	1	LEVER .. Transducer
267	9413498	1	1	1	BEARING .. Needle
268		3	3	3	BOLT .. Case to base - 5/16 - 24 x 1 hex. - Formerly 181608
269	8134415	1	1	1	PIN .. Pivot - Transducer clamp plate
270	8270565	1	1	1	NUT .. Stop - 5/16 - 24 hex.
271	8270563	1	1	1	STUD .. Case to base
PLATE ASSEMBLY .. Trimmer Switch					
272	8395854	1	1	1	PLATE ASSEMBLY .. Trimmer switch - Formerly 8291473
273	8284091	4	4	4	INSERT .. Thread - Formerly applied
274	8298850	1	1	1	PLUG .. Jones
275	8291485	1	1	1	SOCKET .. Jones
276	9417420	2	2	2	SCREW .. No. 6 - 32 x 3/8 thrust head slotted

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
COVER ASSEMBLY .. Trimmer Switch					
279	8306062	1	1	1	COVER ASSEMBLY .. Trimmer switch
281	8291493	1	1	1	SCREW .. Cover mounting - No. 10 - 32 x 3/8 hex. head cap
SWITCH .. Micro					
311	8291481	2	2	2	SWITCH .. Micro
312	8291472	1	1	1	LEVER ASSEMBLY .. Trimmer switch
313	8291495	1	1	1	HELI-COIL
314	8291479	1	1	1	SPRING .. Lever
315	8291494	1	1	1	LEVER .. Trimmer switch
315A	9416701	2	2	2	PIN .. Lever stop - Formerly 8291491
315B	8113995	2	2	2	RING .. Snap
315C	8113761	2	2	2	WASHER .. Plunger
LEVER ASSEMBLY .. Speed Droop					
*316	8298840	1	1	1	LEVER ASSEMBLY .. Speed droop
317	9413499	1	1	1	BEARING .. Lever - Formerly applied
318	8291467	1	1	1	PIN
319	8289241	2	2	2	RING .. Retaining
320	8291468	2	2	2	WASHER
321	8298848	1	1	1	LEVER .. Speed droop
322	8270611	1	1	1	BRACKET .. Speed droop adjusting
321	8291496	1	1	1	LINK .. Speed servo
322	8270622	1	1	1	PIN .. Speed servo
323		1	1	1	PIN .. Cotter - 1/16 x 3/8 in. long - Formerly 119981
325	8284047	1	1	1	PIN .. Headed
327	8270649	1	1	1	LEVER .. Floating
328	8289242	1	1	1	LINK .. Pivot
329	8270650	1	1	1	PISTON .. Linkage return
329A	8291478	4	4	4	SCREW .. No. 6 - 32 x 15/16 round head
329B		8	8	8	WASHER .. Lock - No. 6 - Formerly 131181
329C	8270673	2	2	2	PIN .. Pivot - Speed droop lever
329D	9413463	2	2	2	RING .. Snap
330	8270604	1	1	1	PISTON ASSEMBLY .. Speed servo
331	8270653	1	1	1	PIN .. Fuel servo piston
332	8270617	1	1	1	O-RING
333	8270691	1	1	1	PIN .. Limit lever - .186 dia. x .812 in. long
334	8270692	1	1	1	LEVER .. Limit
335	8270651	1	1	1	PIVOT
336		1	1	1	NUT .. Lock - 1/4 - 20 - Formerly 124818
337	8270684	1	1	1	NUT .. Output - 1/4 - 28 hex.
338	8270677	1	1	1	SLEEVE .. Bearing retaining
339	8270637	1	1	1	PIN .. .126 dia. x .562 in. long
340	9413471	1	1	1	SCREW .. No. 10 - 32 x 1-7/8 hex. socket head
*341	8288659	1	1	1	MAGNET
RECEPTACLE					
342	8342428	1	-	-	RECEPTACLE .. 19 pole - Replaces 8270571
*343	8342429	-	1	1	RECEPTACLE .. 19 pole
344	8270590	1	1	-	NUT .. Clamp - Formerly applied
345	8270568	1	1	1	PLUG .. 5 pole
346	8270569	1	1	1	GROMMET
347	8270570	1	1	1	NUT .. Retaining - 3/4 - 20
*352	8200229	15	4	2	TERMINAL .. Lug
353	9311572	A.R.			SPAGHETTI .. Clear - 3 ft. long - Replaces 8247156
*354	8281009	A.R.			SPAGHETTI .. No. 8 - Clear - 3 ft. long - Replaces 8270726

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
WIRE .. Electrical					
*355		A.R.			WIRE .. Pink - 20 AWG. - 19/32 strands
*356		A.R.			WIRE .. Purple - 20 AWG. - 19/32 strands
*357		A.R.			WIRE .. Orange - 20 AWG. - 19/32 strands
*358		A.R.			WIRE .. White - 20 AWG. - 19/32 strands
*359		A.R.			WIRE .. Green - 10 AWG. - 19/32 strands
*360		A.R.			WIRE .. Red - 20 AWG. - 19/32 strands
*361		A.R.			WIRE .. Blue - 20 AWG. - 19/32 strands
*362		A.R.			WIRE .. Black - 20 AWG. - 19/32 strands
*363		A.R.			WIRE .. Yellow - 20 AWG. - 19/32 strands
*364		A.R.			WIRE .. Brown - 20 AWG. - 19/32 strands
*365		A.R.			WIRE .. Gray - 20 AWG. - 19/32 strands
*366		A.R.			WIRE .. Orange - 20 AWG. - 26/34 strands
*367		A.R.			WIRE .. Gray - 20 AWG. - 26/34 strands
*368		A.R.			WIRE .. Green - 20 AWG. - 26/34 strands
*369		A.R.			WIRE .. Brown - 20 AWG. - 26/34 strands
*371		A.R.			WIRE .. Purple - 20 AWG. - 26/34 strands
372		A.R.			WIRE .. Pink - 20 AWG. - 26/34 strands
373		A.R.			WIRE .. White - 20 AWG. - 19/32 strands
373A	8270725	4	4	4	SCREW .. No. 6 - 32 x 3/8 fillister head screw
373B		4	4	4	WASHER .. Lock - No. 6 - Formerly 131181
373C	8288663	A.R.			WIRE .. Lock - Sold by the foot
374	8138124	1	1	1	STRAP .. Wire
375	8202951	1	1	1	SCREW .. Strap mounting - 8 - 32 x 1/4 fil. head
376	8291492	A.R.			WIRE .. Lock
377	8270714	1	1	1	RECEPTACLE .. 5 Pole
378		1	1	1	SCREW .. 10 - 32 x 1-1/2 fil. head - Slotted - Formerly 132143
379	8113991	2	2	2	WASHER .. 1/4 - Plain
380		2	2	2	SCREW .. 10 - 32 x 1-3/8 fil. head - Slotted - Formerly 426422
380A	8291475	1	1	1	PIN .. Dowel
381		3	3	3	PIN .. Cotter - 1/16 x 5/8 long - Formerly 107761
382	8270654	1	1	1	FORK .. Spring - Formerly applied
383	8270645	2	2	2	PIN .. Pivot
384	8270644	1	1	1	PIN .. Pivot
384A	8291476	2	2	2	NUT .. Lock
385	8270656	1	1	1	LEVER .. Floating
386		2	2	2	BEARING .. Needle - Formerly 191345
387	8270683	1	1	1	SHAFT .. Speed setting
388	8246873	1	1	1	SPRING .. Coil - Compressor
389		2	2	2	PIN .. Cotter - 1/16 x 3/8 in. long - Formerly 119981
390	8270619	1	1	1	PIN .. Speed droop lever
390A	8270685	1	1	1	LEVER .. Speed control
390B		1	1	1	PIN .. Cotter - 3/32 x 5/8 in. long - Formerly 137159
BLOCK .. Shaft Mounting					
391	8270580	1	1	1	BLOCK .. Shaft mounting
REFLECTOR .. Heat - Bi-Metal					
392	8270662	1	1	1	REFLECTOR .. Heat - Bi-metal } Formerly applied
393	8270663	1	1	1	SPACER .. Reflector } Formerly applied
394	8270664	1	1	1	WASHER .. Thrust - Insulating } Formerly applied
395	8270628	2	2	2	WASHER .. Lock - Bi-metal strip } Formerly applied
396		2	2	2	SCREW .. 6 - 32 x 1/2 fil. head - Slotted - Formerly 131899

Reference Numbers 397 thru 467 Not Used.

BRACKET .. Solenoid					
468	8318057	-	1	-	BRACKET .. Solenoid
469	8318058	-	1	-	COVER .. Bracket
470		-	4	-	SCREW .. Cover mounting - 10 - 32 x 3/8 round head - Slotted - Formerly 132900
471		-	15	-	WASHER .. Lock - No. 10 - Formerly 120217

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
BLOCK .. Spring Support					
472	8318062	-	1	-	BLOCK .. Spring support
473	8113767	-	1	-	KNOB .. Adjusting screw
474		-	2	-	PIN .. Roll - Formerly 456342
475	8318052	-	1	-	SPRING .. Load
476	8318063	-	1	-	SHAFT .. Spring loading
476A		-	2	-	SCREW .. 10 - 32 x 5/8 hex. head - Formerly 187837
BLOCK ASSEMBLY .. Bearing Support					
477	8318048	-	1	-	BLOCK ASSEMBLY .. Bearing support
478	8318049	-	1	-	PIN ASSEMBLY .. Block
479		-	4	-	SCREW .. Block mounting - 1/4 - 28 x 1/2 fil. head slotted - Formerly 225578
480		-	6	-	WASHER .. Lock - 1/4 - Formerly 120380
481	8061638	-	2	-	BUSHING .. Oilite
LEVER .. Adjusting					
482	8318065	-	1	-	LEVER .. Adjusting
483	8338014	-	1	-	WASHER .. .265 I.D. x .500 O.D. x .031 in. thick
484	8318059	-	1	-	PIN .. Loading - .124 dia. x 1.639 in. long
485	8318061	-	1	-	SEAL .. Bushing
486		-	1	-	WASHER .. Plain - Copper - 1/4 - Formerly 446186
487	8318050	-	1	-	O-RING
488	8318060	-	1	-	RING .. Seal
LEVER .. Solenoid					
489	8318064	-	1	-	LEVER .. Solenoid
490	8318067	-	1	-	BUSHING .. Adjusting
491	8284049	-	1	-	WASHER .. .203 I.D. x .340 O.D. x .031 in. thick
492		-	1	-	SCREW .. 10 - 32 x 3/4 hex. socket head - Formerly 147118
492A		-	1	-	SCREW .. Drive - No. 2 x 3/16 in. long - Formerly 145368
SOLENOID .. Fuel Stop					
493	8292574	-	2	-	SOLENOID .. Fuel stop
494	8318051	-	8	-	SCREW .. Solenoid mounting
495	8338013	-	2	-	SCREW .. Adjusting
496		-	2	-	NUT .. Lock - 1/4 - 20 hex. - Formerly 120375
BLOCK .. Terminal					
497	9333517	-	1	-	BLOCK .. Terminal - Replaces 8236494
498		-	3	-	FASTENER - Formerly 420439
499		-	2	-	FASTENER - Formerly 420403
*500	8270746	-	2	-	WASHER
CLAMP .. Wire					
504	8193786	2	2	2	CLAMP .. Wire
CUP .. Oil Filler					
505	8017559	1	1	1	CUP .. Oil filler
BLOCK .. Terminal					
*506	8300937	1	1	1	BLOCK .. Terminal - 3 pole
*507		2	2	2	WASHER .. Block mounting - No. 16 internal tooth - Formerly 115543
*507A		2	2	2	SCREW .. Block mounting - 6 - 32 x 3/8 round head - Slotted - Formerly 132697

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Qty. Req. A	B	C	Description
		A	B	C	GOVERNOR .. Automatic load sensing
COVER .. Governor					
508	8270578	1	1	1	COVER .. Governor
509	8270572	1	1	1	GASKET .. Cover
*510		6	6	6	SCREW .. Cover mounting - 1/4 - 28 x 1 fil. head slotted - Formerly 190741
COLUMN .. Governor					
511	8360502	-	-	1	COLUMN .. Governor
511	8291460	1	-	-	COLUMN .. Governor
511	8323435	-	1	-	COLUMN .. Governor
512	9332176	2	2	2	DECAL .. Oil level and piping - Formerly 8388563 and 8113865
513	8270586	1	1	1	NAMEPLATE
514		4	4	4	SCREW .. Nameplate mounting - 5 - 40 x 1/4 round head cross recess - Formerly 432267
514A	8134268	1	1	1	NAMEPLATE
514B	8292521	1	1	1	PLUG .. Pipe - 1/4 - 18 NPTF - Square head
514C		2	2	2	SCREW .. Drive - No. 2 x 3/16 in. long - Formerly 145368
COVER .. End					
515	8270582	1	1	1	COVER .. End
516	8270573	1	1	1	GASKET .. Cover mounting
*517	9415958	4	4	4	SCREW .. End cover - No. 10 - 32 x 1/2 cross recess
518		6	6	6	SCREW .. Cover mounting - 1/4 - 28 x 3 in. long - Formerly 9406768 and 138220
PLUG .. Barrel					
*519	8307374	1	1	1	PLUG .. Barrel

GOVERNOR ASSEMBLY

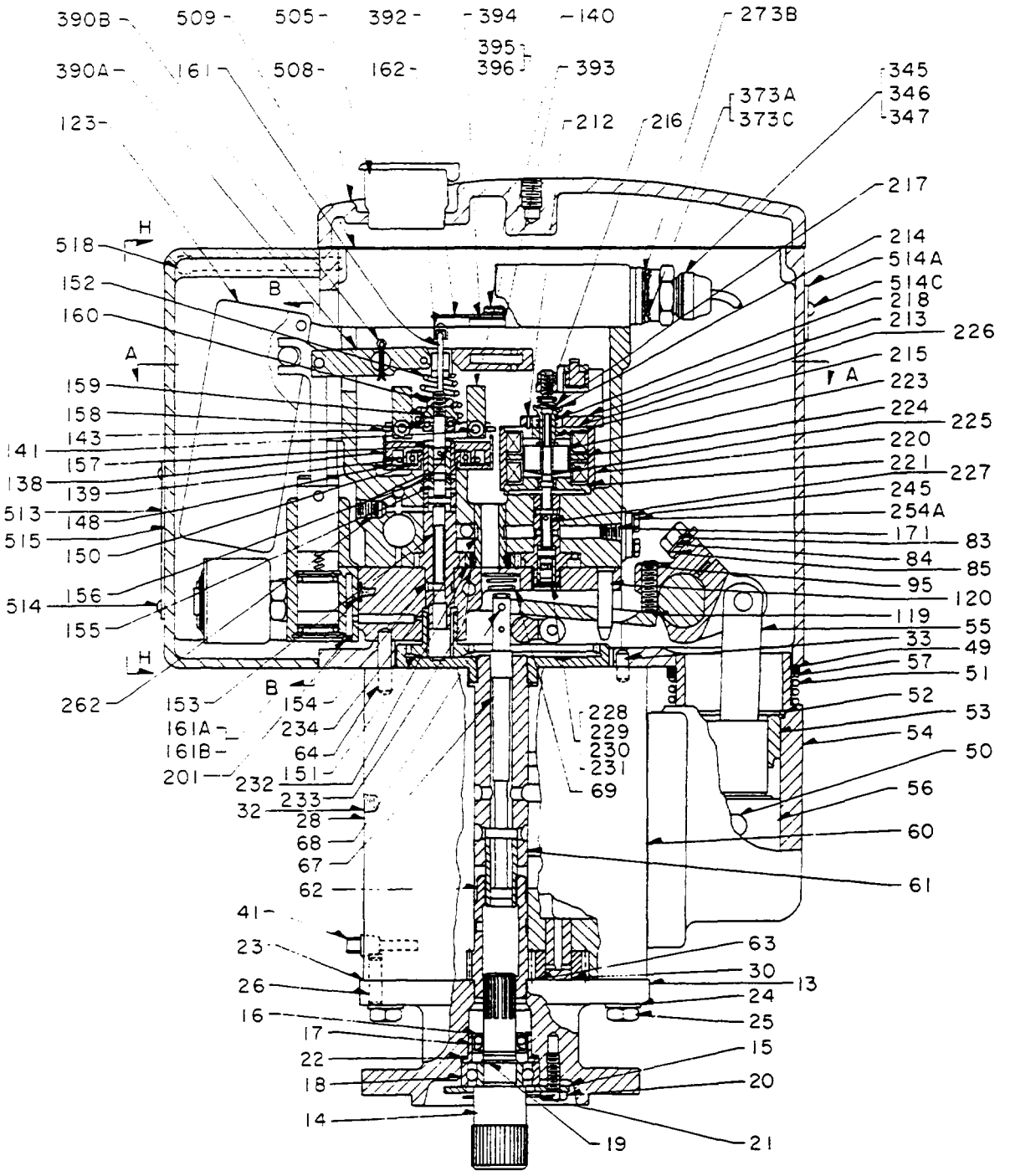
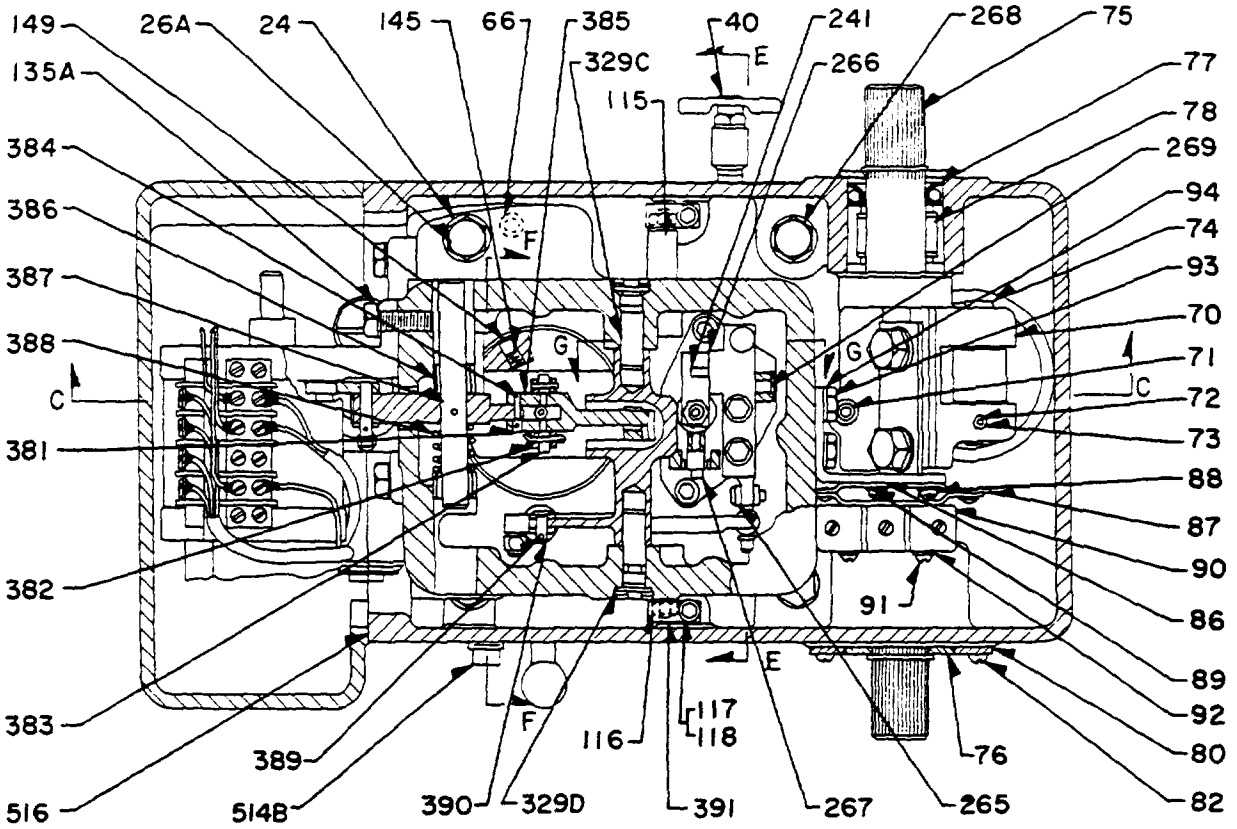


PLATE A64-1

P.L. No. B64

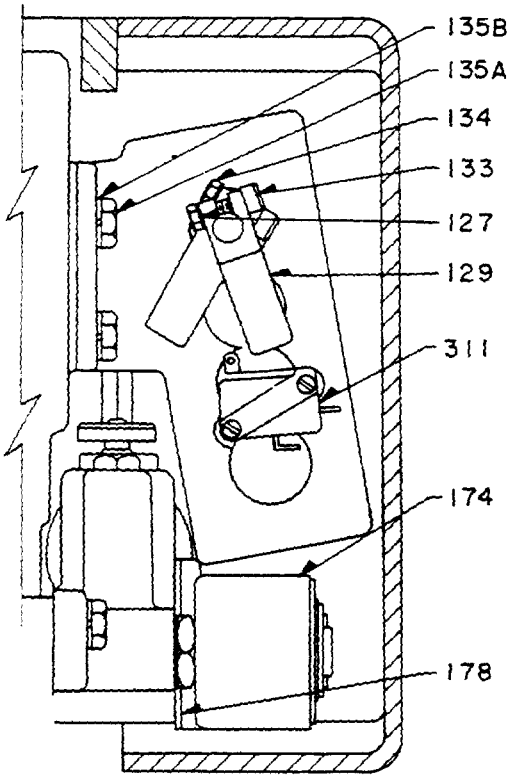
GOVERNOR ASSEMBLY



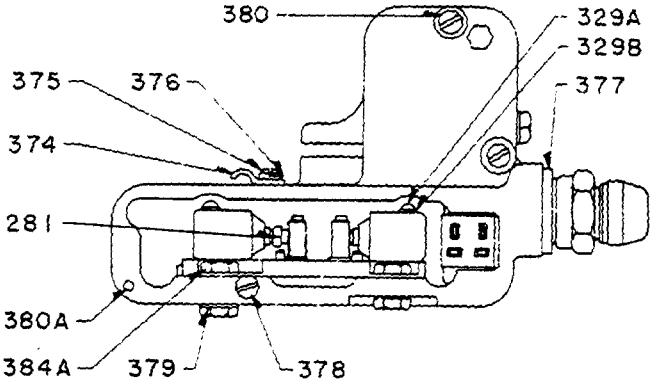
SECTION A-A

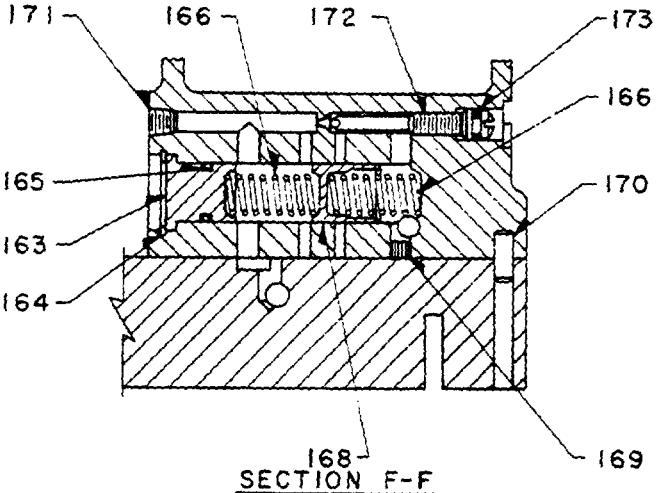
PLATE A64-2

GOVERNOR ASSEMBLY

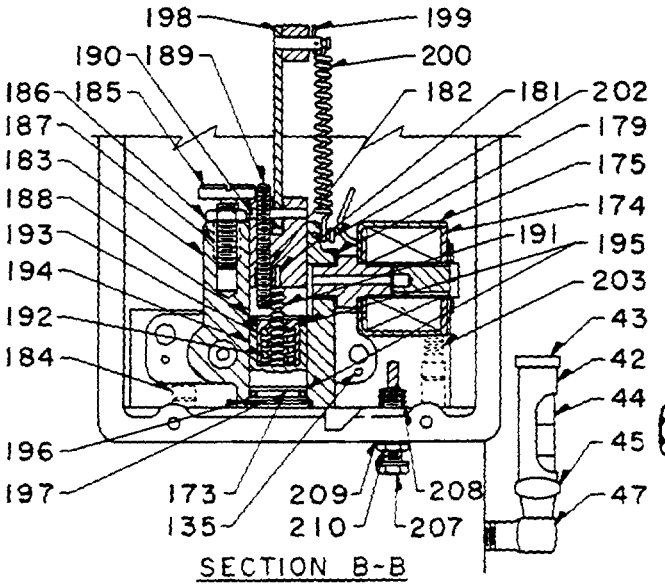


VIEW H-H

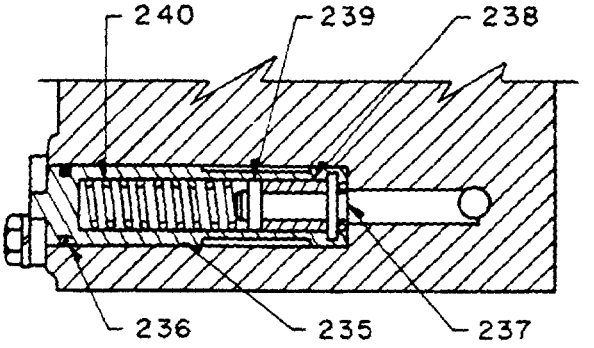




SECTION F-F



SECTION B-B

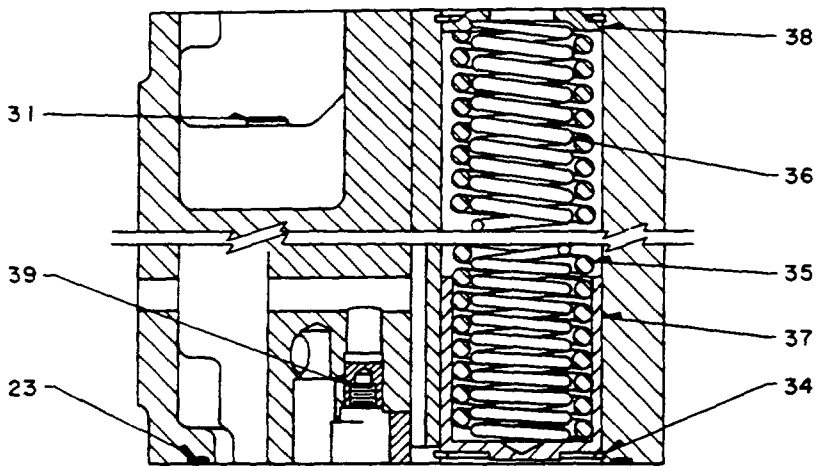


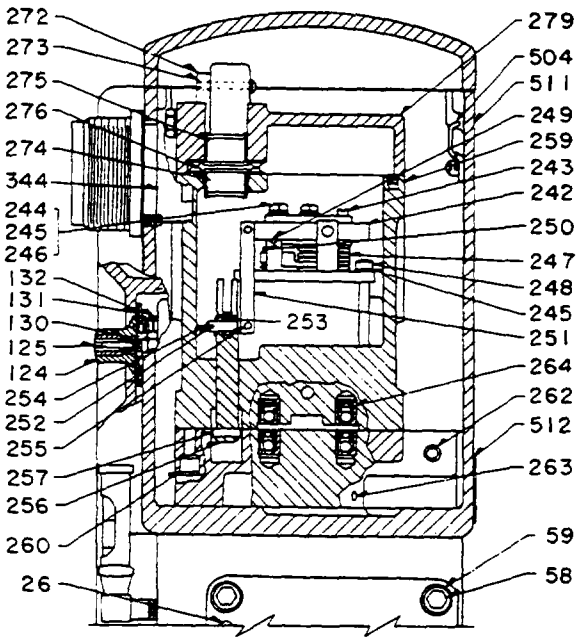
SECTION G-G

PLATE A64-3

P.L. No. B64

GOVERNOR ASSEMBLY





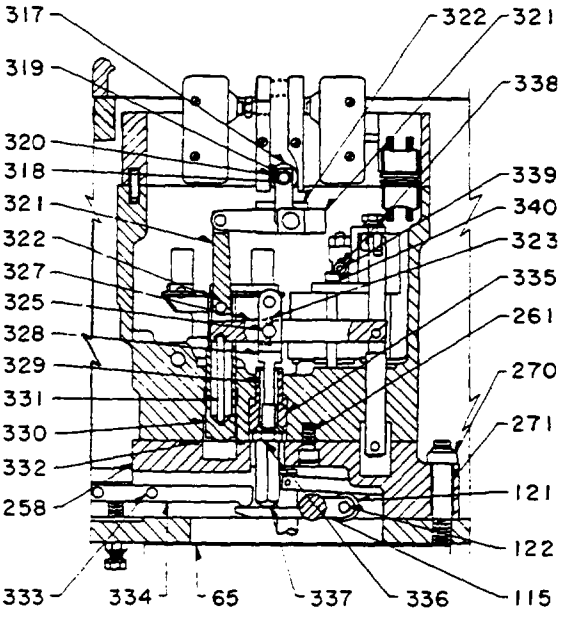
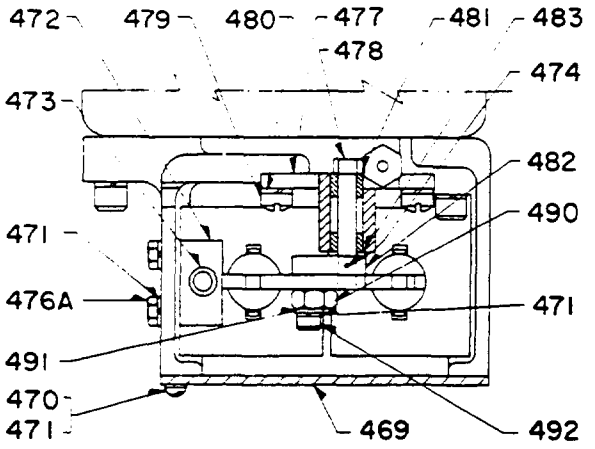
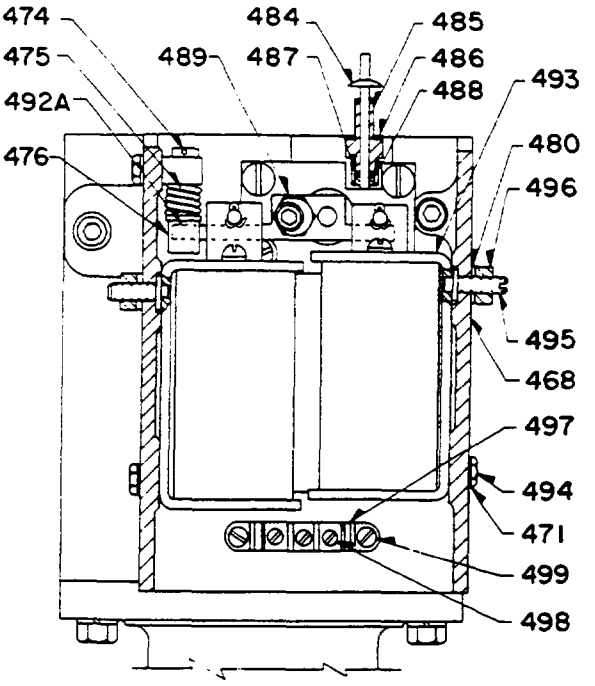
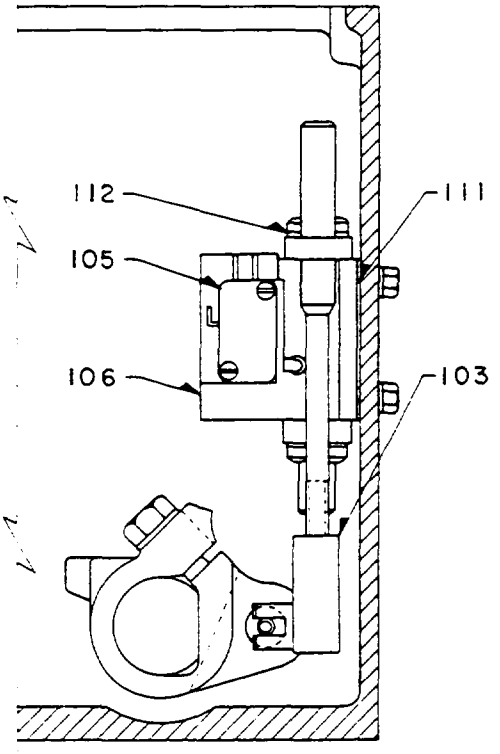


PLATE A64-4

GOVERNOR ASSEMBLY







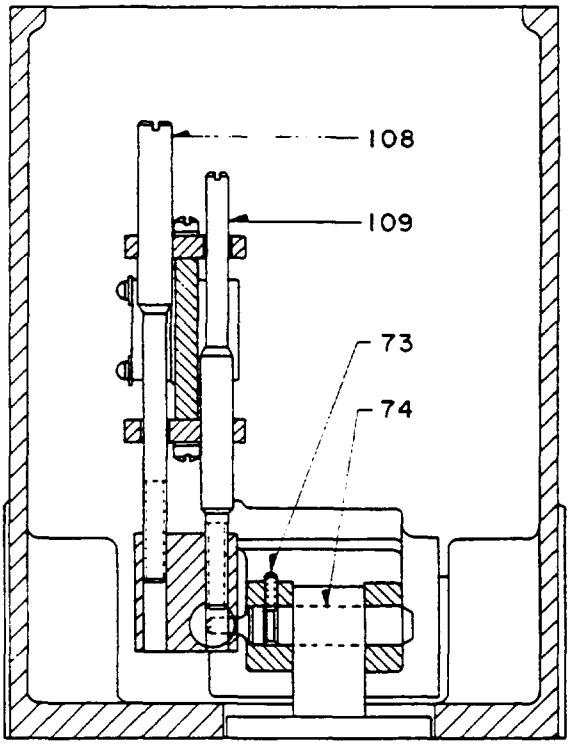


PLATE A64-5

Parts List No. B65

GOVERNOR ASSEMBLY
Model UG-8 Reference List

Ref. No.	Part Number	UTEX Part No.	Synch. Motor Voltage	Synch. Motor Part No.	Solenoid Coil Voltage	Solenoid Coil Part No.	Engine Application	R.P.M.
GOVERNORS WITHOUT LIMIT SWITCHES								
1	8248406	8257367	115V AC/DC	8214418	----	----	8,12,16-645E1	900
2	8267083	8408909	115V AC/DC	8276964	125 VDC	8276965	20-645E4; 12,16-645E1	720
3	8304396	----	115V AC/DC	8276964	64 VDC	8113756	8,12-645E2; 12,16-645E6	900
4	8380188	----	115V AC/DC	8276964	64 VDC	8113756	16-645E1	900
5	8385323	----	120V AC/DC	8390686	64 VDC	8113756	12-645E5; 20-645E7	900
6	8404221	----	220V AC/DC	9324599	----	----	8-645E2	750
GOVERNORS WITH LIMIT SWITCHES								
7	8348653	8489553	115V AC/DC	8350226	125 VDC	8276965	20-645E4	900
8	8365976	8489554	115V AC/DC	8276964	64 VDC	8113756	12,16-645E4	900
9	8381271	----	120V AC/DC	8479790	125 VDC	8276965	16-645E4	750
10	8381272	----	120V AC/DC	8479790	125 VDC	8276965	20-645E4	720
11	8382503	8389867	120V AC/DC	8479790	125 VDC	8276965	16,20-645E4	900
12	8398113	----	48V DC	8330640	48 VDC	8330641	20-645E4 (999-20)	900
13	8410045	----	115V AC/DC	8479788	125 VDC	8276965	20-645E4,E4B	900
14	8414696	8489555	115V AC/DC	8479788	125 VDC	8276965	20-645E4 (999-20)	750
15	8422221	----	115V AC/DC	8479788	125 VDC	8276965	20-645E4	900
16	8426871	----	115V AC/DC	8276964	64 VDC	8113756	20-645E4	750
17	8446901	8489547	120V AC/DC	8479790	125 VDC	8276965	12-645E4B; 16-645E1; 20-645E4 (MP45)	900
18	8446902	8489548	120V AC/DC	8479790	125 VDC	8276965	8,12,16-645E1,E6; 8,12,16,20-645E4; 8,12,16,20-645E4B,E7,E7B,E7C	900
19	8449920	----	120V AC/DC	8479790	64 VDC	8113756	12-645E4B	900
20	8449921	----	24V DC	8479789	24 VDC	8343351	8,20-645E4B	900
21	8452199	----	48V DC	8479791	48 VDC	8330641	20-645E4	900
22	8455659	----	120V AC/DC	8479790	125 VDC	8276965	20-645E4	900
23	8456666	----	24V DC	8479789	24 VDC	8343351	12-645E7B	900
24	8461335	----	120V AC/DC	8479790	125 VDC	8276965	8-645E1; 8,12,20-645E4B (MP45M, MP45B, HG20E4B)	750
25	8479804	----	120V AC/DC	8479790	64 VDC	8113756	12-645E1; 8,12,16-645E8; 12,16,20-645E9	900
26	8492521	----	74V DC	----	64 VDC	8113756	12-645E1	900
27	9317288	----	24V DC	8479789	24 VDC	8343351	12-645E4B	900
28	9330626	----	120V AC/DC	8479790	125 VDC	8276965	16,20-645E10B	900

The governors listed above are all variations of a basic UG-8 governor, and most of their components are identical. Accordingly, the parts lists for these governors have been consolidated as much as possible for easier part number identification. When individual governors require differing components, it will be noted in the description column.

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GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-1

Ref. No.	Part Number	Qty. Req.	Description
1	----	1	GOVERNOR ASM. .. See Page 1 for reference chart
2	274268	4	RING .. Snap - 1.283 in. O.D.
3	8214401	2	WASHER .. Spring seat
4	8214400	2	SPRING .. Accumulator
5	8214398	2	PISTON .. Accumulator
6	444687	6	PLUG .. Pipe - 1/8 M.P.T.
7		1	PIN .. Cotter - .060 x 1/2
8	8214442	1	SHAFT ASM. .. Laminated drive
9	8329986	1	SLEEVE .. Retainer
10	8412884	1	RING .. Retaining
11	8412885	1	WASHER
12	9414258	1	PIN .. Taper
13	8214434	1	DRIVER ASM. .. Ball head gear
14	8062011	12	LAMINATION .. Spring drive
15	8329987	1	GEAR .. Pump drive
16	8214416	1	PIN .. Link
17	8214414	1	PISTON .. Large compensating
18	8335706	1	SPRING .. Piston - Large compensating
19	8335705	1	LINK .. Dashpot
20	8193297	2	BUSHING .. Oilite
21	8214452	1	BUSHING .. Pilot valve
22	8275069	4	VALVE .. Check
23	8262966	4	PIN .. Dowel
24	8262965	1	BASE .. Governor
25	446186	9	WASHER .. Flat
26	9418484	9	BOLT .. Hex. head - 1/4 - 28 x 1
27	8062006	1	PLUG .. Compensating needle valve
28	8061197	1	WASHER .. Copper
29	8061700	1	VALVE .. Compensating needle
30	8214451	1	PISTON .. Power
31	8214397	1	CONTROLET .. Sub-assembly
32	8214454	1	GEAR .. Ball head drive
33	8214444	1	LEVER .. Pilot valve
34	8214449	1	PIN .. Lever to pilot valve
35	143174	2	PIN .. Cotter

GOVERNOR ASSEMBLY
Model UG-8

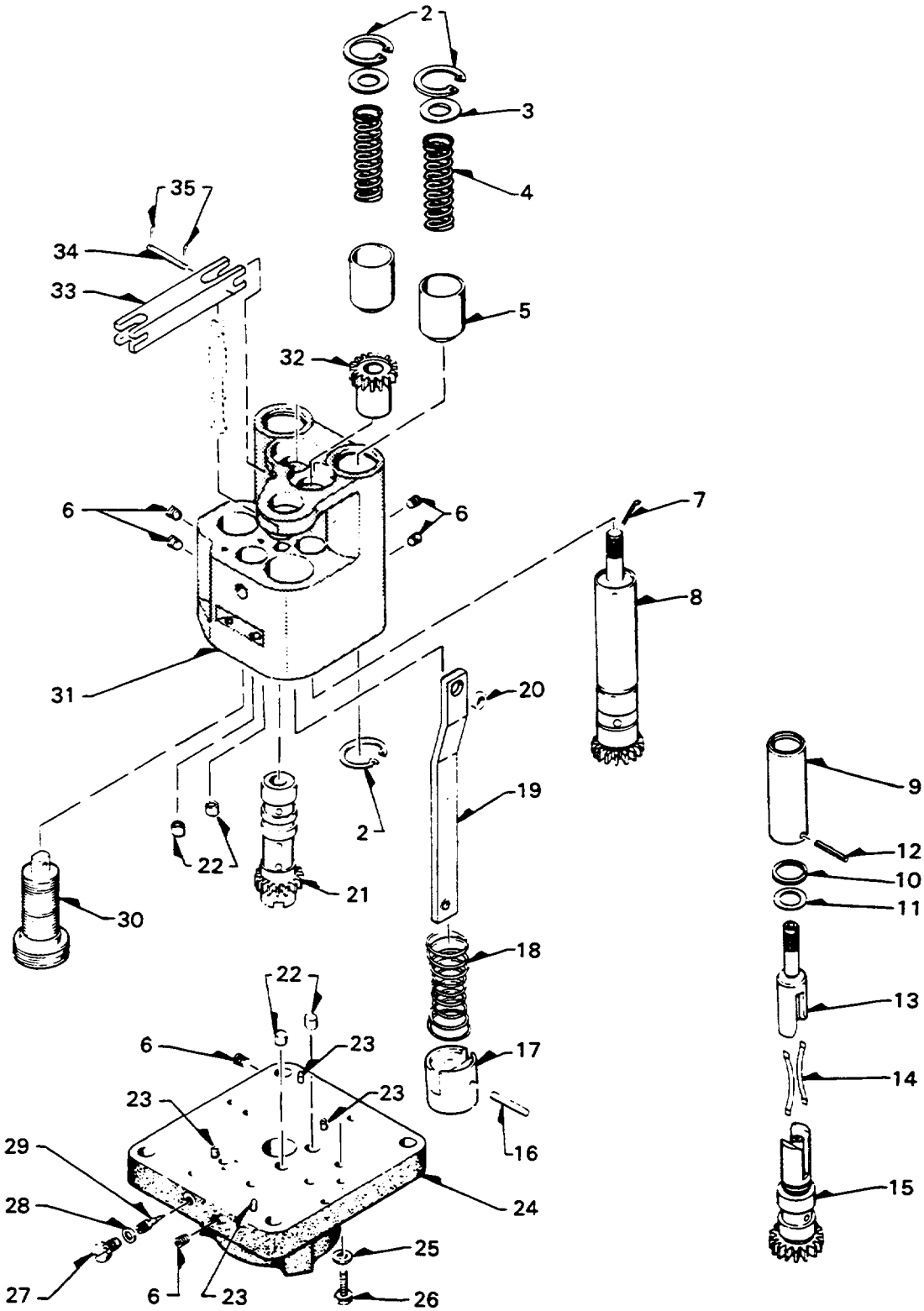

PLATE B65-1

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-2

Ref. No.	Part Number	Qty. Req.	Description
-	----	1	GOVERNOR ASM. .. Model UG-8
36	8187141	2	SEAL .. Oil
37	8214405	2	BEARING .. Output shaft
*38	8402975	1	SHAFT ASM. .. Output - Includes power and compensating levers
39		1	SHAFT .. Output - Not available separately - Use 8402975 (Ref. 38)
40	8214408	1	LEVER .. Power
41	8214409	1	LEVER .. Compensating
42	103595	2	PIN .. Taper
43	8214410	1	PIN .. Link
44	103362	3	PIN .. Cotter
45	8347406	1	PIN .. Power lever
46	8214386	2	PIN .. Compensating lever
47	8214412	1	LINK .. Compensating
48	8061673	1	FULCRUM .. Compensating lever
49	8214402	1	LEVER .. Compensating adjustment
50	8444617	1	SEAL .. O-Ring
*51	8248760	1	GAUGE ASM. .. Oil level - Includes elbow
*52	9328197	1	GAUGE .. Oil - Less elbow - Replaces 8113998
*53	8248762	1	ELBOW .. Oil gauge
54	8017619	1	WASHER .. Copper
55	8061732	1	POINTER .. Compensation adjusting
56	6101223	1	WASHER .. Flat
57	8061819	1	NUT .. Lock - 5/16 - 24 hex.
58	8214450	1	LINK .. Power piston
59		1	WASHER .. Flat
60	8354240	1	LEVER ASM. .. Shutdown
61	8214438	1	NUT .. Dashpot
62	8087642	1	NUT .. Lock - 1/4 - 28 hex.
63	9093559	1	COLLAR .. Piston guide
64	8248770	2	SPRING .. Compensating
65	8248771	1	SEAT .. Spring
66	8248768	1	PISTON .. Dashpot compensating
67	8214445	1	PLUNGER .. Pilot valve
68	8061736	1	SEAT .. Spring
69	8087641	1	SPRING .. Pilot valve
70	8214417	1	SHAFT .. Drive
71	954298	1	BEARING .. Drive shaft
72	8017556	1	RING .. Snap
73	8062007	1	RETAINER .. Bearing
74	8113929	3	BOLT .. Hex. head - Drilled - 1/4 - 28 x 5/8
75	8061742	1	SEAL .. Oil
76	8061721	1	RETAINER .. Oil seal
77	8061755	1	GASKET .. Seal retainer

GOVERNOR ASSEMBLY
Model UG-8

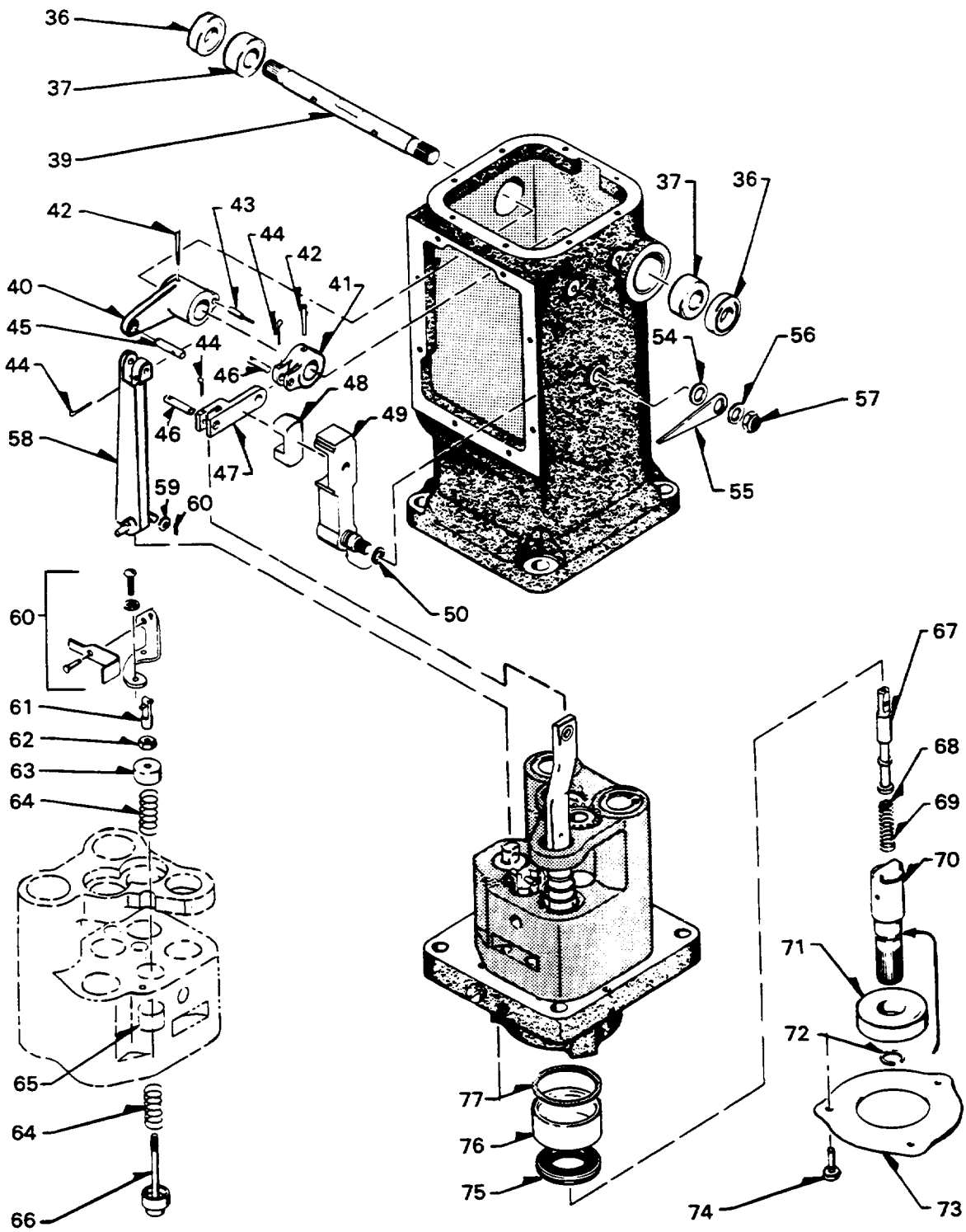

PLATE B65-2

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-3

Ref. No.	Part Number	Qty. Req.	Description
-	----	1	GOVERNOR ASM. .. Model UG-8
78	8249080	1	PIN .. Friction spring
79	8226500	1	SPRING .. Load limit speed droop
80	8214465	1	CAM ASM. .. Load limit
81	8214466	1	CAM ASM. .. Speed droop
82	8214467	1	GEAR ASM. .. Load indicator - Includes bushings
*83	8214478	2	BUSHING .. Oilite
*84	8214463	1	RACK ASM. .. Load limit
85	8227464	1	LEVER .. Load limit
86	8227465	1	RACK .. Load limit
87	8214468	1	PIN .. Rack
88	8214464	1	STRAP ASM. .. Load limit - Includes rack pin
89	8214468	4	PIN .. Rack
90	8248766	1	PANEL .. For governors without limit switches
90	8348120	1	PANEL .. For governors with limit switches
*91	8214460	1	LEVER ASM. .. Speed droop
92	8223130	1	SCREW .. Speed droop adjusting
93	8113991	1	WASHER .. Fulcrum
94	103361	1	PIN .. Cotter
95	8214479	1	LEVER .. Speed droop
96	8214480	1	FULCRUM .. Speed droop
97	120622	1	NUT .. Hex. No. 8-32
98	8061701	1	SCREW .. No. 8-32 - Adjustment
99	8214391	1	SPRING .. Speed droop lever
100	8214449	1	PIN .. Lever
101	143174	2	PIN .. Cotter
102	8214458	1	LEVER .. Speeder screw
103	8214411	1	LINK .. Speed droop
104	8214387	1	PIN .. Dowel
105	8214469	1	GUIDE .. Speeder screw
106	159583	2	SCREW .. No. 8 - 32 x 3/8
107	138530	2	WASHER .. Lock No. 8
108	8390685	1	SCREW .. Speeder - Fine - Governors 8385323 and 8404221 only
108	8230416	1	SCREW .. Speeder - All other governors
109	8390684	1	GEAR .. Speeder - Fine - Governors 8385323 and 8404221 only
109	8230414	1	GEAR .. Speeder - All other governors
110	8298847	1	SPRING .. Speeder - Governors 8248406, 8304396 and 8380188
110	8245561	1	SPRING .. Speeder - Governors 8267083, 8365976, 8426871, 8382503, 8381271 and 8381272
110	8214392	1	SPRING .. Speeder - Governors 8385323 and 8404221
110	8422547	1	SPRING .. Speeder - All other governors
*111	8214437	1	ROD ASM. .. Speeder
112	8017641	1	NUT .. Lock - 1/4 - 28 hex.
113	8214422	1	BEARING .. Thrust
114	8214424	1	SPRING .. Speeder rod
115	8214421	1	ROD .. Includes pin
116	8214441	1	BALLHEAD ASSEMBLY
117	8214430	1	COVER .. Ballhead
118	8214433	2	ARM .. Ball
119	456624	4	BEARING .. Needle
120	8214432	2	PIN .. Ball arm
121	8380886	1	BALLHEAD .. Spring damped
122	9426899	4	PIN .. Sping - Formerly cotter pin 137124
123	954901	1	BEARING .. Ball
124	8380885	1	GEAR .. Ballhead

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

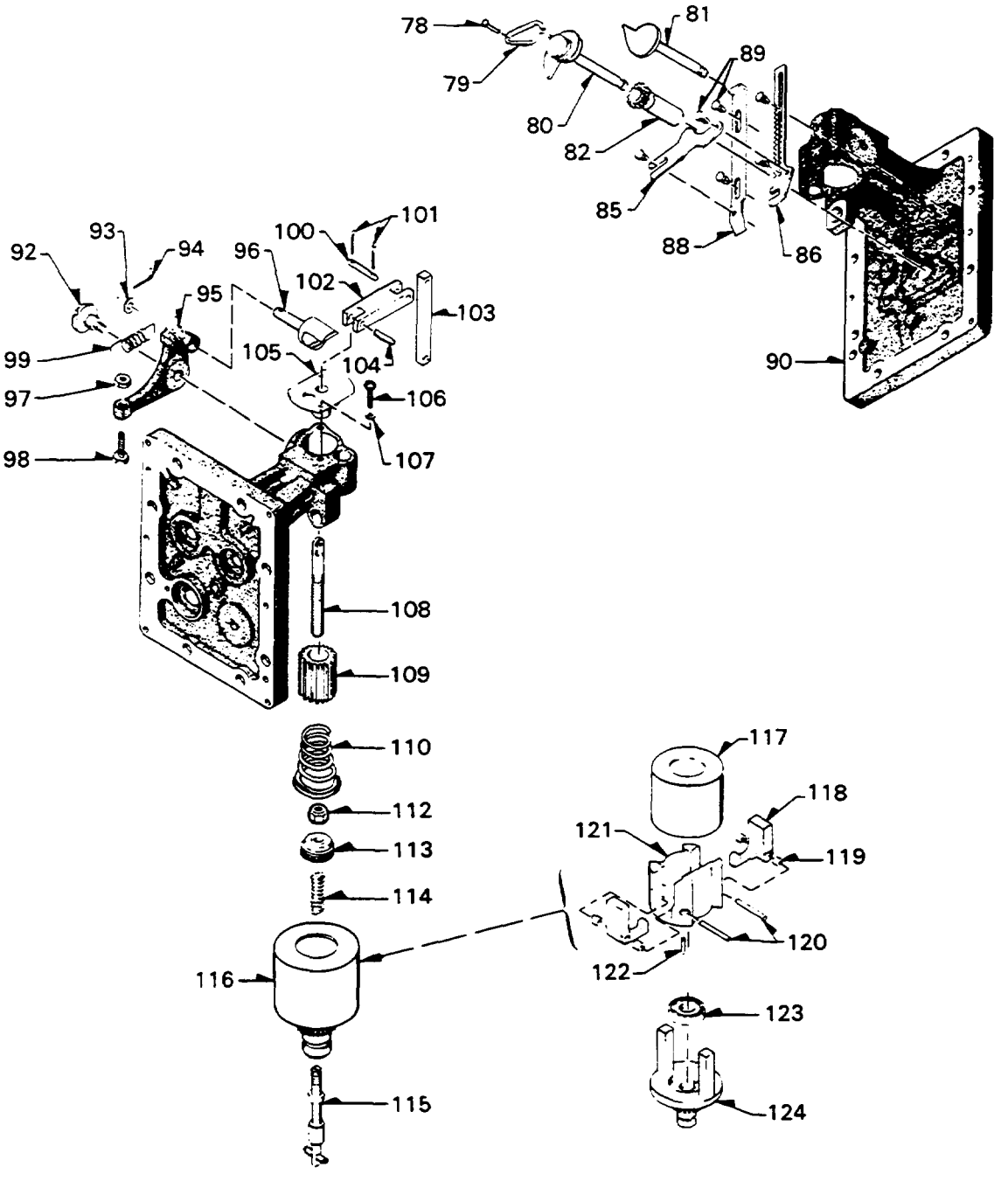

PLATE B65-3

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-4

Ref. No.	Part Number	Qty. Req.		Description
-	----			GOVERNOR ASM. .. Model UG-8
125	8214396	1		GASKET .. Cover to case
*126	8113998	1		GAUGE ASM. .. Oil level - Replaced by 9328197
127	9328197	1		GAUGE ASM. .. Oil level - Replaces 8113998
128	8248762	1		ELBOW .. 90°
129	444687	1		PLUG .. Pipe 1/8 M.P.T.
130	8214394	1		GASKET .. Case to panel
131	8214395	-		GASKET .. Case to base
		A	-	Governors 8248406 and 8404221
		-	B	All Other Governors
132	----	1	1	MOTOR ASM. .. Synchronizing - See chart on Page 1
133	159583	4	-	SCREW .. Bracket mounting No. 8-32
134	138530	4	-	WASHER .. Lock No. 8 - Internal tooth
135	8224047	1	-	BRACKET .. Motor mounting
136	9415958	4	-	SCREW .. Motor mounting No. 10 - 32 x 3/8
137	431487	8	8	SCREW .. Socket head No. 10 - 32 x 5/8 cover mounting
138	120217	8	-	WASHER .. Lock No. 10
139	8061772	1	1	SPRING .. Motor seal
140	8214419	1	-	COVER .. Case
140	8402937	-	1	COVER .. For governor 8398113
140	8276961	-	1	COVER .. For governors 8267083, 8304396, 8380188 and 8385323
140	8348123	-	1	COVER .. For governors 8365976, 8382503, 8381271, 8381272 and 8426871
140	8350225	-	1	COVER .. All other governors
141	140880	-	1	SCREW .. Set No. 10 - 32 x 1/4 socket head
142	8271801	-	4	SCREW .. Fillister head No. 10 - 32 x 3/4 - Motor mounting
143	120217	-	4	WASHER .. Lock No. 10
144	8214420	1	1	CUP .. Oil filler
145	8193786	-	2	STRAP .. Wire (2 wires)
*146	8138124	-	1	STRAP .. Wire (1 wire)
*147	8327421	-	1	CLAMP .. Wire - Plastic - .250 I.D.
148	----	-	2	SCREW .. Fillister head - Lock No. 8 - 32 x 5/16
149	8227930	-	1	GROMMET .. Rubber
150	131830	-	4	SCREW .. Fillister head No. 4 - 40 x 5/16
151	8271791	-	1	RECEPTACLE .. 5 pole male - For governors 8267083, 8304396, 8380188 and 8385323
151	8362376	-	1	RECEPTACLE .. 10 pole male - For governors 8365976, 8381271, 8381272, 8382503, and 8426871
151	8346170	-	1	RECEPTACLE .. 10 pole male - For governor 8398113
151	8350227	-	1	RECEPTACLE .. 14 pole male - For all other governors
152	8266651	-	1	PLUG .. 5 pole female - Use with 8271791 (Ref. 151)
152	8276671	-	1	PLUG .. 10 pole female - Use with 8362376 and 8346170 (Ref. 151)
152	8349062	-	1	PLUG .. 14 pole female (straight) - Use with 8350227 (Ref. 151)
152	8417975	-	1	PLUG .. 14 pole female (90°) - Use with 8350227 (Ref. 151)
*153	9098535	-	1	GASKET .. Receptacle mounting - Flanged receptacles only
154	8274738	-	1	CLAMP .. Cable
*155	8357795	-	2	RECTIFIER .. Silicon diode 3.3 Amp.
*156	8306021	-	1	BLOCK .. Rectifier mounting
*157	9514426	-	1	SUPPRESSOR ASM. .. Diode - Includes white, yellow, and black leads

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GOVERNOR ASSEMBLY
Model UG-8

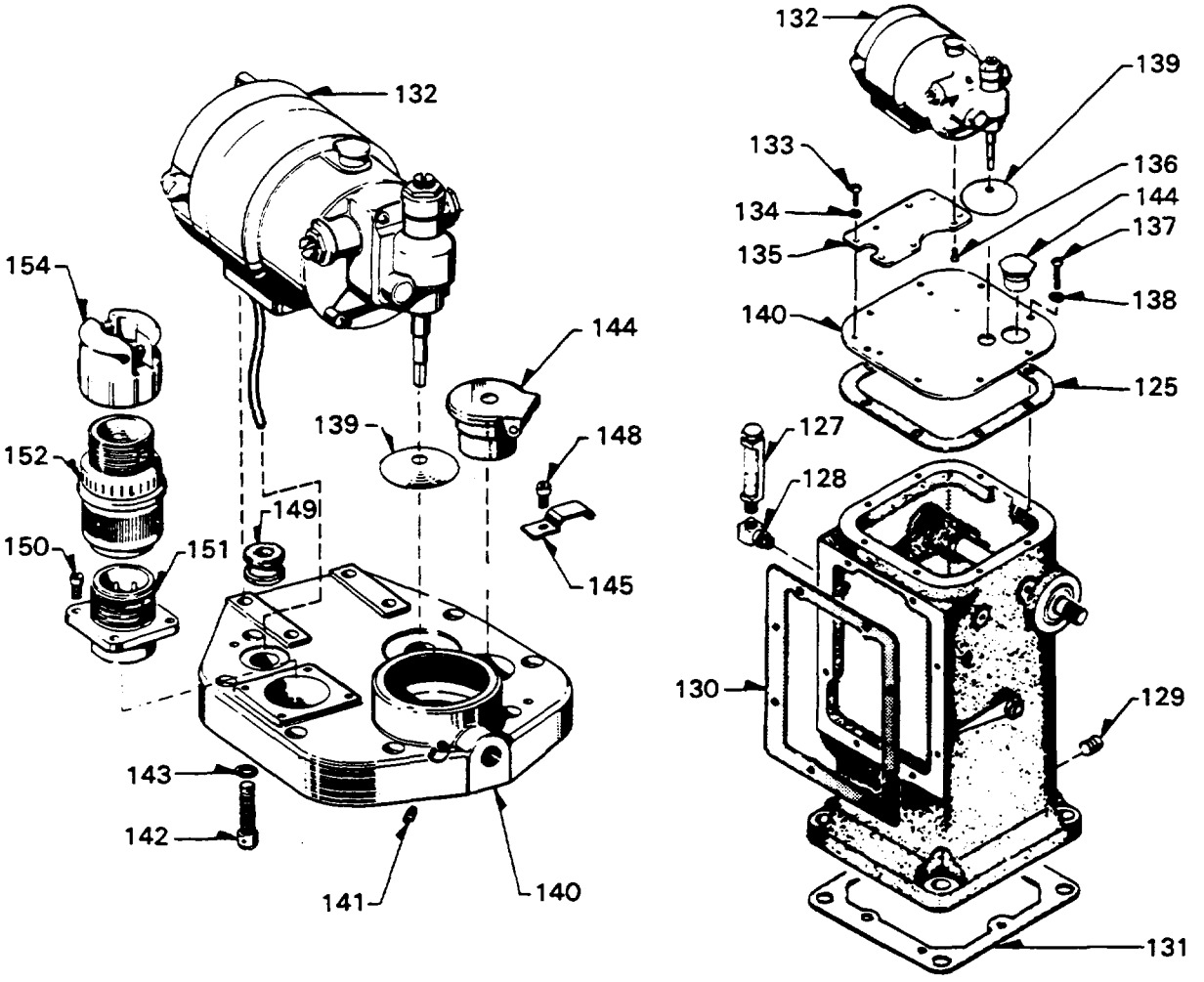


PLATE B65-4

P.L. No. B65

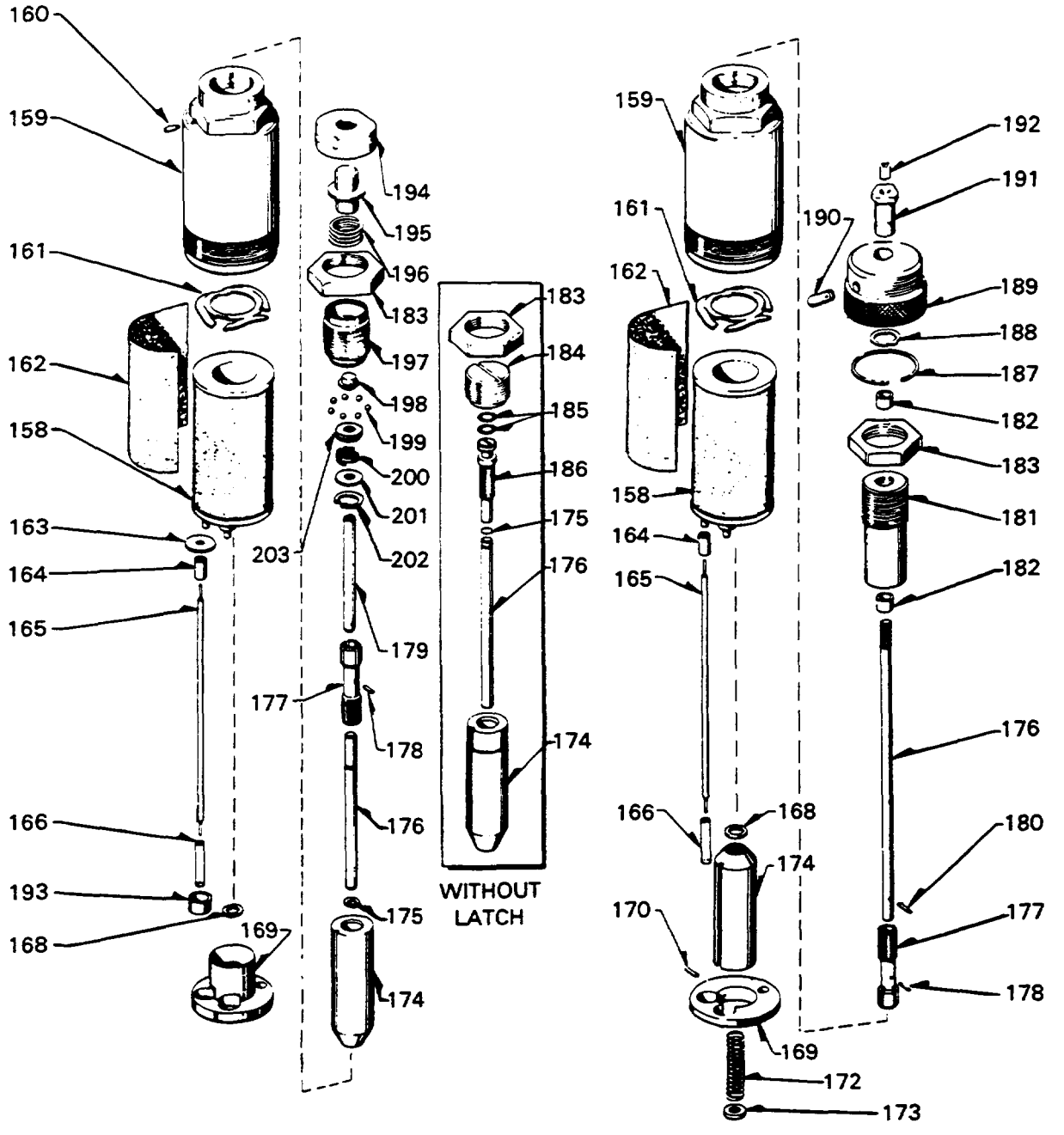
GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-5

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	GOVERNOR .. No latch - Energize to shutdown - Includes governors 8410045, 8414696, 8446901, 8446902, 8449921, 8461335, 8479804 8492521, 9317288 and 9330626
		-	B	-	GOVERNOR .. With latch - Energize to shutdown - Includes governors 8304396 and 8385323
		-	-	C	GOVERNOR .. With latch - De-energize to shutdown - All other governors
158	----	1	1	1	COIL .. Solenoid - See chart on Page 1
159	8203170	1	1	-	CASE .. Solenoid coil
159	8113681	-	-	1	CASE .. Solenoid coil
160	8203172	1	1	-	PIN .. Lock
161	8113989	1	1	1	SPRING .. Load
162	8129082	1	1	1	PAPER .. Insulating
163	----	1	1	-	WASHER .. Flat
164	8271800	1	1	1	CONNECTOR .. Sleeve
165	8329358	A.R.			WIRE .. White - 25 ft.
166	8481009	A.R.			TUBING .. No. 8 - Teflon - 5ft. - Replaces clear tubing 8270726
*167	8481008	A.R.			TUBING .. No. 4 - Teflon - 5 ft.
168	8113761	1	1	1	WASHER .. Air gap
169	8163953	1	1	-	GUIDE .. Plunger - Includes bushings
169	8276960	-	-	1	GUIDE .. Plunger
170	8203172	-	-	1	PIN .. Locking
*171	8113743	-	-	1	PIN .. Locating
172	8276963	-	-	1	SPRING .. Compression - Shutdown
173	6101901	-	-	1	WASHER .. Spring seat
174	8203171	1	-	-	PLUNGER .. Solenoid
174	8276962	-	1	1	PLUNGER .. Solenoid
175	9413362	1	1	-	RING .. Retaining
176	8422549	1	-	-	ROD .. Shutdown
176	8336102	-	1	-	ROD .. Shutdown
176	8308059	-	-	1	ROD ASM. .. Shutdown
177	8276968	-	1	1	SCREW .. Friction plunger
178	456340	-	1	1	PIN .. Roll 1/16 x 1/4
179	8336096	-	1	-	ROD ASM. .. Latch - Includes Ref. Nos. 177 and 178
180	456342	-	-	1	PIN .. Roll 1/16 x 3/8
181	8336109	-	-	1	GUIDE ASM. .. Plunger - Includes bushings - Ref. No. 182
182	----	-	-	2	BUSHINGS .. Guide
183	8113739	1	1	1	NUT .. Hex. jam 3/4 - 32
184	8113738	1	-	-	PLUG .. Plunger stop
185	8247158	2	-	-	RING .. Packing
186	8203169	1	-	-	SCREW .. Adjusting
187	8271802	-	-	1	SPRING .. Latch
188	----	-	-	1	RING .. Snap
189	8271794	-	-	1	KNOB .. Shutdown latch
190	8330639	-	-	1	PIN .. Lock
191	8271793	-	-	1	ADJUSTER .. Rod
192	140880	-	1	1	SCREW .. Set No. 10 - 32 x 1/4 cup point - Hex. socket
193	8152184	1	1	-	TUBING .. Teflon
194	8306016	-	1	-	RETAINER .. Push button
195	8336100	-	1	-	BUTTON .. Push
196	8113837	-	1	-	SPRING .. Diaphragm
197	8336098	-	1	-	STOP .. Plunger
198	8336099	-	1	-	BUSHING .. Ball release
199	----	-	7	-	BALL .. 0.125 dia. - Formerly 453626
200	8336103	-	1	-	SPRING .. Ball loading
201	8336101	-	1	-	WASHER .. Flat
202	9413362	-	1	-	RING .. Snap
203	8336097	-	1	-	WASHER .. Steel and neoprene
*204	8113745	1	1	-	RING .. Snap - Wire retaining

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8



WITH LATCH
ENERGIZE TO SHUT DOWN MODEL

WITH LATCH
DE-ENERGIZE TO SHUT DOWN MODEL

PLATE B65-5

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

PLATE B65-6

Ref. No.	Part Number	Qty. Req.		Description
-	----	1		GOVERNOR ASM. .. Model UG-8
205	----	1		RING .. Retainer
206	8214473	1		COVER .. Friction drive
207	8025261	1		SPRING .. Friction drive
208	8113990	1		NUT .. Lock - 1/4 - 28
209	8061771	1		SPRING .. Drive
210	8214474	1		CASE .. Friction drive
211	8214475	1		PLATE .. Friction drive
212	455105	1		PIN .. Roll - 3/32 x 1/2
213	148401	4		BEARING .. Needle
214	8061680	1		GEAR .. Synch. adjusting - Horizontal
215	189098	1		PIN .. Taper
216	8248764	1		SHAFT .. Synch. adjusting
		A	-	GOVERNORS WITH LIMIT SWITCHES } See Page 1
		-	B	GOVERNORS WITHOUT LIMIT SWITCHES } See Page 1
217	8061645	1	1	COLLAR .. Speed droop
218	8226500	1	1	SPRING .. Load limit speed droop
219	8061747	2	2	SEAL .. Oil
220	455105	1	1	PIN .. Roll - 3/32 x 1/2
221	8069891	3	3	KNOB .. Control
222	140855	3	3	SCREW .. Set - 8 - 32 x 5/16
223	8069890	-	1	KNOB .. Control - Syn. indicator
224	140855	-	1	SCREW .. Set - 8 - 32 x 5/16
225	8061731	1	2	POINTER .. Indicating
226	8229626	1	1	SPRING .. Oil seal
227	8061712	1	1	WASHER .. Bronze
228	9087347	1	1	SEAL .. O-Ring
229	----	2	2	BUSHINGS - Included with Ref. No. 82
230	8061746	1	1	SEAL .. Oil
231	221373	3	3	PIN .. Taper - 6/0 x 3/4
232	8248765	1	1	SHAFT .. Syn. knob gear
233	8214380	1	1	GEAR .. Reduction - 52 Teeth and 11 teeth
234	8061692	1	1	SHAFT .. Idler
235	8350228	1	-	GEAR .. Syn. indicating - 64 Teeth
235	8214382	-	1	GEAR .. Syn. indicating
236	8113944	2	1	PIN .. Stop
237	8348122	1	-	SHAFT .. Syn. indicating
237	8061697	-	1	SHAFT .. Syn. indicating
238	8489437	1	-	CLIP .. Spring
238	----	-	1	CLIP .. Spring
239	159583	6	6	SCREW .. No. 8 - 32 x 3/8
240	153426	8	8	SCREW .. No. 10 - 32 x 5/8
241	120217	8	8	WASHER .. Lock No. 10
242	8248761	-	1	PLATE .. Dial - With four knob holes
*242	8348115	1	-	PLATE .. Dial - With three knob holes and one limit switch opening
*243	8350229	1	-	BLOCK .. Switch mounting
*244	8348119	2	-	RISER .. Switch block
*245	8350231	1	-	ACTUATOR .. Roller leaf
*246	9326795	2	-	SWITCH .. Micro - Replaces 8270712
*247	8428464	2	-	CAM .. Switch
*248	8348112	1	-	COVER .. Switch
*249	8348113	1	-	PLATE .. Cover
*250	8350224	1	-	STRIP .. Terminal - 6 pt.
*251	8489436	1	-	PLATE .. Compensation indicating

GOVERNOR ASSEMBLY
Model UG-8

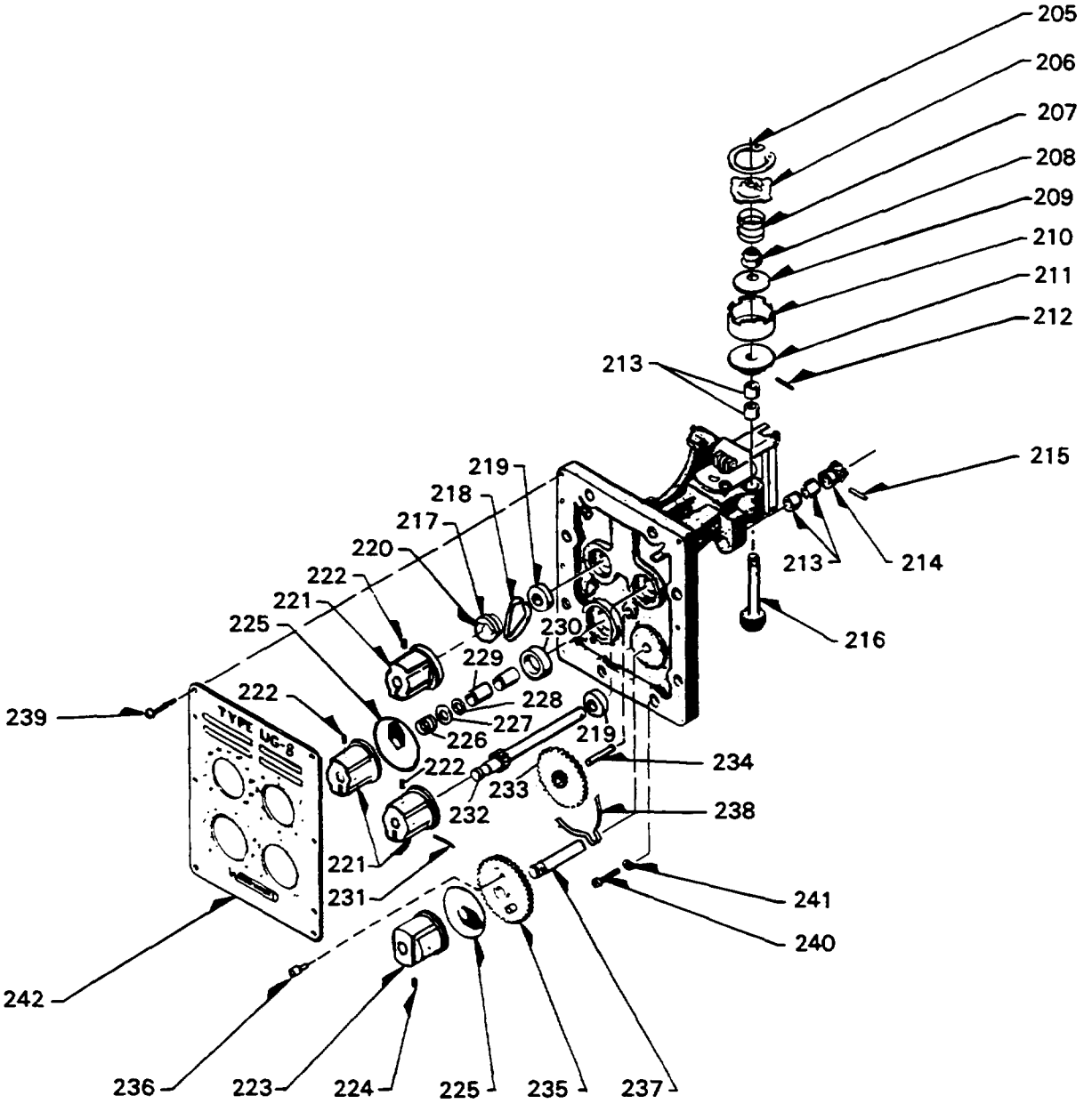


PLATE B65-6

P.L. No. B65

GOVERNOR ASSEMBLY
Model UG-8

Miscellaneous Parts - Not Illustrated

Ref. No.	Part Number	Qty. Req.	Description
252	8434128	A.R.	WIRE .. Black - 20 AWG. - Teflon insulation - 100 ft. long
253	8434129	A.R.	WIRE .. Red - 20 AWG. - Teflon insulation - 100 ft. long
254	8434130	A.R.	WIRE .. Blue - 20 AWG. - Teflon insulation - 100 ft. long
255	8434131	A.R.	WIRE .. White - 20 AWG. - Teflon insulation - 100 ft. long
256	8434132	A.R.	WIRE .. Yellow - 20 AWG. - Teflon insulation - 100 ft. long
257	8434133	A.R.	WIRE .. Green - 20 AWG. - Teflon insulation - 100 ft. long
258	8434134	A.R.	WIRE .. Pink - 20 AWG. - Teflon insulation - 100 ft. long
259	8434135	A.R.	WIRE .. Orange - 20 AWG. - Teflon insulation - 100 ft. long
260	8434136	A.R.	WIRE .. Brown - 20 AWG. - Teflon insulation - 100 ft. long
261	8434137	A.R.	WIRE .. Gray - 20 AWG. - Teflon insulation - 100 ft. long
262	8288663	A.R.	WIRE .. Lock - .026 dia. - 500 ft. long
263	8189218	6	LUG .. Terminal - Blue insulation - No. 6
264	8271792	1	CLAMP .. Amphenol dash 10
265	8487830	A.R.	TUBING .. Heat shrink - 3/16 I.D. x 5/8 long
266	8480983	A.R.	TUBING .. Heat shrink - 1/8 I.D. x 5/8 long
267	8493663	A.R.	TUBING .. Clear teflon - No. 11 - .095 I.D. x 5 ft. long
266	8493664	A.R.	TUBING .. Clear teflon - No. 10 - .106 I.D. x 5 ft. long
267	8481008	A.R.	TUBING .. Clear teflon - No. 8 - .133 I.D. x 5 ft. long
268	8481010	A.R.	TUBING .. Clear teflon - No. 6 - .166 I.D. x 5 ft. long
269	9096934	A.R.	TUBING .. Clear teflon - No. 5 - .186 I.D. x 3 ft. long
270	8481009	A.R.	TUBING .. Clear teflon - No. 4 - .208 I.D. x 5 ft. long
271	9316534	A.R.	TUBING .. Clear teflon - No. 3 - .234 I.D. x 3 ft. long
272	9311572	A.R.	TUBING .. Clear teflon - No. 2 - .263 I.D. x 3 ft. long
273	8152184	A.R.	TUBING .. Clear teflon - No. 0 - .330 I.D. x 3/16 in. long
274	8404521	1	DECAL .. "Red-Increase/Blue-Common/Black-Decrease"
275	8409408	1	DECAL .. "115 VAC/125 VDC"
276	8367182	1	DECAL .. "AC"
277	8367183	1	DECAL .. "115V"
278	8453071	1	DECAL .. "Pins A-C B-C D-E 48 VDC"
279	8395975	1	DECAL .. "AC/DC"
280	8367378	1	DECAL .. "DC"
281	8367379	1	DECAL .. "125V"
282	8430049	1	DECAL .. "Pins A-C B-C D-E 24 VDC"

Parts List No. B66

GOVERNOR ASSEMBLY

Models PGA, PG, PGG, PGR, PGE and PG-PH
8,12,16-645E1 Drill Rig Engines; 8,12,16,20-645 E5,E7,E7B
and 8,12,16-645E2,E6 Marine Engines; 12,20-645E4 and 16,20-645E4B
Stationary Generation Engines; 16-645E8 Marine Drill Rig Engine

Ref. No.	Governor Pt. No.	Speed Control Setting Incl. Replacement and Utex Part Nos.	Solenoid Voltage	Energize Solenoid To:	Engine Application	Page	Col.
PGA ENGINE REGULATING GOVERNOR ASSEMBLIES							
1	8365972	325 RPM at 16 PSI; 906 RPM at 70 PSI Replaces 8376696, 8392034, 8407685 Utex Part No. 8414632	110 VAC	Shutdown	8,12,16,20-645 E5,E7 and 12-645 E1	5	G
2	8366126	350 RPM at 30 PSI; 904 RPM at 70 PSI Replaced by 8448940 UTEX Part No. 8437796	120 VAC	Shutdown	8,12,16,20-645 E5 and 12,16,20-645E7	5	G
3	8367961	325 RPM at 16 PSI; 906 RPM at 70 PSI UTEX Part No. 8397686	110 VAC	Shutdown	8,12,16-645E2	5	G
4	8368590	350 RPM at 30 PSI; 906 RPM at 70 PSI Replaces 8376719	120 VDC	Shutdown	8,12-645E2 and 16-645E6	5	G
5	8374974	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	16-645E5	5	A
6	8376696	325 RPM at 16 PSI; 900 RPM at 70 PSI Replaced by 8365972	120 VAC	Shutdown	12,16-645E5	5	G
7	8376719	350 RPM at 25 PSI; 900 RPM at 70 PSI Replaced by 8368590	120 VAC	Shutdown	12-645E2	5	G
8	8377428	325 RPM at 7 PSI; 906 RPM at 22 PSI	110 VAC	Shutdown	12-645E2	5	A
9	8377429	350 RPM at 30 PSI; 906 RPM at 70 PSI	120 VDC	Shutdown	12-645E2	5	B
10	8378359	350 RPM at 25 PSI; 900 RPM at 70 PSI	120 VAC	Shutdown	16,20-645E5	5	G
11	8380675	350 RPM at 25 PSI; 900 RPM at 70 PSI	120 VAC	Shutdown	12-645E2	5	G
12	8381281	350 RPM at 30 PSI; 904 RPM at 70 PSI Replaced by 8448939	120 VAC	Shutdown	8,12,16-645E2	5	G
13	8381363	325 RPM at 16 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	20-645E5	5	C
14	8385042	325 RPM at 16 PSI; 900 RPM at 70 PSI Replaced by 8367961	120 VAC	Shutdown	12-645E2	5	G
15	8385287	350 RPM at 30 PSI; 906 RPM at 70 PSI	120 VDC	Shutdown	8,12,16-645E5 and 16-645E7	5	C
16	8392034	325 RPM at 16 PSI; 900 RPM at 70 PSI Replaced by 8365972	120 VAC	Shutdown	16-645E5	5	G
17	8392035	325 RPM at 16 PSI; 900 RPM at 70 PSI	120 VAC	Shutdown	16-645E5	5	D
18	8399511	350 RPM at 30 PSI; 906 RPM at 70 PSI	120 VDC	Shutdown	20-645E5	5	B
19	8406909	325 RPM at 16 PSI; 904 RPM at 70 PSI	120 VAC	Shutdown	8-645E2	5	G
20	8407129	350 RPM at 25 PSI; 904 RPM at 70 PSI	120 VAC	Shutdown	12-645E5	-	-
21	8407685	325 RPM at 16 PSI; 900 RPM at 70 PSI Replaced by 8365972	120 VAC	Shutdown	16-645E5	-	-

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Ref. No.	Governor Pt. No.	Speed Control Setting Incl. Replacement and Utex Part Nos.	Solenoid Voltage	Energize Solenoid To:	Engine Application	Page	Col.
22	8408003	350 RPM at 25 PSI; 840 RPM at 70 PSI Formerly 8480083 Replaced by 8448939	120 VAC	Shutdown	8,16-645E6	-	-
23	8419447	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8-645E5	-	-
24	8421579	325 RPM at 16 PSI; 904 RPM at 70 PSI	120 VDC	Shutdown	12-645E5	-	-
25	8426925	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	20-645E5	-	-
26	8427764	350 RPM at 30 PSI; 906 RPM at 70 PSI	120 VDC	Shutdown	12,20-645E5	-	-
27	8430638	350 RPM at 7 PSI; 906 RPM at 22 PSI Replaced by 9550360	110 VAC	Shutdown	16,20-645E5	-	-
28	8434921	350 RPM at 30 PSI; 906 RPM at 70 PSI UTEX Part No. 9332093	110 VAC	Shutdown	16,20-645E5 and 12,16,20-645E7	5	G
29	8436101	350 RPM at 3 PSI; 906 RPM at 15 PSI	74 VDC	Run	12,20-645E4	5	G
30	8441451	400 RPM at 3 PSI; 906 RPM at 15 PSI	24 VDC	Shutdown	12-645E5	-	-
31	8448939	350 RPM at 30 PSI; 906 RPM at 70 PSI Replaces 8381281, 8408003 UTEX Part No. 9099254	110 VAC	Shutdown	8,12,16-645E2 and 8,16-645E6	-	-
32	8448940	350 RPM at 30 PSI; 906 RPM at 70 PSI Replaces 8366126 UTEX Pt. No. 8437796	110 VAC	Shutdown	8,12,16,20-645E5 and 12,16,20-645E7	-	-
33	8449702	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8-645E6	-	-
34	8458792	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	12-645E2	-	-
35	8463676	350 RPM at 3 PSI: 906 RPM at 15 PSI	110 VAC	Shutdown	16-645E7	-	-
36	8466953	350 RPM at 3 PSI; 906 RPM at 15 PSI	110 VAC	Shutdown	20-645E7	5	F
37	8469629	350 RPM at 7 PSI; 906 RPM at 22 PSI	24 VDC	Shutdown	12-645E5	-	-
38	8472494	350 RPM at 7 PSI; 906 RPM at 43 PSI	110 VAC	Shutdown	16-645E2	-	-
39	8473885	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8,12,16-645E2,E6	5	H
40	8477560	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	8,12,16-645E6	-	-
41	8479891	350 RPM at 30 PSI; 906 RPM at 70 PSI	120 VDC	Shutdown	12-645E7	5	C
42	8489805	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	16-645E7	5	D
43	8490772	350 RPM at 10 PSI; 906 RPM at 60 PSI	110 VAC	Shutdown	16-645E5,E7	5	F
44	8491943	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	16-645E7	5	D
45	9082625	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	12-645E6	5	H
46	9086256	350 RPM at 12 PSI; 906 RPM at 60 PSI	24 VDC	Run	20-645E7	5	E
47	9094997	350 RPM at 30 PSI; 906 RPM at 70 PSI	32 VDC	Shutdown	16-645E7	-	-
48	9099162	350 RPM at 30 PSI; 906 RPM at 70 PSI UTEX Part No. 9530365	24 VDC	Run	20-645E7	5	H

GOVERNOR ASSEMBLY

Ref. No.	Governor Pt. No.	Speed Control Setting Incl. Replacement and Utex Part Nos.	Solenoid Voltage	Energize Solenoid To:	Engine Application	Page	Col.
49	9311283	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	16-645E7	5	E
50	9313476	350 RPM at 30 PSI; 756 RPM at 70 PSI	110 VAC	Shutdown	20-645E7	5	H
51	9315005	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8-645E1	-	-
52	9337016	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	8-645E6	-	-
53	9338879	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	16-645E7B	-	-
54	9339505	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8,12,16-645E6	-	-
55	9339506	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8,12,16-645E2,E6	-	-
56	9513093	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	8,12,16,20-645E7B		
57	9519287	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	20-645E4B	-	-
58	9521424	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	16-645E7B	-	-
59	9521453	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	8,16,20-645E7B	-	-
60	9521768	350 RPM at 12 PSI; 906 RPM at 60 PSI	24 VDC	Run	20-645E7B	-	-
61	9525814	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	12-645E7B	-	-
62	9530405	350 RPM at 10 PSI; 831 RPM at 60 PSI	120 VDC	Shutdown	16-645E7B	-	-
63	9537890	350 RPM at 30 PSI; 856 RPM at 70 PSI	110 VAC	Shutdown	12-645E6	-	-
64	9539364	350 RPM at 30 PSI; 906 RPM at 70 PSI	24 VDC	Shutdown	20-645E4B	-	-
65	9540113	350 RPM at 30 PSI; 906 RPM at 70 PSI	110 VAC	Shutdown	12,16-645E6	-	-
66	9550360	350 RPM at 21 PSI; 906 RPM at 66 PSI Replaces 8430638	110 VAC	Shutdown	16,20-645E5	-	-
PG ELECTRO-HYDRAULIC ENGINE REGULATING GOVERNOR ASSEMBLIES							
67	8216206	315 RPM at 5 PSI; 900 RPM at 17 PSI UTEX Part No. 8122846	Non-Elec	Shutdown	12,16-645E1	23	A
68	8378135	290 RPM at 5 PSI; 839 RPM at 17 PSI UTEX Part No. 8296480	Non-Elec	Shutdown	8-645E1	23	A
69	8424298	315 RPM at 5 PSI; 904 RPM at 17 PSI UTEX Part No. 8424300	Non-Elec	Shutdown	8-645E1	23	A
70	8437102	315 RPM at 5 PSI; 904 RPM at 17 PSI Replaced by 8478151 UTEX Part No. 8437103	Non-Elec	Shutdown	8,12,16-645E1	23	A
71	8478151	315 RPM at 5 PSI; 904 RPM at 17 PSI Replaces 8437102 UTEX Part No. 8437103	Non-Elec	Shutdown	8,12,16-645E1 and 16-645E8	23	A
PGG ENGINE REGULATING GOVERNOR ASSEMBLIES							
72	9532351	350 RPM Low Speed; 906 RPM High Speed	120 VAC	Shutdown	16-645E4B	23	D
73	9534663	350 RPM Low Speed; 906 RPM High Speed	120 VAC	Shutdown	20-645E4B	23	D

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Ref. No.	Governor Pt. No.	Speed Control Setting Incl. Replacement and Utex Part Nos.	Solenoid Voltage	Energize Solenoid To:	Engine Application	Page	Col.
PGR ENGINE REGULATING GOVERNOR ASSEMBLY							
74	8380181	350 RPM at 8 PSI; 900 RPM at 17 PSI	120 VAC	Shutdown	8-645E1	23	B
PGE ENGINE REGULATING GOVERNOR ASSEMBLY							
75	9535373	344 RPM Low Speed; 986 RPM High Speed	24 VDC	Shutdown	16-645E1	23	C
PG-PH ENGINE REGULATING GOVERNOR ASSEMBLY							
76	8461697	300 RPM at 6 PSI; 945 RPM at 30 PSI	120 VAC	Shutdown	20-645E5	-	-

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GOVERNOR ASSEMBLY

PGA Engine Regulating Governor Assembly
8-645E2,E5,E6,E7,E7B, 12-645E2,E5,E6,E7,E7B, 16-645E2,E5,E6,E7
E7B, and 20-645E5,E7,E7B,Marine Engines 8,12,16-645E1,
12,20-645E4 and 20-645E4B Drill Rig and Stationary Generation Engines

PLATES B66-1 through B66-5

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
1	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine - See reference chart on Pages 1 thru 3
2	8149658	1	1	1	1	1	1	1	1	BASE .. Governor
3	8149696	1	1	1	1	1	1	1	1	SHAFT .. Drive
4	8062007	1	1	1	1	1	1	1	1	RETAINER .. Bearing
5	8149695	1	1	1	1	1	1	1	1	SEAL .. Oil
*5	8152068	-	-	-	-	-	-	1	-	SEAL .. Oil
6	8149697	1	1	1	1	1	1	1	1	RETAINER .. Oil seal
7	954298	1	1	1	1	1	1	1	1	BEARING .. Ball - Drive shaft
8	8149677	1	1	1	1	1	1	1	1	RING .. Snap
9	8113929	3	3	3	3	3	3	3	3	BOLT .. Bearing retainer to base - 1/4 - 28 x 5/8 hex. head
10	8122250	As Required								WIRE .. Lock - .035 dia. - 100 ft.
11	8149679	1	1	1	1	1	1	1	1	GASKET .. Retainer to base
12	8483071	1	1	1	1	1	1	1	1	GASKET .. Case to base - Replaces 8152078
13	120379	8	8	8	8	8	8	8	8	WASHER .. Lock - 5/16
14	179818	8	8	8	8	8	8	8	8	BOLT .. Case to base - 5/16 - 18 x 1 hex. head
15	8328445	-	-	-	-	-	-	2	-	PIN .. Dowel - Case to base - Governors 8367961, 8380675, 8381281, 8385042, and 8406909
15	103613	2	2	2	2	2	2	2	2	PIN .. #5 Taper - Case to base
16	8326391	1	1	1	1	1	1	1	1	CASE ASSEMBLY .. Power
17	8275069	2	2	2	2	2	2	2	2	VALVE ASSEMBLY .. Check
18	8326398	2	2	2	2	2	2	2	2	VALVE ASSEMBLY .. Check
19	8113672	2	2	2	2	2	2	2	2	PIN .. Grooved - Case to column
20	9413465	4	4	4	4	4	4	4	4	RING .. Snap
21	8149471	2	2	2	2	2	2	2	2	SPRING .. Compression - Large accumulator
22	8057784	2	2	2	2	2	2	2	2	SPRING .. Inner compression - Small accumulator
23	8149470	1	1	1	1	1	1	1	1	STUD .. Idler
24	8149469	2	2	2	2	2	2	2	2	PISTON .. Accumulator
25	8149474	2	2	2	2	2	2	2	2	SEAT .. Spring
26	8118445	1	1	1	1	1	1	1	1	COCK .. Drain
27	8152071	1	2	2	2	2	2	2	2	SEAT .. Spring
28	8152072	2	2	2	2	2	2	2	2	SPRING .. Buffer - Except governor 8381363
*28	8269979	-	-	2	-	-	-	-	-	SPRING .. Buffer - Governor 8381363
29	8152073	1	1	1	1	1	1	1	1	PISTON .. Buffer
30	8152074	1	1	1	1	1	1	1	1	PLUG .. Buffer
31	8478711	1	1	1	1	1	1	1	1	O-RING .. Seal - Replaces 8223699
32	9413448	1	1	1	1	1	1	1	1	RING .. Snap
*33	8442288	-	-	-	-	-	-	1	-	GAUGE ASM. .. Oil - Replaced by 9328197
*34	8319674	-	-	-	-	-	-	2	-	SEAL .. .359 I.D. x .500 O.D. x .067 in. thick
ϕ*35	8174780	-	-	-	-	-	-	3	-	GASKET .. .312 I.D. x .500 O.D. x .062 in. thick
ϕ*36	8350082	-	-	-	-	-	-	2	-	GASKET .. .312 I.D. x .500 O.D. x .078 in. thick
*37	8451381	-	-	-	-	-	-	1	-	GLASS .. Sight
*38	8319675	-	-	-	-	-	-	1	-	CAP .. Gauge
39	8113998	1	1	1	1	1	1	1	1	GAUGE ASM. .. Oil - Replaced by 9328197
40	8319674	2	2	2	2	2	2	2	2	SEAL .. .359 I.D. x .500 O.D. x .067 in. thick
ϕ41	8174780	3	3	3	3	3	3	3	3	GASKET .. .312 I.D. x .500 O.D. x .062 in. thick
ϕ42	8350082	2	2	2	2	2	2	2	2	GASKET .. .312 I.D. x .500 O.D. x .078 in. thick
43	8451381	1	1	1	1	1	1	1	1	GLASS .. Sight
44	8319675	1	1	1	1	1	1	1	1	CAP .. Gauge
*45	9328197	1	1	1	1	1	1	1	1	GAUGE ASM. .. Oil - Curr. applied .. Repl. 8113998 and 8442288
46	8113999	1	1	1	1	1	1	1	1	ELBOW .. Oil gauge
47	8152070	1	1	1	1	1	1	1	1	GEAR .. Idler
48	8152069	1	1	1	1	1	1	1	1	GEAR .. Drive
49	444687	9	9	9	9	9	9	9	9	PLUG .. Pipe - Power case - 1/8 - 27 hex. socket
50	9409954	1	1	1	1	1	1	1	1	PLUG .. Pipe - Power case - 1/16 M.P.T. .. Formerly 8134425

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
51	8386787	1	-	-	-	-	-	-	-	SPRING .. Speeder - Governor 8374974
51	8113867	1	1	1	1	-	-	1	-	SPRING .. Speeder - Except governors 8489805, 8491943, 8365972, 8434921 and 8436101
51	8383167	-	-	1	1	1	1	1	1	SPRING .. Speeder - Except governors 8489805 and 8466953
51	8446587	-	-	-	-	1	-	-	-	SPRING .. Speeder - Governor 8466953
*52	8359662	1	-	-	1	-	1	-	-	SLEEVE ASM. .. Rotating - Governors 8374974, 8479805 and 8466953 .. Replaces 8326471
53	8326471	1	1	1	1	-	1	1	-	SLEEVE ASM. .. Rotating - Except governors 8376719 and 8368590 - Replaced by 8359662
*54	----	-	-	-	-	1	-	-	1	SLEEVE ASM. .. Rotating
*55	8328431	-	-	-	-	-	-	1	-	SLEEVE ASM. .. Rotating - Governors 8376719 and 8368590
56	8230297	1	1	1	1	-	1	AR	1	GEAR ASM. .. Ball head - Incl. bush. - Except Ref. No. 55
56	8328434	-	-	-	-	-	-	1	-	GEAR ASM. .. Ball head - Incl. bush. - Ref. No. 55
57	8149343	1	1	1	1	1	1	1	1	PLUNGER .. Pilot valve
58	8149341	1	1	1	1	1	1	1	1	BUSHING .. Compensating
59	274416	1	1	1	1	-	1	1	-	RING .. Snap - Pilot valve bushing body
*60	9432037	-	-	-	-	1	-	1	1	RING .. Retaining
*61	8326438	1	1	1	1	1	1	1	1	BALL HEAD ASSEMBLY
62	8149340	2	2	2	2	2	2	2	2	ARM ASSEMBLY .. Ball BEARING .. Needle
64	8326440	1	1	1	1	1	1	1	1	BALL HEAD
ϕ65	----	8	8	8	8	8	8	8	8	PIN .. Cotter - 1/16 x 1/2 in. long - Form. applied Pt. No. 103361
ϕ65	190432	8	8	8	8	8	8	8	8	PIN .. Cotter - 1/16 x 1/2 in. long - Corrosion resistant steel - Currently applied
66	8149338	4	4	4	4	4	4	4	4	PIN .. Ball arm
*67	8230299	1	1	1	1	1	1	1	1	COUPLING ASSEMBLY .. Spring
68	8017599	1	1	1	1	-	1	1	-	NUT .. Pilot valve plunger
68	8291770	-	-	-	-	1	-	-	1	NUT .. Pilot valve plunger
69	8149345	1	1	1	1	1	1	1	1	BEARING .. Thrust
70	8230323	1	1	1	1	1	1	1	1	BEARING .. Ball
71	107761	1	1	1	1	-	1	1	-	PIN .. Cotter - Pilot valve plunger - 1/16 x 5/8 in. long
71	----	-	-	-	-	1	-	-	1	PIN .. Cotter - Pilot valve plunger - 1/16 x 5/8 in. long
72	8068098	1	1	1	1	1	1	1	1	WASHER .. Adjusting spring
73	100751	1	1	1	1	-	1	1	-	SCREW .. 8-32 x 1/2 round head - Slotted
73	159592	-	-	-	-	1	-	-	1	SCREW .. 8-32 x 1/2 pan head - Cross recess
74	121752	1	1	1	1	-	1	1	-	WASHER .. Lock - No. 8 .. Formerly 106496
74	----	-	-	-	-	1	-	-	1	WASHER .. Lock - No. 8
75	426241	8	8	8	8	-	8	8	-	WASHER .. Lock - No. 5
76	8152338	1	1	1	1	1	1	1	1	SPRING .. Adjusting
77	9094183	1	1	1	1	1	1	1	1	RING .. Oil seal - Replaces 8230301 and 8488972
78	8350086	1	-	-	1	-	1	-	-	ROD .. Shutdown - Ref. No. 52
78	8350083	1	1	1	-	-	1	1	-	ROD .. Shutdown - Ref. No's. 53 and 54
*78	----	-	-	-	-	1	-	-	1	ROD .. Shutdown
79	224935	8	8	8	8	-	8	8	-	SCREW .. 5-40 x 5/16 fil. head - Slotted
80	8149346	1	1	1	1	1	1	1	1	SEAT .. Speeder spring
81	8319638	1	1	1	1	-	1	1	-	WASHER .. .178 I.D. x .312 O.D. x .031 thick
82	8327388	1	1	1	1	1	1	1	1	COLUMN ASSEMBLY .. Governor
*83	8327394	2	2	2	2	2	2	2	2	INSERT .. Thread
84	444687	5	5	5	5	5	5	5	5	PLUG .. Pipe - 1/8 - 27 hex. socket
85	8113823	1	1	1	1	-	-	1	-	STUD .. Bearing - Except governors 8489805 and 8491943
86	8113848	1	1	1	1	1	1	1	1	GEAR .. Rotating bushing
87	8113839	1	1	1	1	1	1	1	1	SPRING .. Pilot bushing
88	8113815	1	1	1	1	1	1	1	1	BUSHING .. Regulating
89	8113816	1	1	1	1	1	1	1	1	RETAINER .. Regulating
90	8113817	1	1	1	1	1	1	1	1	COLLAR .. Retaining spring
91	8113845	1	1	1	1	1	1	1	1	SPRING .. Retainer - Regulating bushing
92	8113835	1	1	1	1	-	-	1	-	SPRING .. Pilot valve - Except governor 8489805

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
93	8113830	1	1	1	1	1	1	1	1	BEARING .. Thrust
*94	8113974	-	-	2	-	-	-	2	-	PIN .. Straight - 1/8 x 1 in. drilled hd. - Governors 8385287, 8479891, 8376719 and 8368590
*94	8113833	1	1	2	2	2	1	1	1	PIN .. Straight - 1/8 x 3/4 in. drilled head
*95	119981	3	3	3	3	3	3	3	3	PIN .. Cotter - 1/16 x 3/8 in. long
96	8113811	1	1	1	1	1	1	1	1	PISTON .. Oil failure
97	8113838	1	1	1	1	1	1	1	1	SPRING .. Oil failure piston
98	8113780	1	1	1	1	1	1	1	1	BUSHING .. Oil failure valve
99	8113850	1	1	1	1	1	1	1	1	GASKET .. Oil failure bushing
*100	187865	-	-	-	-	-	-	1	-	SCREW .. 1/4 - 28 x 1/2 round head - Except governors 8376719 and 8368590
*100	181561	1	1	1	1	-	-	1	1	SCREW .. 1/4 - 28 x 1/2 hex. head - Except governors 9099162 and 9082625
101	138214	3	3	3	3	3	3	3	3	SCREW .. 1/4 - 28 x 1-1/2 hex. head
102	8163437	1	1	1	1	1	1	1	1	WASHER .. Plain - 1/4
103	8193508	1	1	1	1	1	1	1	1	PLUNGER .. Oil failure
104	8113819	1	1	1	1	1	1	1	1	WASHER .. Diaphragm
105	8327387	1	1	1	1	1	1	1	1	VALVE ASSEMBLY .. By-pass
*106	8327393	1	1	1	1	1	1	1	1	PLUNGER ASSEMBLY
107	8444617	1	1	1	1	1	1	1	1	O-RING .. Replaces 8223697
*108	456342	1	1	1	1	1	1	1	1	PIN .. Roll - 1/16 x 3/8 long - Slotted
109	9098534	1	1	1	1	1	1	1	1	WASHER .. Seal - Repl. 8235790 and 8440165
110	8235788	1	1	1	1	1	1	1	1	SPRING .. Seat retainer
111	8235789	1	1	1	1	1	1	1	1	SPRING .. By-pass valve
112	8235785	1	1	1	1	1	1	1	1	NUT .. Seal retainer
113	8235786	1	1	1	1	1	1	1	1	SLEEVE .. Retainer
114	8235787	1	1	1	1	1	1	1	1	SEAT .. By-pass valve spring
*115	9318632	1	1	1	1	1	1	1	1	O-RING
*115	8223696	-	-	-	4	-	-	4	-	O-RING .. Oil and heat resistant
*116	8201608	1	1	1	1	-	-	1	-	VALVE ASSEMBLY .. Lube - Except governors 8489805 and 8491943
117	8113790	1	1	2	1	-	-	1	-	NUT .. 3/8 - 24 hex.
118	104916	1	1	1	1	-	-	1	-	BALL .. 3/16 in. diameter
119	8201615	1	1	1	1	-	-	1	-	SEAT .. Ball valve
120	8201616	1	1	1	1	-	-	1	-	BODY .. Valve
121	9093702	3	3	3	3	-	-	3	2	O-RING .. Lube valve - Replaces 8223701 - Except governors 8489805 and 8491943
122	6101223	1	1	1	1	1	1	1	1	WASHER .. 21/64 I.D. x 9/16 O.D. x 1/16 in. thick
123	118750	1	1	1	1	-	-	1	-	UNION .. Half - Lube valve } Except governors
*124	8433771	1	1	1	1	-	-	1	1	WASHER .. Formerly 8166486 } 8489805 and 8491943
125	120499	-	-	1	-	-	-	-	-	ELBOW .. 1/4 F.P.T. x 90° - Except governors 8385287 and 8479891
125	444040	1	1	-	1	1	1	1	1	ELBOW .. Street - 1/4 tube
126	8040382	1	1	1	1	1	1	1	1	TEE .. Right angle - Lube shutdown
127	8158716	1	1	1	1	1	1	1	1	DIAPHRAGM .. Lube oil
128	5939163	1	1	1	1	1	1	1	1	NUT .. Stop - 10-32 hex. - Except governors 8385287, 8479891, 8365972, 8434921 and 8436101
129	8113837	1	1	1	1	1	1	1	1	SPRING .. Lube oil diaphragm
130	8201612	1	1	1	1	-	-	1	-	CAP .. Diaphragm - Open - Except governors 8489805, 8491943, 8365972, 8434921 and 8436101
*130	8429435	-	-	-	1	1	1	1	1	CAP .. Diaphragm - Closed
*131	8113790	2	2	2	2	-	-	2	-	NUT .. Diaphragm - 3/8 - 24 hex.
132	8201613	1	1	1	1	-	-	1	-	SCREW .. Diaph. stop - 10-32 x 1
133	8061137	1	1	1	1	-	-	1	-	WASHER .. Copper - 3/8 } Except governors
134	8113791	1	1	1	1	-	-	1	-	HOLDER .. Vacuum diaphragm } 8489805 & 8491943
135	8113788	1	1	1	1	-	-	1	-	DIAPHRAGM .. Vacuum
136	8113794	1	1	1	1	-	-	1	-	SPRING .. Vacuum diaphragm

P.L. No. B66

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	E	F	G	H	Description
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
*137	8382329	1	-	-	-	-	-	-	-	SERVO ASM. .. Governor 8374974
*138	8382335	1	1	-	1	-	-	-	-	SERVO ASM. .. Governors 8377428, 8377429, 8392035 and 8491943
*139	8327389	-	-	1	-	-	-	1	-	SERVO ASM. .. Governors 8381363 and 8436101
*140	----	-	-	-	1	-	-	-	-	SERVO ASM. .. Governor 8489805
*141	9339791	-	-	-	-	-	-	-	1	SERVO ASM. .. Governor 9099162
*142	9513985	-	-	-	-	1	-	-	1	SERVO ASM. .. Governors 9311283 and 9313476
*142A	8456344	-	-	-	-	-	-	1	-	SERVO ASM. .. Governors 8367961, 8380675 8381281, 8385042 and 8406909
*143	8452880	-	-	-	-	-	1	-	-	SERVO ASM. .. Governor 8466953
*144	----	-	-	-	-	-	1	-	-	SERVO ASM. .. Governor 8490772
145	8297038	-	-	-	-	-	1	-	-	PISTON ASM. .. Power - Governor 8466953
145	8217606	1	1	1	1	-	-	1	-	PISTON ASM. .. Power - Ref. Nos. 138, 139 and 142 A
*145	9513988	-	-	-	-	1	-	-	-	PISTON ASM. .. Power - Governor 9311283
*145	9513989	-	-	-	-	-	-	-	1	PISTON ASM. .. Power - Ref. No. 141
146	8359676	1	-	-	-	-	1	-	-	FULCRUM ASM. .. Piston - Ref. Nos. 137 and 143
146	8327396	1	1	1	1	-	-	1	-	FULCRUM ASM. .. Piston - Ref. Nos. 138 and 139
*146	9513992	-	-	-	-	1	-	-	1	FULCRUM ASM. .. Piston - Ref. Nos. 141 and 142
147	8335434	-	-	-	-	-	-	1	-	LINK ASM. .. Ref. No. 142A
147	8317983	1	-	-	-	-	-	-	-	LINK ASM. .. Ref. No. 137
147	9513990	-	-	-	-	1	-	-	1	LINK ASM. Ref. Nos. 141 and 142
148	8463565	-	-	1	-	-	1	1	-	LEVER ASM. .. Ref. Nos. 139, 143, and 144
148	8382330	1	1	-	-	-	-	-	-	LEVER ASM. .. Ref. Nos. 137 and 138
148	8327397	-	-	1	-	-	1	-	-	LEVER ASM. .. Governors 8381363 and 8466953
*148	9513991	-	-	-	-	1	-	-	1	LEVER ASM. .. Ref. Nos. 141 and 142
*149	8306026	1	1	1	1	1	1	1	-	INSERT .. Thread
*150	8327395	1	1	1	1	-	1	1	-	BRACKET ASM. .. Adj. screw
*151	8327407	1	1	1	1	-	1	1	-	INSERT .. Thread
*152	8359675	1	-	-	-	-	1	-	1	PLUNGER ASM. .. Droop - Ref. Nos. 137 and 144
*152	9520582	-	-	1	1	-	1	1	-	PLUNGER ASM. .. Droop - Ref. Nos. 142 and 143
*152	9514001	-	-	-	-	-	-	-	1	PLUNGER ASM. .. Droop - Ref. No. 141
*153	8477265	-	-	1	-	-	-	1	1	CYLINDER ASM. .. Power - Speeder spring Ref. No. 139 Governors 8365972 and 8368590
*153	8327399	1	-	-	-	-	-	1	-	CYLINDER ASM. .. Power - Speeder spring Ref. No. 142A and Governor 8377428
*153	8460052	-	1	-	1	-	1	-	1	CYLINDER ASM. .. Power - Speeder spring Governors 8377429, 8489805 and 8491943
*153	9513993	-	-	-	-	-	1	-	1	CYLINDER ASM. .. Power - Speeder spring Ref. Nos. 141 and 142
154	8326398	-	-	-	-	-	-	1	-	VALVE ASM. .. Check .. Formerly 8307375
*154	8201608	1	1	1	1	-	-	-	-	VALVE ASM. .. Lube - Ref. Nos. 137, 138 and 139
*154	8327387	1	1	1	1	1	1	1	1	VALVE ASM. .. By pass
*154	8479240	-	-	-	-	-	1	-	-	VALVE ASM. .. Needle - Ref. Nos. 143 and 144
*154	8357449	-	-	-	-	-	1	-	-	VALVE ASM. .. Flow control - Ref. Nos. 143 and 144
155	456342	1	1	1	1	-	1	1	-	PIN .. Roll - 1/16 x 3/8 in. long } Except Ref. Nos.
156	8327400	1	1	1	1	-	1	1	-	SPACER .. 1/4 in. O.D. } 140 and 144
*157	120614	2	2	3	2	2	2	2	-	NUT .. 10-32 hex.
*158	8113662	1	-	-	-	1	1	-	1	WASHER .. Plain - .437 O.D. - Ref. Nos. 137 and 143
*159	115545	2	2	2	2	-	-	2	-	WASHER .. Lock - No. 10 - Except Ref. No. 137
*160	8095907	1	1	1	1	-	-	1	-	NUT .. 10-32 hex. - Except Ref. No. 137
*161	222382	1	1	1	1	1	1	1	1	SCREW .. Stop - Power piston 10-32 x 7/8 hex. socket } Except Ref.
162	133634	1	1	1	1	-	1	1	-	SCREW .. 10-32 x 1/2 flat head } Nos. 140 and
163	8387627	1	1	1	1	1	1	1	1	NUT .. Stop - 10-32 hex. } 144
164	8327401	1	1	1	1	-	1	1	-	SPRING .. Torsion
*164	9513994	-	-	-	-	1	-	-	1	SPRING - By pass activating - Ref. No. 142

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	E	F	G	H	Description
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	----									SERVO ASM.
165	140858	1	1	1	1	1	1	1	1	SCREW .. Set - 8-32 x 1/2 hex. head
166	8327402	1	1	1	1	-	1	1	-	LINK .. Load control
166	----	-	-	-	-	1	-	-	1	LINK .. Load control } Except Ref. Nos. 140 and 144
167	8327403	1	1	1	1	-	1	1	-	SLEEVE .. Servo - .214 in. dia.
168	8327404	1	1	1	1	-	1	1	-	SLEEVE .. Servo - .1860 in. dia.
169	8327405	1	1	1	1	-	1	1	-	LINK .. Load control
*169	9513996	-	-	-	-	1	-	-	1	LINK .. Load control - Ref. Nos. 141 and 142
*170	9419956	1	1	1	1	-	1	1	-	SCREW .. 6-32 x 3/8 socket head
*171	8327406	1	-	-	-	-	1	-	-	SCREW .. Adjusting - Ref. Nos. 137 and 143
*171	8348965	1	1	1	1	-	-	1	-	SCREW .. Adjusting - Except Ref. No. 137
*172	8359681	1	1	1	1	1	1	1	1	PIN .. Guide - Except Ref. Nos. 140 and 144
*173	8113972	1	1	-	1	-	-	-	-	LINK .. Pivot pin - Except Ref. Nos. 139 and 140
*174	119981	1	1	-	1	-	-	-	-	PIN .. Cotter - 1/16 x 38 in. long - Qty. 3 req'd. for Ref. No. 137 - Except Ref. Nos. 139 and 140
*175	148028	1	-	-	-	-	-	-	-	SCREW .. 10-32 x 3/8 phil. head - Ref. No. 137
*175	----	-	-	-	-	1	1	-	1	SCREW .. Except Ref. No. 144
*176	8149306	1	-	-	-	1	1	-	1	SCALE .. Speed indicator - Ref. Nos. 137 and 143
*177	8297041	1	-	-	-	1	1	-	1	CAP .. Droop plunger - Ref. Nos. 137, 141 and 143
*178	8366063	1	1	-	1	-	1	-	1	PIN .. Headed - Except Ref. Nos. 139, 140 and 144
*179	8382337	1	1	-	1	-	-	-	-	SPACER .. Except Ref. Nos. 139 and 140
*179	8068098	-	-	-	-	-	1	-	-	SPACER .. Ref. No. 143
*180	8398556	1	-	-	-	-	-	-	-	PIN .. Spacer - Ref. No. 137
*181	----	1	1	1	1	1	1	1	1	RING .. Retaining
182	9087347	As Required								O-RING .. .239 I.D. - Replaces 8223696
183	8113991	3	3	2	3	1	3	3	2	WASHER .. Steel - .500 O.D. - Except gov. 9082625
184	8017584	1	1	1	1	1	1	1	1	SCREW .. Taper
*185	181566	1	1	1	1	1	1	1	1	SCREW .. 1/4 - 28 x 3/4 hex. head
*186	8113800	18	18	18	18	18	18	18	18	WASHER .. Lock - 1/4 - Qty. 16 req. for gov. 8489805
187	8134416	1	1	3	1	2	1	1	2	SCREW .. 1/4 - 28 x 1-3/8 hex. head - Except gov. 9311283
188	138211	11	11	11	11	11	11	11	11	SCREW .. Cap - 1/4 - 28 x 3/4 hex. socket head
189	8221978	1	1	1	1	1	1	1	1	PLUNGER ASSEMBLY .. Shutdown
190	8113779	1	1	1	1	1	1	1	1	TUBING .. Shutdown plunger
191	8223698	1	1	1	1	1	1	1	1	SEAL .. .500 O.D. - Except governor 8490772
192	8328094	1	1	1	1	1	1	1	1	STOP .. Shutdown piston
*193	8364000	1	-	-	-	-	-	-	-	RECEIVER ASM. .. Pneumatic - Governors 8374974 and 8377428
*194	8456341	-	1	-	-	-	-	-	-	RECEIVER ASM. .. Pneumatic - Formerly 8382339 Governor 8377429
*195	8335431	-	-	1	-	-	-	1	-	RECEIVER ASM. .. Pneumatic - Governors 8479891 8376719 and 8368590
*196	8446588	-	-	1	-	-	-	-	-	RECEIVER ASM. .. Pneumatic - Formerly 8384153 Governor 8381363
*197	8400141	-	-	-	1	-	-	-	-	RECEIVER ASM. .. Pneumatic - Governor 8392035
*198	8456346	-	-	-	1	-	-	-	-	RECEIVER ASM. .. Pneumatic - Governor 8489805
*199	----	-	-	-	1	-	-	-	-	RECEIVER ASM. .. Pneumatic - Governor 8491943
*200	8453116	-	-	-	-	-	1	1	-	RECEIVER ASM. .. Pneumatic - Governors 8367961 8380675, 8381281, 8406909 and 8466953
*201	----	-	-	-	-	-	-	1	-	RECEIVER ASM. .. Pneumatic - Formerly 8446583 Governor 8436101
*201A	----	-	-	-	-	-	1	-	1	RECEIVER ASM. .. Pneumatic - 75 VDC Governors 8490772 and 9313476
*202	----	-	-	-	-	-	-	-	1	RECEIVER ASM. .. Pneumatic - Formerly 8446588 Governor 9082625
*203	----	-	-	-	-	-	-	-	1	RECEIVER ASM. .. Pneumatic - Governor 9099162
204	8203171	1	1	1	1	1	1	1	1	PLUNGER ASSEMBLY .. Shutdown
*205	8327408	1	1	1	1	1	1	1	1	SCREW ASSEMBLY .. Speed setting
206	8446585	1	1	1	1	1	1	1	1	LEVER ASM. .. Speed setting - Formerly 8335432
207	8327411	1	1	1	1	1	1	1	1	LINK ASSEMBLY .. Pilot valve
*208	8349593	1	1	1	1	1	1	1	1	NUT ASSEMBLY .. Speed setting

P.L. No. B66

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
										RECEIVER ASSEMBLY .. Pneumatic
*209	8335434	1	1	1	1	1	1	1	1	LINK ASSEMBLY
210	8327443	4	4	4	4	4	4	4	4	PIN .. .126/.1265 x .250 long
211	8335439	1	1	1	1	1	1	1	1	LINK .. .406-.416 dia.
212	8335438	1	1	1	1	1	1	1	1	NUT .. .170-.176 dia.
213	8335440	1	1	1	1	1	1	1	1	COLLAR .. .438-.440 dia.
*214	140932	1	1	1	1	1	1	1	1	SCREW .. Set - 8-32 x 3/8 dog point
215	8327410	1	1	1	1	1	1	1	1	BRACKET ASSEMBLY .. Speed control
216	120217	2	2	2	2	2	2	2	2	WASHER .. Lock - No. 10
217	186542	2	2	2	2	2	2	2	2	SCREW .. Socket head - 10-24 x 1/2 in. long
*218	8306026	1	1	1	1	1	1	1	1	INSERT .. Thread - 8-32
*219	140855	1	1	1	1	1	1	1	1	SCREW .. Set - 8-32 x 5/16 in. long
220	8335433	1	1	1	1	1	1	1	1	SHAFT ASSEMBLY .. Speed setting
221	8113990	1	1	1	1	1	1	1	1	NUT .. Stop
222	8061771	1	1	1	1	1	1	1	1	SPRING .. Friction drive
223	8327439	1	1	1	1	1	1	1	1	SPRING .. Clutch
224	8327441	1	1	1	1	1	1	1	1	KNOB
*225	8113761	1	1	1	1	1	1	1	1	WASHER .. Solenoid plunger
*225	138526	2	-	2	-	-	-	2	-	WASHER .. #6 shakeproof
*226	8113739	1	1	1	1	1	1	1	1	NUT .. Lock
227	8113989	1	1	1	1	1	1	1	1	SPRING .. Washer
228	8113743	1	1	1	1	1	1	1	1	PIN .. Plunger guide locating
*229	8132452	1	1	1	1	1	1	1	1	BODY .. Shutdown plunger
*230	8326421	1	1	1	1	1	1	1	1	PLUG .. Plunger stop
*231	9413499	1	1	1	1	1	1	1	1	BEARING .. Ball
232	8247158	2	2	2	2	2	2	2	2	O-RING .. Replaces 8430050
*233	8349594	4	4	4	4	4	4	4	4	WASHER .. .375 O.D.
234	8133719	2	2	2	2	2	2	2	2	BUSHING .. Solenoid plunger
*235	119981	4	4	4	4	4	4	4	4	PIN .. Cotter - 1/16 x 3/8 long - Repl. 112526
236	112726	1	1	1	1	1	1	1	1	PIN .. Cotter .. 1/16 x 5/16 long - Repl. 137127
*236	112526	-	-	-	4	-	-	-	-	PIN .. Cotter
237	8083732	1	1	1	1	1	1	1	1	WASHER .. .625 O.D. x .391 I.D. x .060 in. thick
238	8113744	2	2	2	2	2	2	2	2	WASHER .. Solenoid shield
239	8327416	1	1	1	1	1	1	1	1	WASHER .. Copper
240	120614	1	1	1	1	1	1	1	1	NUT .. 10-32 hex.
241	115545	2	2	2	2	-	-	2	2	WASHER .. Lock - No. 10 - Except Ref. Nos. 199, 200 & 203
242	140880	1	1	1	1	1	1	1	1	SCREW .. Set - 10-32 x 1/4
243	145639	1	1	1	1	1	1	1	1	BALL .. Steel
*244	5939163	-	1	-	1	-	-	1	1	NUT .. Elastic stop - 10-32 hex. - Except Ref. Nos. 199, 200 and 203
*245	117327	4	4	4	4	4	4	4	4	SCREW .. 4-40 x 1/4 flat head
*245	159229	2	-	2	-	-	-	2	-	SCREW .. #6 pan head
246	8329355	As Required								WIRE .. Black - 20 AWG - 25 ft. length
247	8329358	As Required								WIRE .. White - 20 AWG. - 25 ft. length
248	8329359	As Required								WIRE .. Yellow - 20 AWG. - 25 ft. length
249	8329361	As Required								WIRE .. Pink - 20 AWG. - 25 ft. length
250	8329362	As Required								WIRE .. Orange - 20 AWG. - 25 ft. length
251	8329363	As Required								WIRE .. Brown - 20 AWG. - 25 ft. length
*252	8481009	As Required								TUBING .. Teflon - No. 4 clear - 5 ft. long
*253	8481010	As Required								TUBING .. Teflon - No. 6 clear - 5 ft. long
*254	8481008	As Required								TUBING .. Teflon - No. 8 clear - 5 ft. long
255	8152184	2	2	2	2	2	2	2	2	TUBING .. Teflon - No. 0 clear - 3/16 in.
*256	8270628	1	-	-	1	-	-	-	-	WASHER .. Lock - Ref. Nos. 193 and 197
*257	451783	-	1	1	2	-	-	2	-	SCREW .. 10-32 x 2-1/8 socket head
*258	----	4	4	4	4	4	4	4	4	SCREW .. 6-32 x 3/8 fil. head - Formerly 154978
*259	8327417	1	1	1	1	1	1	1	1	SCREW .. 10-32 x 1 button head

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	----	1	1	1	1	1	1	1	1	RECEIVER ASSEMBLY .. Pneumatic
*260	8327418	1	1	1	1	-	-	1	1	NUT .. Lock - 10-32 hex. - Except Ref. Nos. 195, 199, 200 and 203
261	140851	1	1	1	1	1	1	1	1	SCREW .. Set - 10-32 x 1 hex. socket
262	8152443	1	1	1	1	1	1	1	1	SPRING .. Unloading
263	8327419	1	1	1	1	1	1	1	1	SPRING .. Friction
264	8487290	1	1	1	1	1	1	1	1	SPRING .. Tension .. Formerly 8327420
265	8113755	1	1	1	1	1	1	1	1	SWITCH .. Lube oil signal
*266	8329469	2	-	2	2	-	-	2	2	CLAMP .. Wire - 1/4 in. dia. - Ref. Nos. 193, 195, 196, 197, 201 and 203
267	8113756	1	-	-	1	1	1	1	1	COIL .. Solenoid - Except Ref. Nos. 199, 200, 201, 202 & 203
267	8276965	-	1	1	-	-	-	1	-	COIL .. Solenoid - Ref. Nos. 194, 195 and 201 - Form. 8376965
267	8343351	-	-	1	-	-	-	-	1	COIL .. Solenoid - Ref. Nos. 196 and 202
*268	8357795	-	2	2	2	2	2	2	2	RECTIFIER
269	8129082	1	1	1	1	1	1	1	1	PAPER .. Insulator
*270	8200229	As Required								TERMINAL .. Stakon
*271	8349596	-	1	1	1	1	1	1	1	BLOCK .. Rectifier mounting
*272	8306022	2	-	-	2	2	2	2	2	LUG .. Soldering - Except Ref. Nos. 198, 199, 201 and 203
*273	8364004	1	1	-	1	-	-	-	-	RECEPTICAL .. 10 pin
*273	8327422	-	-	1	-	-	1	1	1	RECEPTICAL .. 5 pin
274	8321531	1	1	1	1	1	1	1	1	GASKET .. Receiver cup
275	8321532	1	1	1	1	1	1	1	1	GASKET .. Cover
*276	8327423	2	2	2	2	2	2	2	2	PIN .. Dowel
277	8327424	1	1	1	1	1	1	1	1	PIN .. Spring anchor
278	8327425	1	1	1	1	1	1	1	1	PIN .. Spring anchor
279	9419955	1	1	1	1	1	1	1	1	SCREW .. 5-40 x 3/4 socket head
280	117608	2	2	2	2	-	-	2	2	SCREW .. 10-32 x 3 fil. head
*281	8327427	1	1	1	1	1	1	1	1	PLATE .. Dial
281A	8327426	1	1	1	1	1	1	1	1	SCREW .. Pilot - Bracket
*282	100702	-	-	-	-	1	1	1	-	SCREW .. 6-32 x 7/8 fil. hd. slotted
283	8152429	1	1	1	1	1	1	1	1	SEAT .. Shutdown rod
284	8152442	1	1	1	1	1	1	1	1	ROD .. Solenoid plunger
285	8203169	1	1	1	1	1	1	1	1	SCREW .. Adjusting
286	8203170	1	1	1	1	1	1	1	1	CASE .. Solenoid
287	8203172	1	1	1	1	1	1	1	1	PIN .. Lock - Solenoid plunger
288	8202849	1	1	1	1	1	1	1	1	BRACKET .. Switch mounting
289	8202850	1	1	1	1	1	1	1	1	PLATE .. Switch bracket clamp
290	8327428	2	2	2	2	2	2	2	2	NUT .. Lock
291	8327429	1	1	1	1	1	1	1	1	SPACER .. .370 in. long
292	8327430	1	1	1	1	1	1	1	1	SCREW .. Passage
293	8327431	1	1	1	1	1	1	1	1	BRACKET .. Switch
294	8327432	1	1	1	1	1	1	1	1	SEAT .. Spring
295	8349597	-	1	1	1	1	1	1	1	COVER .. Rectifier
296	8349591	1	1	1	1	2	2	2	2	BRACKET .. Pivot
297	8327436	1	1	1	1	1	1	1	1	SCREW .. Knurled head
298	8327437	1	1	1	1	1	1	1	1	WASHER .. Low speed stop
299	8327438	1	1	1	1	1	1	1	1	PIN .. Speed setting spring
*300	426241	1	1	1	1	1	1	1	1	WASHER .. Lock - No. 5
*301	8335436	1	1	1	1	1	1	1	1	PIN .. Straight - .1875 dia. x 1.875 in. long
*302	106497	2	2	2	2	2	2	2	2	WASHER .. Lock - No. 10
*303	9415959	1	1	1	1	1	1	1	1	SCREW .. 10-32 x 1-1/8 hex. soc. hd.
*304	9513997	-	-	-	-	1	-	-	1	BLOCK .. By-pass adjusting
*305	8149705	-	-	-	-	-	10	10	-	WASHER .. Lock
*306	193257	1	1	1	1	1	1	1	1	SCREW .. 6-32 x 1/4 round head - Slotted .. Replaces 132688
*307	115543	1	1	1	1	1	1	1	1	WASHER .. Lock - No. 6 internal tooth
*308	177812	-	1	1	1	1	1	1	1	SCREW .. 10-32 x 3/4 fil. head
*309	8352997	1	1	-	1	1	1	1	1	STRAP .. Wire bundle

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	----	1	1	1	1	1	1	1	1	RECEIVER ASSEMBLY .. Pneumatic
*310	8326420	-	1	1	1	1	1	1	1	WASHER .. Plain - .149 I.D. x .375 O.D. x .032
*311	273751	1	1	1	1	1	1	1	1	PIN .. Roll
*311A	8493660	1	-	1	1	1	1	1	1	PIN .. Man. shutdown - 1.266 in. long
*311B	131181	-	-	-	1	1	1	1	1	WASHER .. Lock - No. 6 light spring
*312	8449591	-	1	1	1	2	2	1	1	PAPER .. Insulator - Qty. 2 req'd. for Ref. No. 200
*313	8276671	1	-	-	-	-	-	-	-	PIN .. Roll
*314	9513995	-	-	-	-	1	-	-	1	ROD .. By-pass actuating
*315	8493663	-	-	-	1	-	-	-	-	SLEEVE .. Teflon
*316	8284048	1	1	1	1	4	4	1	1	WASHER .. Plain - .188 I.D. - Qty. 4 req'd. for Ref. No. 200
317	118753	1	1	1	1	1	1	1	1	ELBOW .. Tube - 1/4 x 1/8 N.P.T.
318	181568	As Required								SCREW .. 1/4 - 28 x 1 hex. head
*319	138213	1	1	1	1	1	1	1	1	SCREW .. 1/4 - 28 x 1-1/4 socket head
*320	138215	1	1	1	1	1	1	1	1	SCREW .. 1/4 - 28 x 1-3/4 socket head
*321	8147713	1	1	1	1	-	-	1	-	SCREW .. 1/4 - 28 x 2-3/8 socket head - Except Governors 8385287, 8379891 and 8489805
*322	8113844	1	1	1	1	-	-	1	-	SPRING .. Floating lever link - Except Governors 8385287, 8379891 and 8489805
*323	8327391	1	1	1	1	1	1	1	1	SPRING .. Compression
324	8303067	1	1	1	1	1	1	1	1	GASKET .. Side plate
325	8303066	1	1	1	1	1	1	1	1	PLATE .. Side
326	8327392	1	1	1	1	1	-	1	-	PIN .. By-pass - Except governor 8392035
*327	8317985	1	1	-	1	-	-	-	-	BRACKET ASSEMBLY .. Switch
*328	8317987	1	1	-	1	-	-	-	-	SHAFT ASSEMBLY .. Operating
*329	8317988	1	1	-	1	-	-	-	-	BRACKET ASSEMBLY .. Switch
*330	120614	1	1	-	1	-	-	-	-	NUT .. Machine - 10-32 hex.
*331	187828	1	1	-	1	-	-	-	-	SCREW .. Cap - 10-32 x 1/2 hex. head
*332	125982	1	1	-	1	-	-	-	-	SCREW .. Machine - 10-32 x 1/2 hex. head
*333	8392468	1	1	-	1	-	-	-	-	SCREW .. Set - 10-32 x 3/4 in. long
*334	8317989	1	1	-	1	-	-	-	-	SPRING .. Switch
*335	8311282	1	1	-	1	-	-	-	-	SWITCH .. Micro
*336	8317990	1	1	-	1	-	-	-	-	LEVER .. Spring
*337	8317991	1	-	1	-	-	-	-	-	LEVER .. Switch
*338	8382330	1	1	-	1	-	-	-	-	LEVER ASM. .. Floating - Adjustable - Except governor 8392035
*339	8400139	-	-	-	1	1	1	-	-	LEVER ASM. .. Floating - Adjustable - governors 8392035, 8466953 and 9311283
*340	9513986	-	-	-	-	1	1	-	-	LEVER ASM. .. Floating - Adjustable .. Formerly 8479252
*341	8317983	1	1	-	1	-	-	-	-	LINK ASSEMBLY .. Lever
*342	8382331	1	1	-	1	-	-	-	-	LEVER ASSEMBLY .. Floating
*343	8113767	1	1	-	1	1	-	-	-	KNOB .. Adjusting screw
*344	8113768	1	1	-	1	1	1	-	-	PIN .. Adjusting screw
*345	119981	1	1	-	1	-	-	-	-	PIN .. Cotter - 1/16 x 3/8 in. long
*346	8318226	1	1	-	1	-	-	-	-	WASHER .. Plain - .375 O.D.
*347	8113772	1	1	-	1	1	-	-	-	SPRING .. Compensating
*348	8314686	1	1	-	1	-	-	-	-	SPACER .. Limit
*349	8479253	-	-	-	-	1	1	-	-	ECCENTRIC .. Wide link
*350	8452881	-	-	-	-	1	1	-	-	LINK .. Pivot pin
*351	8433217	-	-	-	-	1	1	-	-	PIN .. Movable fulcrum
*352	8433219	-	-	-	-	1	1	-	-	BLOCK .. Adjusting
*353	8400140	-	-	-	1	-	-	-	-	SWITCH ASSEMBLY .. Limit
*354	8193296	-	-	-	1	-	-	-	-	BRACKET ASM. .. Switch
*355	8191964	-	-	-	1	-	-	-	-	SPACER .. Lever
*356	121801	-	-	-	3	-	-	-	-	WASHER .. Lock - No. 10 int. tooth - Formerly 115545
*357	125982	-	-	-	3	-	-	-	-	SCREW .. Switch lever - 10-32 x 1/2 hex. head
*358	120380	-	-	-	1	-	-	-	-	WASHER .. Lock - 1/4
*359	154966	-	-	-	2	-	-	-	-	SCREW

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
		-	-	-	1	-	-	-	-	SWITCH ASSEMBLY .. Limit
*360	274676	-	-	-	1	-	-	-	-	RING .. Retaining
*361	8191962	-	-	-	1	-	-	-	-	SPRING .. Torsion
*362	8311242	-	-	-	1	-	-	-	-	SWITCH .. Micro
*363	8235575	-	-	-	1	-	-	-	-	SWITCH .. Limit
*364	106495	-	-	-	1	-	-	-	-	WASHER .. Lock - Formerly 131181
*365	8191878	-	-	-	1	-	-	-	-	SHAFT .. Switch
*366	8191879	-	-	-	1	-	-	-	-	LEVER .. Shaft
*367	8191880	-	-	-	1	-	-	-	-	LEVER .. Switch
*368	8364002	1	-	-	1	-	-	-	-	BRACKET .. Switch
*369	8400142	-	-	-	1	-	-	-	-	PLATE .. Switch
*370	8113778	1	1	-	1	-	-	-	-	PIN .. Spring - 5-32 x 3/4 in. long - Except governors 8392035 and 8489805
*371	120614	2	2	-	2	-	-	-	-	NUT .. 10-32 hex. - Except governor 8392035
*372	8326443	1	1	-	1	-	-	-	-	NUT .. Lock - 3/8 - 24 - Except governors 8377429, 8392035 and 8489805
*373	125982	2	2	-	2	-	-	-	-	SCREW .. Cap - 10-32 x 1/2 - Except governor 8392035
*374	138216	1	1	-	1	-	-	-	-	SCREW .. Cap - 1/4 - 28 x 2 soc. hd. - Governor 8392035
*375	8348619	-	-	-	4	-	-	-	-	PLUG .. Pipe - 3/8 M.P.T. soc. hd. - Governor 8392035
*376	8392343	-	-	-	1	1	1	-	1	PIN .. Drilled straight
*377	8247158	-	-	-	-	-	-	2	-	O-Ring .. .176 I.D. x .070
*378	9316534	-	-	-	-	-	-	1	-	TUBING .. 3 AWG. Teflon
*379	8299215	-	-	-	-	-	-	1	-	INSERT .. 10-32 x .38 NF 2B thread
*380	8335437	-	-	-	-	-	-	1	-	SHAFT .. Manual speed adjusting
381	8386786	1	-	-	-	-	-	1	-	SPRING ASM. .. Speed setting - Gov. 8374974
381	8327381	1	1	1	1	-	1	1	1	SPRING ASM. .. Speed setting - Except governors 8368590, 8491943, 9311283 and 9313476
381	8477338	-	-	-	1	1	-	1	1	SPRING ASM. .. Speed setting - Governors 8368590, 8491943, 9311283 and 9313476
382	8217607	1	1	1	1	1	1	1	1	PLUG ASM. .. Spring check
*383	8327379	-	-	1	1	-	-	1	-	BOX ASM. .. Bellows - Except governor 8377428 and 8436101
*383	8382332	1	-	-	-	-	-	-	-	BOX ASM. .. Bellows - Governor 8377428
*383	8343346	-	-	-	-	-	1	1	-	BOX ASM. .. Bellows - Governor 8466953 and 8436101
*383	9339542	-	-	-	-	1	1	1	1	BOX ASM. .. Bellows - Governors 8490772 9082625, 9086256, 9099162 and 9311283
384	8327385	1	1	1	1	1	1	1	1	BELLOWS ASM. .. Except governors 8377428 8436101 and 8466953
384	8382336	1	-	-	-	-	-	-	-	BELLOWS ASM. .. Governor 8377428
384	8343349	-	-	-	-	-	1	1	-	BELLOWS ASM. .. Governors 8466953 and 8436101
385	9419953	1	1	1	1	1	1	1	1	SCREW .. Set - Socket head
386	9411617	1	1	1	1	1	1	-	1	RING .. Snap
387	8321533	1	1	1	1	-	-	-	-	O-Ring .. Except governor 8377428
387	8382066	1	-	-	-	-	-	-	-	O-Ring .. Governor 8377428
387	8446630	-	-	-	-	1	1	-	1	O-Ring
388	8327386	1	1	1	1	-	1	1	-	CUP .. Pneumatic receiver - Except governor 8466953
388		-	-	-	-	1	1	-	1	CUP .. Pneumatic receiver
*ϕ389	8404120	1	1	-	-	-	-	-	-	CYLINDER ASM. .. Power
*ϕ390	8328432	1	1	-	1	-	-	1	-	CYLINDER ASM. .. Power - Governors 8374974 8377428, 8377429, 8392035, 8376719 and 8368590
*ϕ391	8404126	-	-	1	-	-	-	1	-	CYLINDER ASM. .. Power - Governors 8381363 8365972, 8434921 and 8436101
*ϕ392	8368478	-	-	1	-	-	-	1	-	CYLINDER ASM. .. Power

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
*ϕ393	8460052	-	-	-	1	-	-	-	1	CYLINDER ASM. .. Power - Governors 8489805, 8491943 and 9099162
*394		-	-	-	-	1	-	-	-	CYLINDER ASM. .. Power - Governor 9311283
*395	8479241	-	-	-	-	1	1	-	-	CYLINDER ASM. .. Power
*ϕ396	8477265	-	-	-	-	-	-	1	1	CYLINDER ASM. .. Power
397	8201590	1	1	1	1	1	1	1	1	PISTON ASSEMBLY .. Power
398	8353211	1	1	1	1	-	-	1	-	CYLINDER ASM. .. Power - Ref. Nos. 390 and 392
398	8404146	1	1	1	-	-	-	1	-	CYLINDER ASM. .. Power - Ref. Nos. 389 and 391
398	8460058	-	-	-	1	1	-	-	1	CYLINDER ASM. .. Power - Ref. Nos. 393 and 394
398	8479256	-	-	-	-	1	1	1	1	CYLINDER ASM. .. Power - Ref. No. 395 and 396
399	8113656	1	1	1	1	1	1	1	1	RING .. Seal - Spring guard
400	8113657	1	1	-	1	1	1	1	1	ROD .. Tail - Power piston - Except Ref. No. 396
401	8113658	1	1	-	1	1	1	1	1	NUT .. Lift - Tail rod
402	8201591	1	1	1	1	1	1	1	1	BEARING .. Needle - Terminal shaft
403	456382	1	1	1	1	1	1	1	1	BEARING .. Needle - Terminal shaft
404	8061742	1	1	1	1	1	1	1	1	SEAL .. Oil
405	8211818	1	1	1	1	1	1	1	1	SEAL .. Oil
406	8444617	1	1	1	1	1	1	1	1	O-RING .. Needle valve - Replaces 8223697
407	8223700	1	1	1	1	1	1	1	1	O-RING .. Spring guard
408	111840	1	1	1	1	1	1	1	1	PIN .. Taper - Except Ref. No. 394
*409	444687	1	1	1	1	1	1	1	1	PLUG .. Pipe - Cylinder cover
410	120423	4	4	4	4	4	4	4	4	WASHER .. Lock - 1/4 - Spring guard
411	8057114	2	2	2	2	2	2	2	2	WASHER .. Lock - 5/16 - Power lever
412	115549	1	1	-	1	1	1	1	1	WASHER .. Lock - 3/8 - Tailrod - Except Ref. Nos. 391, 392 and 396
412	8368476	-	-	1	-	-	-	1	1	WASHER .. Plain - .45 I.D. x .62 O.D. x .03 thick
413	145368	2	2	2	2	2	2	2	2	SCREW .. Drive - Scale - No. 2 - 3/16 round head
414	217908	2	2	2	2	2	2	2	2	SCREW .. 5-16-18 x 7/8 socket head - Power lever
415	9413435	2	2	2	2	2	2	2	2	RING .. Snap-in - Rod pin
416	106496	2	2	2	2	-	-	1	-	WASHER .. Lock - No. 8 - Pointer - Except Ref. Nos. 393, 394, 395 and 396
417	8113663	1	1	-	1	1	1	1	1	NUT .. Lock - 3/8 - 24 - Tail rod - Except Ref. Nos. 391 & 396
418	138211	8	8	8	8	8	7	8	8	SCREW .. 1/4 - 28 x 3/4 socket head - Qty. 7 required for Ref. Nos. 393 and 395
419	8134427	4	4	4	4	4	4	4	4	SCREW .. 1/4 - 28 x 1/2 socket head - Spring guard
420	8113800	8	8	8	8	10	9	8	8	WASHER .. Lock - No. 10 - Cover - Qty. 9 required for Ref. Nos. 393 and 395
421	106497	1	1	1	1	-	-	1	1	WASHER .. Lock - No. 10 - Rack lever - Except Ref. No. 393
422	442034	2	2	2	2	-	-	2	2	SCREW .. 8-32 x 3/8 socket head - Pointer - Ref. Nos. 390 and 392
423	8201593	1	1	1	1	1	1	1	1	NUT .. Stop - 7/16 - 20 - Piston rod
*424	9411494	2	2	2	2	2	2	2	2	RING .. Retaining .. Formerly 9411294
425	8113664	1	1	1	1	1	1	1	1	SPRING .. Guard seal
426	8149111	1	1	1	1	1	1	1	1	SPRING .. Servo
427	8201594	1	1	1	1	-	-	1	1	SCALE .. Terminal shaft - Except Ref. Nos. 390 and 393
427	8460056	-	-	-	1	1	1	-	-	SCALE .. Terminal shaft - Except Ref. No. 394
428	8152339	1	1	1	1	1	1	1	1	GASKET .. Guard to power cylinder
429	8201595	1	1	1	1	1	1	1	1	GASKET .. Cover to power cylinder
430	8149113	1	1	1	1	1	1	1	1	VALVE .. Needle
431	8326406	1	1	-	1	1	1	1	1	GUARD ASSEMBLY .. Spring - Except Ref. Nos. 391 & 392
*432	452656	1	1	-	1	1	1	1	1	INSERT .. Helicoil thread
*433	8149115	1	1	-	1	1	1	1	1	GUARD .. Spring
434	8201598	1	1	1	1	1	1	1	1	COVER .. Power cylinder
435	8201600	2	2	2	2	2	2	2	2	LINK .. Power piston
436	8201601	1	1	1	1	1	1	1	1	PIN .. Power lever
437	8201604	1	1	1	1	1	1	1	1	PIN .. Piston rod

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	----	1	1	1	1	1	1	1	1	CYLINDER ASSEMBLY .. Power
438	8201596	1	1	1	1	-	-	1	1	LEVER .. Rack dial - Except Ref. Nos. 393 and 396
438	8459853	-	-	1	-	-	-	1	1	LEVER .. Rack dial - Ref. Nos. 391 and 396
438	8463565	-	-	-	1	1	1	-	1	LEVER .. Rack dial - Ref. Nos. 393 and 395
438	8463566	-	-	-	-	1	-	-	-	LEVER .. Rack dial - Ref. No. 394
439	8201597	1	1	1	1	-	-	1	-	POINTER .. Ref. Nos. 390 and 392
439	8346334	1	1	1	1	-	-	1	-	POINTER .. Ref. Nos. 389 and 391
439	8463567	-	-	-	1	1	1	-	1	POINTER .. Except Ref. No. 390 & 396
440	8201599	1	1	1	1	1	1	1	1	LEVER .. Power piston
441	8201602	1	1	1	1	-	-	1	1	SHAFT .. Terminal - Except Ref. No. 393
441	8460057	-	-	-	1	1	1	1	-	SHAFT .. Terminal - Ref. Nos. 393 and 395
441	8463564	-	-	-	-	1	-	-	-	SHAFT .. Terminal - Ref. No. 394
*442	132046	1	1	1	1	-	-	1	1	SCREW .. 10-24 x 5/8 fil. head - Rack lever - Except Ref. No. 393
*443	8326407	1	1	-	1	1	1	1	1	SCREW .. Stop - Except Ref. Nos. 391 and 392
*444	120613	1	1	-	1	1	1	1	1	NUT .. 1/4 - 28 hex. - Except Ref. Nos. 391 and 392
ϕ445	8328087	1	1	1	1	-	-	1	-	COVER ASM. .. Governors 8374974, 8377428 8381363, 8385042, 8392035 and 8399511
ϕ446	8474727	-	-	-	-	-	1	1	-	COVER ASM. .. Governors 8365972 and 8466953
*447	9339543	1	-	1	-	-	1	1	1	COVER ASM. .. Ref. Nos. 445 and 446
ϕ448	8477318	-	-	-	-	-	-	-	1	COVER ASM. .. Governor 9099162
ϕ449	8327378	-	-	-	-	-	-	1	-	COVER ASM. .. Governor 8436101 - Form. 8327379
450	8131835	2	2	2	2	2	2	2	2	BUSHING .. Cover doweling
451	8061137	1	1	1	1	-	1	1	1	WASHER .. Copper - Except Ref. No. 447
452	8017559	1	1	1	1	1	1	1	1	CUP .. Oil filter
453	179838	1	1	1	1	-	-	1	-	SCREW .. 3/8 - 16 x 7/8 hex. head
454	8140550	1	1	1	1	1	1	1	1	GASKET .. Formerly 140550
455	145373	4	4	4	4	4	4	4	4	SCREW .. Drive - No. 6 x 1/4
456	8270586	1	1	1	1	1	1	1	1	PLATE .. Name
*457	8113846	1	1	1	1	1	-	1	1	SPRING .. S.D. plunger - Except Ref. No. 447
*458	455105	1	1	1	1	-	-	1	-	PIN .. Roll - Ref. No. 445
*459	443120	-	-	-	1	-	1	1	-	PIN .. Groove - Ref. No. 446
*460	8326402	1	1	1	1	-	1	1	1	PLUG .. Bearing - Except Ref. Nos. 448 and 449
*461	8326403	1	1	1	1	-	1	1	1	CAP .. Plunger - Except Ref. Nos. 448 and 449
*462	----	1	1	1	1	-	-	1	-	PLUNGER .. Ref. No. 445
*462	8474728	-	-	-	1	-	1	1	-	PLUNGER .. Ref. No. 446
*463	8328091	1	1	1	1	-	-	1	-	COVER .. Ref. No. 445
*463	8474729	-	-	-	1	-	1	1	-	COVER .. Ref. No. 446
*464	9339790	1	-	1	-	-	2	2	2	SHUTDOWN ASM. .. Manual
465	8113870	1	1	1	1	1	1	1	1	GASKET .. Case to column
466	8068098	4	4	4	4	4	4	4	4	WASHER .. Plain - 5/16
467	220342	6	6	6	6	6	6	6	6	SCREW .. Drive - Round head
468	8113869	1	1	1	1	1	1	1	1	GASKET
469	8113662	3	2	2	2	2	1	2	1	WASHER .. Lock - 3/16
470	8075907	1	1	1	1	1	-	1	1	NUT .. 10-32 hex. - Except governors 8491943 and 9311283
*471	179837	1	1	1	1	-	-	1	-	SCREW .. 3/8 - 16 x 3/4 hex. head
*472	8113927	4	4	4	4	4	4	4	4	SCREW .. 5/16 - 24 x 4 - 31/32 hex. head - Column to base
*473	8132974	3	3	3	3	3	3	3	3	CAP .. Shipping
474	431487	1	1	1	1	-	-	1	-	SCREW .. 10-32 x 5/8 socket head
*474	8365140	-	-	-	-	2	-	2	2	SCREW .. 24 x 7 - .250 hex. head
475	8134268	1	1	1	1	1	1	1	1	PLATE .. Name
*476	8359664	1	-	-	-	1	-	-	-	LEVER ASM. .. Droop - Governors 8374974 and 9086256
*477	----	-	-	-	1	-	-	-	-	LEVER ASM. .. Cam - Governor 8489805
*478	----	-	-	-	1	-	-	-	-	LEVER ASM. .. Floating adj. - Governor 8489805
*479	8113650	-	1	-	-	-	-	-	-	FUEL JACK ASM. .. Governor 8399511
*480	9500644	-	-	-	-	-	-	-	1	KIT ASM. .. Telescoping droop - Governor 9099162

P.L. No. B66

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
481	8257091	1	1	-	-	-	-	1	-	BUSHING .. Speed setting
*482	8328090	1	1	1	1	1	1	1	1	PLUG .. Speed setting bushing
483	8327383	1	1	1	1	1	1	1	1	COUPLING .. Bellows - Except governors 8377428 and 8466953
*484	8382334	1	-	-	-	-	-	-	-	COUPLING .. Bellows - Governor 8377428
*484	8343348	-	-	-	-	-	1	-	-	COUPLING .. Bellows - Governor 8466953
485	8113925	1	1	1	1	-	-	1	-	NUT .. Power piston - Except governors 8489805 and 8491943
*486	8140550	-	-	-	-	-	-	1	1	GASKET - Cover
487	119981	1	1	1	1	1	1	1	1	PIN .. Cotter - 1/16 x 3/8 in. long - Tail rod
488	107761	1	1	1	1	1	1	1	1	PIN .. Cotter - 1/16 x 5/8 in. long
489	8113832	1	1	1	1	-	-	1	-	PIN .. Headed - Tail rod - Except governors 8489805 and 8491943
*490	8132447	2	2	2	2	2	2	2	2	PIN .. Drive - Lock - Pointer
491	145368	2	2	2	2	2	2	2	2	SCREW .. Drive - Nameplate
492	8284037	2	2	2	2	2	2	2	2	NUT .. 8-32 hex. - Shutdown rod
493	8130450	2	2	2	2	-	-	2	-	SCREW .. 5/16 - 24 x 5-31/32 hex. head
494	138242	4	4	4	4	4	4	4	4	SCREW .. 3/8 - 16 x 1 socket head - Power cylinder
495	8152079	4	4	4	4	4	4	4	4	WASHER .. Lock - Power cylinder
496	8152077	2	2	2	2	2	2	2	2	PLATE .. Name - Bleed hole
*497	8351636	1	1	1	1	1	1	1	1	CAP .. Shipping
*498	8367182	1	-	-	1	-	-	1	1	DECAL .. Reads A.C. - Qty. 2 req'd. for governor 8374974 - Governors 8377428, 8392035, 8489805, 8365972, 8434921, 8366126, 8376696, 8378359, 8392034, 9313476, 9099162 and 8473885
*499	8367183	1	-	-	1	1	1	1	1	DECAL .. Reads 115 V - Qty. 2 req'd. for governor 8374974 - Governors 8377428, 8392035, 8489805, 9086256, 9311283, 8466953, 8490772, 8365972, 8434921, 8366126, 8376696, 8378359, 8392034, 9313476, 9099162 and 8473885
*500	8367378	-	1	1	1	-	-	-	1	DECAL .. Reads D.C. - Governor 8377429, 8399511, 8381363, 8385287, 8479891, 8491943, and 9082625
*501	8367379	-	1	1	-	-	1	-	-	DECAL .. Reads 125 V - Except governors 8381363 and 8490772
*502	8384151	-	-	1	1	-	-	-	1	DECAL .. Reads 24 V - Governors 8381363 8491943 and 9082625
*503	8395975	-	-	-	-	1	1	-	-	DECAL .. Reads A.C. - D.C.
*504	8359666	1	-	-	-	-	-	-	-	PIN .. Step - Governor 8374974
*505	187828	1	-	-	-	-	-	-	-	SCREW .. 10-32 x 1/2 in. lg. - Governor 8374974
*506	8297026	1	-	-	-	-	-	-	1	NUT .. Shutdown - Governors 8374974 and 9099162
*507	8152078	1	1	-	1	-	-	-	-	GASKET .. Power cylinder - Governors 8374974, 8399511 and 8491943
*507	8483071	-	-	1	-	-	-	1	-	GASKET .. Power cylinder - Governors 8381363 8365972, 8376696 and 8392034
508	8367181	-	-	-	1	-	-	-	-	SPRING .. Speeder servo - Governor 8392035
508	----	-	-	-	1	-	1	-	1	SPRING .. Speeder servo - Governors 8491943, 8466953, 9082625 and 9099162
508	8113841	1	-	-	-	-	-	1	-	SPRING .. Speeder servo - Governors 8377428 8376719, 8368590 and 8367961
508	8348345	-	1	1	-	1	-	1	-	SPRING .. Speeder servo - Governors 8381363, 8399511, 8436101, 8365972 and 9311283
*509	120217	1	-	-	-	-	-	-	-	WASHER .. Lock - Governor 8374974
*510	8359667	1	-	-	-	-	-	-	1	SPACER .. .312 O.D. x .250 thick - Gov.'s. 8374974 & 9099162
*511	8359668	1	-	-	-	-	-	-	1	CAM .. Droop - Governors 8474974 and 9099162
512	8327382	1	1	1	1	1	1	1	1	PLUNGER .. Speed setting pilot valve
*512	9520582	-	-	-	-	1	-	-	-	PLUNGER .. Speed setting pilot valve - Gov. 9311283

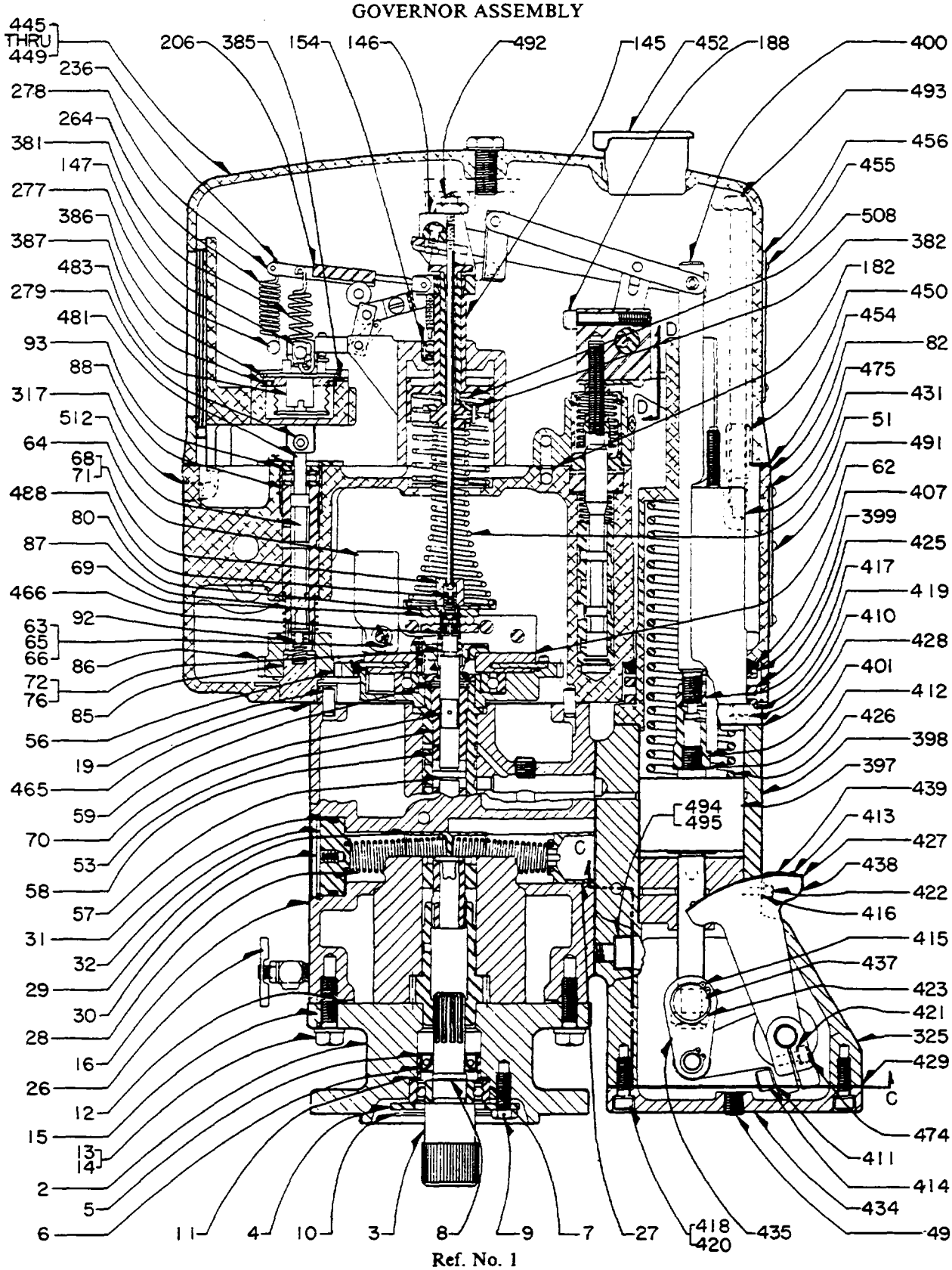
GOVERNOR ASSEMBLY

P.L. No. B66

Ref. No.	Part Number	Quantity Required								Description
		A	B	C	D	E	F	G	H	
	----	1	1	1	1	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
*513	8167317	1	-	-	1	-	1	1	1	BUSHING .. Speed adj. pilot valve - Governors 8374974, 8377428, 8392035 and 9099162
*513	8275539	-	-	1	-	-	-	1	-	BUSHING .. Speed adj. pilot valve - Governors 8381363, 8365972 and 8367961
*513	9093521	-	-	-	-	1	-	-	-	BUSHING .. Speed adj. P.V. governor 9086256
*514	8328090	1	1	1	1	1	1	1	1	PLUG .. Speed setting bushing
*515	9409954	1	1	1	1	-	-	1	-	PLUG .. 1/16 NPTF socket head
*516	9332176	1	1	1	1	1	1	1	1	DECAL .. Set of ten - Reads PG governor .. Formerly 8113865
*516	115545	-	-	-	1	-	-	-	-	WASHER .. Lock - No. 10
*518	455644	-	-	-	1	-	-	-	-	SCREW .. Machine - 10-32 x 7/8 - Cap } Governor
*519	8191863	-	-	-	1	-	-	-	-	ARM .. Tail rod } 8392035
*520	8191864	-	-	-	1	-	-	-	-	SCREW .. Special - Knurled head
*521	9092922	1	1	-	-	-	1	1	-	PLUG .. Buffer bore
*522	120622	1	1	-	-	-	1	1	-	NUT
*523	444866	4	-	-	-	-	-	4	-	PLUG .. Pipe
*524	8444618	1	-	1	1	-	1	1	-	O-Ring .. .359 I.D. x .500 O.D.
*525	9514005	-	-	-	-	1	-	-	1	DIAPHRAM ASM. .. Governors 9311283 and 9099162
*526	8429434	-	-	-	-	1	-	-	1	PLUG
*527	8433771	-	-	-	-	1	-	-	1	WASHER
*528	8113805	-	-	-	-	1	1	-	-	VALVE .. Pilot
*529	8132087	-	-	-	-	1	1	-	-	WASHER
*530	8297029	1	1	-	-	-	-	-	-	ROD .. Tail - Governor 8374974
*531	8348618	-	-	-	-	-	-	1	-	PLUG .. Pipe - 1/4 PT. dry seal
*532	118752	-	-	-	-	-	4	-	-	CONNECTOR .. 45° flared tube - Governor 8466953
*533	8480983	4	-	4	-	-	-	-	-	TUBING .. Heat shrinkable
*534	8293770	-	-	-	-	1	-	-	1	INDICATOR .. Load control
*535	9514117	-	-	-	-	1	-	-	1	PLATE
*536	9500643	-	-	-	-	-	-	1	-	CUP .. Pneumatic receiver
*537	9513987	-	-	-	-	-	-	1	-	COVER
*538	8112962	-	-	-	-	-	-	1	-	PISTON
*539	8127608	-	-	-	-	-	-	1	-	PIN
*540	8353239	-	-	-	-	-	-	1	-	VALVE .. Shutdown

P.L. No. B66

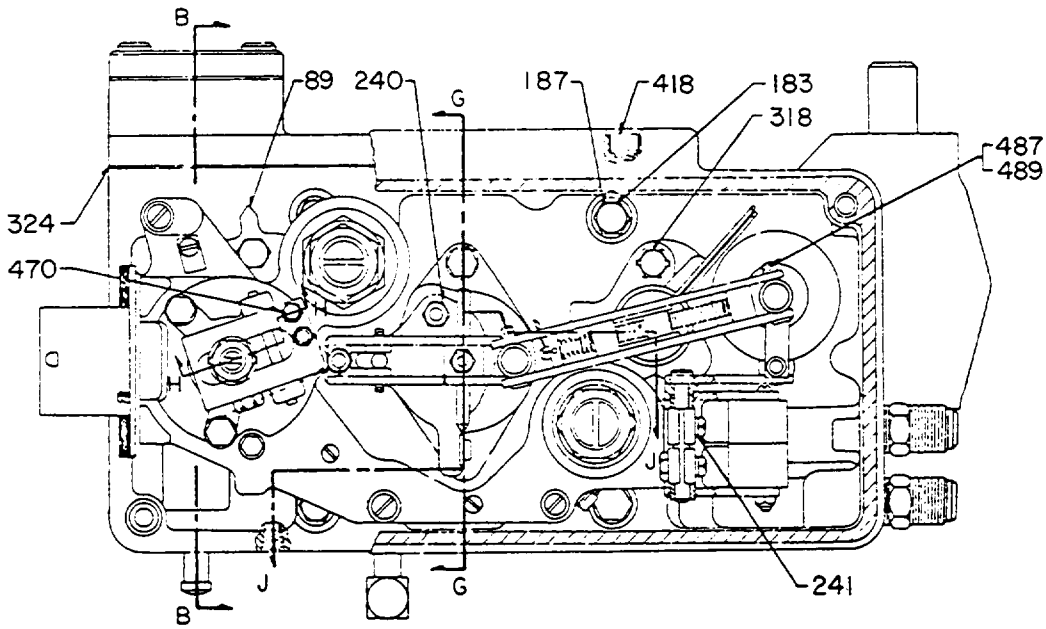
GOVERNOR ASSEMBLY

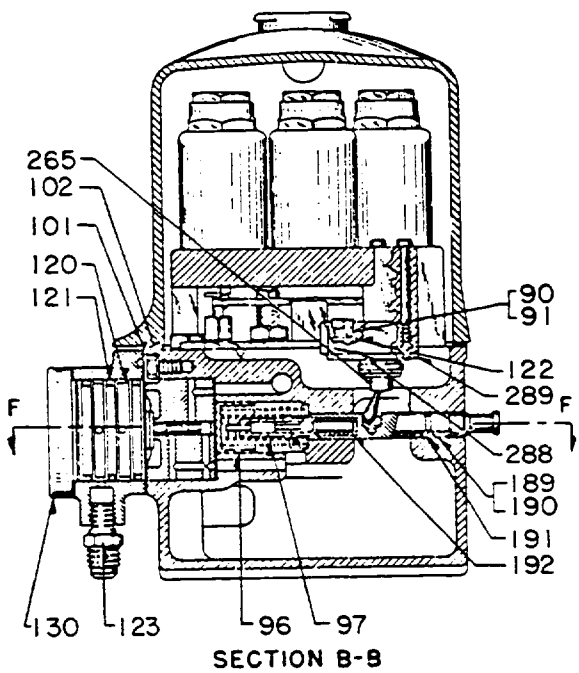


Ref. No. 1

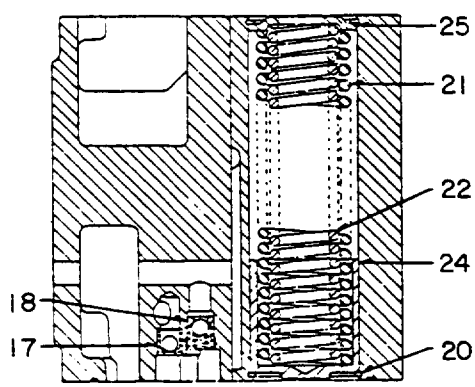
PLATE B66-1

GOVERNOR ASSEMBLY





SECTION B-B

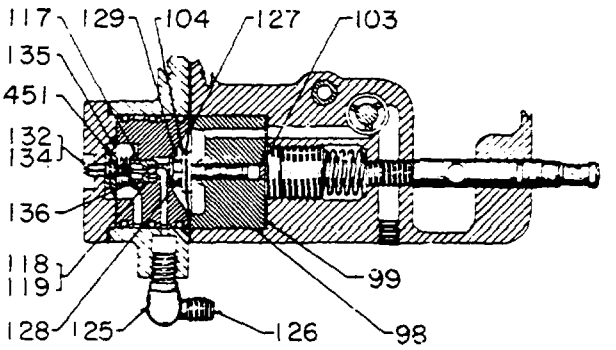


SECTION J-J

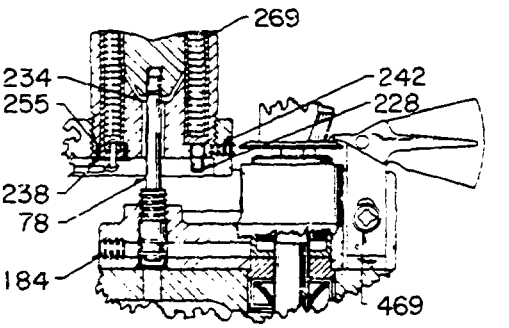
PLATE B66-2

P.L. No. B66

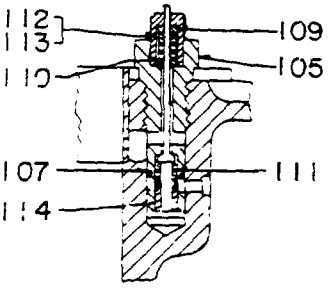
GOVERNOR ASSEMBLY



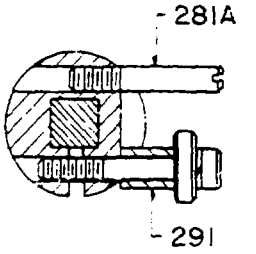
SECTION F-F

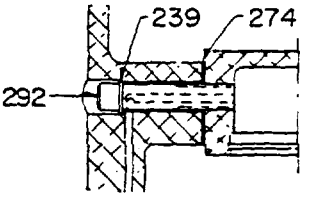


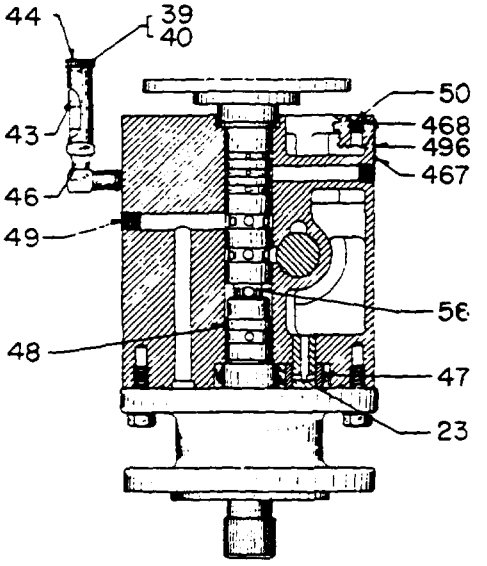
SECTION D-D



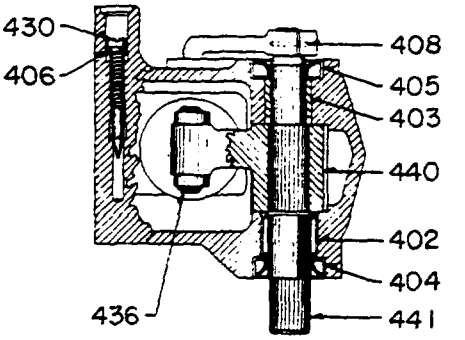
SECTION H-H







SECTION G-G



SECTION C-C

PLATE B66-3

P.L. No. B66

GOVERNOR ASSEMBLY

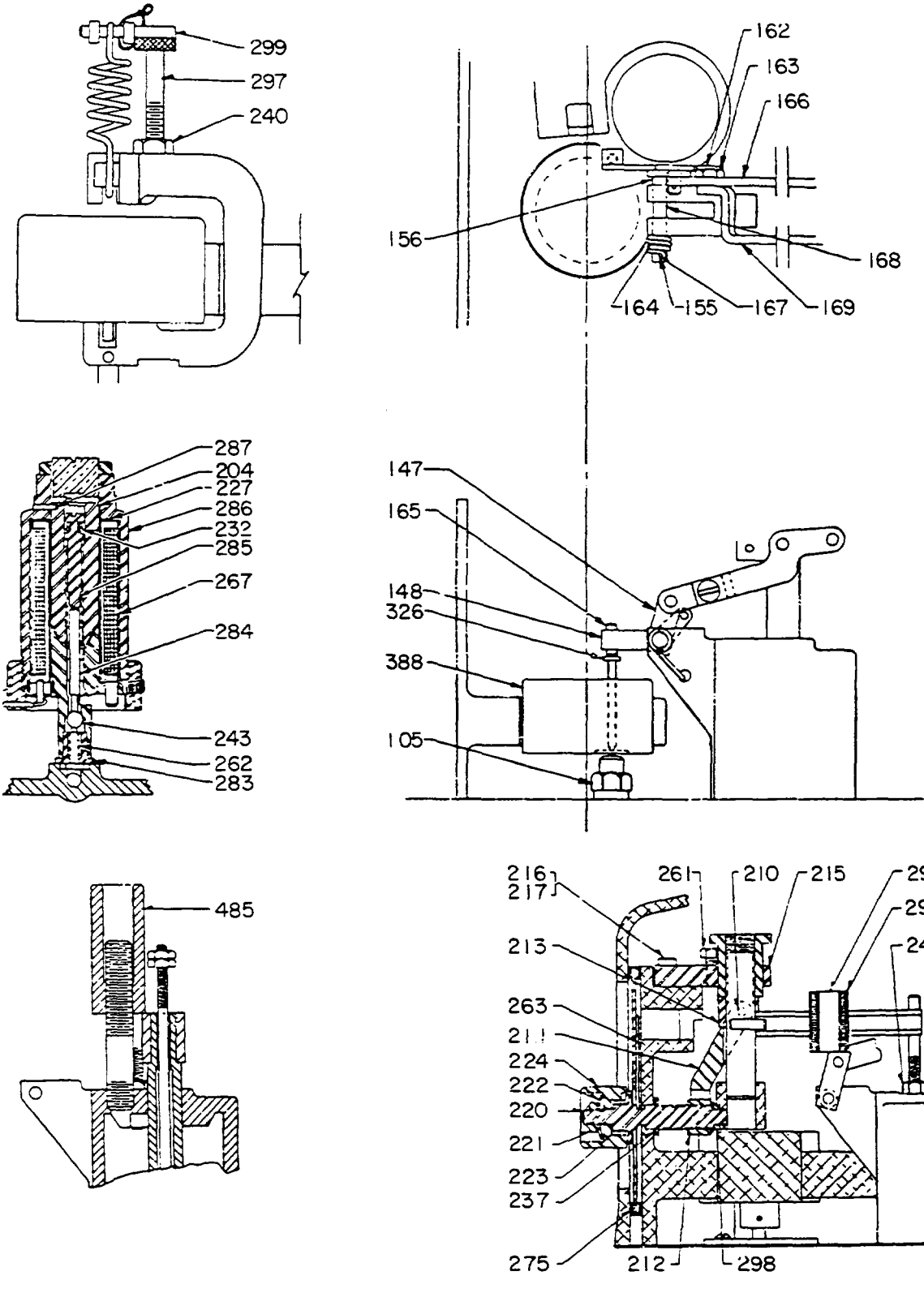


PLATE B66-4

P.L. No. B66

GOVERNOR ASSEMBLY

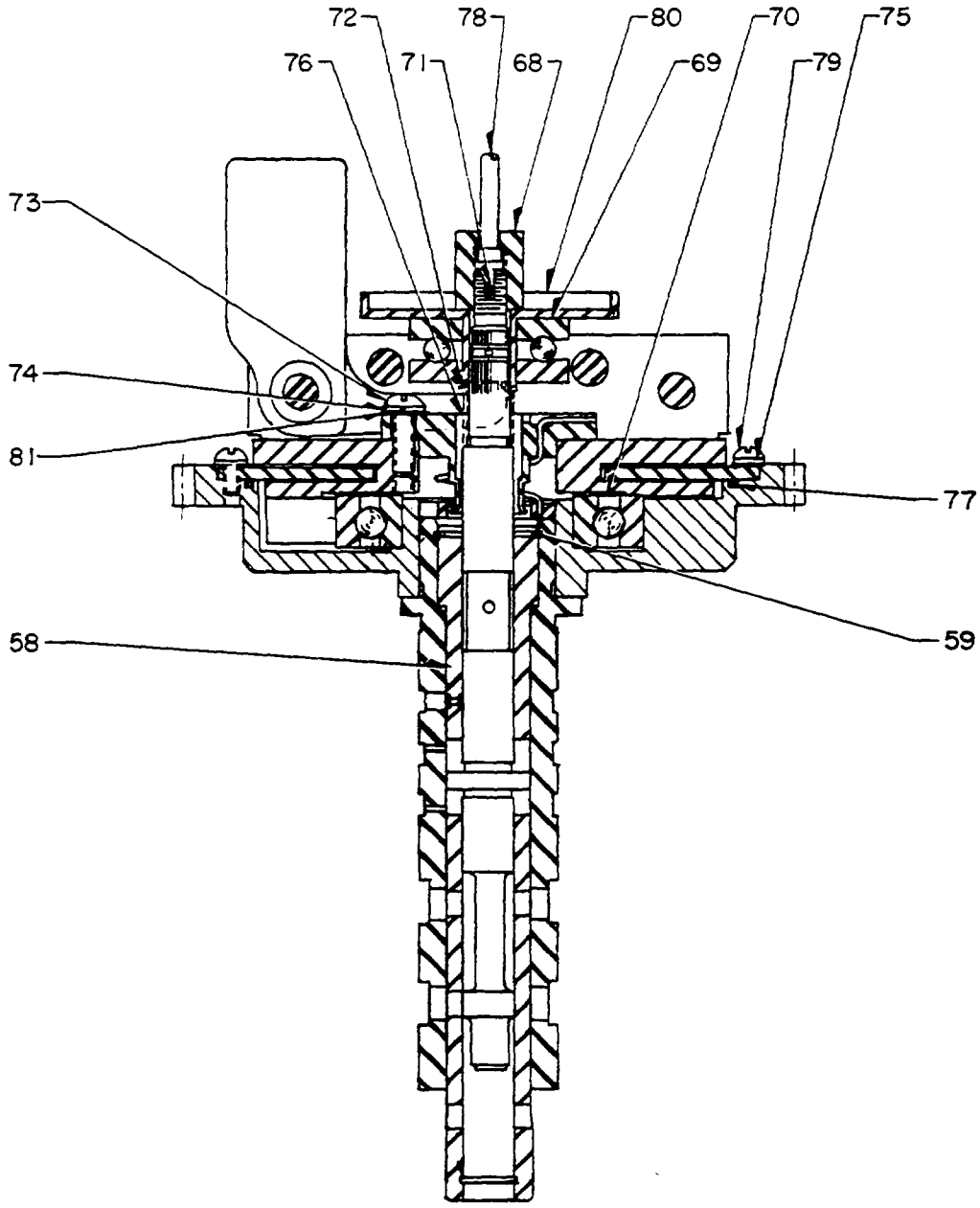


PLATE B66-5

GOVERNOR ASSEMBLY

PG,PGG,PGR,PGE,PG-PH Engine Regulating Governor Assembly
8,12,16-645E1 Drill Rig Engines;
16-645E8 Marine Drill Rig Engines And
16,20-645E4B Stationary Generation Engines
PLATES B66-6 through B66-10

Ref. No.	Part Number	Quantity Required				Description
		A	B	C	D	
*1	- - - -	1	1	1	1	GOVERNOR ASSEMBLY .. Engine - See Ref. chart on Pages 3 and 4
2	8149658	1	1	1	1	BASE .. Governor
3	8149696	1	1	1	1	SHAFT .. Drive - Serrated
4	8062007	1	1	1	1	RETAINER .. Bearing
5	8149695	1	1	1	1	SEAL .. Oil
6	8149697	1	1	1	1	RETAINER .. Oil seal
7	954298	1	1	1	1	BEARING .. Ball - Drive shaft
8	8149677	1	1	1	1	RING .. Snap
9	8113929	3	3	3	3	BOLT .. Bearing - Retainer to base - 1/4 - 28 x 5/8 hex. hd.
10	8288663	AR	AR	AR	AR	WIRE .. Lock - .026 in. dia. - Available 500 ft. length
11	8149679	1	1	1	1	GASKET .. Retainer to base
12	8152068	1	1	1	1	SEAL .. Oil - Case to base - 5/16 - 18 x 1 hex. head
13	120379	8	8	8	8	WASHER .. Lock - 5/16
14	179818	8	8	8	8	BOLT .. Case to base - 5/16 - 18 x 1 hex. head
15	103613	2	2	2	2	PIN .. Dowel - Case to base - No. 5 x 3/4 in. long
16	8149426	1	1	-	-	CASE ASM. .. Power - Governors 8216206, 8378135 and 8380181
16	8429420	1	-	1	-	CASE ASM. .. Power - Governors 8437102, 8478151 and 9535373
*16	8326391	-	-	-	1	CASE ASM. .. Power - Governors 9532351 and 9534663
17	8149470	1	1	1	1	STUD .. Idler
18	8201045	2	2	2	2	PLUG .. Drive - Ball check
19	9432040	4	4	4	4	RING .. Snap - Retainer .. Formerly 9413465
20	8149469	2	2	2	2	PISTON .. Accumulator
21	8149471	2	2	2	2	SPRING .. Accumulator - Outer
22	8057784	2	2	2	2	SPRING .. Accumulator - Inner
23	8149474	2	2	2	2	SEAT .. Spring - Accumulator
24	8113672	2	2	2	2	PIN .. Grooved - Dowel case to column
25	444687	13	13	13	13	PLUG .. Pipe - 1/8 M.P.T. hex. socket
26	9409954	1	1	1	1	PLUG .. Pipe - 1/16 M.P.T. hex. socket
27	8118445	1	1	1	1	COCK .. Drain - 1/8 M.P.T.
28	8152071	1	1	1	1	SEAT .. Buffer spring
29	8152072	2	2	2	-	SPRING .. Buffer
*29	8269979	-	-	-	2	SPRING .. Buffer - Governor 9534663
*29	8326395	-	-	-	2	SPRING .. Buffer - Governor 9532351
30	8152073	1	1	1	1	PISTON .. Buffer
31	8152074	1	1	1	1	PLUG .. Buffer spring - 1-5/16 in. diameter
32	8478711	1	1	1	1	O-RING .. Plug - Replaces 8223699
33	9413448	1	1	1	1	RING .. Snap - Buffer plug
ϕ*34	8442288	1	1	-	-	GAUGE ASSEMBLY .. Oil level - Replaced by 8113998 - See Ref. No. 40
*35	8319674	2	2	-	-	SEAL .. .359 I.D. x .500 O.D. x .067 in. thick
ϕ*36	8174780	3	3	-	-	GASKET .. .312 I.D. x .500 O.D. x .062 in. thick
ϕ*37	8350082	2	2	-	-	GASKET .. .312 I.D. x .535 O.D. x .078 in. thick
*38	8451381	1	1	-	-	GLASS .. Sight
*39	8319675	1	1	-	-	CAP .. Gauge
ϕ40	8113998	1	1	-	-	GAUGE ASSEMBLY .. Oil level - Replaces 8442288 - See Ref. No. 34
*40	9328197	1	1	1	1	GAUGE ASSEMBLY .. Oil - Currently applied .. Repl. 8113998 and 8442288
41	8319674	2	2	-	-	SEAL .. .359 I.D. x .500 O.D. x .067 in. thick
ϕ42	8174780	3	3	-	-	GASKET .. .312 I.D. x .500 O.D. x .062 in. thick
ϕ43	8350082	2	2	-	-	GASKET .. .312 I.D. x .535 O.D. x .078 in. thick
44	8131381	1	1	-	-	GLASS .. Sight
45	8319675	1	1	-	-	CAP .. Gauge
46	8113999	1	1	1	1	ELBOW .. Oil gauge

P.L. No. B66

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
47	8152070	1	1	1	1	GEAR .. Idler
48	8152069	1	1	1	1	GEAR .. Drive
49	8383167	1	-	1	1	SPRING .. Speeder
*49	8335812	-	1	-	-	SPRING .. Speeder
*50	9327175	1	-	-	1	SLEEVE ASSEMBLY .. Rotating .. Replaces 8238927
*50	8359662	-	1	1	-	SLEEVE ASSEMBLY .. Rotating
51	8160610	1	-	-	-	GEAR ASSEMBLY .. Ball head - Includes bushing
51	8230297	-	1	1	-	GEAR ASSEMBLY .. Ball head - Includes bushing
52	8149343	1	1	1	-	PLUNGER .. Pilot valve
53	8149341	1	1	1	-	BUSHING .. Compensation
54	9432037	1	1	1	-	RING .. Snap - Bushing - Pilot valve body .. Formerly 274416
55	8353912	1	-	-	-	BALL HEAD ASSEMBLY
55	8326438	-	1	1	-	BALL HEAD ASSEMBLY
56	8149340	2	2	2	-	ARM ASSEMBLY .. Ball
57	148401	2	2	2	-	BEARING .. Needle - 1/4 in. shaft
58	8228384	1	-	-	-	COUPLING ASSEMBLY .. Spring drive
59	103361	8	-	-	-	PIN .. Cotter - 1/16 x 1/2 in. long
59	190432	-	8	8	-	PIN .. Cotter - 1/16 x 1/2 in. long - Stainless steel
60	8149338	4	4	4	-	PIN .. Ball arm
61	8353911	1	-	1	-	RETAINER .. Ball arm
62	8353910	1	-	1	-	BALL HEAD .. Governor
62	8326440	-	1	-	-	BALL HEAD .. Governor
63	121839	1	-	1	-	SCREW .. No. 6-32 x 5/16 round head
64	131181	1	-	1	-	WASHER .. Lock - No. 6
64A	8230299	-	1	1	-	COUPLING ASSEMBLY .. Spring drive
65	8152338	1	1	1	-	SPRING .. Adjusting - Pilot valve
66	8068098	1	1	1	-	WASHER .. Plain - 5/16
67	8149345	1	1	1	-	BEARING .. Thrust
68	8149346	1	1	1	-	SEAT .. Speeder spring
69	8350083	1	-	-	-	ROD ASSEMBLY .. Shutdown
69	8350086	-	1	1	-	ROD ASSEMBLY .. Shutdown
70	8291770	1	1	1	-	NUT .. Plunger - Pilot valve .. Formerly 8017599
71	107761	1	1	1	-	PIN .. Cotter - 1/16 x 5/8 in. long
72	8160641	1	-	-	-	BEARING .. Ball - Centering
72	8230323	-	1	1	-	BEARING .. Ball - Centering
73	159592	-	1	1	-	SCREW .. No. 8-32 x 1/2 - Slotted head .. Formerly 100751
74	121752	-	1	1	-	WASHER .. Lock - No. 8 .. Formerly 106496
75	426241	-	8	8	-	WASHER .. Lock - No. 5 - Light spring - Plain
76	224935	-	8	8	-	SCREW .. Machine - No. 5-40 x 5/16 fil. head - Slotted
77	9094183	-	1	1	-	RING .. Oil seal .. Replaces 8488972
*78	8319638	-	1	1	-	WASHER .. .168 I.D. x .312 O.D. x .031 thick
79	8284037	2	-	-	-	NUT .. Shutdown rod - No. 8-32 hex.
80	8474082	1	-	-	-	COLUMN ASSEMBLY .. Governors 8424298 and 8437102 Formerly 8447875
80	9514120	1	-	-	-	COLUMN ASSEMBLY .. Governor 8478151
80	8216207	1	1	-	1	COLUMN ASSEMBLY .. Governors 8216206, 8378135 and 8380181 .. Formerly 8201617
80	9333600	-	-	1	-	COLUMN ASSEMBLY .. Governor 9535373
*81	8348618	1	-	-	-	PLUG .. Pipe - 1/4 M.P.T. - Square socket
82	8113848	1	1	-	-	GEAR .. Drive - Pilot valve assembly
83	8113839	1	1	-	-	SPRING .. Pilot valve bushing
84	8167317	1	1	1	1	BUSHING .. Speed adjusting pilot valve
85	8113815	1	1	-	-	BUSHING .. Regulating
86	8113835	2	1	-	-	SPRING .. Bell crank
87	8113825	1	1	1	1	PLUNGER .. Speed adjusting pilot valve
88	8327382	1	1	1	1	PLUNGER .. Speed adjusting

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
89	8113830	1	1	-	-	BEARING .. Thrust - Rotating bushing
90	8113833	1	1	-	-	PIN .. Straight - 1/8 x 3/4 in. long - Drilled head
91	8113831	1	1	-	-	PIN .. Pilot valve - 1/8 x 9/16 in. long
92	119981	3	5	-	-	PIN .. Cotter - 1/16 x 3/8 in. long
93	8383169	1	-	-	-	LEVER .. Lower floating - Except governor 8216206
93	9333520	1	-	-	-	LEVER .. Lower floating - Governor 8216206 .. Replaces 8113802
93	8203164	-	1	-	-	LEVER .. Lower floating
94	8017584	-	1	-	-	SCREW .. Taper
*95	8433771	1	1	-	-	WASHER .. Lube oil diaphragm
96	8113816	1	1	-	-	RETAINER .. Regulating bushing
97	6101223	1	1	-	-	WASHER .. Plain - Bushing retainer
98	8113845	1	1	-	-	SPRING .. Regulating bushing retainer
99	8113817	1	1	-	-	COLLAR .. Spring retainer
100	181566	1	1	-	-	BOLT .. Retainer - 1/4 - 28 x 3/4 hex. head
101	8113991	5	3	1	-	WASHER .. Plain - Bushing retainer - 1/4
102	8113822	1	1	-	-	SCREW .. Retainer - Special - 1/4 - 28
103	8113840	1	1	-	-	SPRING .. Solenoid counter balance
104	8235782	1	1	1	1	VALVE ASSEMBLY .. By-pass
105	8235784	1	1	1	1	PLUNGER ASSEMBLY .. By-pass valve
106	8223697	1	1	1	1	O-Ring .. Valve body
107	456342	1	1	1	1	PIN .. Straight - 1/16 x 3/8 in. long
108	8235785	1	1	1	1	NUT .. Seal retainer
109	8235786	1	1	1	1	RETAINER .. Sleeve
110	8235787	1	1	1	1	SEAL .. By-pass valve spring .. Formerly 8234787
111	8235788	1	1	1	1	SPRING .. Seal retainer
112	8235789	1	1	1	1	SPRING .. By-pass valve .. Formerly 8234789
113	9318632	1	1	1	1	O-Ring .. Seal - Replaces 9098534
114	8235783	1	1	1	1	BODY .. By-pass valve
115	8131473	1	-	-	-	SPRING .. Pilot valve bushing
116	8146495	1	-	-	-	BUSHING .. Pilot valve - Load control .. Replaces 8144135
117	9413362	1	-	-	-	RING .. Retaining
118	8113805	1	-	-	-	PLUNGER .. Load control pilot valve
119	8113849	1	-	-	-	GASKET .. Oil seal - Load control
120	8047553	1	-	-	-	SEAL .. Oil - Load control plunger
121	8113807	1	-	-	-	PISTON .. Overriding
122	8113806	1	-	-	-	COLLAR .. Spring
123	8129778	2	-	-	-	NUT .. Lock - 5/16 - 24 hex.
124	8113843	1	-	-	-	SPRING .. Valve - Outer
125	8126520	1	-	-	-	SPRING .. Valve - Inner
126	8188850	1	-	-	-	RETAINER .. Spring
127	8113827	1	-	-	-	RING .. Snap - Retainer
128	8132087	1	-	-	-	WASHER .. Indicator - Modified cup
129	8165078	1	-	-	-	CYLINDER .. Overriding - Governors 8424298 and 8437102
*129	9514118	1	-	-	-	CYLINDER .. Overriding - Governor 8478151
*129	8165076	1	-	-	-	CYLINDER .. Overriding - Governors 8216206 and 8378135
130	8113847	1	-	-	-	INDICATOR .. Load control
131	8113808	1	-	-	-	HEAD .. Cylinder
132	8017584	2	-	-	-	SCREW .. Taper
133	155173	1	-	-	-	SCREW .. No. 10-32 x 1/4 round head - Cross recess
134	8113662	1	-	-	-	WASHER .. Lock - 3/16
135	181568	2	-	-	-	BOLT .. 1/4 - 28 x 1 hex. head
*136	8404206	1	-	-	-	CYLINDER ASSEMBLY .. Power - Governors 8378135 and 8437102
*136	8367362	1	-	-	-	CYLINDER ASSEMBLY .. Power - Governor 8216206 - Form. 8201584
*136	8460052	1	-	1	1	CYLINDER ASSEMBLY .. Power - Governors 8478115, 9535373, 9532351 and 9534663

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required				Description
		A	B	C	D	
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
*136	8404118	-	1	-	-	CYLINDER ASSEMBLY .. Power - Governor 8380181
137	8201590	1	1	1	1	PISTON ASM. .. Power
138	8113656	1	1	1	1	RING .. Seal - Spring guard
139	8113657	1	-	1	1	ROD .. Tail - Power piston
139	8297029	-	1	-	-	ROD .. Tail - Power piston
140	8201591	1	1	1	1	BEARING .. Needle - Terminal shaft
141	456382	1	1	-	-	BEARING .. Needle - Terminal shaft
142	8061742	1	1	1	1	SEAL .. Oil - 1.379 O.D. x 13/16 I.D.
143	8211818	1	1	1	1	SEAL .. Oil - 1.379 O.D. x 11/16 I.D.
144	8444617	AR	1	1	3	O-RING .. Needle valve - .296 I.D. x .438 O.D. .. Repl. 8223697
145	8223700	1	1	1	1	SEAL .. Spring guard - 2.093 I.D. x 2.500 O.D.
146	111840	1	1	1	1	PIN .. Taper - No. 2 x 3/4 in. long
147	444687	1	1	1	1	PLUG .. Pipe - 1/8 M.P.T. hex. socket head
148	120423	4	4	4	4	WASHER .. Lock - Spring guard - 1/4 internal teeth
149	8057114	2	2	2	2	WASHER .. Lock - Power lever - 5/16
150	115549	1	1	1	1	WASHER .. Lock - 3/8 - Internal tooth
*150	8149705	-	-	1	1	WASHER .. Lock
151	145368	2	2	2	2	SCREW .. Drive - Scale - No. 2 x 3/16 round head
152	132046	1	1	-	-	SCREW .. Rack lever - No. 10-24 x 5/8 fil. head - Except power cylinder assembly 8460052
153	217908	2	2	-	-	SCREW .. Cap - 5/16 - 18 x 7/8 hex. socket head
154	8113800	8	8	-	-	WASHER .. Lock - 1/4
155	9413435	2	2	-	-	RING .. Snap - Rod pin
156	106496	2	2	-	-	WASHER .. Lock - Pointer - No. 8 - Except power cylinder assembly 8460052
157	8113663	1	1	1	1	NUT .. Lock - Tail rod - 3/8 - 24 hex.
158	138211	8	8	8	8	SCREW .. Cap - 1/4 - 28 x 3/4 hex. socket head
159	8134427	4	4	4	4	BOLT .. Spring guard - 1/4 - 28 x 1/2 hex. socket head
160	106497	1	1	-	-	WASHER .. Lock - No. 10 - Except power cylinder assembly 8460052
ϕ161	9421614	2	2	2	2	SCREW .. Cap - No. 8-32 x 3/8 hex. socket head - Except power cylinder assembly 8460052
ϕ161	9433510	2	-	-	-	SCREW .. Cap - 1/4 - 28 x 5/8 hex. socket head - Power cylinder assembly 8460052
162	8201593	1	1	1	1	NUT .. Lock - Piston rod - 7/16 - 20 hex.
163	9411494	2	2	2	2	RING .. Retaining - .338 I.D.
164	8113664	1	1	1	1	SPRING .. Guard seal
165	8149111	1	1	1	1	SPRING .. Servo
166	8152339	1	1	1	1	GASKET .. Guard to power cylinder
167	8201595	1	1	-	-	GASKET .. Cover to power cylinder
168	8201594	1	1	-	-	SCALE .. Terminal shaft - Except power assembly 8460052
168	8460056	1	-	1	1	SCALE .. Terminal shaft - Power cylinder assembly 8460052
169	8149113	1	1	1	1	VALVE .. Needle
170	8149115	1	1	1	1	GUARD .. Spring (Col. A - Governor 8216206 only)
*171	8326406	1	-	1	1	GUARD ASSEMBLY .. Spring - Except governor 8216206
172	8201598	1	1	1	1	COVER .. Power cylinder
173	8201600	2	2	2	2	LINK .. Power piston
174	8201601	1	1	1	1	PIN .. Power lever
175	8201604	1	1	1	1	PIN .. Piston rod
176	8201596	1	1	-	-	LEVER .. Rack dial - Except power cylinder assembly 8460052
176	8459853	1	-	1	1	LEVER .. Rack dial - Power cylinder assembly 8460052
177	8201597	1	-	-	-	POINTER .. Rack scale - Governor 8378135
ϕ177	8346334	1	1	-	-	POINTER .. Rack scale - Governors 8216206, 8380181 and 8424298
ϕ177	8460055	1	-	1	1	POINTER .. Rack scale - Governors 8478115, 9535373, 9532351 and 9534663
178	8201599	1	1	1	1	LEVER .. Power piston - Serrated
179	8201602	1	1	-	-	SHAFT .. Terminal - Except power cylinder assembly 8460052

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	----	1	1	1	1	CYLINDER ASSEMBLY .. Power
179	8460057	1	-	1	1	SHAFT .. Terminal - Power cylinder assembly 8460052
180	8248309	1	-	-	-	CYLINDER ASM. .. Power - Governors 8378135 and 8316206
ϕ180	8460058	1	-	1	1	CYLINDER ASM. .. Power - Governors 8437102, 8478115, 9535373, 9532351 and 9534663
180	8346333	1	1	-	-	CYLINDER ASM. .. Power - Governors 8216206 and 8380181
181	8113658	1	1	1	1	NUT .. Lift - Tailrod - 3/8 - 24
*182	----	1	-	1	1	NUT .. Lock - 1/4 - 28 hex.
*183	8326407	1	-	1	1	SCREW .. Stop
*184	8460059	-	-	1	1	BRACKET .. Rack pointer scale - Power cylinder assembly 8460052
*185	8460054	-	-	1	1	SCREW .. Nylok - Scale mtg. - Power cylinder assembly 8460052
*186	9331279	1	-	1	-	SERVO ASSEMBLY .. Speeder spring
*186	8446763	-	1	-	-	SERVO ASSEMBLY .. Speeder spring
*186	----	-	-	-	1	SERVO ASSEMBLY .. Speeder spring
187	8217606	1	-	-	-	PISTON ASSEMBLY .. Power
187	8297038	-	1	-	-	PISTON ASSEMBLY .. Power
*187	8112962	-	-	1	-	PISTON ASSEMBLY .. Power
188	8113963	1	-	-	-	CYLINDER .. Power
188	8297036	-	1	-	-	CYLINDER .. Power
189	8113967	1	-	-	-	FULCRUM ASM. .. Power piston
189	8297037	-	1	-	-	FULCRUM ASM. .. Power piston
*189	8284088	-	-	1	-	FULCRUM ASM. .. Power piston
190	8113970	2	-	2	-	LEVER .. Power piston .. Formerly 8145336
190	8257093	-	2	-	-	LEVER .. Power piston
191	8113971	1	1	1	-	SCREW .. Special adjusting fulcrum
192	8113764	1	-	1	-	PIN .. Adjustable fulcrum
193	8452881	1	-	1	-	LINK .. Pivot pin .. Replaces 8113972
194	8113973	1	1	1	-	LINK .. Floating lever
195	119981	3	2	4	-	PIN .. Cotter - 1/16 x 3/8 in. long
196	8134415	1	1	1	-	PIN .. Straight - 3/16 x 3/4 in. long
197	8113832	1	-	2	-	PIN .. Headed - 3/16 x 25/32 in. long
198	8113974	1	-	1	-	PIN .. Straight - 1/8 x 1 in. long
*198	8127608	1	-	1	-	PIN .. Stop
199	8113976	2	4	2	-	SPACER .. Link
200	8113662	4	2	4	-	WASHER .. Plain - 13/64 I.D. x 7/16 O.D. x 1/32 in. thick
201	120614	1	1	1	-	NUT .. No. 10-32 hex.
202	148028	1	1	1	-	SCREW .. No. 10-32 x 3/8 round head - Cross recess
203	8113977	1	1	1	-	NUT .. No. 10-32 hex. stop
204	222384	1	-	-	-	SCREW .. Set - Piston stop - No. 10-32 x 1-1/4 hex. socket
204	222382	-	1	-	-	SCREW .. Set - Piston stop - No. 10-32 x 7/8 hex. socket
205	8113772	1	1	1	-	SPRING .. Link - Adjusting
206	8149306	1	1	1	-	SCALE .. Speed indicator
*207	8359675	-	1	-	-	PLUNGER ASSEMBLY .. Droop
*208	8297040	-	1	-	-	PIN .. Straight - 1/8 x 1 in. long
*209	8297041	-	1	-	-	CAP .. Droop plunger
*210	8297042	-	1	-	-	PIN .. Adjusting fulcrum
211	8160339	1	-	-	-	CUP ASSEMBLY .. "D" solenoid
212	8459855	1	-	-	-	PLATE ASSEMBLY .. Triangular - Governors 8424298 and 8378102 .. Replaces 8383168
212	8113795	1	-	-	-	PLATE ASSEMBLY .. Triangular - Governor 8216206
213	9333521	1	-	-	-	PLATE ASSEMBLY .. Triangular - Governors 8378135 8437102 and 8478151 .. Replaces 8459885
*213	9520126	1	-	1	-	PLATE ASSEMBLY .. Triangular - Governors 8478151 and 9535373
*214	8113773	1	1	-	-	PLUNGER ASSEMBLY .. Shutdown
*214	9514001	-	-	1	-	PLUNGER ASSEMBLY .. Low lube oil shutdown

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
*214	9520582	-	-	-	1	PLUNGER ASSEMBLY .. Low lube oil alarm
215	8113775	1	1	-	-	PLUNGER .. Shutdown
216	8113779	1	1	-	-	TUBING .. Plunger
217	8444618	1	1	-	-	O-RING .. Seal - .369 I.D. x 1/2 O.D. x .075 in. thick
218	3292030	1	1	-	-	SPRING .. Relief valve
219	8113778	1	1	-	-	PIN .. Spring - 5/32 x 3/4 in. long
220	104918	1	1	-	-	BALL .. 1/4 in. diameter
221	8113774	1	1	-	-	PIN .. Plunger shutdown
222	8113776	1	1	-	-	SEAT .. Ball-valve
223	8479252	1	-	-	-	LEVER ASSEMBLY .. Adjustable floating
*223	----	-	-	1	-	LEVER ASSEMBLY .. Adjustable floating
*224	8113772	1	-	-	-	SPRING .. Compression - Adjusting link
*225	8113767	1	-	-	-	KNOB .. Adjusting screw
*226	8113768	1	-	-	-	PIN .. Adjusting screw
227	8479253	1	-	-	-	ECCENTRIC .. Wide link
228	8433219	1	-	-	-	BLOCK .. Adjusting
229	119981	2	-	-	-	PIN .. Cotter - 1/16 x 3/8 in. long
230	442039	1	-	-	-	SCREW .. Cap - No. 8-32 x 7/8 in. long
*231	8433217	1	-	-	-	PIN .. Movable fulcrum
*232	8479254	2	-	-	-	LINK .. Bent pilot valve
*233	8113761	1	-	-	-	WASHER .. Solenoid
234	8113780	1	1	-	-	BUSHING .. Oil failure valve
*235	8201608	1	1	-	-	VALVE ASSEMBLY .. Lube oil - Governors 8378135 and 8380181
236	8113790	1	-	-	-	NUT .. Valve
237	104916	1	-	-	-	BALL .. Valve
238	8201615	1	-	-	-	SEAT .. Ball
239	8201616	1	-	-	-	BODY .. Valve
*240	8113975	1	-	1	-	STUD .. .375 x 16 manual speed setting
241	444040	1	1	1	-	ELBOW .. Street - 1/4 M.P.T. - 90°
242	8040382	1	1	1	1	TEE .. 1/4 M.P.T. x 1/4 tube
*243	139009	1	1	-	-	SCREW .. Set - 1/4 - 28 x 1/4 hex. socket
244	8147713	3	3	-	-	SCREW .. Cap - 1/4 - 28 x 2-3/8 socket head
245	8113811	1	1	-	-	PISTON .. Oil failure
246	8231570	1	-	-	-	PLUNGER .. Pilot valve - Overriding
247	8113819	1	1	-	-	WASHER .. Diaphragm
248	8113788	1	1	-	-	DIAPHRAGM .. Vacuum - Governors 8216206, 8378135 and 8380181
249	8113790	2	2	-	-	NUT .. Diaphragm
250	8113791	1	1	-	-	RETAINER .. Vacuum diaphragm
251	8061137	1	1	-	-	WASHER .. Copper - Vacuum diaphragm
252	118750	1	1	-	-	CONNECTOR .. Half- Lube vacuum - 3/8 O.D. x 1/4 M.P.T. — Governors 8216206, 8378135 & 8380181
253	8113794	1	1	-	-	SPRING .. Vacuum diaphragm
254	8201612	1	1	-	-	CAP .. Diaphragm
255	8201613	1	1	-	-	SCREW .. Diaphragm stop
*256	8429435	1	-	-	-	CAP .. Diaphragm — Governors 8424298, 8437102, and 8478151
*257	8429434	1	-	-	-	PLUG .. Low vacuum hole
258	8158716	1	1	-	-	DIAPHRAGM .. Lube oil
*258	9514005	1	-	1	1	DIAPHRAGM .. Lube oil shutdown - Governors 8478151, 9535373, 9532351 and 9534663
*259	9087347	2	-	1	-	O-RING .. Seal - 3/8 O.D. - Replaces 8223696
260	8223701	3	3	-	-	O-RING .. Seal - 2.012 O.D.
261	118752	4	-	-	-	CONNECTOR .. Half - Load control - 1/2 O.D. x 3/8 M.P.T.
262	5939163	1	1	-	-	NUT .. Diaphragm - No. 10-32 hex.

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
263	8113800	19	17	-	-	WASHER .. Lock - 1/4
264	8134416	2	2	-	-	SCREW .. Servo - 1/4 - 28 x 1-3/8 hex. head
265	217940	1	1	-	-	SCREW .. Cap - Bushing retainer - 1/4 - 28 x 3/8 hex. socket head
266	8163437	1	1	-	-	WASHER .. Plain - 1/4
267	138216	4	4	-	-	SCREW .. Diaphragm cap - 1/4 - 28 x 2 hex. socket head
268	138214	3	3	-	-	SCREW .. Side plate - 1/4 - 28 x 1-1/2 hex. socket head
269	138211	7	7	-	-	SCREW .. Cap - Side plate - 1/4 - 28 x 3/4 hex. socket head
270	8113832	1	-	-	-	PIN .. Headed - 3/16 x 25/32 in. long
271	8113836	1	-	-	-	SPRING .. Pilot valve plunger - Overriding
272	8113846	1	1	-	-	SPRING .. Shutdown plunger
273	8113837	1	1	-	-	SPRING .. Diaphragm
274	8113844	1	1	-	-	SPRING .. Link - Floating lever
275	8113838	1	1	-	-	SPRING .. Oil failure piston
*275	8113867	1	-	-	-	SPRING .. Speeder
276	8113850	1	1	-	-	GASKET .. Oil failure bushing
277	8201610	1	1	-	1	GASKET .. Side plate
*277	8483071	-	-	1	1	GASKET .. Side plate
278	8193508	1	1	-	-	PLUNGER .. Oil failure
279	8201611	1	1	-	-	PLATE .. Side - Lube oil diaphragm
*279	8286155	-	-	-	1	PLATE .. Side - Lube oil diaphragm
*280	8201606	1	-	-	-	POWER PACK .. Electrical equipment
281	8113683	5	-	-	-	PLUNGER ASSEMBLY .. Solenoid
282	8163953	5	-	-	-	GUIDE ASSEMBLY .. Solenoid
283	8113743	5	-	-	-	PIN .. Locating
284	8133719	10	-	-	-	BUSHING .. Plunger guide
*285	8191878	1	-	-	-	SHAFT .. Switch
*286	8191879	1	-	-	-	LEVER .. Shaft
*287	8191880	1	-	-	-	LEVER .. Switch
*288	8191881	1	-	-	-	LEVER .. Adjusting switch
289	8201620	1	-	-	-	CONNECTOR ASSEMBLY .. Male - 12 point - Includes wire and lugs
*290	8329355	AR	-	-	-	WIRE .. Teflon - Black - 25 ft. length
291	8329356	AR	-	-	-	WIRE .. Teflon - Red - 25 ft. length
*292	8329357	AR	-	-	-	WIRE .. Teflon - Blue - 25 ft. length
*293	8329358	AR	-	-	-	WIRE .. Teflon - White - 25 ft. length
*294	8329359	AR	-	-	-	WIRE .. Teflon - Yellow - 25 ft. length
*295	8329360	AR	-	-	-	WIRE .. Teflon - Green - 25 ft. length
*296	8329361	AR	-	-	-	WIRE .. Teflon - Pink - 25 ft. length
*297	8329362	AR	-	-	-	WIRE .. Teflon - Orange - 25 ft. length
*298	8329363	AR	-	-	-	WIRE .. Teflon - Brown - 25 ft. length
*299	8097414	1	-	-	-	HOUSING .. Connector - Flanged
*300	8200229	2	-	-	-	LUG .. Terminal - No. 6 stud - Non-insulated
*301	8481010	1	-	-	-	TUBING .. Teflon - Replaces 8326434
*302	8203174	1	-	-	-	PLUG .. Connector
303	8193296	1	-	-	-	BRACKET ASSEMBLY .. Switch
*304	8192136	1	-	-	-	PIN .. Bracket
*305	8193297	2	-	-	-	BUSHING .. Oilite
306	8113681	5	-	-	-	CASE .. Solenoid
307	8113684	5	-	-	-	ROD .. Solenoid plunger
308	8113761	5	-	-	-	WASHER .. Solenoid plunger
309	8113738	5	-	-	-	PLUG .. Plunger stop
310	8113739	5	-	-	-	NUT .. Lock - 3/4-32 hex.
311	8113989	5	-	-	-	SPRING .. Load
*312	8191962	1	-	-	-	SPRING .. Torsion - Switch lever shaft
313	8113740	1	-	-	-	COVER .. Wiring
314	8113742	1	-	-	-	PLATE .. Connector clamp
315	8113744	10	-	-	-	WASHER .. Soldering shield - 1/2 O.D.

P.L. No. B66

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	8201606	1	-	-	-	POWER PACK .. Electrical equipment
316	120217	2	-	-	-	WASHER .. Lock - No. 10 - Spring lock
*317	115545	4	-	-	-	WASHER .. Lock - No. 10 - Internal teeth
*318	115544	1	-	-	-	WASHER .. Lock - No. 8 - Internal teeth
*319	222380	1	-	-	-	SCREW .. Set - No. 10-32 x 5/8 hex. socket - Flat point
320	140880	5	-	-	-	SCREW .. Set - No. 10-32 x 1/4 hex. socket - Cup point
*321	455674	2	-	-	-	SCREW .. Machine - No. 6-32 x 1-7/8 round head
322	8113745	5	-	-	-	RING .. Snap - .187 O.D.
323	8113746	3	-	-	-	NUT .. Speed
324	145154	3	-	-	-	SCREW .. Tapping - No. 8-18 x 1-1/4 round head
*325	8191964	1	-	-	-	SPACER .. Lever
*326	9415674	2	-	-	-	SCREW .. Switch bracket - No. 10-32 x 3/4 hex. head
*327	8116931	AR	-	-	-	CEMENT .. Gasket - 1 pint
328	8152184	10	-	-	-	TUBING .. Varnishing - .337 I.D.
*329	121832	1	-	-	-	SCREW .. Machine - No. 8-32 x 3/8 round head
330	155998	4	-	-	-	SCREW .. Machine - No. 10-32 x 3/8 flat head - Cross recess
331	8377913	2	-	-	-	SCREW .. Switch bracket - No. 10-32 x 2-5/16 fil. head - Cross recess
332	8113755	1	-	-	-	SWITCH .. Lube oil signal
333	8113756	5	-	-	-	COIL .. Solenoid - 700 Ohms
*334	8311242	2	-	-	-	SWITCH .. Micro
*335	8329469	1	-	-	-	CLAMP .. Wire
*336	8035119	2	-	-	-	NUT .. Stop - No. 6-32 hex.
*337	274676	1	-	-	-	RING .. Snap
*338	8284081	1	-	-	-	WASHER .. .203 I.D. x .38 O.D. x .05 thick
339	8129082	5	-	-	-	PAPER .. Insulating
*340	8189218	4	-	-	-	TERMINAL .. Stakon lug
341	8113760	1	-	-	-	GASKET .. Connector plate
342	8191876	1	-	-	-	BRACKET .. Solenoid
343	8202849	1	-	-	-	BRACKET .. Switch mounting
*343	8191877	1	-	-	-	BRACKET .. Switch mounting
344	8202850	1	-	-	-	PLATE .. Switch bracket clamp
*345	100945	1	-	-	-	SCREW .. 6-32 x 3/8 in. long
*346	120614	3	-	-	-	NUT .. No. 10-32 hex.
*347	8113662	1	-	-	-	WASHER .. Plain - 13/64 I.D. x 7/16 O.D. x 1/32 in. thick
*348	8398575	-	1	-	-	RECEIVER ASSEMBLY .. Pneumatic - Governor 8380181
349	8203171	-	1	-	-	PLUNGER ASSEMBLY .. Shutdown
350	8147964	-	1	-	-	SCREW .. Idle speed setting
351	8156672	-	1	-	-	LEVER .. Control
352	8113739	-	1	-	-	NUT .. Jam
*352	8326443	-	1	-	-	NUT .. Jam
353	8113989	-	1	-	-	SPRING .. Load
*354	8113743	-	1	-	-	PIN .. Plunger guide locating
355	8132452	-	1	-	-	BODY .. Shutdown valve
356	8113738	-	1	-	-	PLUG .. Plunger stop
357	8247158	-	2	-	-	O-RING .. Replaces 8430050
*358	8133719	-	2	-	-	BUSHING .. Solenoid plunger stop
*359	8113744	-	2	-	-	WASHER .. Soldering shield
*360	120614	-	3	-	-	NUT .. No. 10-32 hex.
*361	115545	-	4	-	-	WASHER .. Lock - No. 10
362	140880	-	2	-	-	SCREW .. Set - No. 10-32 x 1/4
363	145639	-	1	-	-	BALL .. Steel
*364	8329355	-	AR	-	-	WIRE .. Black - 20 AWG. - Teflon - 25 ft. length
*365	8329358	-	AR	-	-	WIRE .. White - 20 AWG. - Teflon - 25 ft. length
*366	8329354	-	AR	-	-	WIRE .. Pink - 20 AWG. - Teflon - 25 ft. length
367	8270726	-	2	-	-	TUBING .. Teflon - No. 0 clear - 3/16 in.
*368	8152184	-	AR	-	-	TUBING .. Teflon - No. 8 clear - 5 ft. length

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	8398575	-	1	-	-	RECEIVER ASSEMBLY .. Pneumatic
369	8152443	-	1	-	-	SPRING .. Solenoid valve
370	8113755	-	1	-	-	SWITCH .. Lube oil signal
*371	8329469	-	2	-	-	CLAMP .. Wire
372	8113756	-	1	-	-	COIL .. Solenoid
373	8129082	-	1	-	-	PAPER .. Insulator
*374	8306022	-	2	-	-	LUG .. Soldering
375	8297043	-	1	-	-	CONNECTOR .. 8 pin
376	8097414	-	1	-	-	HOUSING .. Connector - Flange
377	8200229	-	2	-	-	LUG .. Terminal
378	8152429	-	1	-	-	SEAT .. Shutdown rod
379	8152442	-	1	-	-	ROD .. Solenoid plunger
380	8203169	-	1	-	-	SCREW .. Adjusting
381	8203170	-	1	-	-	CASE .. Solenoid
382	8203172	-	1	-	-	PIN .. Lock - Solenoid plunger
*382	8297025	-	1	-	-	PIN .. Drilled straight
*383	8202849	-	1	-	-	BRACKET .. Switch mounting
*384	8202850	-	1	-	-	PLATE .. Switch bracket clamp
*385	8357795	-	2	-	-	RECTIFIER
*386	8349596	-	1	-	-	BLOCK .. Rectifier mounting
*387	8349597	-	1	-	-	COVER .. Rectifier
*388	115543	-	1	-	-	WASHER .. Lock - No. 6 - Internal tooth
*389	8326420	-	1	-	-	WASHER .. Plain - .149 I.D. x .375 O.D. x .032 thick
*390	8327421	-	1	-	-	CLAMP .. Nylon
*391	8449591	-	1	-	-	INSULATOR .. Paper
392	8131965	-	1	-	-	LINK ASSEMBLY .. Diaphragm
393	8203166	-	1	-	-	LINK ASSEMBLY .. Floating lever
*394	8193296	-	1	-	-	BRACKET ASSEMBLY .. Switch
395	8113742	-	1	-	-	PLATE .. Connector clamp
396	8113790	-	1	-	-	NUT .. Receiver diaphragm - 3/8 - 24 hex.
397	8131668	-	1	-	-	CAP .. Speed control bracket
398	8129923	-	1	-	-	WASHER .. Diaphragm
399	8131836	-	1	-	-	PIN .. Pivot
400	8131834	-	1	-	-	SEAT .. Spring
401	8132448	-	1	-	-	COVER .. Wire
402	8137828	-	1	-	-	WASHER .. Keyed retainer
403	9087347	-	1	-	-	O-RING .. Shutdown transfer hole
404	8147963	-	1	-	-	SLIDE .. Control lever
405	8113672	-	2	-	-	PIN .. Dowel - Drive lock
406	8149778	-	1	-	-	WASHER .. .375 I.D. x .750 O.D. x .062 in. thick
407	8132998	-	1	-	-	PIN .. Headed
*408	8191964	-	1	-	-	WASHER .. Switch shaft spacer
409	138530	-	2	-	-	WASHER .. Lock - No. 8 - Internal tooth
410	120217	-	2	-	-	WASHER .. Lock - No. 10
*410	8284081	-	2	-	-	WASHER .. .203 I.D. x .38 O.D.
411	8075907	-	3	-	-	NUT .. No. 10-32 hex.
*412	134530	-	1	-	-	NUT .. No. 6-32 hex.
*413	125982	-	2	-	-	SCREW .. Switch lever - No. 10-32 x 1/2 hex. head
*414	155033	-	2	-	-	SCREW .. Machine .. No. 8-32 x 3/8 - Round head - Cross recess
415	8113800	-	3	-	-	WASHER .. Lock - 1/4
*416	8113745	-	1	-	-	RING .. Snap - Solenoid plunger
417	8392468	-	2	-	-	SCREW .. Set - No. 10-32 x 3/4 hex. socket
418	223004	-	1	-	-	SCREW .. Set - No. 10-32 x 1/2 hex. socket
*419	8270628	-	1	-	-	WASHER .. Lock - Special
420	8134416	-	3	-	-	BOLT .. 1/4 - 28 x 1-3/8 hex. head
421	8147962	-	1	-	-	NUT .. Lock - 3/8-32 hex.
*422	274676	-	1	-	-	RING .. Retaining
*422	----	1	-	-	-	RING .. Retaining - .438 I.D. .. Formerly 8188852

P.L. No. B66

GOVERNOR ASSEMBLY

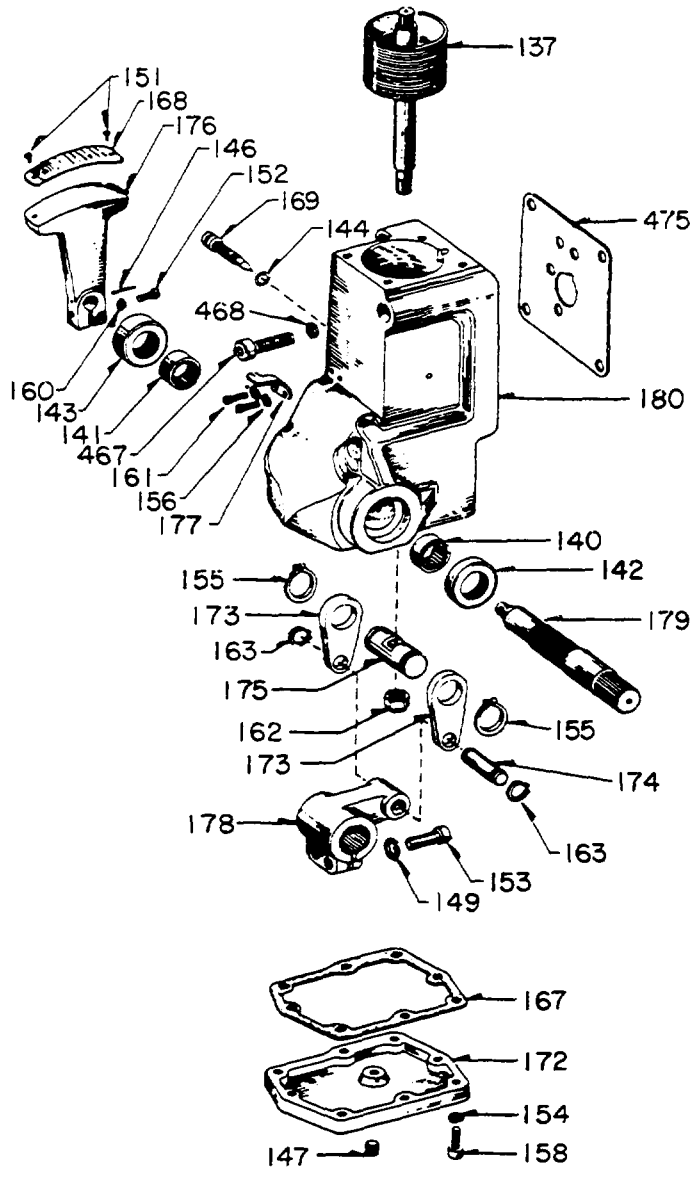
Ref. No.	Part Number	Quantity Required A	B	C	D	Description
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
	8398575	-	1	-	-	RECEIVER ASSEMBLY .. Pneumatic
*423	100746	-	1	-	-	SCREW .. Machine - No. 6-32 x 1/2 - Round head - Slotted
424	155998	-	4	-	-	SCREW .. Machine - No. 10-32 x 3/8 - Flat head - Cross recess
*425	455674	-	2	-	-	SCREW .. Machine - No. 6-32 x 1-7/8 round head
*426	9415674	-	2	-	-	SCREW .. Switch bracket - No. 10-32 x 3/4 hex. head
427	8130247	-	1	-	-	SPRING .. Compression - By-pass rod
*428	8311242	-	1	-	-	SWITCH .. Spot micro
429	8113760	-	1	-	-	GASKET .. Connector plate
*430	8035119	-	1	-	-	NUT .. Lock - No. 6-32 hex.
431	153517	-	2	-	-	SCREW .. Machine - No. 10-32 x 1-3/4 - Fil. head cross recess
*432	8189218	-	2	-	-	TERMINAL .. Stakon lug
*433	8191878	-	1	-	-	SHAFT .. Switch
*434	8191879	-	1	-	-	LEVER .. Shaft
435	8191880	-	1	-	-	LEVER .. Switch
436	8203173	-	1	-	-	BRACKET .. Speed control
*437	8230296	-	1	-	-	BLOCK .. Dummy switch
*438	8191962	-	1	-	-	SPRING .. Torsion
439	8113823	-	1	1	-	STUD .. Bearing - Pilot valve drive gear
*440	8230294	-	1	-	-	LEVER .. Adjustable floating
*441	8297032	-	1	-	-	CAM .. Speed droop
*442	8297033	-	1	-	-	PIN .. Droop
*443	8297034	-	1	-	-	TURNBUCKLE
*444	8297035	-	1	-	-	FORK .. Speed droop
445	8367213	1	-	1	-	COVER ASSEMBLY
445	8277246	-	1	-	-	COVER ASSEMBLY
445	8477318	-	-	-	1	COVER ASSEMBLY
446	8131835	2	2	2	2	BUSHING .. Cover doweling
447	8017559	1	1	1	1	CUP .. Oil filler
448	8140550	1	1	1	1	GASKET .. Cover
*449	8061137	-	1	-	-	WASHER .. Special copper
*450	179833	-	1	-	-	BOLT .. 3/8 - 16 x 1/2 hex. head
*451	145373	-	4	-	4	SCREW .. Drive - No. 6 x 1/4 in. long
*452	8270586	-	1	-	-	PLATE .. Name
*452	8326397	-	-	-	1	PLATE .. Name
*453	8277249	-	1	-	-	SPRING .. 2.400 in. free length
*454	8192136	-	1	-	-	PIN .. Stop
*454A	8069891	-	1	-	-	KNOB .. Control
*454B	221373	-	1	-	-	PIN .. Taper
*455	8035122	-	2	-	-	NUT .. Stop - No. 10-32 hex.
*456	140855	-	1	-	-	SCREW .. Set - No. 8-32 x 5/16 in. long
*457	100870	-	2	-	-	SCREW .. Machine - No. 10-32 x 3/4 flat head
*458	8277253	-	1	-	-	SLIDER .. Lock
*459	421445	-	4	-	-	SCREW .. Machine - No. 3-48 x 1/4 round head slotted
*460	8277251	-	1	-	-	PLATE .. Dial - Manual
*461	8277254	-	1	-	-	SCREW .. Speed adjusting
*462	8277256	-	1	-	-	GUIDE .. Spring - Male
*463	8277257	-	1	-	-	GUIDE .. Spring - Female
*464	9411494	-	1	-	-	RING .. Retaining
*465	8365140	2	-	-	2	SCREW .. Cover - 5/16 - 24 x 7-1/4 hex. head - Drilled
466	115548	2	-	-	2	WASHER .. Lock - 5/16
467	138242	4	-	-	-	SCREW .. Cap - Power cylinder to power case - 3/8 - 16 x 1 hex. socket head
468	8152079	4	4	4	4	WASHER .. Lock - 3/8
469	159572	4	4	-	-	SCREW .. Column nameplate - 8-32 x 1/4 pan head
*470	432267	2	2	-	-	SCREW .. Nameplate insert - No. 5-40 x 1/4 round head

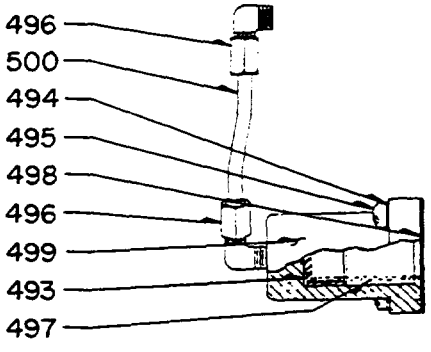
GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required				Description
		A	B	C	D	
	----	1	1	1	1	GOVERNOR ASSEMBLY .. Engine
471	8152077	2	2	-	-	PLATE .. Name - Bleed hole
472	8356332	1	-	-	-	PLATE .. Name - Column .. Governor 8424298
*472	8203163	-	1	-	-	PLATE .. Name
*473	8356333	1	-	-	-	INSERT .. Nameplate - Includes setting .625 x 2.188 in. long
474	220342	6	-	-	-	SCREW .. Drive - Bleed hole nameplate
475	8483071	1	1	-	-	GASKET .. Power cylinder case - Replaces 8152078
*476	9332176	1	1	1	1	LABEL .. Piping - Set of 10 decals .. Replaces 8113865
477	119981	1	2	-	-	PIN .. Cotter - Tail rod - 1/16 x 3/8 in. long
478	8113832	1	1	-	-	PIN .. Headed - Tail rod - 3/16 x 25/32 in. long
479	8201587	4	-	-	-	SCREW .. Column to case - 5/16 - 24 x 4-3/4 hex. head
480	8113869	1	1	-	-	GASKET .. Column to case - Transfer hole
481	8113870	1	1	1	1	GASKET .. Case to column
*482	8075907	1	1	-	-	NUT .. Knurled screw - No. 10-32
*483	273641	1	1	-	-	SCREW .. Tail rod arm - No. 10-32 x 7/8 in. long
484	8113927	4	4	-	-	SCREW .. Column to case - 5/16 - 24 x 4-31/32 hex. head
485	8113841	1	-	1	-	SPRING .. Speeder spring servo
486	8217607	1	1	1	1	PLUG ASSEMBLY .. Spring check
487	456350	1	1	1	1	PIN .. Stop
*488	8191863	1	1	-	-	ARM .. Tail rod - Except governor 8216206
*489	8191864	1	1	-	-	SCREW .. Special - No. 10-32 - Knurled head
490	8129924	-	1	-	-	DIAPHRAGM .. Receiver
491	8297044	-	1	-	-	SPRING .. Pneumatic speed control
492	8482432	-	-	1	-	ACCUMULATOR ASSEMBLY .. Low lube oil - Round body - Except governors 8378135 and 8216206
493	8113811	-	-	1	-	PISTON .. Oil failure
494	8327416	-	-	4	-	WASHER .. .225 I.D. x .400 O.D. x .031 thick
495	190741	-	-	4	-	SCREW .. 1/4 - 28 x 1 in. - Fillister head
496	8393771	-	-	2	-	ELBOW .. 1/4 tube x 1/8 M.P.T.
497	8429426	-	-	1	-	SPRING .. Accumulator
498	8482434	-	-	1	-	GASKET .. Accumulator body to case
499	8488280	-	-	1	-	BODY .. Accumulator
500	8488281	-	-	1	-	TUBE .. Accumulator
*501	8149474	2	-	-	-	SEAT .. Spring
*502	9514117	1	-	1	-	PLATE .. Column side
*503	452652	1	-	1	1	INSERT .. Helicoil thread
*504	9514438	-	-	-	1	UNION .. Bulkhead limiter
*505	----	1	-	1	-	ROD .. Power piston
*506	9093702	3	3	-	-	O-RING .. Preformed
*507	8132974	2	2	-	-	CAP .. Shipping - 7/16 - 20 thread
*508	8132976	4	4	-	-	CAP .. Shipping - 3/4 - 16 thread
*509	9514124	-	-	-	1	PLATE ASSEMBLY
*510	8292129	-	-	-	1	FILTER ASM.
*511	8297955	-	-	-	1	PLUG & FILTER ASM.
*512	----	-	-	-	1	PLUG .. Filter
*513	8421794	-	-	-	1	CARTRIDGE .. Filter - 2.625 in. long
*514	8286156	-	-	-	1	FILTER .. Cartridge case
*515	3292039	-	-	-	1	PLUG .. Pipe
*516	8330683	-	-	-	1	O-RING .. O.D. 1.255 in. - I.D. 1.050 in.
*517	5156913	-	-	-	1	GASKET
*518	8438310	1	-	-	-	INSERT .. Nameplate
*519	9092922	1	-	-	-	PLUG .. Buffer
*520	8149703	10	10	-	-	WASHER .. Lock
*521	8248310	1	-	-	-	BUSHING .. 2-5/16 dia.

P.L. No. B66

GOVERNOR ASSEMBLY





Ref. No. 492

PLATE B66-6

GOVERNOR ASSEMBLY

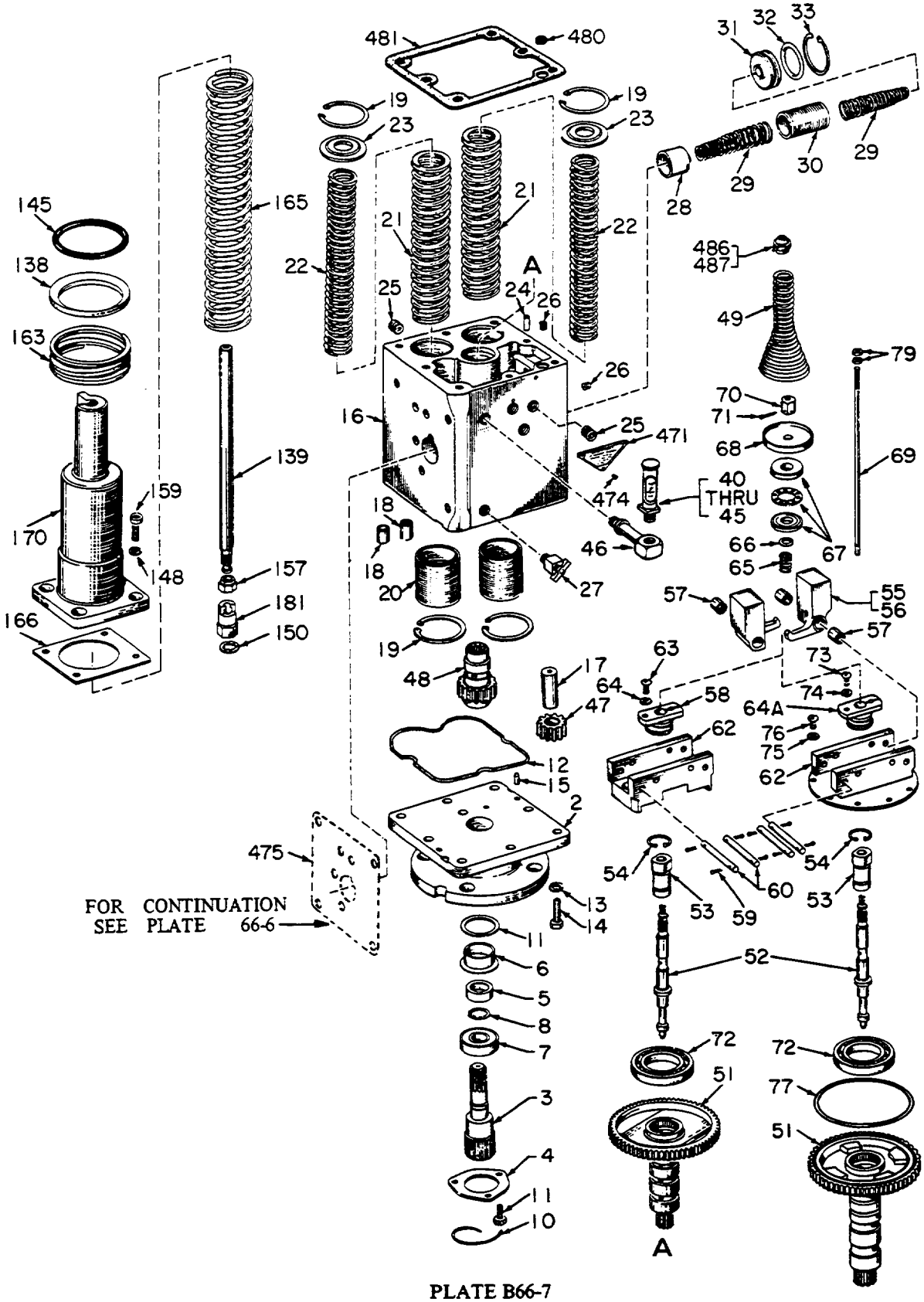


PLATE B66-7

P.L. No. B66

GOVERNOR ASSEMBLY

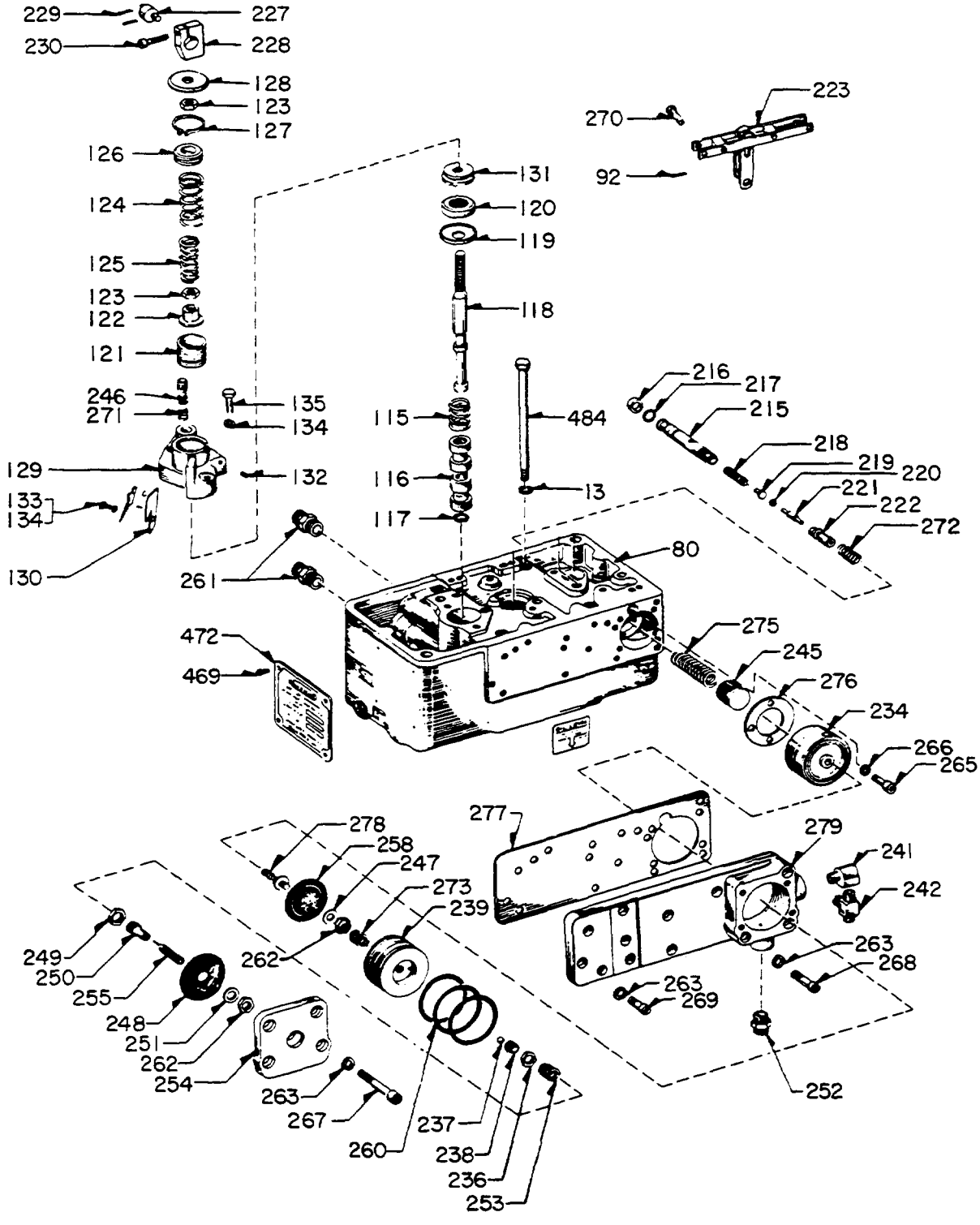


PLATE B66-8

P.L. No. B66

GOVERNOR ASSEMBLY

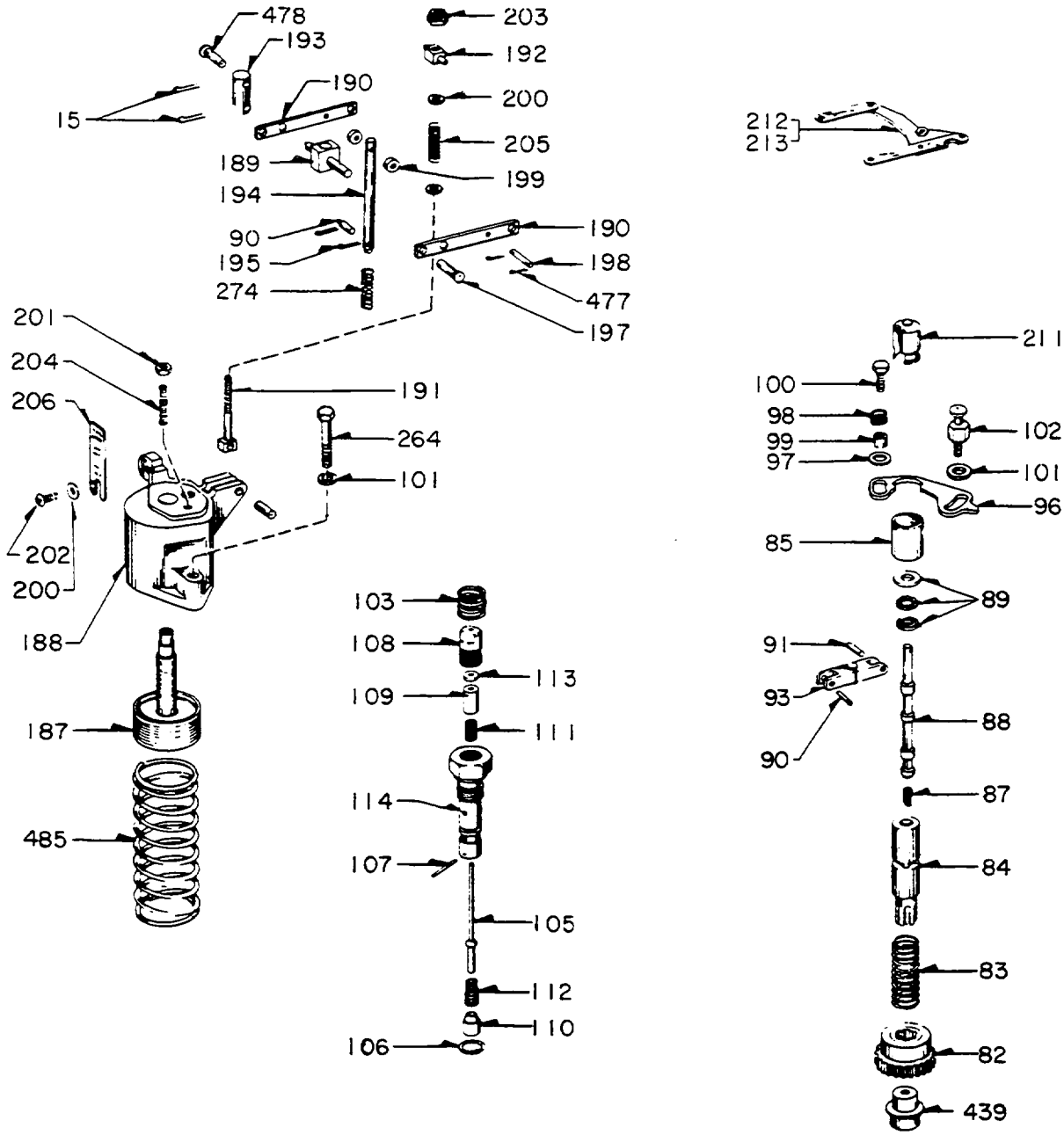


PLATE B66-9

P.L. No. B66

GOVERNOR ASSEMBLY

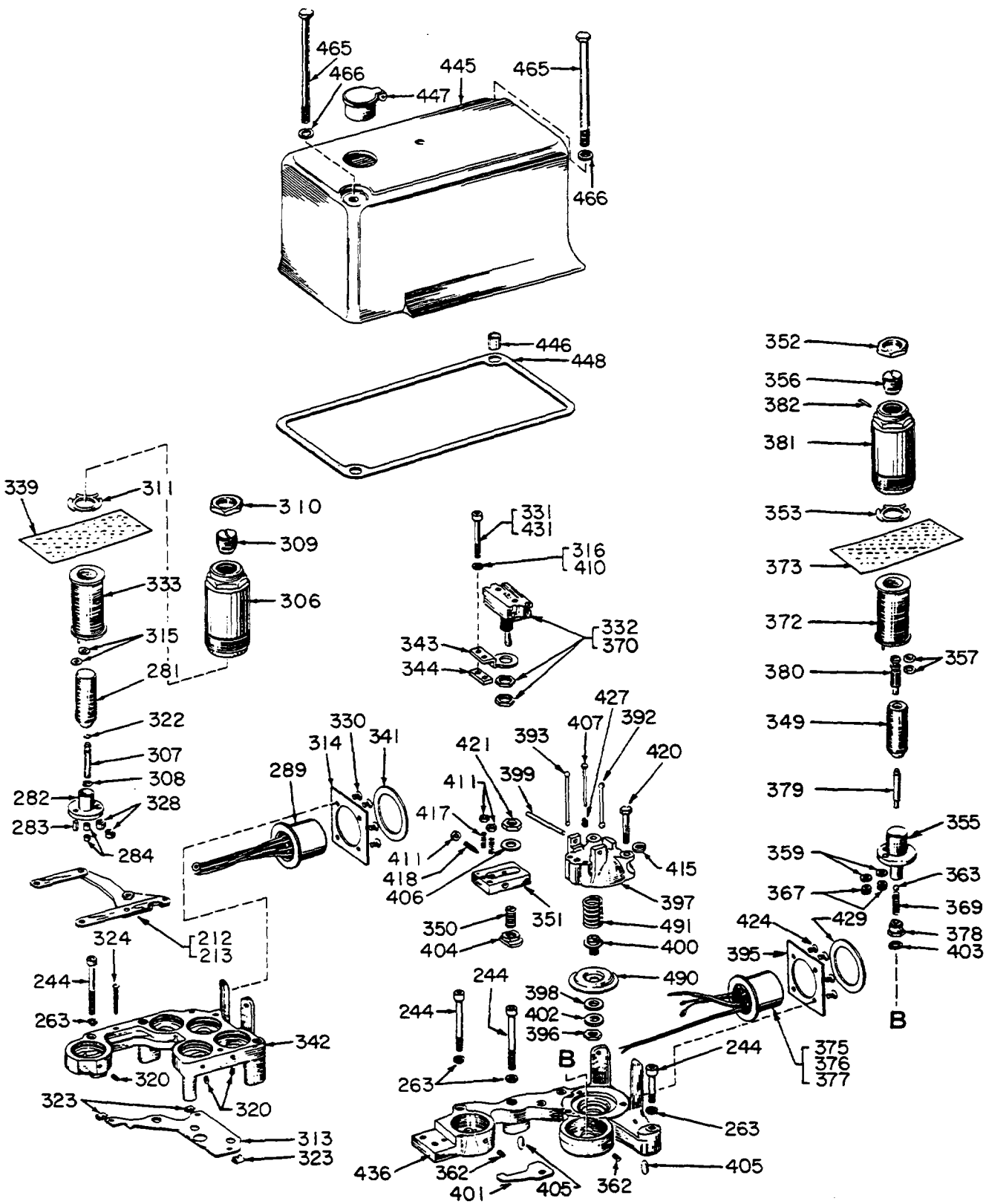


PLATE B66-10

Parts List No. B67

GOVERNOR ASSEMBLY

Reference List

Models EGB-10,EGB-13 and EGB-35
8,12,16-645E1; 8,12,16,20-645E4; 12,16,20-645E4B; 20-645E7B
8,12,16-645E8; 16,20-645E9; 16,20-645E9B Engines

Ref. No.	Part Number	Unit Exch. Part No.	Description	Model Application	Ref. Col.
EGB-10 GOVERNORS					
1	8357529	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - 120 Volt D.C. - Replaced by 8448031	MP45	A
2	8366579	8476675	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - 120 Volt D.C. - Replaced by 8448031	S20E4, MP45	A
3	8376832	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Solenoid energize to shutdown - Replaced by 8413968	MP45	B
4	8382204	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Solenoid energize to run - Replaced by 9536410	MP45	B
5	8383629	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 750 engine R.P.M. - Electric speed control pilot valve - 120 Volt D.C. - Replaced by 8448032	MP45	A
6	8386584	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 350 to 960 engine R.P.M. - Solenoid energize to shutdown - 74 Volt D.C. - Replaced by 8413967	MP45	B
7	8390879	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 720 engine R.P.M. electric speed control pilot valve - 120 Volt D.C. - Replaced by 8413964	MP45	A
8	8397633	8476676	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 8413962	MP45	A
9	8397634	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 8413963	MP45	A
10	8398849	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 9504944	MP45	D
11	8398850	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 9504944	MP45	D
12	8413962	8476676	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaces 8397633	MP45	C
13	8413963	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaces 8397634	MP45	C

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Unit Exch. Part No.	Description	Model Application	Ref. Col.
14	8413964	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 720 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaces 8390879	MP45	C
15	8413965	8444082	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 9504944 - Replaces 8398849	S20E4, MP45	E
16	8413966	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C. - Replaced by 9504944 - Replaces 8398850	MP45	E
17	8413967	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 350 to 960 engine R.P.M. - Solenoid energized to shut-down - 74 Volt D.C. - Replaces 8386584	SR11,12 16E1, MP45	F
18	8415876	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Solenoid energize to run - 120 Volt D.C.	S16E4	H
19	8431504	8489541	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Solenoid energize to run - 120 Volt D.C.	S20E4	G
20	8431749	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Solenoid energize to run - 120 Volt D.C.	S12E4	G
21	8434042	----	GOVERNOR ASSEMBLY .. Engine - Actuator - 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to shutdown - 120 Volt D.C.	MP45	E
22	8439140	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 900 engine R.P.M. - Solenoid energize to run - 120 Volt D.C.	S20E4	F
23	8448031	8476675	GOVERNOR ASSEMBLY .. Engine - Actuator - 900 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to run - 120 Volt D.C. - Replaces 8357529 and 8366579	S8E4, S20E4, MP45	H
24	8448032	----	GOVERNOR ASSEMBLY .. Engine - Actuator - 750 engine R.P.M. - Electric speed control pilot valve - Solenoid energize to run - 120 Volt D.C. - Replaces 8383629	MP45	H
25	8448381	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 945 engine R.P.M. - Solenoid energize to shutdown - 48 Volt D.C.	S20E4	A
26	8451483	----	GOVERNOR ASSEMBLY .. Engine - Actuator - For 900 engine R.P.M. - Electric speed control pilot valve - 120 Volt D.C.	S16E4 S20E4B	H

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Unit Exch. Part No.	Description	Model Application	Ref. Col.
EGB-13 GOVERNORS					
27	8413968	-----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 900 engine R.P.M. - Hydrualic actuator on pilot valve - Solenoid energized to shutdown	MP45	F
28	8413969	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydrualic actuator on pilot valve - Solenoid energized to run - 120 Volt A.C. Replaced by 9536410	MP45	F
29	8414598	8489540	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C.	999-20	H
30	8455181	8480915	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydrualic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt A.C.	LD12E1,LD12E4B MD8,12,16E8, MD20E9	F
31	8458791	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C.	S16E4B, HG20E4B	F
32	8460853	8480916	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve	S12E1,S16E4R, S12,16E4B, SG8E1,SG20E4B, LD12E1,MD12, 16E8,MD20E9	J
33	8461334	8489542	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C.	S20E4R	G
34	8499862	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt A.C.	MD16E9	J
35	9334953	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 110 Volt A.C.	MG20E7B	F
36	9504944	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Solenoid type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C. Replaces 8413966	S2064,MP45	E
†37	9505392	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt A.C. - Applies 115V. speed setting motor 8400021	LD12E1,MD16E8, MD16,20E9B	-
†38	9507513	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C. - Applies 115V. D.C. speed setting motor 8481002	S12,16E4B SG12,16,20E4B	-
†39	9509173	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 24 Volt D.C.	S8,12E1	-
†40	9517003	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve	MD12,16E8	-

† Component Parts Lists for Governors Ref. Nos. 37 thru 40 will be made available upon request.

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Unit Exch. Part No.	Description	Model Application	Ref. Col.
†41	9526336	9566647	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Applies 24V. D.C. speed setting motor 9548398 which includes 9581163 brush	S20E4B,LD8E1, LD12E4B,MD12E8, MD16,20E9B, MG16E8,E9B	-
†42	9527464	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 24 Volt D.C. Applies 24V. D.C. speed setting motor 9548398 which includes 9581163 brush	GM20E7BL	-
†43	9531853	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Applies 115V. A.C./D.C. speed setting motor 9559777	LD12E1 MD12,16E8, MD16E9B	-
†44	9536410	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to run - 120 Volt A.C. Replaces 8382204 and 8413969	MP45	-
†45	9540279	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 110 Volt A.C.	SG20E4B	-
†46	9540692	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C.	SG20E4B	-
†47	9548895	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to run - 24 Volt D.C.	MG20E7B	-
EGB-35 GOVERNOR					
†48	9083196	----	GOVERNOR ASSEMBLY .. Engine - Actuator - Dial type - 400 to 960 engine R.P.M. - Hydraulic actuator on pilot valve - Solenoid energized to shutdown - 120 Volt D.C. - Applies 115V. D.C. speed setting motor 8481002	S12E4R, S20E4R	-

† Component Parts Lists for Governors Ref. Nos. 41 thru 48, will be made available upon request.

GOVERNOR ASSEMBLY

Models EGB-10, 13 and 35
PLATE B67-1 thru 6

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	
*1	----										GOVERNOR ASM. .. Engine - See chart on Pages 1,2,3 and 4
2	8149658	1	1	1	1	1	1	1	1	1	BASE .. Governor
3	8149696	1	1	1	1	1	1	1	1	1	SHAFT .. Drive - Serrated
4	8149695	1	1	1	1	-	-	-	-	-	SEAL .. Oil
4	8452844	-	-	-	-	1	1	1	1	1	SEAL .. Oil
5	8149697	1	1	1	1	1	1	1	1	1	RETAINER .. Oil seal
6		1	1	1	1	1	1	1	1	1	BEARING .. Ball - Drive shaft - Formerly 954298
7		1	1	1	1	1	1	1	1	1	RING .. .621 free diameter - Formerly 8149677
8	8113929	3	3	3	3	3	3	3	3	3	BOLT .. Bearing retainer to base - 1/4 - 28 x 5/8 hex. hd. - Drilled
9	8288663	As Required									WIRE .. Lock - .026 dia. - Available 500 ft. length
10	8149679	1	1	1	1	1	1	1	1	1	GASKET .. Retainer to base
11	8062007	1	1	1	1	1	1	1	1	1	RETAINER .. Bearing
12	8270552	1	1	1	1	1	1	1	1	1	SHAFT ASM. .. Intermediate
*13	8270553	1	1	1	1	1	1	1	1	1	CYLINDER ASM. .. Power - Except governors 8414598, 8415876, 9504944 and 9506385
*13	9506385	-	-	-	-	1	1	-	1	-	CYLINDER ASM. .. Power - Governors 8414598, 8415876, 9504944 and 9506385
14	8444377	1	1	1	1	1	1	1	1	1	RING .. Power cylinder } Except governors 8414598,
15	8270595	1	1	1	1	1	1	1	1	1	PIN .. Piston rod to piston } 8415876, 9504944 and 9506385
15		-	-	-	-	1	1	-	1	-	PIN .. Piston rod to piston - Governor 8419598, 8415876, 9504944 and 9506385
16	8270596	1	1	1	1	1	1	1	1	1	SPRING .. Power cylinder } Except governors
17		1	1	1	1	1	1	1	1	1	RING .. 2.141 free diameter - Formerly 274867 } 8414598,8415876,
18	8270597	1	1	1	1	1	1	1	1	1	PLUG .. Power cylinder } 9334953 and
19	8270598	1	1	1	1	1	1	1	1	1	CYLINDER .. Power } 9504944
19		-	-	-	-	1	1	-	1	-	CYLINDER .. Power - Governors 8414598, 8415876, 9504944 and 9506385
20	8270599	1	1	1	1	1	1	1	1	1	ROD .. Power piston - Except governors 8414598, 8415876, 9504944 and 9506385
20		-	-	-	-	1	1	-	1	-	ROD .. Power piston - Governors 8414598, 8415876, 9504944 and 9506385
21	8270600	1	1	1	1	1	1	1	1	1	PISTON .. Power - Except governors 8414598, 8415876, 9504944 and 9506385
21		-	-	-	-	1	1	-	1	-	PISTON .. Power - Governors 8414598, 8415876, 9504944 and 9506385
22	8270601	1	1	1	1	1	1	1	1	1	SEAL .. Power cylinder - Except governors 8414598, 8415876, 9504944 and 9506385
*23		-	-	-	-	1	1	-	1	-	SPRING .. Servo return } Governors 8414598,
*24		-	-	-	-	1	1	-	1	-	SEAT .. Return spring } 8415876, 9504944
*25		-	-	-	-	1	1	-	1	-	SEAT .. Piston spring } and 9506385
26	9328197	1	1	1	1	1	1	1	1	1	GAUGE ASM. .. Oil level - Replaces 8113998 and 8442288
27		2	2	2	2	2	2	2	2	2	SEAL .. Glass to body
28	8113998	1	1	1	1	1	1	1	1	1	GAUGE ASM. .. Oil level - Replaced by 9328197
29	8444618	2	2	2	2	2	2	2	2	2	SEAL .. .359 I.D. x .500 O.D. x .067 in. thick - Formerly 8319674
30	8350082	5	5	5	5	5	5	5	5	5	GASKET .. .312 I.D. x .535 O.D. x .078 in. thick - Formerly 8174780
31	8131381	1	1	1	1	1	1	1	1	1	GLASS .. Sight
32	8319675	1	1	1	1	1	1	1	1	1	CAP .. Gauge
33	8442288	1	1	1	1	1	1	1	1	1	GAUGE ASM. .. Oil level - Replaced by 9328197
34	8444618	2	2	2	2	2	2	2	2	2	RING .. .359 I.D. x .500 O.D. x .067 in. thick - Formerly 8319674
35	8350082	5	5	5	5	5	5	5	5	5	GASKET .. .312 I.D. x .535 O.D. x .078 in. thick - Formerly 8174780
36	8451831	1	1	1	1	1	1	1	1	1	GLASS .. Sight
37	8319675	1	1	1	1	1	1	1	1	1	CAP .. Gauge
38											Ref. No. Not Used
39											Ref. No. Not Used
40	8113999	1	1	1	1	1	1	1	1	1	ELBOW .. Oil gauge

P.L. No. B67

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
41	8298832	1	-	-	-	-	-	-	-	-	CASE ASM. .. Power - Except governor 8448381
41	8451301	1	-	-	-	-	-	-	-	-	CASE ASM. .. Power - Governor 8448381
41	8394159	-	1	-	-	-	-	-	-	-	CASE ASM. .. Power
41	8422433	-	-	1	-	-	-	-	1	-	CASE ASM. .. Power - Col. H formerly applied - Governors 8448031, 8448032 and 8451483
41	8318046	-	-	-	1	-	-	-	-	-	CASE ASM. .. Power
41		-	-	-	-	1	-	-	-	-	CASE ASM. .. Power - Governors 8413965, 8413966
41	8418626	-	-	-	-	1	-	-	-	-	CASE ASM. .. Power - Governor 8434042
41		-	-	-	-	1	-	-	-	-	CASE ASM. .. Power - Governor 9504944
41	8418615	-	-	-	-	-	1	-	-	-	CASE ASM. .. Power - Formerly applied
41	8481005	-	-	-	-	-	1	1	1	-	CASE ASM. .. Power - Col. H governors 8414598, 8415876
41		-	-	-	-	-	-	-	1	-	CASE ASM. .. Power - Governors 8448031, 8448032
41		-	-	-	-	-	-	-	-	1	CASE ASM. .. Power - Governors 8460853, 8499862
42	8149469	2	2	2	2	2	2	2	2	-	PISTON .. Accumulator
43	8149470	1	1	1	1	1	1	1	1	-	STUD .. Idler
44	8201045	2	2	2	2	2	2	2	2	-	PLUG .. Drive - Ball check - Except governors 8434042, 8439140 and 8448381
45		4	4	4	4	4	4	4	4	-	RING .. Snap - Accumulator - Formerly applied Col. C thru H - Formerly 9413465 - Col. A except 8357529
45		4	-	4	4	4	4	4	4	-	RING .. Snap - Accumulator - Formerly 9432040 Col. A governor 8357529 - Col. E governor 8434042
46	8149471	2	2	2	2	2	2	2	2	-	SPRING - Accumulator - Outer
47	8057784	2	2	2	2	2	2	2	2	-	SPRING .. Accumulator - Inner - Except governors 8448381, 9504944
47	8444623	2	-	-	-	2	2	2	-	-	SPRING .. Accumulator - Inner - Governors 8448381, 9504944
48	8149474	2	2	2	2	2	2	2	2	-	SEAT .. Spring - Accumulator
49	8113672	2	2	2	2	2	2	2	2	-	PIN .. Grooved - Dowel case to column - Formerly applied - Except governor 8448381
50		5	6	5	6	5	5	5	5	-	PLUG .. Pipe - 1/8 M.P.T. - Formerly 444687
51	8134425	5	6	-	-	-	5	-	-	-	PLUG .. Pipe - 1/16 M.P.T. - Except governor 8357529
*52	8275069	2	-	-	-	2	-	-	-	-	VALVE .. Check - Pump discharge } Col. A gov. 8448381
*53	8326398	2	-	-	-	2	-	-	-	-	VALVE .. Check - Pump suction } Col. E except gov. 8434042
54	8451276	1	1	1	1	1	1	1	1	1	LEVER ASM. .. Terminal - Except governor 8448381
54	8292512	1	-	-	-	-	-	-	-	-	LEVER ASM. .. Terminal - Governor 8448381
55	8284091	1	1	1	1	1	1	1	1	1	INSERT .. Thread - Helical coil - No. 6 - 32 thread - Form. appl.
56	8270593	1	1	1	1	1	1	1	1	1	INSERT .. Thread - Helical coil - 5/16 - 24 thread
*57	8371954	1	-	1	-	-	-	-	1	-	CONNECTOR ASM. .. Male - 10 pole - Governor 8366579, 8383629, 8390879, 8397633, 8397634, 8448031, 8448032 and 8451483
*57	8390876	-	1	-	-	-	1	-	-	-	CONNECTOR ASM. .. Male - 10 pole - Governors 8376832, 8382204, 8413968, 8413969 and 8439140
*58		5	5	5	-	-	5	-	5	-	TERMINAL .. Wire
*59	8270726	As Req.			-	-	-	-	AR	-	TUBING .. Insulating - Spaghetti - No. 8 - 3 ft. long - Formerly applied
*60	8291485	1	2	1	-	-	2	-	1	-	SOCKET .. Cinch Jones - 4 pin
*61	8481008	1	2	1	-	-	2	-	-	-	TUBING .. Teflon - 5 ft.
*62	8346170	1	1	1	-	-	1	-	1	-	RECEPTACLE .. 10 pole
*63	8480983	9	15	9	-	-	15	-	-	-	TUBING .. Heat shrink
*64	8346949	9	10	9	-	-	10	-	9	-	TUBE .. Plastic - .106 I.D. x 5/8 in. long } Formerly
*65	8481010	-	AR	-	-	-	AR	-	-	-	TUBING .. Teflon - .166 I.D. x 5 ft. } Applied
*66	8129083	-	5	-	-	-	5	-	-	-	TUBING .. Plastic - .133 I.D. x 3/4 in. long } Applied
*67	8360270	1	-	-	-	-	-	-	-	-	CONNECTOR ASM. .. Male - 10 pole - Governor 8357529
*67	8395358	-	1	-	-	-	1	-	-	-	CONNECTOR ASM. .. Male - 10 pole - Governors 8386584, 8413967
*67	8402939	-	-	-	1	1	-	-	-	-	CONNECTOR ASM. .. Male - 10 pole - Except governor 9504944
*67		-	-	-	-	1	-	-	-	-	CONNECTOR ASM. .. Male - 10 pole - Governor 9504944

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required A	B	C	D	E	F	G	H	J	Description
											GOVERNOR ASSEMBLY .. Engine
											CONNECTOR ASM. .. Male - 10 pole
*68	8113754	-	-	-	AR		-	-	-	-	TUBING .. Plastic - No. 4 - 3 ft. length
*69		AR		-	As Req.			-	-	-	TUBING .. Insulating - Spaghetti - No. 8 - 3 ft. long } Formerly applied
*70	8481010	AR	-	-	AR		-	-	-	-	TUBING .. Insulating - .166 I.D. x 5 ft. long
*71	8346949	AR		-	As Req.			-	-	-	TUBING .. Clear plastic - .016 I.D. x 5/8 in. long
*72	8480983	7	12	-	11	11	12	-	-	-	TUBING .. Heat shrink
*73		3	-	-	-	-	-	-	-	-	TERMINAL .. Wire - Formerly 8200229
*73		-	6	-	5	8	6	-	-	-	TERMINAL .. Wire - Formerly 8189218
*74	8444605	-	-	-	AR		-	-	-	-	TUBING .. Clear plastic - .148 I.D. x 3 ft. long - Formerly applied
75	8291485	1	2	-	1	1	2	-	-	-	SOCKET .. Cinch Jones - 4 pin
76	8346170	1	1	-	1	1	1	-	-	-	RECEPTACLE .. 10 pole
*77	8481008	AR		-	-	AR		-	-	-	TUBING .. Teflon
*78	8437288	-	-	-	-	-	1	1	-	-	CONNECTOR ASM .. Male - 14 pole - Governors 8431749, 8455181
*78		-	-	-	-	-	1	-	-	-	CONNECTOR ASM. .. Male - 14 pole - Governor 9334953
*78	8480982	-	-	-	-	-	-	1	-	-	CONNECTOR ASM. .. Male - 19 pole - Governor 8461334
79	8291485	-	-	-	-	-	2	2	-	-	SOCKET .. Cinch Jones - 4 pin
*80		-	-	-	-	-	AR		-	-	TERMINAL .. Wire - Formerly 8189218 - Col. F Qty. 10 - 9334953 - Qty. 8 - Except 9334953 - Col. G Qty. 8 - 8431749 - Qty. 14 - 8461334
81	8350227	-	-	-	-	-	1	1	-	-	CONNECTOR .. 14 pole - Col. G except governor 8461334
*81	8480984	-	-	-	-	-	-	1	-	-	CONNECTOR .. 14 pole - Governor 8461334
*82	8480983	-	-	-	-	-	AR		-	-	TUBE .. Shrinkable - 1/8 I.D. x 5/8 in. long - Col. F Qty. 18 except 9334953 - Qty. 20 - 9334953 Col. G Qty. 18 - 8431749 - Qty. 29 - 8461334
*83	8481008	-	-	-	-	-	AR		-	-	TUBING .. Teflon - No. 4 x 5 ft. long
*84	9316534	-	-	-	-	-	AR		-	-	TUBING .. Teflon - No. 8 x 5 ft. long - Form. 8481009
*85	8481010	-	-	-	-	-	AR		-	-	TUBING .. Teflon - No. 6 x 5 ft. long
*86	8425062	1	-	-	-	-	-	1	1	1	CONNECTOR ASM. .. Male - 14 pole - Governors 8414598, 8415876, 8431504, 8448381, 8458791 and 8499862
*86		-	-	-	-	-	-	-	-	1	CONNECTOR ASM. .. Male - 14 pole - Governor 8460853
*87	8113754	AR	-	-	-	-	-	As Req.			TUBING .. Plastic - No. 4 x 3 ft. long
*88	8270726	AR	-	-	-	-	-	As Req.			TUBING .. Insulating - No. 8 x 3 ft. long } Formerly applied
*89	8481010	AR	-	-	-	-	-	As Req.			TUBING .. Teflon - .166 I.D. x 5 ft. long
*90	8364949	15	-	-	-	-	-	15	15	15	TUBING .. Clear plastic - .016 I.D. x 5/8 in. long
*91	8480983	20	-	-	-	-	-	20	20	AR	TUBING .. Heat shrink - Col. J - Qty. 20 - 8499862 - 4 req. 8460853
*92	8481008	2	-	-	-	-	-	2	2	AR	TUBING .. Teflon - 5 ft. long - Col. J - Qty. 2 - 8499862 - Qty. 1 - 8460853
93	8491485	2	-	-	-	-	-	2	2	2	SOCKET .. Cinch Jones - 4 pin
94	8350227	1	-	-	-	-	-	1	1	1	CONNECTOR .. 14 pole
*95		10	-	-	-	-	-	20	20	20	TERMINAL .. Wire - Formerly 8189218 - Col. J - Governor 8499862 only
96	8328445	2	2	2	2	2	2	2	2	2	PIN .. Dowel - Columns F, G, H and J formerly applied
97	8360001	1	1	1	1	1	1	1	1	1	PIN .. Dowel
98	8270574	1	1	1	1	1	1	1	1	1	GASKET .. Power cylinder to case
99		4	4	4	4	4	4	4	4	4	SCREW .. 3/8 - 16 x 1 hex. socket head - Formerly 138242 } Columns F, G, H and J form. appl.
100	8152079	4	4	4	4	4	4	4	4	4	WASHER .. Lock - 3/8
101	8152069	1	1	1	1	1	1	1	1	1	GEAR .. Drive } Column E except
102	8152070	1	1	1	1	1	1	1	1	1	GEAR .. Idler } 8413965, 8413966
103	8360279	1	1	1	1	1	1	1	1	1	PLUNGER .. Pilot valve - Except governor 8448381
103	8444629	1	-	-	-	-	-	-	-	-	PLUNGER .. Pilot valve - Governor 8448381
104	8360277	1	1	1	1	1	1	1	1	1	PIN .. Straight - Pilot valve plunger to relay beam
105		1	1	1	1	1	1	1	1	1	RING .. Snap - Formerly 274416
106	8360280	1	1	1	1	1	1	1	1	1	BUSHING .. Plunger
107	8360276	1	1	1	1	1	1	1	1	1	RETAINER .. Bushing
108		1	1	1	1	1	1	1	1	1	PIN .. Spring - 1/8 x 7/16 in. long - Formerly 456355

P.L. No. B67

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
109	8360275	1	1	1	1	1	1	1	1	1	SPRING .. Pilot valve
110	8113870	1	1	1	1	1	1	1	1	1	GASKET .. Case to column
111	8306055	1	1	1	1	1	1	1	1	1	SCREW .. Set - 5/16 - 24 x 1-1/16 - Slotted - Headless
112		2	2	2	2	2	2	2	2	2	SCREW .. Set - 5/16 - 24 x 1-1/4 hex. head - Except governors 8357529, 8413967, 8431749, 8439140 and 8455181
113	8057114	2	-	2	2	-	2	2	-	-	WASHER .. Lock - 21/64 I.D. - Governors 8366579, 8383629, 8390879, 8397633, 8397634, 8398849, 8398850, 8413962, 8413963, 8413964, 8414598, 8415876, 8431504 and 8448381
114	8306059	1	-	1	1	1	1	1	1	-	CAM .. Lever - Except governors 8413676, 8431749, 8439140 and 8455181 - Columns F, G and H formerly applied
115		1	1	1	1	1	1	1	1	1	SCREW .. Set - No. 6 - 32 x 5/16 dog point - Formerly 9415981
116	8291459	1	1	1	1	1	1	1	1	1	SHAFT .. Terminal
117	8372931	1	-	-	-	-	-	-	-	-	PLATE .. Dial - Left hand - Early 8366579 governor
118	8372932	1	-	-	-	-	-	-	-	-	PLATE .. Dial - Right hand - Early 8366579 governor
119		4	4	4	4	4	4	4	4	4	PIN .. Grooved - 3/32 x 1/4 in. long
120	8291456	1	1	1	1	1	1	1	1	1	POINTER .. Dial (quantity 2 used on earlier models)
121		4	4	4	4	4	4	4	4	4	SCREW .. Plate mounting - No. 6 - 32 x 1/4 truss head Formerly 273808 - Columns F, G, H and J formerly applied
122		2	2	2	2	2	2	2	2	2	RING .. Snap - Terminal shaft - Formerly applied - Formerly 9413435
123	8444628	2	2	2	2	2	2	2	2	2	SEAL .. Oil - Terminal shaft - column A governor 8448381
124		2	2	2	2	2	2	2	2	2	BEARING .. Terminal shaft - Formerly 9416801 } Columns F, G, H
125		1	1	1	1	1	1	1	1	1	PIN .. Terminal lever - Formerly 8288650 } and J form appl.
126	8346162	2	2	2	2	2	2	2	2	2	RETAINER ASM. .. Shaft - Includes bearing
127		2	2	2	2	2	2	2	2	2	BEARING .. Control shaft - Formerly 9413498
128	8017619	2	2	2	2	2	2	2	2	2	WASHER .. Retainer - .435 I.D. x .625 O.D. x .031 - Copper
129	8298837	1	1	1	1	1	1	1	1	1	ROLLER .. Relay beam
130	8298835	1	1	1	1	1	1	1	1	1	PIN .. Roller
131	8360278	1	1	1	1	1	1	1	1	1	BEAM .. Relay
132	8270639	1	1	1	1	1	1	1	1	1	BUSHING .. Compensating
133	8270563	1	1	1	1	1	1	1	1	1	STUD .. Case to base
134	8270565	2	2	2	2	1	2	1	1	1	NUT .. Lock - 5/16 - 24 hex.
135	8288658	1	1	1	1	1	1	1	1	1	PIN .. Guide
136	8346182	1	1	1	1	1	1	1	1	1	BALL HEAD ASM. } Column E - Governor 8434042
137	8270694	2	2	2	2	2	2	2	2	2	ARM ASM. .. Ball head } Column F - Except Governor
138	8270695	2	2	2	2	2	2	2	2	2	PIN .. Arm retainer } 8413967, 8455181 - Column J -
139	8270696	1	1	1	1	1	1	1	1	1	RING .. Retaining } Governor 8460853
140	8270688	1	1	1	1	1	1	1	1	1	PINION .. Pilot valve - Column J governor 8499862 - Column H except governor 8451483
140		-	-	-	-	-	-	-	1	-	PINION .. Pilot valve - Governor 8451483
141	8270643	1	1	-	1	-	-	-	-	-	BUSHING .. Pilot valve - Column A except governor 8448381
141	8395362	1	1	1	-	1	1	1	1	1	BUSHING .. Pilot valve - Column A governor 8448381 - Column B governor 8386584 - Column E governor 8434042
142	8270640	1	1	1	1	1	1	1	1	1	PLUNGER .. Pilot valve
143		1	1	1	1	1	1	1	1	1	RING .. Snap - Retaining - No. 43 - .438 bore dia. - Formerly 9413362 - Column G except governor 8461334
144		1	1	1	1	1	1	1	1	1	RING .. Snap - Retaining - No. 62 - .625 shaft dia. - Formerly 9413466 - Column G except governor 8461334
145	9543312	1	1	1	1	1	1	1	1	1	BEARING ASM. .. Thrust - Formerly 8291465 - Column G except governor 8461334
145	8291465	-	-	-	-	-	-	1	-	-	BEARING ASM. .. Thrust - Governor 8461334
146	8270641	1	1	1	1	1	1	1	1	1	SEAT .. Speeder spring
147	8270642	1	1	1	1	1	1	1	1	1	NUT .. Speeder spring seat
148		1	-	1	1	1	-	-	-	-	SPRING ASM. .. Speeder - Formerly 8491835 except governors 8434042, 8448381
148	8491834	1	1	-	-	1	1	1	1	1	SPRING ASM. .. Speeder - Governors - Column A governor 8448381 - Column E governor 8434042 - Column F governor 8455181 - Column J governor 8499862

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
149	8400800	1	-	2	2	2	-	-	2	-	LEVER .. Floating - Except governors 8414598, 8415876 and 8448381
149	8346960	1	2	-	-	-	1	1	2	2	LEVER .. Floating - Column A governor 8448381 - Column H governor 8414598, 8415876
*150	8360290	1	-	2	2	2	-	-	2	-	SPACER .. Floating lever - Except governors 8414598, 8415876 and 8448381
*151	8360288	1	-	1	1	1	-	-	1	-	LEVER .. Speed control - Except governors 8414598, 8415876, 8448381 and 8451483
152	8346959	1	2	-	-	-	-	-	2	2	LEVER .. Speed adjusting - Column A governor 8448381 - Column H governors 8414598, 8415876 - Column J governor 8499862
153	8260286	1	-	1	1	1	-	-	1	-	PIN .. Speed control lever - Except governors 8414598, 8415876, 8448381 and 8451483
154		2	2	2	2	2	2	2	2	2	PIN .. Cotter - 1/32 x 3/8 in. long - Formerly 143174 - Column G except governor 8461334
*155	8246873	1	-	1	1	1	-	-	1	-	SPRING .. Speed setting shaft - Except governors 8414598, 8415876, 8448381 and 8451483
*156	8365154	1	-	1	1	1	-	-	1	-	SPACER .. Lever - Formerly 8364154 - Except governors 8414598, 8415876, 8448381 and 8451483
*157	8270683	1	-	1	1	1	-	-	1	-	SHAFT .. Speed setting - Except governors 8414598, 8415876, 8448381 and 8451483
*158		2	-	2	2	2	-	-	2	-	BEARING .. Needle - Formerly 191345 - Except governors 8414598, 8415876, 8448381 and 8451483
159	8346956	1	1	-	-	-	1	1	1	1	SPACER .. Speed adjusting lever - Column A governor 8448381 - Column H governors 8414598, 8415876
160	8113990	1	1	-	-	-	1	1	1	1	NUT .. Lock - 1/4 - 28 hex. - Column A governor 8448381 - Column H governors 8414598, 8415876
161	8346208	1	1	1	1	1	1	1	1	1	NUT .. Output
162	8270651	1	1	1	1	1	1	1	1	1	PIVOT .. Output nut
163	8346211	1	1	1	1	1	1	1	1	1	PISTON .. Linkage return
164		1	1	1	1	1	1	1	1	1	NUT .. Lock - 1/4 - 28 hex. - Formerly 120613
165	8346186	1	1	1	1	1	1	1	1	1	LEVER ASM. .. Droop
166	8270673	2	2	2	2	2	2	2	2	2	PIN .. Pivot - Droop lever
167		2	2	2	2	2	2	2	2	2	RING .. Snap - Formerly 9413463 - Column A governor 8448381 - Column G except governor 8461334
168	8291496	1	1	1	1	1	1	1	1	1	LINK .. Speed servo
169	8270619	1	1	1	1	1	1	1	1	1	PIN .. Droop lever
170	8346201	1	1	1	1	1	1	1	1	1	PIN .. Headed
171	8346188	1	1	1	1	1	1	1	1	1	PISTON ASM. .. Speed servo
172	8444621	1	1	1	1	1	1	1	1	1	O-Ring .. Seal
173	8350487	1	1	1	1	1	1	1	1	1	LINKAGE ASM. .. Floating lever
174	8351313	1	1	1	1	1	1	1	1	1	PIN .. Headed — Column J governor 8460853
175		1	1	1	1	1	1	1	1	1	PIN .. Cotter - 1/16 x 3/8 in. long - Formerly 119981 — Column J governor 8460853
176	8289242	1	1	1	1	1	1	1	1	1	LINK .. Pivot — Column J governor 8460853
177		2	2	2	2	2	2	2	2	2	PIN .. Cotter - 1/16 x 3/8 in. long - Formerly 119981
178	8270653	1	1	1	1	1	1	1	1	1	PIN .. Piston - Fuel servo
179	8346189	1	1	1	1	1	1	1	1	1	PISTON ASM. .. Servo - Column F except governor 9334953 - Column G except governor 8461334 - Column J except governor 8499862
179		-	-	-	-	-	1	-	-	1	PISTON ASM. .. Servo - Governors 8499862, 9334953
179	8480987	-	-	-	-	-	-	1	-	-	PISTON ASM. .. Servo - Governor 8461334
180	8350488	1	1	1	1	1	1	1	1	1	PIN .. Piston servo
181	8350489	1	1	1	1	1	1	1	1	1	RING .. Retaining - Columns F, G, H and J formerly applied
182	8346205	1	1	1	1	1	1	1	1	1	SLEEVE .. Piston - Column F except governor 9334953 - Column J governor 8460853
183	8270616	1	1	1	1	1	1	1	1	1	O-Ring .. Piston sleeve - Formerly 8346196 - Column G except governor 8461334

P.L. No. B67

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
183	8444620	-	-	-	-	-	-	1	-	-	O-RING .. Piston sleeve - Governor 8461334
184	8346954	1	1	1	1	1	1	1	1	1	WASHER .. Spring - Bowed - Column F except governor 9334953 - Column J governor 8460853
185	8346207	1	1	1	1	1	1	1	1	1	TUBE .. Oil - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
186	8247158	1	1	1	1	1	1	1	1	1	O-RING .. Oil tube - Formerly 8430050
187	8346203	1	1	1	1	1	1	1	1	1	BUSHING .. Pilot valve - Column F except governor 9334953 - Column J governor 8499862
187		-	-	-	-	-	1	-	-	-	BUSHING .. Pilot valve - Governor 9334953
188	8346204	1	1	1	1	1	1	1	1	1	PLUNGER .. Pilot - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
189	8346206	1	1	1	1	1	1	1	1	1	BUSHING .. Compensating
190		1	1	1	1	1	1	1	1	1	RING .. Snap - Formerly 9413463 - Column G except gov. 8461334
191	8346953	1	1	1	1	1	1	1	1	1	SPRING .. Magnet adjusting
192	8346955	1	1	1	1	1	1	1	1	1	WASHER .. Spring
193	8346193	1	1	1	1	1	1	1	1	1	TRANSDUCER ASM. .. Governor
194	8346216	1	1	1	1	1	1	1	1	1	RING .. Transducer temperature compensating
195	8346192	1	1	1	1	1	1	1	1	1	MAGNET ASM. .. Transducer
196	8346191	1	1	1	1	1	1	1	1	1	COVER ASM. .. Coil - Column A except governor 8448381 - Column F except governor 9334953 - Column G governor 8461334 - Column J governor 8460853
196	8480997	-	-	-	-	-	1	1	-	1	COVER ASM. .. Coil - Column F governor 9334953 - Column G except governor 8461334 - Column J governor 8499862
197	8346212	1	1	1	1	1	1	1	1	1	SCREW .. Cover - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
198	8270636	1	1	1	1	1	1	1	1	1	SCREW .. Cover mounting - No. 6 - 32 x 3/8 in. - Socket head
199		1	1	1	1	1	1	1	1	1	WASHER .. Steel - Formerly 131014 - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
200	8346961	1	1	1	1	1	1	1	1	1	BRACKET ASM. .. Transducer - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8452968
200	8480989	-	-	-	-	-	1	1	-	1	BRACKET ASM. .. Transducer - Column F governor 9334953 - Column J governor 8499862
201	8068086	1	1	1	1	1	1	1	1	1	PIN .. Mounting - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
201	8270626	-	-	-	-	-	-	1	-	-	PIN .. Mounting - Governor 8461334
202	8346197	2	2	2	2	2	2	2	2	2	SCREW .. Bracket mounting - No. 10 - 32 x 1-7/8 socket head - Column F except governor 9334953 - Column G except governor 8461334 - Column J governor 8460853
203		2	2	2	2	2	2	2	2	2	WASHER .. Lock - No. 10 - Formerly 120217 - Apply with Item 202
*204	8360285	1	-	1	1	1	-	-	1	-	BRACKET ASM. .. Droop adj.
*205		1	-	1	1	1	-	-	1	-	SCREW .. Bracket mounting - 10 - 32 x 1/2 - Formerly 431942
*206		1	-	1	1	1	-	-	1	-	WASHER .. Lock - No. 10 Formerly 120217
*207	8284081	1	-	1	1	1	-	-	1	-	WASHER .. .380 O.D. Formerly 8284041
208	8372295	1	1	-	-	-	1	1	1	1	LINK ASM. .. Speed droop
209	8491836	1	1	-	-	-	1	1	1	1	LEVER ASM. .. Speed droop
209		-	-	-	-	-	1	-	-	-	LEVER ASM. .. Speed droop - Except governors 8413968, 8439140
210	8372296	1	1	-	-	-	1	1	1	1	PIN .. Pivot
211		2	2	-	-	-	2	2	2	2	NUT .. Stop - No. 10 - 32 hex. - Formerly 5939163

Except governors 8414598, 8415876 and 8448381

Column A governor 8448381

Column H governors 8414598 and 8415876

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
212	8346957	2	2	-	-	-	2	2	2	2	SPACER .. Speed droop link
213	8346202	1	1	-	-	-	1	1	1	1	LEVER .. Speed droop cam
214		1	1	-	-	-	1	1	1	1	SCREW .. Cap - No. 10 - 32 x 5/8 hex. Socket head - Formerly 431487
215		1	1	-	-	-	1	1	1	1	WASHER .. Lock - No. 10
											Col. A governor 8448381 - Col. H governors 8414598, 8415876 - Col. J governor 8499862
216	8346187	1	1	-	1	-	-	-	-	-	GEAR ASM. .. Idler - Except governor 8448381
216	8288656	1	-	1	-	1	1	1	1	1	GEAR ASM. .. Idler - Column A governor 8448381
217	8289239	1	1	1	1	1	1	1	1	1	STUD .. Idler gear
218		1	1	1	1	1	1	1	1	1	RING .. Snap - Formerly 9432041, 9417421 - Column G except governor 8461334
219	8298842	1	1	1	1	1	1	1	1	1	PLUG .. Buffer
220	8346196	1	1	1	1	1	1	1	1	1	RING .. Buffer plug - Formerly 8444620
221	8288657	2	2	2	2	2	2	2	2	2	SPRING .. Buffer piston - Column E governor 8434042
222	8270648	1	1	1	1	1	1	1	1	1	PISTON .. Buffer
223	8270668	2	2	2	2	2	2	2	2	2	VALVE .. Needle
224	8247158	2	2	2	2	2	2	2	2	2	O-RING .. Needle valve - Formerly 8430050 - Columns F, G, H and J formerly applied
225		10	10	10	10	10	10	10	10	10	PLUG .. Pipe - 1/16 - 27 - Formerly 9409966 - Column G except governor 8461334
226		1	1	1	1	1	1	1	1	1	RING .. Snap - Formerly 9413464 - Column F except governor 9334953 - Column G except governor 8461334
227	8346209	1	1	1	1	1	1	1	1	1	CAP .. Buffer - Column F except governor 9334953 - Column J governor 8460853
228	8444619	1	1	1	1	1	1	1	1	1	O-RING .. Buffer - Column F except governor 9334953 - Column J governor 8460853
229	8346198	2	2	2	2	2	2	2	2	2	SPRING .. Buffer - Column E governor 8434042 - Column F governors 8413968, 8439140 - Column J governor 8499862
230	8346210	1	1	1	1	1	1	1	1	1	PISTON .. Buffer - Column F except governor 9334953 - Column G except governor 8461334 - Column J 8460853
231	8270733	1	-	1	1	1	-	-	-	-	STRAP .. Speed
232	8270734	1	-	1	1	1	-	-	-	-	PISTON ASM. .. Speed setting
233		1	-	1	1	1	-	-	-	-	PIN .. Lock - Formerly 8130451
234	8270747	1	-	1	1	1	-	-	-	-	INSERT .. Thread
											Except governor 8448381
*235	8300937	1	-	-	-	-	-	-	-	-	BLOCK .. Terminal - 3 pole - Governors 8357529, 8366579, 8383629 and 8390879 only
*235	9333517	1	-	1	1	1	-	-	-	-	BLOCK .. Terminal - Formerly 8236494 - Governors 8397633, 8397634, 8413962, 8413963, 8413964, 8398849, 8398850, 8413965, 8413966 and 8434042
*236	9098533	2	-	2	2	2	-	-	2	-	O-RING .. .667 I.D. x .880 O.D. formerly 8355581
237	8288649	1	-	1	1	1	-	-	1	-	PIN .. Adjusting
238	8398933	1	-	1	1	1	-	-	1	-	SPRING .. Shutdown
											Except governors 8414598, 8415876 and 8448381
239		1	-	-	1	1	-	-	1	-	SCREW .. Drive - Formerly 145373 - Except governors 8414598, 8415876, 8448031, 8448032 and 8448381
240	8440164	1	-	1	1	1	-	-	1	-	SCREW .. Set. No. 10 - 32 x 1-3/4 hex. socket head
241		1	-	1	1	1	-	-	1	-	RING .. Snap - Piston plug - Formerly 9414477
242	8270737	1	-	1	1	1	-	-	1	-	SPRING .. Piston buffer - Free length 1.213 inches
243	8270738	1	-	1	1	1	-	-	1	-	SPRING .. Piston - Compression - Free length .575 inches
244	8270740	1	-	1	1	1	-	-	1	-	PLUG .. Piston
245	8270741	1	-	1	1	1	-	-	1	-	SCREW .. High speed stop
246	8270742	1	-	1	1	1	-	-	1	-	CYLINDER .. Speed setting
247	8270743	2	-	2	2	2	-	-	2	-	WASHER .. Lock - Tab
248	8270744	1	-	1	1	1	-	-	1	-	PISTON .. Idle speed setting
249	8270745	1	-	1	1	1	-	-	1	-	PISTON .. O-Ring seal
*250	8270689	2	-	2	2	2	-	-	2	-	PLUG .. .126 dia. x .187 long
											Except governor 8448381 - Column H 8414598, 8415876 formerly applied

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
*251	8270746	2	2	2	2	2	2	2	2	2	WASHER .. Fibre - Formerly applied except governors 8386584, 8413968, 8413969, 8414598, 8415876, 8431749, 8439140, 8448381, 8451483 and 8460853
252		2	-	2	2	2	-	-	2	-	RING .. Snap - Formerly 274418 - Formerly applied
253	8469587	2	-	-	1	1	-	-	-	-	VALVE .. Solenoid - Speed setting - Formerly 8328484 and 8398443 - Except governor 8448381
253	8469588	-	-	-	-	-	-	-	2	-	VALVE .. Solenoid - Speed setting - Formerly 8452845 - Formerly applied governors 8448031 and 8448032
253	8418613	-	-	-	-	-	-	-	1	-	VALVE .. Solenoid - Speed setting - Governors 8414598 and 8415876
253		-	-	-	-	-	-	-	1	-	SOLENOID ASM. .. Speed setting - Except governors 8414598 and 8415876
*254	8247158	1	-	-	1	-	-	-	-	-	O-RING .. Except governor 8448381 - Formerly 8440165
*254	9098534	-	-	1	-	-	-	-	-	-	O-RING .. Formerly 8440165
*254	8440165	-	-	-	-	1	-	-	1	-	O-RING .. .210 O.D. x .070 I.D. - Column H except governors 8414598, 8415876 and 8451483
255	8129778	1	-	1	1	1	-	-	1	-	NUT .. Jam - 5/16 - 24 hex. - Except governors 8414598, 8415876 and 8448381
256		3	3	3	3	3	3	3	3	3	SCREW .. Body mounting - No. 10 - 32 x 1-1/8 hex. socket head - Formerly 9415959 } Column G except governor 8461334
257		3	3	3	3	3	3	3	3	3	SCREW .. Body mounting - No. 10 - 32 x 1-3/8 hex. socket head - Formerly 9415960 } Column G except governor 8461334
258	8270559	2	-	2	2	2	-	-	2	-	PIN .. Dowel - 1/8 dia. x .560 in. - Except governors 8414598, 8415876 and 8448381
259	8270588	1	-	1	1	1	-	-	1	-	SCREW .. 1/4 - 28 x 1-1/4 hex. hd. - Drilled } Except governors 8414598, 8415876 and 8448381
260		1	-	1	1	1	-	-	1	-	WASHER .. Copper - 1/4 I.D. x 1/2 O.D. - Formerly 446186 } Except governors 8414598, 8415876 and 8448381
261	8270587	1	-	1	1	1	-	-	1	-	NUT .. Lock - 1/4 - 28 hex. } Except governors 8414598, 8415876 and 8448381
262	8270589	1	-	1	1	1	-	-	1	-	SPRING .. Coil } Except governors 8414598, 8415876 and 8448381
263	8247158	1	-	1	1	1	-	-	1	-	O-RING .. Except governors 8357529, 8397633, 8397634, 8414598, 8415876 and 8448381
*264	8360283	1	-	1	1	1	-	-	1	-	COVER .. Solenoid valve
*265	8346164	1	-	1	1	1	-	-	1	-	GASKET .. Solenoid valve cover mounting
*266		6	-	6	6	6	-	-	6	-	SCREW .. Cover mounting - 1/4 - 28 x 3 hex. socket - Formerly 138220
*267	8149705	6	-	6	6	6	-	-	6	-	WASHER .. Lock - 1/4 split
*268	8360281	1	-	1	1	1	-	-	1	-	SLEEVE ASM. .. Speed adjusting
*269	8360284	1	-	1	1	1	-	-	1	-	SCREW .. Speed adjusting
*270	8360282	1	-	1	1	1	-	-	1	-	NUT .. Lock - 3/4 - 16 hex.
*271		1	-	1	1	1	-	-	1	-	WASHER .. Lock - 3/4 - Formerly 115554
*272		1	-	1	1	1	-	-	1	-	NUT .. 5/16 - 24 hex. - Formerly 120368
*273	8270586	1	-	1	1	1	-	-	1	-	PLATE .. Name
*274		4	-	4	4	4	-	-	4	-	SCREW .. Nameplate mounting - No. 5 - 40 x 1/4 - Formerly 432267 } Except governors 8414598, 8415876, 8448381 and 9504944
275	8346947	1	1	1	1	1	1	1	1	1	PLATE .. Spacer - Column F formerly applied - Column G except governor 8461334
276	8298850	1	1	1	1	1	1	1	1	1	PLUG .. 4 pin
277	8360289	1	-	-	1	-	-	-	-	-	BASE .. Sub governor - Except governor 8448381
277	8418622	1	-	-	-	-	-	-	-	-	BASE .. Sub governor - Column A governor 8448381 - Column H governor 8414598, 8415876 - Column J governor 8499862
		-	-	1	-	1	-	-	1	-	BASE .. Sub governor - Formerly 8418627 - Except governor 8414598, 8415876, 8451483 and 9504944
277		-	-	-	-	1	-	-	-	-	BASE .. Sub governor - Governors 8413965, 8413966
278		1	1	1	1	1	1	1	1	1	SCREW .. Base mounting - No. 10 - 32 x 7/8 hex. socket head - Formerly 193250 } Column G except governor 8461334
279		3	3	3	3	3	3	3	3	3	SCREW .. Base mounting - No. 10 - 32 x 1/2 hex. socket head - Formerly 187828 } Column G except governor 8461334

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
280		10	10	10	10	10	10	10	10	10	WASHER .. Lock - No. 10 - Formerly 120217
281	8017559	1	1	1	1	1	1	1	1	1	CUP .. Oil filler - Column B and J formerly applied - Column F governor 8491808 only - Except governors 8413967, 8455181, 8460853 and 9334953
281		-	-	-	-	-	1	-	-	-	CUP .. Oil filler - Governors 8413967, 8455181 and 9334953
281		-	-	-	-	-	-	-	-	1	CUP .. Oil filler - Governor 8460853
282	8360274	1	-	1	1	1	-	-	1	-	COVER .. Governor - Except governors 8414598, 8415876 and 8448381
282	8383136	1	1	-	-	-	1	1	-	-	COVER .. Governor - Governor 8448381 - Except governors 8415876, 8431504 and 9555742
282	8422455	-	-	-	-	-	1	1	1	-	COVER .. Governor - Governors 8415876, 8414598, 8431504 and 9555742
282	8444625	-	-	-	-	-	-	-	-	1	COVER .. Governor - Governor 8460853 only
283	8360272	1	-	1	1	1	-	-	1	-	GASKET .. Governor cover to column - Except governors 8397633, 8397634, 8414598, 8415876 and 8448381
283	8346165	1	1	-	-	-	1	1	1	1	GASKET .. Governor cover to column - Governors 8414598, 8415876, 8448321 and 8460853
284		7	7	7	7	7	7	7	7	7	SCREEN .. Cover mounting - 1/4 - 28 x 5/8 fill. head - Formerly 189136
285		7	7	7	7	7	7	7	7	7	WASHER .. Lock - 1/4 - Formerly 120380
286	8307374	2	2	2	2	2	2	2	2	2	PLUG .. Barrel
287		3	5	3	3	3	3	3	3	3	SCREW .. Case mounting - 5/16 - 24 x 1 hex. head - Formerly 181608 - Except governors 8434042, 8448381 and 8499862
287		5	-	-	-	5	-	-	5	-	SCREW .. Case mounting - 5/16 - 24 x 1 hex. head - Formerly 181608 - Governors 8434042, 8448381 and 8499862
288		3	5	3	3	3	3	3	3	3	WASHER .. Lock - 5/16 - Formerly 120379 - Except governors 8434042, 8448281 and 8499862
288		5	-	-	-	5	-	-	5	-	WASHER .. Lock - 5/16 - Formerly 120379 - Governors 8434042, 8448381 and 8499862
289		2	2	2	2	2	2	2	2	2	SCREW ASM. .. Includes lockwasher - Socket mounting - Formerly 420403 } Columnm A governor 8448381
290	8292522	4	4	4	4	4	4	4	4	4	SCREW .. Receptacle mounting
291		4	4	4	4	4	4	4	4	4	WASHER .. Lock - No. 6 - Formerly 131181
292	9098535	1	1	1	1	1	1	1	1	-	GASKET .. Connector mounting - Formerly 8372265 - Except governors 8414598, 8415876, 8431504, 8434042, 8448381 and 8455181
292	8425063	1	-	-	-	-	1	1	1	1	GASKET .. Connector mounting - Governors 8414598, 8415876, 8431504, 8448381, 8455181 and 8499862
*293	8307375	1	-	1	-	4	4	4	4	4	VALVE ASM. .. Check - Column A governor 8448381 only
*294		1	-	1	1	1	-	-	1	-	PIN .. Cotter - Speed control lever - .090 x .625 - Colum A except governors 8448381 - Column E governor 8434042 only
*295	8017584	1	-	1	-	1	1	1	1	1	SCREW .. Taper - 1/4 - 28 hex. socket head - Column A governor 8448381 only
*296		1	-	1	1	1	-	-	1	-	ORIFICE .. No. 76 hole x 1/4 in. hole - Formerly 8270686 - except governors 8414598, 8415876, 8448381 and 9504944
297	8270691	1	1	1	1	1	1	1	1	1	PIN .. Pivot - Load limit lever
298	8270692	1	1	1	1	1	1	1	1	1	LEVER .. Load limit
299	8418628	1	-	1	-	1	-	1	1	1	CASE .. Sub governor - Column A governor 8448381 - Column F governor 8458791 - Column G governor 8431504 - Column H governor 8414598, 8415876 - Column J governor 8499862 only
299	8418623	-	-	-	-	-	1	1	-	-	CASE .. Sub governor - Except governors 8431504, 8458791 and 9334953
299		-	-	-	-	-	1	-	-	1	CASE .. Sub governor - Governors 8460853 and 9334953

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
300	8360271	1	1	1	1	1	1	1	1	1	GEAR ASM. .. Pilot valve bushing - Column F except governor 9334953 - Column H except governor 8415876
*301	8347043	1	-	-	1	-	-	-	-	-	SWITCH .. Micro - Formerly 8347073 - Governors 8397633, 8397634, 8398849 and 8398850
*301	8422432	1	-	1	-	1	1	1	-	-	SWITCH AND ACTUATOR ASM. .. Governors 8366579. 8383629, 8390879, 8413962, 8413963, 8413964, 8413965, 8413966, 8431504, 8434042 and 8448381
*301		-	-	-	-	-	-	-	1	-	SWITCH .. Rack and term
*302		2	-	2	-	2	2	2	2	-	SCREW .. BRACKET MOUNTING - No. 8 - 32 x 5/16 fillister head - Formerly 131958, 9428052
*303		2	-	2	-	2	2	2	2	-	WASHER .. Lock - No. 8 - Formerly 106496 - Form. appl.
*304		2	-	2	-	2	2	2	2	-	WASHER .. Lock - No. 6 - Formerly 131181, 106495
*305		2	-	2	-	2	2	2	2	-	SCREW .. Switch mounting - No. 6 - 32 x 1 fillister head - Formerly 131919
*306	8306057	1	-	1	-	1	1	1	1	-	BRACKET .. Adjusting switch
*307	8421922	1	-	1	-	1	1	1	1	-	SWITCH .. Micro
*308	8421923	1	-	1	-	1	1	1	1	-	ACTUATOR .. Switch
*309	8421924	1	-	1	-	1	1	1	1	-	BRACKET .. Switch
*310		2	-	2	2	2	2	2	2	-	SCREW .. Bracket mounting - No. 10 - 32 x 3/8 hex. head - Formerly 9415671 - Except governors 8357529, 8413967, 8413968, 8413969, 8431749 and 8439140
*311	8306059	1	-	1	-	1	1	1	-	-	SWITCH .. Cam rack
*312	8407507	2	-	2	-	2	2	2	-	-	PLUG .. Pipe - 7/8 in.
*313		2	-	2	-	2	2	2	-	-	SCREW .. 8 - 32 x .31 fil. head slotted - Formerly 131958
*314		2	-	2	-	2	2	2	-	-	WASHER .. Lock - No. 8 - Formerly 121841
*315		2	-	2	-	2	2	2	-	-	WASHER .. Lock - 5/16 - Formerly 120214
*316		2	-	2	-	2	2	2	-	-	WASHER .. Lock - No. 10 - Formerly 120217
*317	8444617	1	-	1	1	1	-	-	1	-	O-RING .. .300 I.D. x .070 - Except governors 8414598 and 8448381
*318	8418618	1	-	1	-	1	1	1	1	1	SLEEVE .. Relief valve
*319	8418619	1	-	1	-	1	1	1	1	1	SPACER .. Relief valve } Column A governor
*320	8418620	1	-	1	-	1	1	1	1	1	PLUNGER .. Relief valve } 8448381 only
*321	8418621	1	-	1	-	1	1	1	1	1	SPRING .. Relief valve
322	8346958	1	1	-	-	-	1	1	1	1	POST .. Speed adjusting
*323	8307379	1	1	-	-	-	1	1	1	1	BUSHING .. Speed adjusting post } Column A governor
324	8491837	1	1	-	-	-	1	1	1	1	SPRING .. Speed droop } 8448381 only -
325	8491838	1	1	-	-	-	1	1	1	1	PIN .. Spring anchor } Column H governors
*326	8346215	1	1	-	-	-	1	1	1	1	PIN .. Drilled - Straight - .092 dia. x 1.03 in. long } 8414598 and 8415876
*327	8452970	1	-	-	-	1	1	1	1	1	SPRING .. Booster - Floating lever linkage - Column A governor 8448381 - Column E governor 9504944 - Column F except governor 9334953 - Column H governor 8414598 and 8415876 - Column J except governor 8460853
*327		-	-	-	-	-	1	-	-	1	SPRING .. Booster - Column F governor 9334953 - Column J governor 8460853
*328		1	-	-	-	-	-	-	-	-	SPRING .. Pilot valve centering - Governor 8448381 only - Formerly 8444616
*329	8306057	1	-	-	1	-	-	-	-	-	BRACKET .. Switch } Governors 8397633, 8397634,
*330	8306058	1	-	-	1	-	-	-	-	-	BRACKET .. Adj. switch } 8398849 and 8398850
*331		2	2	2	2	2	2	2	2	2	PIN .. Taper - No. 2 x 5/8 in. long - Case to sub governor base - Formerly 140153 - Column G except governor 8461334
*332	8270674	1	1	1	1	1	1	1	1	1	PLUG .. Governor case - .219 dia. x .203 long
*333	8270689	1	1	1	1	1	1	1	1	1	PLUG .. Sub governor - .126 dia. x .187 long
*334	8318226	1	-	1	1	1	1	-	1	-	WASHER .. .200 I.D. x .375 O.D. - Except governor 8448381

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
335	8348618	2	-	2	2	2	1	-	1	-	PLUG .. Pipe - 1/4 - Column F governor 8458791 - Except governors 8414598, 8415876 and 8434042
*336		8	-	8	8	1	1	1	-	1	SCREW .. 5/16 - 24 x 2-1/2 hex. head - Formerly 181621 - Except governor 8448381
*337	8318047	-	-	-	-	1	-	-	-	-	STOP ASM. .. Fuel - Formerly applied governor 8413965
*338		4	-	4	4	4	4	4	4	4	SCREW .. No. 8 - 32 x 3/8 pan head - Formerly 159583 - Except governors 8357529, 8413966, 8413967, 8413968, 8414598, 8415876 and 8448031
339	8444618	1	1	-	-	1	1	1	1	1	O-RING .. .360 I.D. x .070 - Column A governor 8448381 - Column E governor 8434042 - Column H governor 8414598, 8415876 and Column J governor 8499862
*340	9332176	1	-	1	1	1	-	-	1	-	LABEL .. Piping - Formerly 8113865 - Except governors 8434042, 8448031, 8448032 and 8451483
*341	8113672	1	1	1	1	1	1	1	1	1	PIN .. Dowel - 1/4 x .562 in. long - Except governor 8434042
*342	8118445	1	1	1	1	1	1	1	1	1	COCK .. Drain - Column H governors 8414598 and 8415876
*343	8292521	1	1	1	1	1	1	1	1	1	PLUG .. Pipe - Column asm. - 1/4 - 18 - Square head
344	8257076	2	2	-	-	2	2	1	2	2	ELBOW .. Shutdown solenoid - 1/4 tube x 1/8 M.P.T.
345		1	1	-	-	-	1	1	1	1	TUBE .. Copper - 1/4 O.D. - Formerly 8098593
346	8430086	1	1	-	-	1	1	1	1	1	FITTING .. Banjo type
347	8418616	1	1	-	-	1	1	1	1	1	BOLT .. Bleeder
348	8383132	1	1	-	-	1	1	1	1	1	BRACKET .. Solenoid mounting
349	8061197	2	2	-	-	-	2	2	2	2	WASHER .. Copper - Bleeder bolt
350	8488341	1	1	-	-	-	1	1	1	1	SEAL .. Oil
351	8291483	1	1	-	-	1	1	1	1	1	STRIP .. Terminal
352		2	2	-	-	-	2	2	2	2	SCREW .. No. 6 - 32 x 1/2 fil. head - Formerly 8291477
353		2	2	-	-	-	2	2	2	2	WASHER .. Lock - No. 6 internal tooth - Formerly 115543
354		2	2	-	-	-	2	2	2	2	SCREW .. Solenoid - No. 10 - 32 x 1/2 fil. head - Drilled - Form. 8235572
355		2	2	-	-	-	2	2	2	2	WASHER .. No. 10 - Form. 120217
											Column A governor 8448381 - Column E governor 9504944 - Column H governors 8414598 and 8415876 - Column J governor 8499862
356	8449080	1	-	-	-	-	-	-	-	-	VALVE .. Shutdown solenoid - Governor 8448381
356	8395360	-	1	-	-	-	1	-	-	-	VALVE .. Shutdown solenoid - Governors 8386584 and 8413967
356	8410692	-	1	-	-	-	1	-	-	1	VALVE .. Shutdown solenoid - Governors 8376832, 8382204, 8413968, 8413969, 8455181 and 8499862 120 VAC
356	8418617	-	-	-	-	-	1	1	-	-	VALVE .. Shutdown solenoid - Governors 8431504 and 8439140
356	8453135	-	-	-	-	-	-	1	1	-	VALVE .. Shutdown solenoid - Governors 8461334, 8414598 and 8431749
*356A		1	1	-	-	-	1	1	1	1	WASHER .. Plain - 1/2 - Apply with Ref. No. 356 - Formerly 115551
											Form. appl.
*357		2	-	2	2	2	-	-	2	-	SCREW .. Nameplate mounting - No. 2 x 3/16 - Formerly 145368
*358	8134268	1	-	1	1	1	-	-	1	-	PLATE .. Name
											Except governors 8414598, 8415876 and 8448381
359		1	-	1	1	1	-	-	1	-	SCREW .. 5/16 - 24 x 2-1/2 hex. head - Formerly 181622
360		1	-	1	1	1	-	-	1	-	WASHER .. Lock - 5/16 - Form. 120379
											Except governors 8414598, 8415876, 8434042 and 8448381
361		8	8	8	8	8	8	8	8	8	BOLT .. Case to base - 5/16 - 18 x 1 hex. head - Formerly 179818
362		8	8	8	8	8	8	8	8	8	WASHER .. Lock - 5/16 - Formerly 120379
*363	8488379	1	-	1	1	1	-	-	1	-	PLUG .. Expansion - Except governors 8414598, 8415876 and 8448381

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GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
364	9332176	1	1	1	1	1	1	1	1	1	LABEL SET .. Decal - Replaces 8288653
*365	8113869	2	2	2	2	2	2	2	2	2	GASKET .. Silicon - Power case to column and column to sub - Base - 1/4 I.D. x 7/16 O.D. x 1/8 in. thick
366	8444624	1	1	1	1	1	1	1	1	1	RING .. Oil seal - Case to base
367		2	2	2	2	2	2	2	2	2	PIN .. Taper - Case to base - No. 5 x 3/4 in. long - Formerly 103613 - Column E formerly applied
368	8298836	1	1	1	1	1	1	1	1	1	PLUG .. Magnetic
369	8149705	6	6	6	6	6	6	6	6	6	WASHER .. Lock - 1/4 split - Column J governor 8499862
370		6	6	-	-	6	6	6	6	6	SCREW .. Dial panel mounting - 1/4 - 28 x 1-3/4 in. long - Formerly 9436050
371		4	4	-	-	4	4	4	4	4	SCREW .. Dial plate mounting - No. 8 - 32 x 3/8 in. long Formerly 159583
*372		1	1	-	-	1	1	1	1	1	BOLT .. Lower column - 5/16 - 24 x 2 hex. head - Formerly 181620
*373	8061197	1	1	-	-	1	1	1	1	1	WASHER .. Copper - 21/64 I.D. x 17/32 O.D.
*374	8189218	2	2	3	3	3	2	2	2	2	TERMINAL .. Insulation - Stakon lug - Column A governor 8448381 only
*375		2	-	2	-	-	-	-	-	-	BOLT .. 1/4 - 28 x 3/4 hex. head - Formerly 181566
*376	8394156	1	1	1	1	1	1	1	1	1	POINTER .. Wedge shaped - Column G formerly applied
*377	8394155	1	1	1	1	1	1	1	1	1	SCALE .. Terminal shaft - Column G formerly applied - Column J governor 8499862
*377		-	-	-	-	-	-	1	-	1	SCALE .. Terminal shaft - Column J governor 8460853
*378		2	-	2	2	2	-	-	2	-	SCREW .. Strap mounting - Formerly 8202951 - Except governors 8414598, 8415876, 8434042 and 8448381
*379	8138124	1	-	2	-	2	-	1	1	-	STRAP .. Wire - Except governors 8414598 and 8415876
*379	8193786	-	-	-	2	2	-	-	-	-	STRAP .. Wire
*380	8367378	1	1	1	1	1	1	1	1	1	DECAL .. DC - Except governors 8376832, 8382204, 8413968, 8413969, 8415876 and 8455181
*380	8367182	-	1	-	-	-	1	-	-	1	DECAL .. AC - Governors 8376832, 8382204, 8413968, 8413969, 8455181 and 8499862
*381	8367379	1	-	1	1	1	1	1	1	1	DECAL .. 125 Volt - Except governors 8413967, 8413968, 8413969, 8415876, 8451483 and 9555742
*381	8367183	-	1	-	-	-	1	-	-	1	DECAL .. 115 Volt - Governors 8413967, 8413968, 8413969, 8455181, 8499862 and 9555742
*381	8395359	-	1	-	-	-	1	-	-	-	DECAL .. 75 Volt - Governor 8386584 - Column F formerly applied
382	8452841	1	-	1	-	-	-	-	-	-	COLUMN ASM. .. Except governor 8448381
382	8451278	-	1	-	-	-	1	-	-	-	COLUMN ASM. .. Governors 8376832, 8382204 and 8386584 - Column F formerly applied governors 8413968 and 8413969
382	8451299	1	-	-	-	-	1	1	1	1	COLUMN ASM. .. Governors 8414598, 8415876, 8431504, 8448381 and 8499862
382		-	-	-	1	-	-	-	-	-	COLUMN ASM.
382		-	-	-	-	1	-	-	-	-	COLUMN ASM. .. Governors 8413965 and 8413966
382	8491811	-	-	-	-	-	1	-	-	-	COLUMN ASM. .. Governors 8413967, 8413968, 8413969 and 8439140
382	8481007	-	-	-	-	-	-	1	-	-	COLUMN ASM. .. Governor 8461334
382		-	-	-	-	-	-	-	-	1	COLUMN ASM. .. Governor 8460853
*383	8451303	2	2	2	2	2	2	2	2	2	INSERT .. Thread

Column A governor 8448381 - Column H governors 8414598 and 8415876

Used on later models

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
384	8451279	1	-	-	-	-	-	-	-	-	MOTOR .. Speed setting - 48 Volt D.C. - Governor 8448381
384	8491813	-	1	-	-	-	1	1	-	-	MOTOR .. Speed setting - 110 Volt D.C. - Column F except governor 9334953 - Column G governor 8431749
384	9559777	-	-	-	-	-	1	-	-	-	MOTOR .. Speed setting - 115V. A.C./D.C. - Governor 9334953
384	9332246	-	-	-	-	-	-	1	1	-	MOTOR .. Speed setting - 125 Volt D.C. - Replaces 8452996
384	9320910	-	-	-	-	-	-	-	-	1	MOTOR .. Speed setting - 125 Volt A.C./D.C. - Governor 8499862 only
385		2	2	-	-	-	2	2	4	-	SCREW ASM. .. No. 6 - 32 x 1/2 round head - Incl. L washer - Formerly 420403 - Column A governor 8448381 - Column H governors 8414598 and 8415876
386		4	4	-	-	-	4	4	4	-	WASHER .. Lock - No. 10 split - Formerly 120217 - Column A governor 8448381 only - Column H governors 8414598 and 8415876
387		4	4	-	-	-	4	4	4	-	SCREW .. Motor mounting - No. 10 - 32 x 1/2 fil. head - Formerly 8235572 - Column A governor 8448381 only - Column E governor 9504944 only - Column F governor 8491808 only - Column H governors 8414598 and 8415876
388	8227930	1	1	-	-	-	1	1	1	-	GROMMET .. Rubber - Cover - Column A governor 8448381 only - Column H governor 8414598 and 8415876
389	8383135	-	1	-	-	-	1	1	1	-	BRACKET .. Motor mounting - Included in motor assemblies 8452996 and 8491813
390		4	4	-	-	-	4	4	-	4	SCREW .. Bracket to motor mounting - No. 10 - 32 x 3/4 flat head - Formerly 100867 - Column A governors 8366579 and 8448381 - Column B formerly applied - Column F governors 8413967, 8413968, 8413969, 8439140 and 8455181 - Column G governor 8431749
390		-	-	-	-	-	4	4	4	-	SCREW .. Bracket to motor mounting - No. 10 - 24 x 3/8 flat head - Formerly 115030 - Governors 8414598, 8415876 and 8431504
391		-	-	-	-	-	4	4	4	-	WASHER .. Lock - Countersunk - Formerly 138597 - Used with Ref. No. 390
392	8061772	1	1	-	-	-	1	1	1	-	SPRING .. Motor seal
393	8346947	1	1	-	-	-	1	1	1	-	PLATE .. Spacer
394	8298850	1	1	-	-	-	1	1	1	-	PLUG .. Electrical connector - 4 pin
395	8383137	1	1	-	-	-	1	1	1	-	BRACKET .. Plug mounting
396	8291485	1	1	-	-	-	1	1	1	-	SOCKET .. Cinch Jones - 4 pin
397		1	1	-	-	-	1	1	1	-	SCREW ASM. .. Socket mtg. - No. 6 - 32 x 1/2 round head - Incl. lockwasher - Formerly 420403
398	8346172	1	1	-	-	-	1	1	1	1	STRAP ASM. .. Load limit
399	8346173	1	1	-	-	-	1	1	1	1	BLOCK ASM. .. Speed adjusting
400	8432666	1	1	-	-	-	1	1	1	1	SHAFT ASM. .. Speed adjusting
401	8432667	1	1	-	-	-	1	1	1	1	CAM ASM. .. Speed droop
402	8432668	1	1	-	-	-	1	1	1	1	CAM ASM. .. Load limit
403	8346177	1	1	-	-	-	1	1	1	1	PANEL .. Dial
404	8113954	3	3	-	-	-	3	3	3	3	KNOB .. Dial panel
405	8214473	1	1	-	-	-	1	1	1	1	COVER .. Friction drive
406	8214474	1	1	-	-	-	1	1	1	1	CASE .. Friction drive
407	8214475	1	1	-	-	-	1	1	1	1	PLATE .. Friction drive
408	8075983	3	3	-	-	-	3	3	3	3	NUT .. Elastic stop - 1/4 - 20 hex.
409	8032717	2	2	-	-	-	2	2	2	2	NUT .. Elastic stop - 3/8 - 24 hex.
410		3	3	-	-	-	3	3	3	3	SCREW .. No. 10 - 32 x 3/8 flat head - Formerly 100867 and 155998
411		1	1	-	-	-	1	1	1	1	RING .. Snap - Friction drive cover - Formerly 9414477
412		1	1	-	-	-	1	1	1	1	RING .. Snap - Shaft bushing - Form. 9414479
413	8346962	1	1	-	-	-	1	1	1	1	BUSHING .. Shaft - Formerly applied
414		1	1	-	-	-	1	1	1	1	SCREW .. Set - No. 6 - 32 x 5/8 - Form. 9416871

Column A governor 8448381 only - Column H governors 8414598 and 8415876

Column A governor 8448381 - Column H governors 8414598 and 8415876

P.L. No. B67

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
415		4	4	-	-	-	4	4	4	4	WASHER .. Lock - No. 6 - Formerly 131181 - Column A governor 8448381 only - Column H governors 8414598 and 8415876 - Column J governor 8499862 only
415		-	-	-	-	-	-	-	-	2	WASHER .. Lock - No. 6 - Formerly 131181 - Governor 8460853 only
416		2	2	-	-	-	2	2	2	2	SCREW .. No. 6 - 32 x 1/2 socket head - Formerly 9413469 - Column A governor 8448381 - Column H governors 8414598 and 8415876 - Column J governor 8499862
416		-	-	-	-	-	-	-	-	2	SCREW .. No. 6 - 32 x 1/2 round head - Formerly 132705 - Governor 8460853
417	8061771	1	1	-	-	-	1	1	1	1	SPRING .. Friction drive
418	8292544	1	1	-	-	-	1	1	1	1	SPRING .. Load limit strap
419	8292545	2	2	-	-	-	2	2	2	2	WASHER .. Cupped spring
420	8292547	3	3	-	-	-	3	3	3	3	DISC .. Pointer
421	8346178	1	1	-	-	-	1	1	1	1	WASHER .. Plain - 21/64 x 5/8 O.D. x .050 thick
422		2	2	-	-	-	2	2	2	2	PIN .. Roll - 3/32 x 1/2 in. long - Formerly 455105
423		1	1	-	-	-	1	1	1	1	PIN .. Roll - 1/16 x 1/2 in. long - Formerly 455478
424	8346951	1	1	-	-	-	1	1	1	1	DIAL .. Speed setting
425	8292551	1	1	-	-	-	1	1	1	1	GEAR .. Dial stop
426	8346179	1	1	-	-	-	1	1	1	1	PINION
427		1	1	-	-	-	1	1	1	1	PIN .. Roll - 5/32 dia. x 5/8 in. long - Formerly 9436589 - Form. appl.
428	8346180	1	1	-	-	-	1	1	1	1	GEAR .. Speed adjusting shaft
429	8346181	1	1	-	-	-	1	1	1	1	GEAR .. Intermediate shaft
											Col A governor 8448381 only - Column H governors 8414598 and 8415876
430	8227930	1	1	-	-	-	1	1	1	1	GROMMET .. Rubber - Dial panel - Column A governor 8448381 only - Column H governors 8414598 and 8415876 - Column J governor 8499862 only
431	8346952	-	-	-	-	-	-	-	-	1	PLUG .. Grommet hole - Governor 8460853 only
432	8292554	2	2	-	-	-	2	2	2	2	STOP .. Speed set dial
433	8292555	2	2	-	-	-	2	2	2	2	SPACER .. Dial stop
434	8292557	1	1	-	-	-	1	1	1	1	PLATE .. Dial locating
435	8346224	1	1	-	-	-	1	1	1	1	SCREW .. Speed adjusting
436	8350553	1	1	-	-	-	1	1	1	1	SCREW .. No. 10 - 32 x 1 socket head cap
437		2	2	-	-	-	2	2	2	2	PIN .. Locating - Dial plate - Formerly 8300773 - Formerly applied
438		1	1	-	-	-	1	1	1	1	SCREW .. No. 8 - 32 x 1/4 fil. head - Formerly 131954
439		1	1	-	-	-	1	1	1	1	WASHER .. Lock - No. 8 ext. tooth - Formerly 121752
											Column A governor 8448381 only - Column H governors 8414598 and 8415876
440		1	1	-	-	-	1	1	1	1	PIN .. Cotter - 1/32 x 1/4 - Formerly 435883
441		1	1	-	-	-	1	1	1	1	WASHER .. .130 I.D. x .438 O.D. x .032 thick - Formerly 8422389, 221416 - Formerly applied
442		4	4	-	-	-	4	4	4	4	WASHER .. Lock - No. 2 medium spring - Formerly 178156
443		4	4	-	-	-	4	4	4	4	SCREW .. No. 2 - 56 x 3/8 round head - Formerly 421439
444	9326795	2	2	-	-	-	2	2	2	2	SWITCH .. Micro - Limit - Formerly 8270712
445	8414735	2	2	-	-	-	2	2	2	2	INSULATOR .. Micro switch - Formerly applied
											Column A governor 8448381 - Column H governors 8414598 and 8415876 - Column J governor 8499862

P.L. No. B67

GOVERNOR ASSEMBLY

Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
446	8449064	1	1	-	-	-	1	1	1	1	ARM .. Actuator
447	8449065	1	1	-	-	-	1	1	1	1	PLATE .. Switch mounting
448		1	1	-	-	-	1	1	1	1	PIN .. Dowel - .124 dia. x 3/4 in. long - Formerly 8348127
449		2	2	-	-	-	2	2	2	2	SCREW .. No. 8 - 32 hex. head cap - Formerly 274529 - Formerly appl.
450		2	2	-	-	-	2	2	2	2	NUT .. No. 8 - 32 hex. - Formerly 8284037
451	8200229	4	4	-	-	-	4	4	4	4	TERMINAL .. Crimp type - Formerly applied
452	5939163	1	1	-	-	-	1	1	1	1	NUT .. No. 10 - 32 hex.
453	8346164	1	1	-	-	-	1	1	1	1	GASKET .. Dial panel
											Column A governor 8448381 - Column H governors 8414598 and 8415876 - Column J governor 8499862
*454	8350224	1	-	-	-	-	1	1	1	1	BLOCK .. Terminal - 6 pole - Governors 8413967, 8414598, 8415876, 8431504, 8448381, 8455181 and 8499862
*455	9333517	-	1	-	-	-	1	-	1	-	BLOCK .. Terminal - 3 pole - Governors 8376832, 8382204, 8413968, 8413969, 8414598, 8415876 and 8439140 - Formerly 8236494
*456	8395361	-	1	-	-	-	-	-	-	-	BLOCK .. Terminal - 4 pole - Governor 8386584
*457	8326434	A.R.		-	-	-		As Req.			TUBING .. Plastic - Clear
*458		A.R.		-	-	-		As Req.			WIRE .. White - Formerly 8291482
*459		A.R.		-	-	-		As Req.			WIRE .. Green - Formerly 8298857
*460		A.R.		-	-	-		As Req.			WIRE .. Orange - Formerly 8347044
											Formerly applied - Col. A governor 8448381 only - Col. H governors 8414598 and 8415876 - Col. J governor 8499862
*461	8138124	1	1	-	-	-	1	1	1	1	STRAP .. Wire
462	8346963	1	1	-	-	-	1	1	1	1	BUSHING .. Speed adjusting screw - Upper
463	8346965	1	1	-	-	-	1	1	1	1	BUSHING .. Speed adjusting screw - Lower
464	8346964	1	1	-	-	-	1	1	1	1	BUSHING .. Pinion
											Formerly applied - Col. A 8448381 only - Col. H governors 8414598 and 8415876
*465	8394157	1	1	1	1	1	1	1	1	1	BLOCK .. Terminal scale - Columns G and J - Formerly applied
*466	8394158	2	2	2	2	2	2	2	2	2	PIN .. Dowel - .186 dia. x .500 in. long
*467		2	2	2	2	2	2	2	2	2	SCREW .. Terminal block mounting - No. 10 - 32 x 5/8 hex. socket head - Formerly 431487
468	8346946	1	1	-	-	-	1	1	1	1	PLATE .. Dial and name - Column A governor 8448381 only - Column H governors 8414598 and 8415876
*469	8436325	-	-	-	-	-	1	-	-	-	GASKET .. Oil failure bushing - Formerly applied - Governor 8455181
470	8318047	-	-	-	1	1	-	-	-	-	STOP ASM. .. Fuel
471	8318048	-	-	-	1	1	-	-	-	-	BLOCK ASM. .. Bearing support
472	8318049	-	-	-	1	1	-	-	-	-	PIN ASM. .. Block
473	8113767	-	-	-	1	1	-	-	-	-	KNOB .. Adjusting screw
474	8407630	-	-	-	1	1	-	-	-	-	PACKING .. Formerly 8318050 ring
475	8061638	-	-	-	2	2	-	-	-	-	BUSHING .. Oilite
476		-	-	-	2	2	-	-	-	-	PIN .. Roll - Formerly 456342
477		-	-	-	1	1	-	-	-	-	WASHER .. Copper - Formerly 446186
478		-	-	-	4	4	-	-	-	-	SCREW .. Block mounting - 1/4 - 28 x 1/2 fil. hd. - Slotted - Formerly 225578
479		-	-	-	15	15	-	-	-	-	WASHER .. Lock - No. 10 - Formerly 120217
*480		-	-	-	4	4	-	-	-	-	SCREW .. Cover mounting - No. 10 - 32 x 3/8 round head - Slotted - Formerly 132290
481		-	-	-	6	6	-	-	-	-	WASHER .. Lock - 1/4 - Formerly 120380
482		-	-	-	1	1	-	-	-	-	SCREW .. No. 10 - 32 x 3/4 hex. socket head - Formerly 147118
483		-	-	-	2	2	-	-	-	-	SCREW .. No. 10 - 32 x 5/8 hex. head - Formerly 187837

P.L. No. B67

GOVERNOR ASSEMBLY

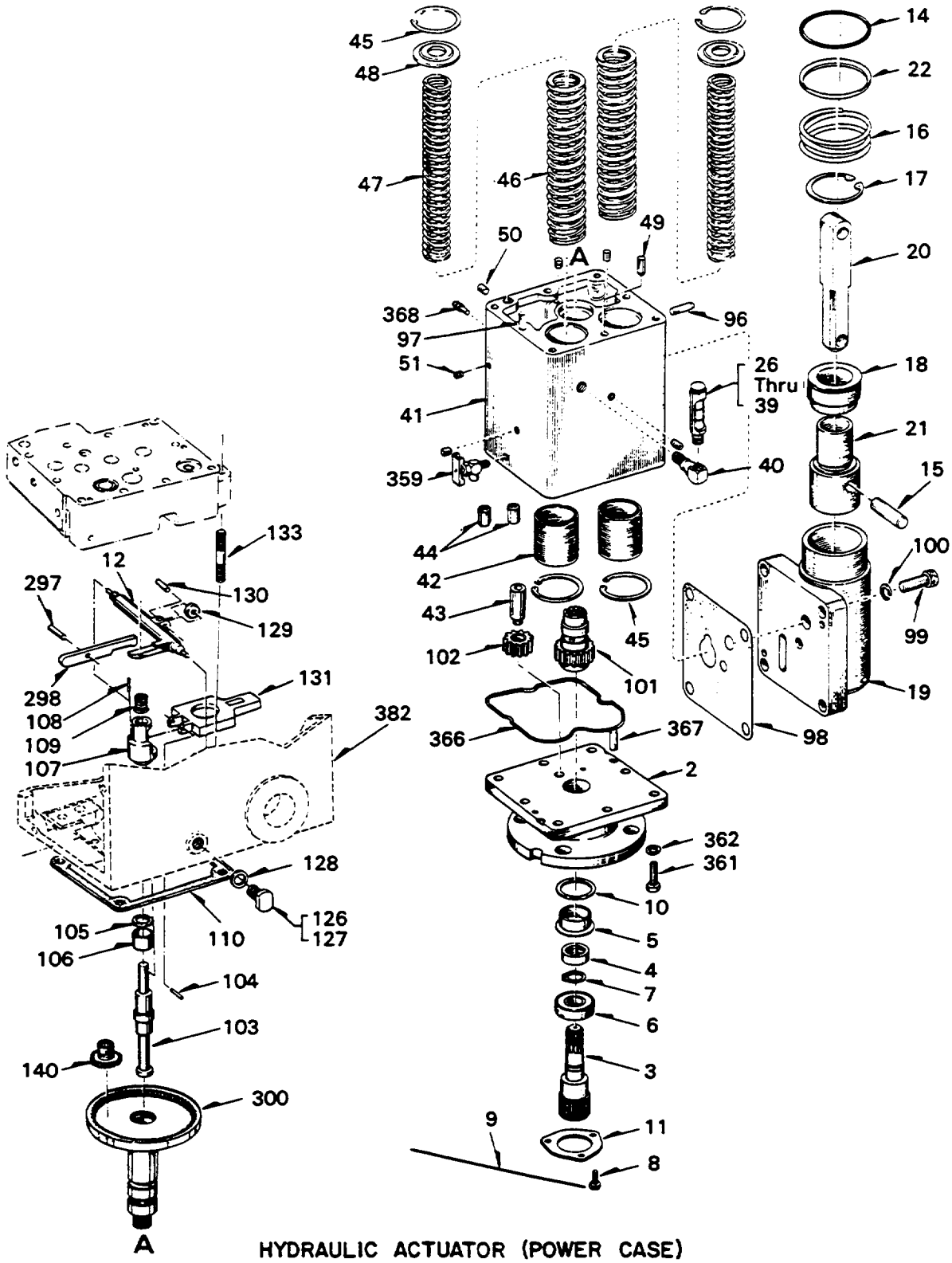
Ref. No.	Part Number	Quantity Required									Description
		A	B	C	D	E	F	G	H	J	GOVERNOR ASSEMBLY .. Engine
	8318047	-	-	-	1	1	-	-	-	-	STOP ASM. .. Fuel
484	8318051	-	-	-	8	8	-	-	-	-	SCREW .. Solenoid mounting - No. 10 - 24 x 21/32 hex. head - Drilled
485	8284049	-	-	-	1	1	-	-	-	-	WASHER .. Plain - .203 I.D. x .340 O.D. - Formerly applied
486	8318052	-	-	-	1	1	-	-	-	-	SPRING .. Load
487	8292574	-	-	-	2	2	-	-	-	-	SOLENOID .. Fuel stop
488		-	-	-	1	1	-	-	-	-	SCREW .. Drive - No. 2 x 3/16 in. long - Formerly 145368
489	8318057	-	-	-	1	1	-	-	-	-	BRACKET .. Solenoid
490	8318058	-	-	-	1	1	-	-	-	-	COVER .. Bracket
491	8318059	-	-	-	1	1	-	-	-	-	PIN .. Loading - .124 dia. x 1.639 in. long
492	8318060	-	-	-	1	1	-	-	-	-	RING .. Seal
493	8318061	-	-	-	1	1	-	-	-	-	SEAL .. Bushing
494	8318062	-	-	-	1	1	-	-	-	-	BLOCK .. Spring socket
495	8318063	-	-	-	1	1	-	-	-	-	SHAFT .. Spring loaded
496	8318064	-	-	-	1	1	-	-	-	-	LEVER .. Solenoid
497	8318065	-	-	-	1	1	-	-	-	-	LEVER .. Adjusting
498	8318067	-	-	-	1	1	-	-	-	-	BUSHING .. Adjusting
499	9333517	-	-	-	1	1	-	-	-	-	BLOCK .. Terminal - Formerly 8236494
500		-	-	-	2	2	-	-	-	-	SCREW ASM. .. Includes lockwasher - No. 6 - 32 x 1/2 in. long - Formerly 420403
501		-	-	-	2	2	-	-	-	-	WASHER .. Fibre - Formerly 8270746
502		-	-	-	3	3	-	-	-	-	SCREW ASM. .. Includes lockwasher - No. 5 - 40 x 5/16 in. long - Formerly 420439 - Form. appl.
503	8338013	-	-	-	2	2	-	-	-	-	SCREW .. Adjusting
504	8338014	-	-	-	1	1	-	-	-	-	WASHER .. Copper
505		-	-	-	2	2	-	-	-	-	NUT .. Lock - 1/4 - 20 hex. - Formerly 120375
506		-	-	-	10	10	-	-	-	-	WASHER .. Plain - No. 10 - Formerly 103338
507	8323433	-	-	-	1	1	-	-	-	-	TUBE ASM.
*508		-	-	-	4	4	-	-	-	-	SCREW .. Cover mounting
*509	8113662	-	-	-	4	4	-	-	-	-	WASHER .. Plain
510		-	-	-	2	2	-	-	-	-	TERMINAL .. Insulated lug
*511	8480988	-	-	-	-	-	-	1	-	-	SPRING ASM. .. Restoring
*512	8270620	-	-	-	-	-	-	1	-	-	PIN .. Lever - Headed - Drilled
*513	8270621	-	-	-	-	-	-	1	-	-	PIN .. Lever - Straight - Drilled
*514	8270637	-	-	-	-	-	-	1	-	-	PIN .. Bearing
*515	8350489	-	-	-	-	-	-	1	-	-	RING .. Snap
*516	8346955	-	-	-	-	-	-	1	-	-	WASHER .. .220 x .438 x .032
*517	8270665	-	-	-	-	-	-	1	-	-	LEVER .. Transducer
*518	8270677	-	-	-	-	-	-	1	-	-	SLEEVE .. Retainer
*519	8480998	-	-	-	-	-	1	1	-	1	LEVER .. Servo
*520	8480999	-	-	-	-	-	1	1	-	1	PIN .. Pivot
*521	8480996	-	-	-	-	-	1	1	-	1	SEAT .. Adjustable spring

New design governor 8461334

New design governors; Col. F - 9334953; Col. G - 8461334 and Col. J - 8499862

P.L. No. B67

GOVERNOR ASSEMBLY

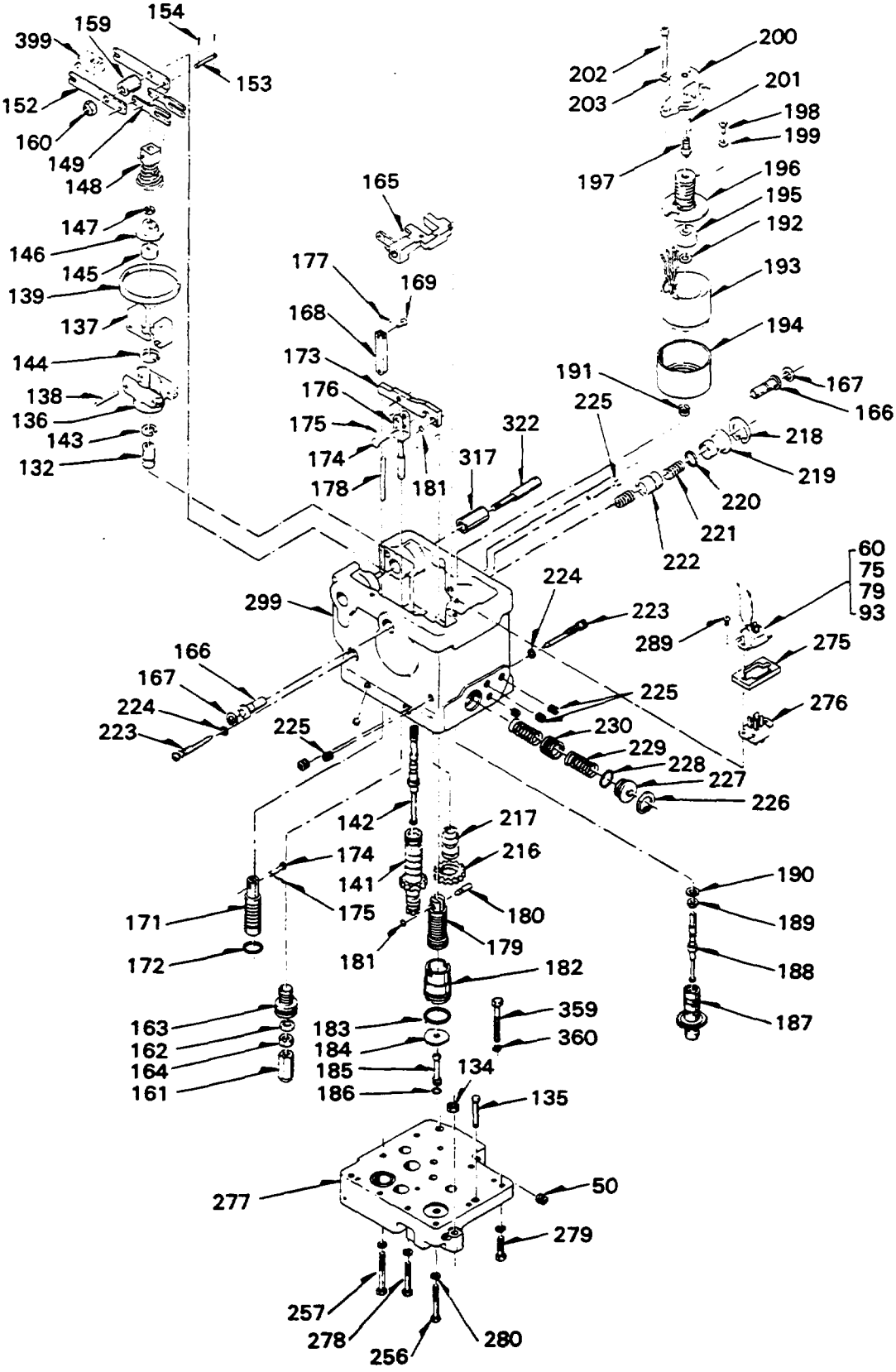


HYDRAULIC ACTUATOR (POWER CASE)

PLATE B67-1

P.L. No. B67

GOVERNOR ASSEMBLY

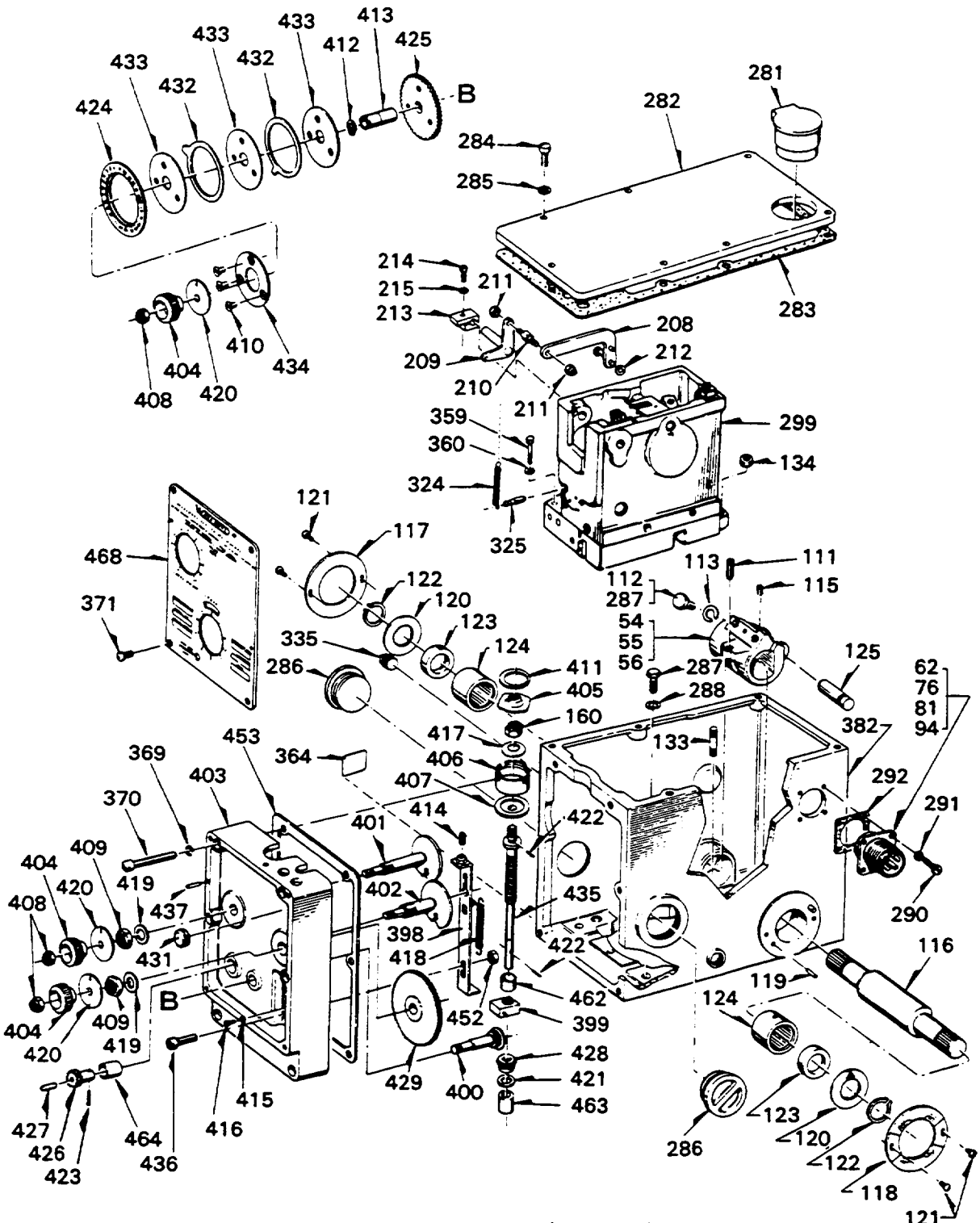


HYDRAULIC ACTUATOR (SUB GOVERNOR)

PLATE B67-2

P.L. No. B67

GOVERNOR ASSEMBLY

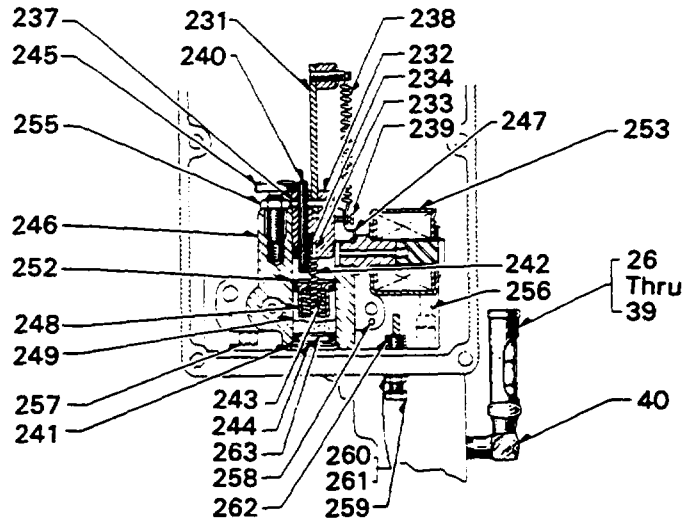


HYDRAULIC ACTUATOR (COLUMN)

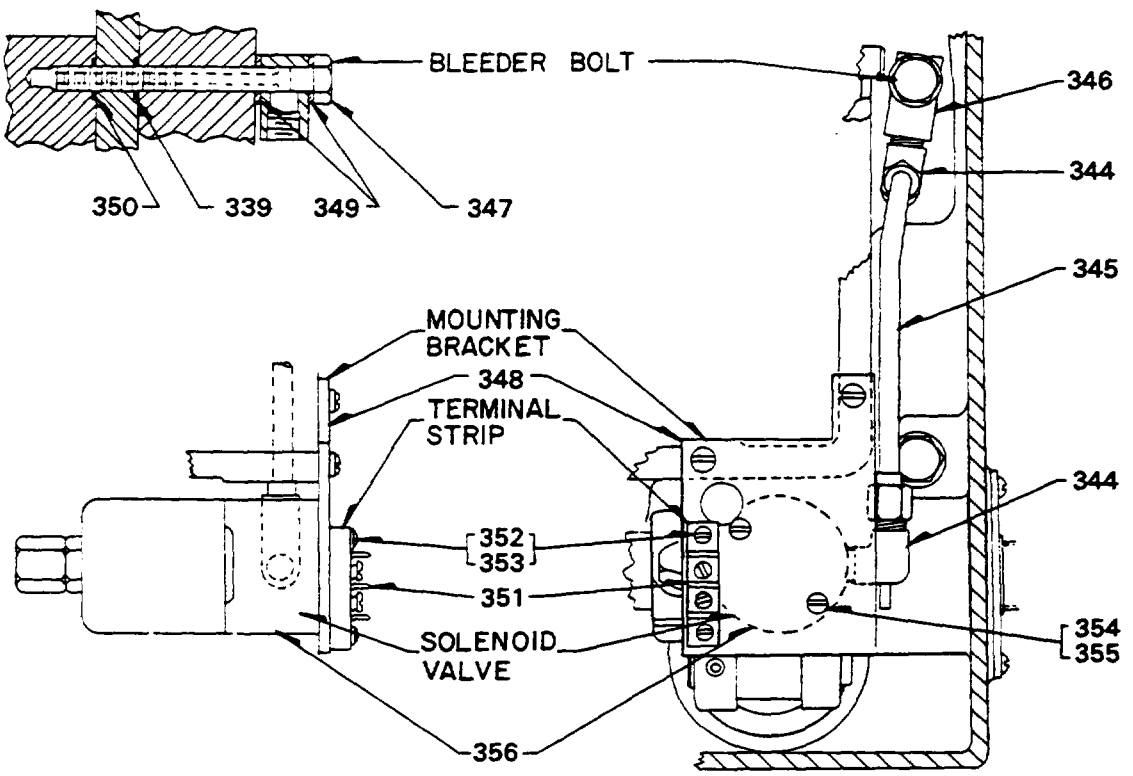
PLATE B67-3

P.L. No. B67

GOVERNOR ASSEMBLY



SOLENOID OPERATED SPEED SETTING ASSEMBLY



SHUTDOWN SYSTEM

PLATE B67-4

P.L. No. B67

GOVERNOR ASSEMBLY

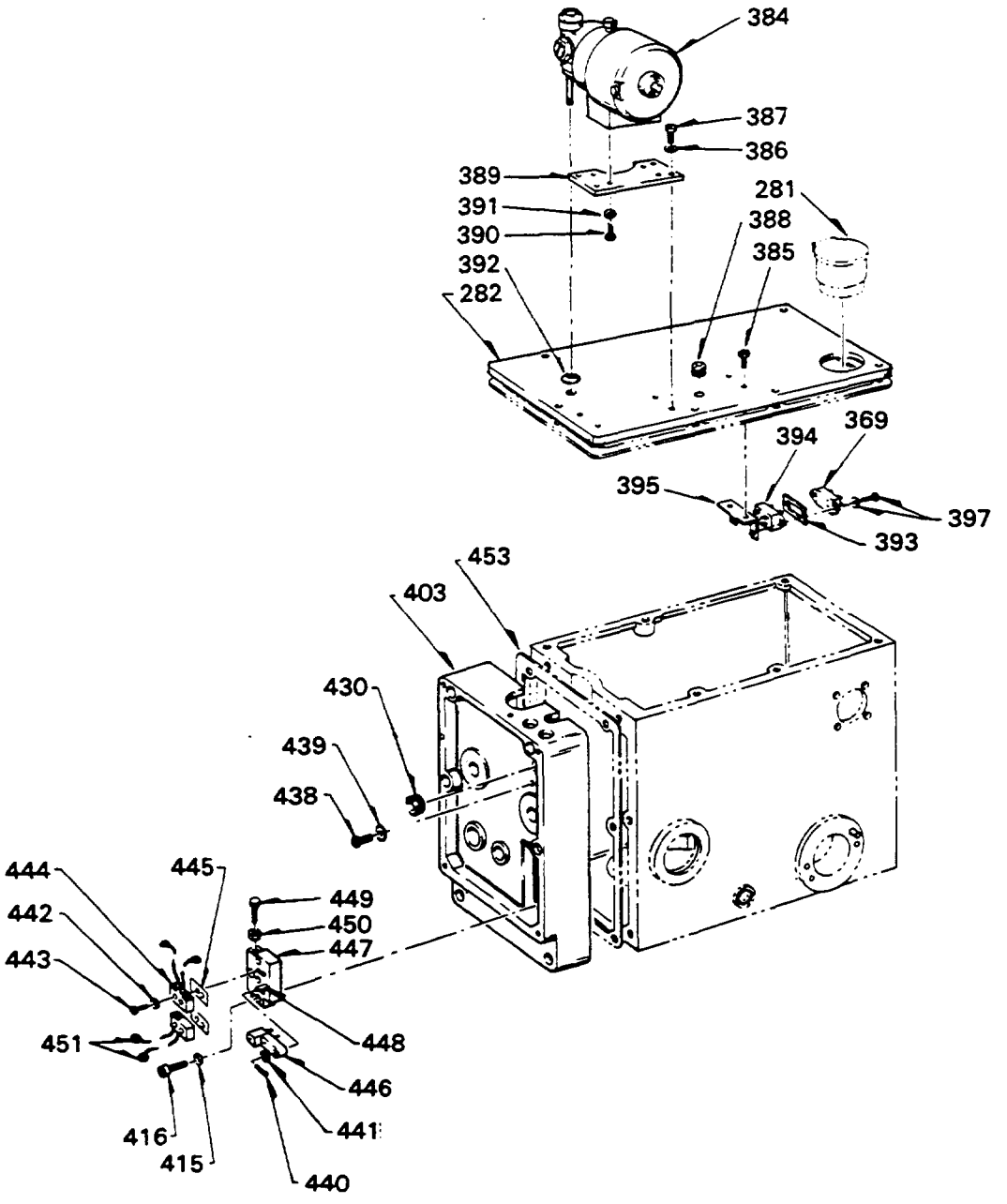
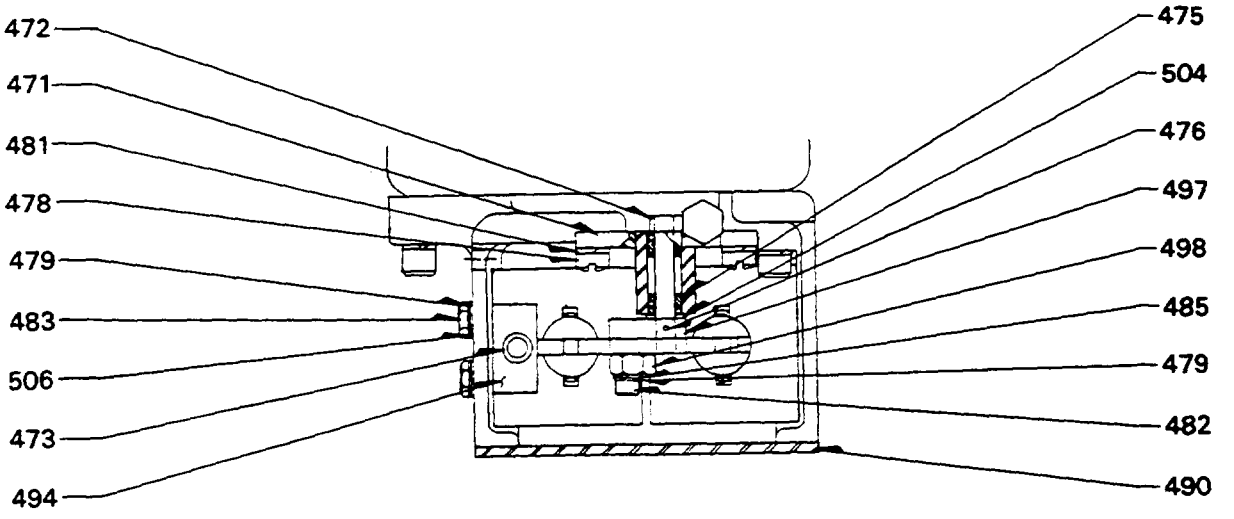


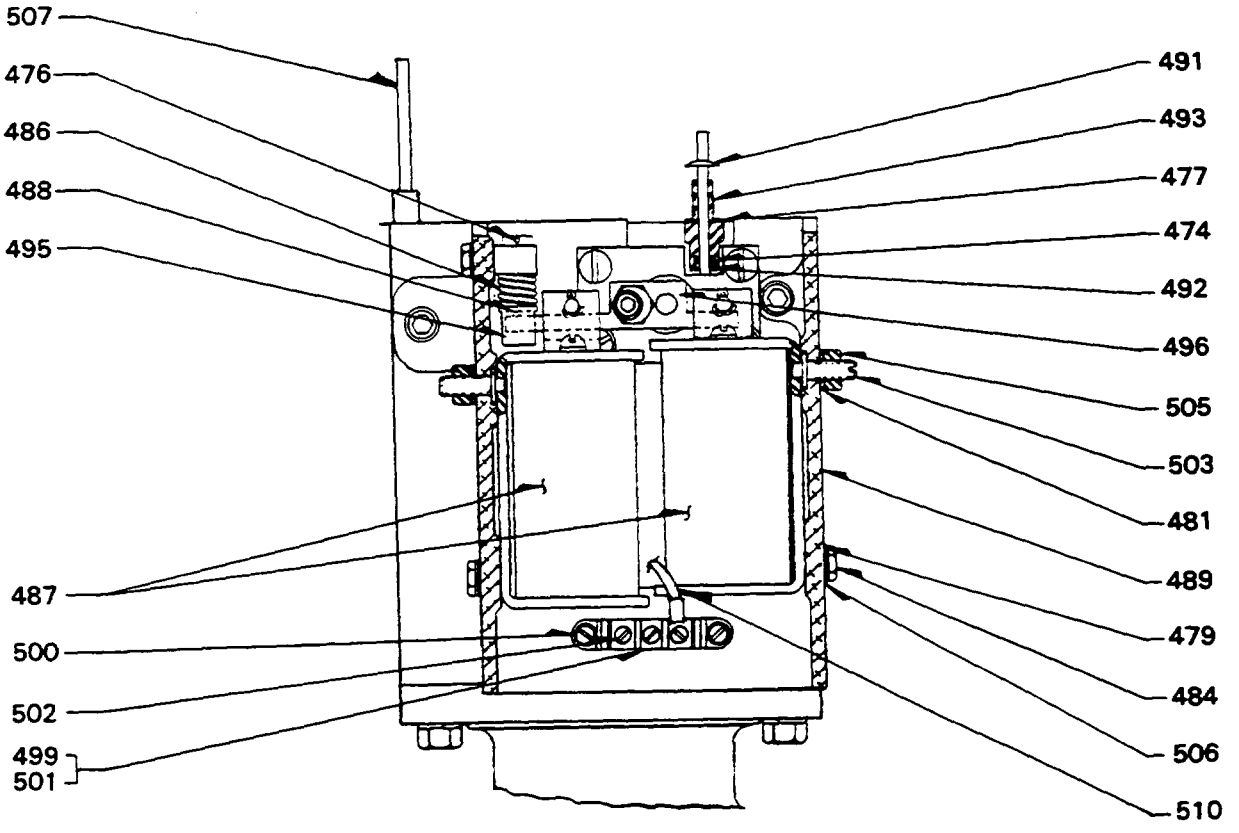
PLATE B67-5

P.L. No. B67

GOVERNOR ASSEMBLY



TOP VIEW



FRONT VIEW

Ref. No. 470

PLATE B67-6

GOVERNOR DRIVE AND GOVERNOR DRIVE GEAR

Governor Drive Gear Application
All 645 Engines

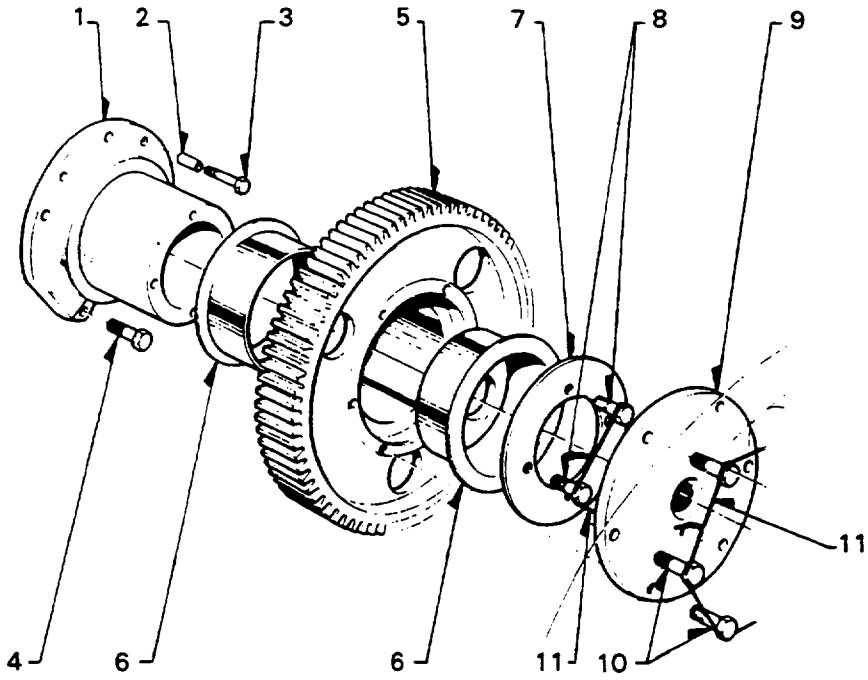
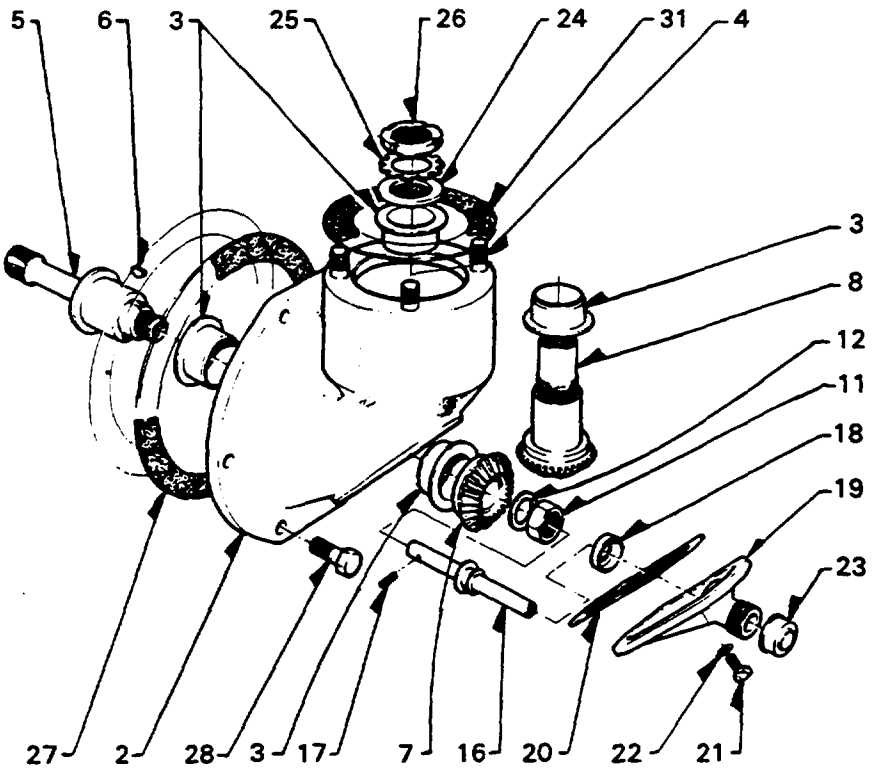


PLATE B70-1

Ref. No.	Part Number	Qty. Req.	Description
1	8084468	1	STUBSHAFT .. Drive Gear
2	8070243	2	PIN .. Dowel - Locating .500 dia. x 1 in. long with 1/4 - 28 threaded end 8115096 .. .505 dia. 8115097 .. .510 dia. 8115098 .. .515 dia.
3	8060180	2	BOLT .. Drilled hex. head - 1/4 - 28 x 3/8
4	8028291	5	BOLT .. Drilled hex. head - 1/2 - 20 x 1-1/8
5	8041930	1	GEAR .. Governor drive - 113 tooth
6	8039671	2	BUSHING .. Drive gear
7	8028188	1	PLATE .. Retaining
8	8028314	4	BOLT .. Drilled hex. head - 3/8 - 24 x 7/8
9	8028480	1	FLANGE .. Drive - Splined
10	8028312	6	BOLT .. Drilled hex. head - 3/8 - 24 x 1
11	8116738	A.R.	WIRE .. Lock - 3/64 dia. x 500 ft.

P.L. No. B70

GOVERNOR DRIVE AND GOVERNOR DRIVE GEAR
Governor Drive Assemblies
All 645 Engines



Ref. No. 1 - Column E
PLATE A70-2

Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	UG-8 Governor Application - Without Tachometer Drive - Except 16, 20-645E10B
		-	B	-	-	-	UG-8 Governor Application - With Tachometer Drive
		-	-	C	-	-	UG-8 Governor Application - Without Tachometer Drive - 16,20-645E10B only
		-	-	-	D	-	EGB, LSG, PG Governor Application - Without Tachometer Drive
		-	-	-	-	E	EGB, LSG, PG Governor Application - With Tachometer Drive
*1	9513179	1	-	-	-	-	DRIVE ASM. .. Governor - Without tachometer drive
*1	8212654	-	1	-	-	-	DRIVE ASM. .. Governor - With tachometer drive
*1	9513181	-	-	1	-	-	DRIVE ASM. .. Governor - Without tachometer drive
*1	8175893	-	-	-	1	-	DRIVE ASM. .. Governor - Without tachometer drive
1	8219659	-	-	-	-	1	DRIVE ASM. .. Governor - With tachometer drive
*2	8290276	1	1	1	-	-	HOUSING ASM. .. Governor drive
2	8176657	-	-	-	1	1	HOUSING ASM. .. Governor drive
3	8039674	4	4	4	4	4	BUSHING .. Shaft
4	8028951	-	-	-	4	4	STUD .. 1/2 - 13 x 1/2 - 20 x 1-7/8 in. long
*5	9514175	1	-	1	1	-	SHAFT .. Governor drive gear - Formerly 8196728
5	8196728	-	1	-	-	1	SHAFT .. Governor drive gear
6	106750	1	1	1	1	1	KEY .. Woodruff
*7	8212655	1	1	-	-	-	GEAR .. Drive - 33 teeth
7	8028238	-	-	1	1	1	GEAR .. Drive - 24 teeth
*8	8212650	1	1	-	-	-	GEAR .. Driven - 21 teeth - Does not include driven shaft
8	8028499	-	-	1	1	1	GEAR .. Driven - 22 teeth - Includes driven shaft
*9	8212653	1	1	-	-	-	SHAFT .. Driven
*10	106749	1	1	-	-	-	KEY .. Woodruff

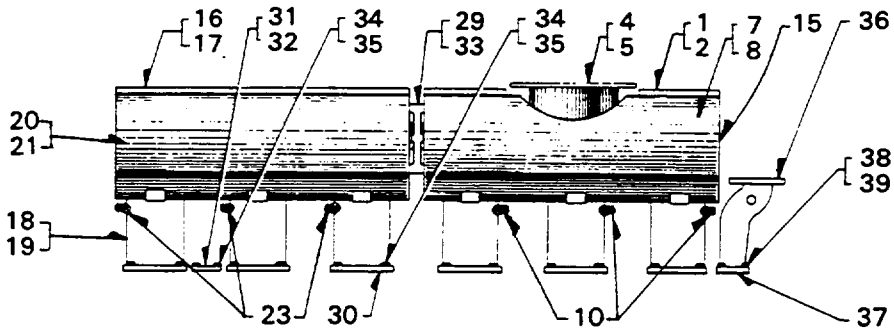
GOVERNOR DRIVE AND GOVERNOR DRIVE GEAR

Ref. No.	Part Number	Quantity Required					Description
		A	B	C	D	E	
-	----	1	1	1	1	1	DRIVE ASM. .. Governor
*11	8060089	1	-	1	1	-	NUT .. Lock - 3/4 - 16 hex.
11	8059714	-	1	-	-	1	NUT .. Lock - 3/4 - 16 hex. - Slotted
12	8028733	1	1	1	1	1	WASHER .. Flat - 3/4
*13	8049463	1	1	-	-	-	NUT .. Lock - 1/2 - 20 hex. - Driven gear to shaft
*14	8212658	1	1	-	-	-	WASHER .. Flat - 1/2
*15	8212651	1	1	-	-	-	WASHER .. Thrust - 3/4 I.D. x 2-1/2 O.D. x 5/32 thick
16	8196727	-	1	-	-	1	SHAFT .. Drive - Tachometer
17	455277	-	1	-	-	1	PIN .. Roll - 1/8 x 1-1/8
18	8196726	-	1	-	-	1	BAFFLE .. Oil slinger
*19	9513178	1	-	1	1	-	COVER .. Housing - Formerly 8196833
19	8028618	-	1	-	-	1	COVER .. Housing
20	8028209	1	1	1	1	1	GASKET .. Cover
21	179839	7	7	7	7	7	BOLT .. Hex. head - 3/8 - 16 x 1
22	103321	7	7	7	7	7	WASHER .. Lock - 3/8
23	849330	-	1	-	-	1	CAP .. Tachometer drive - 7/8 - 18
24	8028365	-	1	-	-	1	SPACER .. Gear
25	127688	-	1	-	-	1	WASHER .. Lock - Bearing type
26	127711	-	1	-	-	1	NUT .. Lock - Bearing type
27	8028229	1	1	1	1	1	GASKET .. Drive mounting
28	181433	6	6	6	6	6	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
Governor To Governor Drive Mounting Hardware							
*29	103028	-	-	-	4	4	NUT .. Hex. - 1/2 - 20
*30	103323	-	-	-	4	4	WASHER .. Lock - 1/2 } EGB, LSG, PG Governors
31	8028239	-	-	-	1	1	GASKET .. Governor mounting
*31	8028239	1	1	1	-	-	GASKET .. Adapter to drive
*32	8212659	1	1	1	-	-	ADAPTER .. Drive to governor
*33	8212660	1	1	1	-	-	GASKET .. Adapter to governor
*34	138292	4	4	4	-	-	SCREW .. Socket head cap - 1/2 - 13 x 1-1/2 } UG-8 Governors
*35	103323	4	4	4	-	-	WASHER .. Lock - 1/2
*36	179848	4	4	4	-	-	BOLT .. Hex. head - 3/8 - 16 x 2-1/4
*37	115549	4	4	4	-	-	WASHER .. Lock - 3/8
Tachometer Generators							
ϕ*38	3261563	-	1	-	-	1	GENERATOR .. Tachometer - 6 volts D.C. per 1000 R.P.M.
*39	3329218	-	1	-	-	1	SHAFT .. Flexible drive - 2.62 in. long
*40	8126591	-	1	-	-	1	KIT .. Brush replacement
ϕ*41	8245949	-	1	-	-	1	GENERATOR .. Tachometer - 10 volts A.C. per 1000 R.P.M.
*42	8212627	-	1	-	-	1	COVER .. Binding post - 1/2 - F.P.T. conduit connection

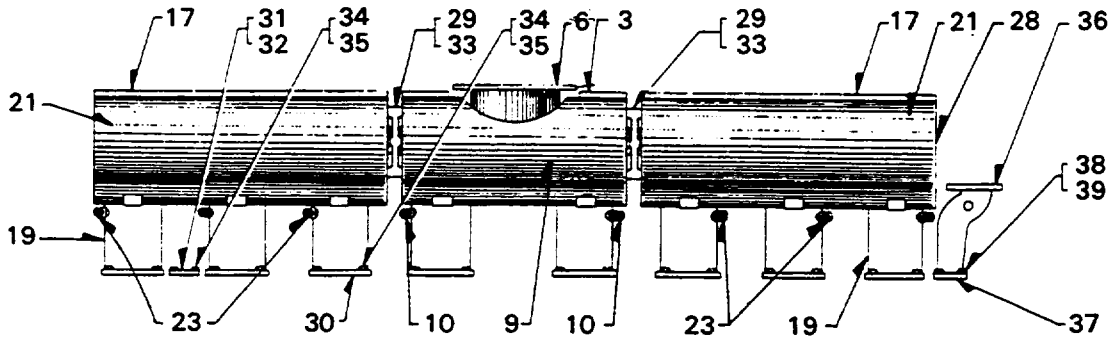
Parts List No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber And Heat Shield Application For Normally Aspirated Engines
8,12,16-645E1,E2,E6,E8 Engines



Columns A and B



Column C

PLATE B72-1

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	12-645E1,E2,E6,E8 engines
		-	-	C	16-645E1,E2,E6,E8 engines
1	8251713	1	-	-	CHAMBER ASM. .. Exhaust - With stack - Replaces 8402591
2	8253275	-	1	-	CHAMBER ASM. .. Exhaust - With stack - Replaces 8333805
3	8214995	-	-	1	CHAMBER ASM. .. Exhaust - With stack - Replaces 3323476
4	8251652	1	-	1	CHAMBER ASM. .. Exhaust
5	8253252	-	1	-	CHAMBER ASM. .. Exhaust
6	8214996	-	-	1	CHAMBER ASM. .. Exhaust
7	9525910	2	-	-	HEAT SHIELD ASM.
8	9526068	-	2	-	HEAT SHIELD ASM.
9	9525650	-	-	2	HEAT SHIELD ASM.
10	103868	4	6	4	PLUG .. Pipe - 1/2 M.P.T.
*11	179838	8	8	8	BOLT .. 3/8 - 16 x 7/8 hex. head
*12	103321	8	8	8	WASHER .. 3/8 spring lock
*13	102635	8	8	8	NUT .. 3/8 - 16 hex.
*14	8479454	4	4	-	CLIP .. End sheet
15	8419242	1	1	-	SHEET .. End
16	8215134	1	-	-	CHAMBER ASM. .. Exhaust - Without stack - Replaces 3323921
17	8214748	-	1	2	CHAMBER ASM. .. Exhaust - Without stack - Replaces 3323477
18	8215136	1	-	-	CHAMBER ASM. .. Exhaust
19	8214613	-	1	2	CHAMBER ASM. .. Exhaust

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

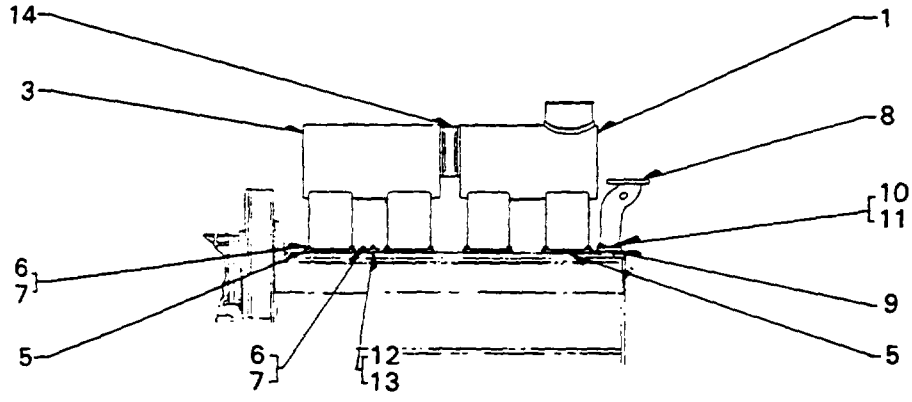
Ref. No.	Part Number	Quantity Required			Description	
		A	-	-	8-645E1,E2,E6,E8 engines	
		-	B	-	12-645E1,E2,E6,E8 engines	
		-	-	C	16-645E1,E2,E6,E8 engines	
	8215134	1	-	-	CHAMBER ASM. .. Exhaust - Without stack - Replaces 3323921	
	8214748	-	1	2	CHAMBER ASM. .. Exhaust - Without stack - Replaces 3323477	
20	9525737	2	-	-	HEAT SHIELD ASM. .. Formerly 8215737	
21	9525473	-	2	4	HEAT SHIELD ASM. .. Formerly 8214609	
*22	8214035	2	2	4	BRACKET .. Heat shield connecting	
23	103868	4	6	12	PLUG .. Pipe - 1/2 M.P.T.	
*24	179838	12	12	24	BOLT .. 3/8 - 16 x 7/8 hex. head	
*25	103321	12	12	24	WASHER .. 3/8 spring lock	
*26	102635	12	12	24	NUT .. 3/8 - 16 hex.	
*27	8479454	4	4	8	CLIP .. End sheet	
28	8419242	1	1	2	SHEET .. End	
29	8158870	1	1	2	CLAMP .. Exhaust manifold - 10-3/8 I.D. - Stainless steel	
30	9337724	4	6	8	GASKET .. Manifold to crankcase - Replaces 8281295 and 8459714	
31	8080858	1	1	1	FLANGE .. Blind - Water outlet - Camshaft drive end	
32	8070513	1	1	1	GASKET .. Flange mounting	
33	8116738	As Req.			WIRE .. Lock - 3/64 dia. - 500 ft. length	
34	271584	28	40	52	BOLT .. Manifold mounting - 5/8 - 18 x 1-5/8 hex. head	
35	8133334	28	40	52	WASHER .. Lock - 5/8	
36	8370361	1	1	1	ADAPTER .. Water outlet	
37	8347756	1	1	1	GASKET .. Adapter to crankcase	
38	272563	4	4	4	BOLT .. Adapter mounting - 1-14 x 2-1/4 hex. head	
39	103348	4	4	4	WASHER .. Lock - 1 inch	
†*40	8379061	1	-	-	CHAMBER ASM. .. Exhaust - With stack - Replaces 8287313	For order 2354 Only - Model SR1IE1A
†*41	8378813	1	-	-	CHAMBER ASM. .. Exhaust - Without stack - Replaces 8287525	For order 2354 Only - Model SR1IE1A
*42	8164745	1	-	-	CLAMP .. Exhaust manifold	For order 2354 Only - Model SR1IE1A
†*43	8367099	-	2	-	CHAMBER ASM. .. Exhaust - No longer furnished - Replaced by 8370162 manifold - See Page 3, Ref. No. 2	For order 2355 only - Model SR12E1W
*44	103868	-	12	-	PLUG .. Pipe - 1/2 square head	For order 2355 only - Model SR12E1W

† Does Not Include Heat Shields.

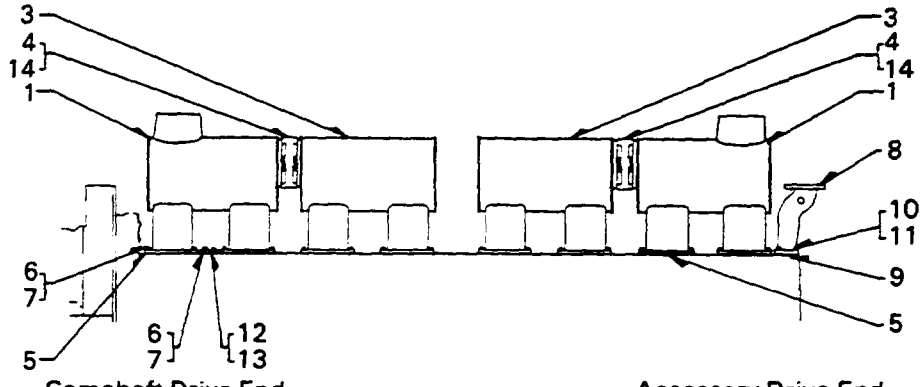
P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Silencing Type Exhaust Chamber Application
8,12,16-645E1 Engines



8-645E1 Engine



Camshaft Drive End — Accessory Drive End

16-645E1 Engine

PLATE B72-2

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1 engine (models LD8E1, SR11E1A)
		-	B	-	12-645E1 engine (models S12E1, LD12E1)
		-	-	C	16-645E1 engine (model S16E1)
1	8451090	1	-	2	CHAMBER ASM. .. Exhaust - With stack
*2	8370162	-	2	-	CHAMBER ASM. .. Exhaust - With stack
3	8374192	1	-	2	CHAMBER ASM. .. Exhaust - Without Stack
4	8164745	1	-	2	CLAMP .. Exhaust chamber - 8-1/4 inch
5	9337724	4	6	8	GASKET .. Exhaust chamber to crankcase - Replaces 8459714
6	271584	28	40	52	BOLT .. Chamber to crankcase - 5/8 - 18 x 1-5/8 hex. head
7	8291560	28	-	52	WASHER .. 5/8 hardened - Formerly 8133334
7	8133334	-	40	-	WASHER .. 5/8 lock
8	8370361	1	1	1	ADAPTER .. Water outlet
9	8347756	1	1	1	GASKET .. Adapter to crankcase
10	272563	4	4	4	BOLT .. Adapter mounting - 1-1/4 x 2-1/4 hex. head
11	103348	4	4	4	WASHER .. Lock - 1 inch
12	8080858	1	1	1	FLANGE .. Blind - Water outlet - Camshaft drive end
13	8070513	1	1	1	GASKET .. Flange mounting
14	8116738	As Req.			WIRE .. Lock - 3/64 dia. - 500 ft. length

P8009, P8460, P9265, P9762

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber Application
8-645E1 Engine
Model SR11E1A - Orders 2356 and 2371

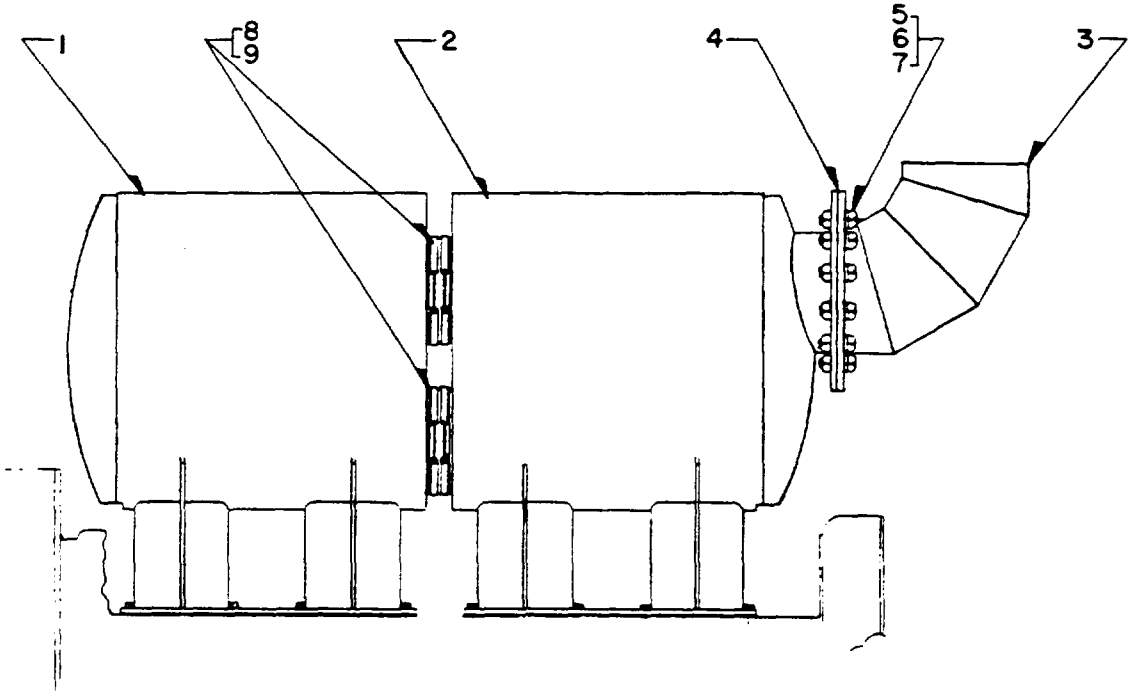


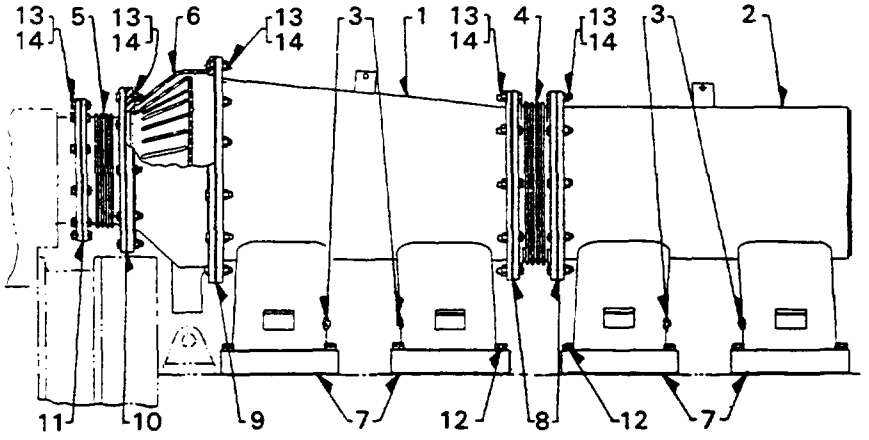
PLATE B72-3

Ref. No.	Part Number	Qty. Req.	Description
1	8229473	1	CHAMBER .. Exhaust
2	8251676	1	CHAMBER .. Exhaust - With opening for exhaust elbow
3	8251656	1	ELBOW .. Exhaust
4	3309711	1	GASKET .. Elbow mounting
5	271658	12	BOLT .. 7/8 - 9 x 2-1/2 hex. head
6	103327	12	WASHER .. Lock - 7/8
7	220082	12	NUT .. 7/8 - 9 hex.
8	8230989	2	CLAMP ASSEMBLY .. Manifold
9	8116738	A.R.	WIRE .. Lock - 3/64 dia. - Available 500 ft. length

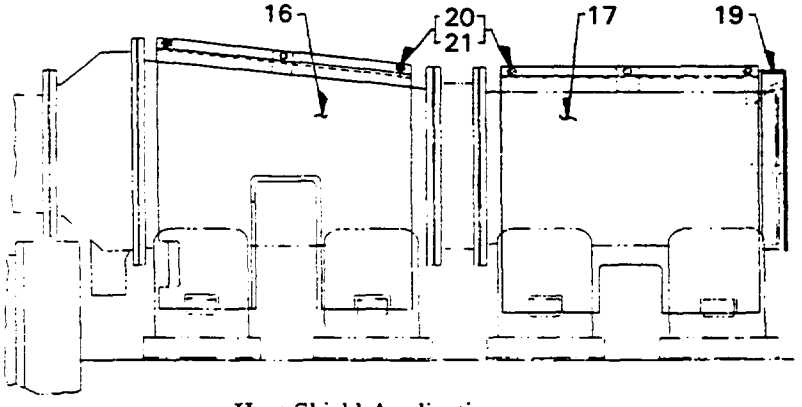
P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber and Heat Shield Application
8-645E4,E4B,E5,E7,E7B, and E7C Engines



Exhaust Manifold Application



Heat Shield Application

Camshaft Drive End — Accessory Drive End

PLATE B72-4

Ref. No.	Part Number	Qty. Req.	Description
*ϕ1	8422486	1	CHAMBER ASM. .. Exhaust - Rear - Early 8-645E4,E5 engines only
ϕ1	9517565	1	CHAMBER ASM. .. Exhaust - Rear - Replaces 8424247 - Current 8-645E4,E4B,E5,E7B,E7C engines
2	9517568	1	CHAMBER ASM. .. Exhaust - Front - Replaces 8422468
3	8348620	-	PLUG .. Pipe - 1/2 MPT - 4 required per chamber
4	8408985	1	JOINT ASM. .. Expansion - Between chambers
5	8408987	1	JOINT ASM. .. Expansion - Adapter to turbocharger
*†ϕ6	8328188	1	SCREEN ASM. .. Adapter - Non trap type - Utex 8393922 - Early 8-645E4,E5 engines only
†ϕ6	9557143	1	SCREEN ASM. .. Adapter - Trap type - Utex 9558715 - Replaces 9526331, 8482700, and 8358828

† Trap Type Adapter Screen 9557143 can be applied to Engines Having the Non Trap Adapter Screen 8328188 if Exhaust Chamber 8422486 is replaced by 9517565 Chamber and 8358834 Gasket is applied.

7	9337724	4	GASKET .. Exhaust chamber to crankcase - Replaces 8281295 and 8459714
8	8309214	2	GASKET .. Expansion joint to chamber
*ϕ9	8309214	1	GASKET .. Exhaust chamber to adapter - Applied with 8422486 chamber
ϕ9	8358834	1	GASKET .. Exhaust chamber to adapter - Applied with 9517565 or 8424247 chambers
10	8309213	1	GASKET .. Adapter to expansion joint
11	8309212	1	GASKET .. Expansion joint to turbocharger

9518919D, 9083767

P.L. No. B72

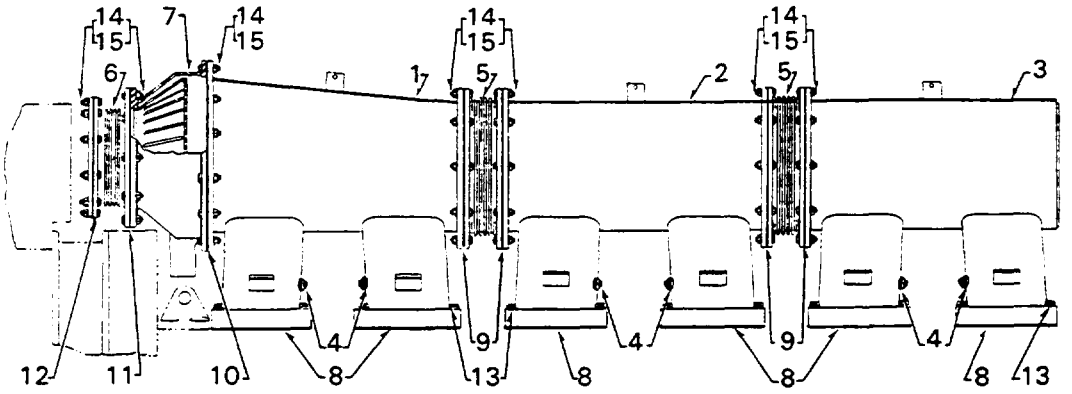
EXHAUST CHAMBER ASSEMBLY

Ref. No.	Part Number	Qty. Req.	Description
*ϕ12	8460207	24	BOLT ASM. .. Chamber to crankcase - Includes spacer - For 1-3/8 in. Hold down flange - Formerly 271749 bolt and 8133334 washer
ϕ12	9318052	24	BOLT ASM. .. Chamber to crankcase - Includes washer - For 2-1/8 in. Hold down flange - Replaces 8453449
13	8287827	A.R.	BOLT .. Expansion joint and adapter mounting - 1/2 - 20 x 2 hex. head Qty. 50 required when applying 8422486 exhaust chamber Qty. 52 required when applying 9517565 or 8424247 exhaust chambers
14	9338626	A.R.	NUT .. 1/2 - 20 hex. - Stainless steel - Replaces 8284621 Qty. 50 required when applying 8422486 exhaust chamber Qty. 52 required when applying 9517565 or 8424247 exhaust chambers
*15	----	A.R.	COMPOUND .. Thread 8278929 .. 1 quart 8315394 .. 4 oz. tube
*ϕ16	8351248	2	SHIELD ASM. .. Heat - Rear - Right and left - Applied to 8422486 Exhaust chamber
ϕ16	8358826	1	SHIELD ASM. .. Heat - Rear - Right } Applied to 9517565 or
*ϕ16	8358827	1	SHIELD ASM. .. Heat - Rear - Left } 8424427 exhaust chamber
17	8351254	2	SHIELD ASM. .. Heat - Front - Right and left
*18	8419225	1	SHIELD ASM. .. Heat - Expansion joint - Early 8-645E4,E5 Engines only
19	8419243	1	SHIELD ASM. .. Heat - Accessory drive end
20	181379	6	BOLT .. Heat shield mounting - 3/8 - 24 x 1-1/4 hex. head
21	8261074	6	NUT .. Special - 3/8 - 24 hex.
*22	8323288	4	BOLT .. Expansion joint heat shield - 1/2 - 20 x 2-1/4 hex. head } Early 8-645E4,E5
*23	6101229	8	WASHER .. Plain - 1/2 } engines only

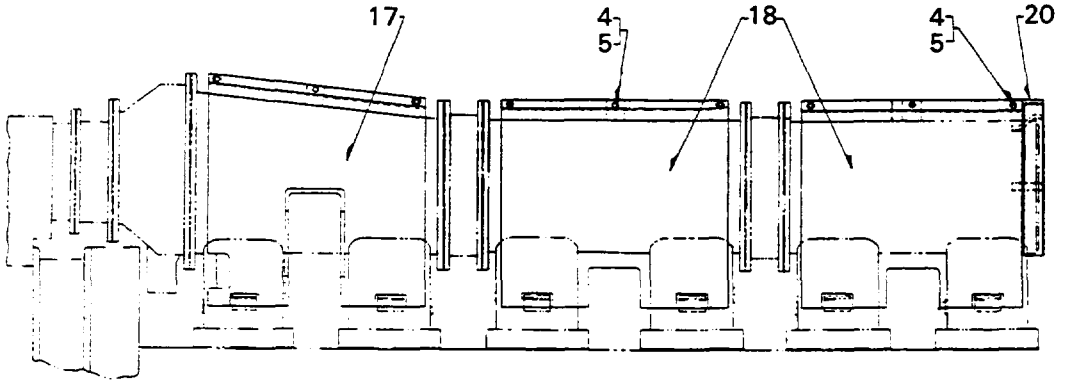
P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber and Heat Shield Application
12-645E4,E4B,E5,E7,E7B,E7C,E9, and E9B Engines



Exhaust Manifold Application



Heat Shield Application

Camshaft Drive End

Accessory Drive End

PLATE B72-5

Ref. No.	Part Number	Qty. Req.	Description
*ϕ1	8430439	1	CHAMBER ASM. .. Exhaust - Rear - Early 12-645E4,E5,E7,E9 engines only
ϕ1	9517565	1	CHAMBER ASM. .. Exhaust - Rear - Replaces 8424247 - Current 12-645E4, E4B,E5,E7,E7C,E9, and E9B engines
2	9518940	1	CHAMBER ASM. .. Exhaust - Center - Replaces 8430440
3	9517568	1	CHAMBER ASM. .. Exhaust - Front - Replaces 8422468
4	8348620	-	PLUG .. Pipe - 1/2 M.P.T. - 4 required per chamber
5	8408985	2	JOINT ASM. .. Expansion - Between chambers
6	8408987	1	JOINT ASM. .. Expansion - Adapter to turbocharger
*†ϕ7	8328188	1	SCREEN ASM. .. Adapter - Non trap type - Utex 8393922 - Early 12-645E4,E5,E7,E9 engines only
†ϕ7	9557143	1	SCREEN ASM. .. Adapter - Trap type - Utex 9558715 - Replaces 9526331, 8482700, and 8358828

† Trap Type Adapter Screen 9557143 can be applied to Engines having the Non Trap Adapter Screen 8328188 if Exhaust Chamber 8430439 is replaced by 9517565 Chamber and 8358834 Gasket is applied.

8	9337724	6	GASKET .. Exhaust chamber to crankcase - Replaces 8281295 and 8459714
9	8309214	4	GASKET .. Expansion joint to chamber
*ϕ10	8309214	1	GASKET .. Exhaust chamber to adapter - Applied with 8430439 chamber
ϕ10	8358834	1	GASKET .. Exhaust chamber to adapter - Applied with 9517565 or 8424247 chambers
11	8309213	1	GASKET .. Adapter to expansion joint
12	8309212	1	GASKET .. Expansion joint to turbocharger

9518918D, 9083885

P.L. No. B72

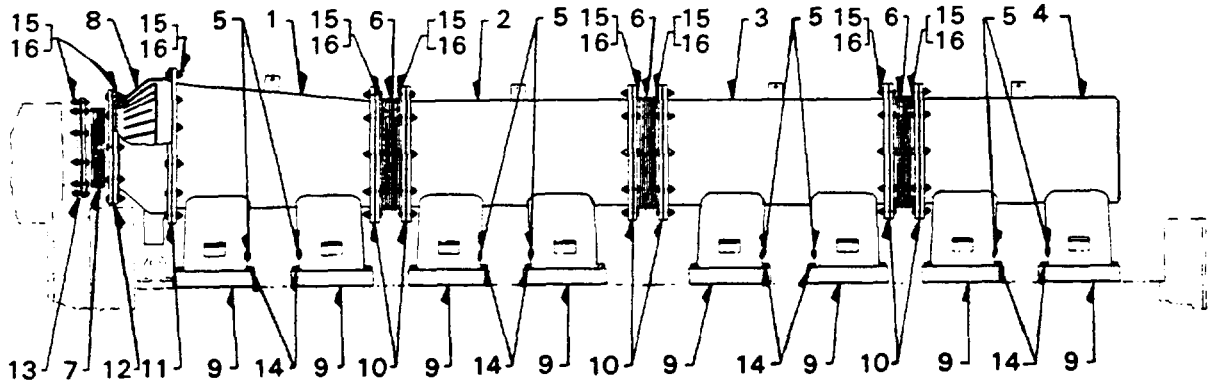
EXHAUST CHAMBER ASSEMBLY

Ref. No.	Part Number	Qty. Req.	Description
*ϕ13	8460207	36	BOLT ASM. .. Chamber to crankcase - Includes spacer - For 1-3/8 in. Hold down flange - Formerly 271749 bolt and 8133334 washer
ϕ13	9318052	36	BOLT ASM. .. Chamber to crankcase - Includes washer - For 2-1/8 in. Hold down flange - Replaces 8453449
14	8287827	A.R.	BOLT .. Expansion joint and adapter mounting - 1/2 - 20 x 2 hex. head Qty. 70 required when applying 8430439 exhaust chamber Qty. 72 required when applying 9517565 or 8424247 exhaust chambers
15	9338626	A.R.	NUT .. 1/2 - 20 hex. - Stainless steel - Replaces 8284621 Qty. 70 required when applying 8430439 exhaust chamber Qty. 72 required when applying 9517565 or 8424247 exhaust chambers
*16	----	A.R.	COMPOUND .. Thread 8278929 .. 1 quart 8315394 .. 4 oz. tube
*ϕ17	8351248	2	SHIELD ASM. .. Heat - Rear - Right and left - Applied to 8430439 Exhaust chamber
ϕ17	8358826	1	SHIELD ASM. .. Heat - Rear - Right } Applied to 9517565 or
*ϕ17	8358827	1	SHIELD ASM. .. Heat - Rear - Left } 8424247 exhaust chamber
18	8351254	4	SHIELD ASM. .. Heat - Center and front, right and left
*19	8419225	2	SHIELD ASM. .. Heat - Expansion joint - Early 12-645E4,E5,E7, E9 engines only
20	8419243	1	SHIELD ASM. .. Heat - Accessory drive end
21	181370	9	BOLT .. Heat shield mounting - 3/8 - 24 x 1-1/4 hex. head
22	8261074	9	NUT .. Special - 3/8 - 24 hex.
*23	8323288	8	BOLT .. Expansion joint heat shield - 1/2 - 20 x 2-1/4 hex. head } Early 12-645E4,E5,E7,
*24	6101229	16	WASHER .. Plain - 1/2 } E9 engines only

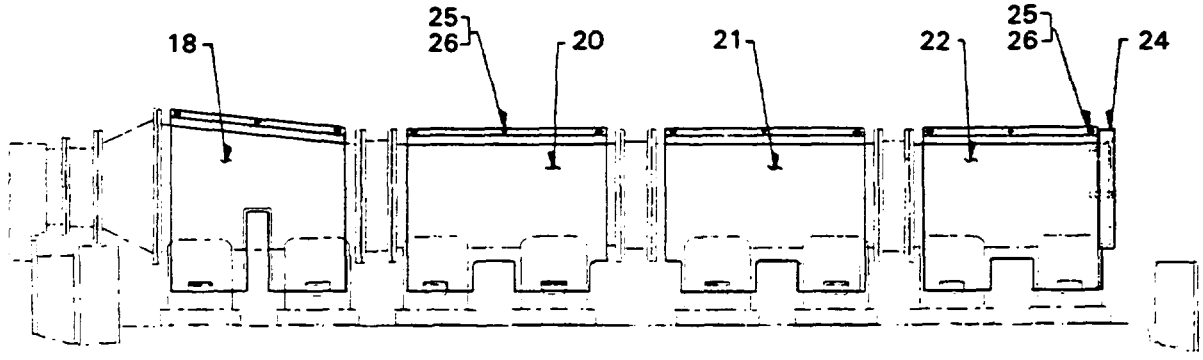
P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber and Heat Shield Application
16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B, and E10B Engines



Exhaust Manifold Application



Camshaft Drive End | Heat Shield Application | Accessory Drive End

PLATE B72-6

Ref. No.	Part Number	Qty. Req.		Description
		A	-	16-645E4 engine - MP36 only
		-	B	16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
1	8365661	1	-	CHAMBER ASM. .. Exhaust - Rear
1	9517565	-	1	CHAMBER ASM. .. Exhaust - Rear - Replaces 8424247
2	8365658	1	-	CHAMBER ASM. .. Exhaust - Intermediate rear
2	9517566	-	1	CHAMBER ASM. .. Exhaust - Intermediate rear - Replaces 8427730
3	8365659	1	-	CHAMBER ASM. .. Exhaust - Intermediate - Front
3	9517567	-	1	CHAMBER ASM. .. Exhaust - Intermediate - Front - Replaces 8427729
4	8365660	1	-	CHAMBER ASM. .. Exhaust - Front
4	9517568	-	1	CHAMBER ASM. .. Exhaust - Front - Replaces 8422468
5	8348620	-	16	PLUG .. Pipe - 1/2 M.P.T. - 4 required per chamber
6	8408985	3	3	JOINT ASM. .. Expansion - Between chambers - Replaces 8321099
7	8408987	1	1	JOINT ASM. .. Adapter to turbocharger - Replaces 8321126
8	9557143	1	1	SCREEN ASM. .. Adapter - Replaces 8358828, 8482700, and 9526331
9	9337724	8	8	GASKET .. Chamber to crankcase - Replaces 8281295 and 8459714
10	8309214	6	6	GASKET .. Expansion joint to chamber
11	8358834	1	1	GASKET .. Chamber to adapter
12	8309213	1	1	GASKET .. Adapter to expansion joint
13	8309212	1	1	GASKET .. Expansion joint to turbocharger
*ϕ14	8460207	48	48	BOLT ASM. .. Chamber to crankcase - Includes spacer - For 1-3/8 in. Hold down flange - Formerly 271749 bolt and 8133334 washer
ϕ14	9318052	48	48	BOLT ASM. .. Chamber to crankcase - Includes washer - For 2-1/8 in. Hold down flange - Replaces 8453449

8365683M, 9518702F, 8427615D

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

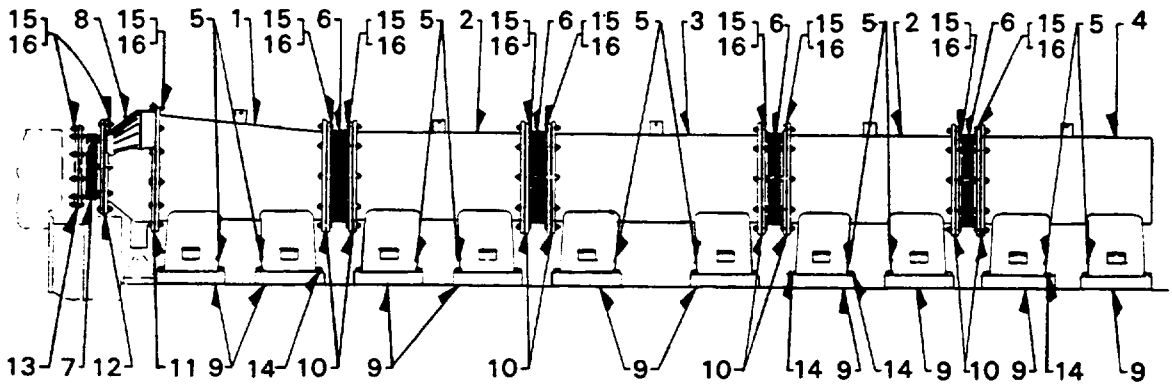
Ref. No.	Part Number	Qty. Req.		Description
		A	-	16-645E4 engine - MP36 only
		-	B	16-645E4,E4B,E5,E7,E7B,E7C,E9,E9B,E10B engines
15	8287827	92	92	BOLT .. Expansion joint and adapter mounting - 1/2 - 20 x 2 hex. head
16	9338626	92	92	NUT .. 1/2 - 20 hex. - Stainless steel - Replaces 8284621
*17	----	As	Req.	COMPOUND .. Thread 8278929 .. 1 quart 8315394 .. 4 oz. tube
†18	8358826	-	1	SHIELD ASM. .. Heat - Rear right
*19	8358827	-	1	SHIELD ASM. .. Heat - Rear left
20	9326969	-	2	SHIELD ASM. .. Heat - Intermediate rear right and intermediate front left - Formerly 8439800
21	9326966	-	2	SHIELD ASM. .. Heat - Intermediate rear left and intermediate front right - Formerly 8351251
22	8351254	-	2	SHIELD ASM. .. Heat - Front right and left
*23	8419225	-	3	SHIELD ASM. .. Heat - Expansion joint - Early 16-645E4, E5,E7, and E9 engines only
24	8419243	-	1	SHIELD ASM. .. Heat - Accessory drive end
25	181370	-	12	BOLT .. Heat shield mounting - 3/8 - 24 x 1-1/4 hex. head
26	8261074	-	12	NUT .. Special - 3/8 -24 hex.
*27	8323288	-	12	BOLT .. Expansion joint heat shield - 1/2 - 20 x 2-1/4 hex. head } Early 16-645E4,E5 E7, and E9 engines
*28	6101229	-	24	WASHER .. Plain - 1/2

† See Catalog 321, Parts List 1300 for Head Shields Applicable to Model MP36

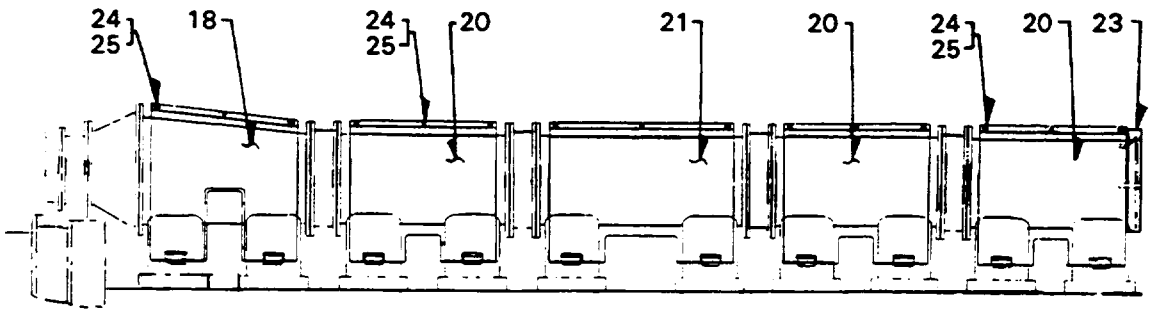
P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber and Heat Shield Application
20-645E4,E4B,E5,E7,E7B,E7C,E9,E9B, and E10B Engines



Exhaust Manifold Application



Heat Shield Application

Camshaft Drive End — Accessory Drive End

PLATE B72-7

Ref. No.	Part Number	Qty. Req.		Description
		A	-	20-645E4 engine (models MP45,MP45M,MP45B,HG20E4B only)
		-	B	20-645E4,E4B (models S20E4 & S20E4B), E5,E7,E7B,E7C,E9,E9B, E10B engines
1	9516746	1	-	CHAMBER ASM. .. Exhaust - Rear - Replaces 8358830
1	9517565	-	1	CHAMBER ASM. .. Exhaust - Rear - Replaces 8424247
2	9518522	2	-	CHAMBER ASM. .. Exhaust - Intermediate front and rear - Replaces 8360484
2	9524165	-	2	CHAMBER ASM. .. Exhaust - Intermediate front and rear - Replaces 8424336
3	9518705	1	-	CHAMBER ASM. .. Exhaust - Center - Replaces 8360480
3	9518709	-	1	CHAMBER ASM. .. Exhaust - Center - Replaces 8424323
4	9316231	1	-	CHAMBER ASM. .. Exhaust - Front - Replaces 8351182
4	9517568	-	1	CHAMBER ASM. .. Exhaust - Front - Replaces 8422468
5	8348620	-	20	PLUG .. Pipe - 1/2 M.P.T. - 4 required per chamber
6	8408985	4	4	JOINT ASM. .. Expansion - Between chamber - Replaces 8321099
7	8408987	1	1	JOINT ASM. .. Adapter to turbocharger - Replaces 8321126
8	9557143	1	1	SCREEN ASM. .. Adapter - Replaces 8358828, 8482700, and 9526331
9	9337724	10	10	GASKET .. Chamber to crankcase - Replaces 8281295 and 8459714
10	8309214	8	8	GASKET .. Expansion joint to chamber
11	8358834	1	1	GASKET .. Chamber to adapter
12	8309213	1	1	GASKET .. Adapter to expansion joint
13	8309212	1	1	GASKET .. Expansion joint to turbocharger

9518707, 9518708, 8423649

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Ref. No.	Part Number	Qty. Req.		Description
		A	-	20-645E4 engine (models MP45, MP45M, MP45B, HG20E4B only)
		-	B	20-645E4,E4B (models S20E4 & S20E4B), E5,E7,E7B,E7C,E9,E9B, E10B engines
ϕ14	8460207	60	60	BOLT ASM. .. Chamber to crankcase - Includes spacer - For 1-3/8 in. Hold down flange - Formerly 271749 bolt and 8133334 washer
ϕ14	9318052	60	60	BOLT ASM. .. Chamber to crankcase - Includes washer - For 2-1/8 in. Hold down flange - Replaces 8453449
15	8287827	112	112	BOLT .. Expansion joint and adapter mounting - 1/2 - 20 x 2 hex. head
16	9338626	112	112	NUT .. Spl. - 1/2 - 20 hex - Stainless steel - Replaces 8284621 - Slflkg.
*17	----	As Req.		COMPOUND .. Thread 8278929 .. 1 quart 8315394 .. 4 oz. tube
†18	8358826	-	1	SHIELD ASM. .. Heat - Rear - Right
*19	8358827	-	1	SHIELD ASM. .. Heat - Rear - Left
20	8351254	-	6	SHIELD ASM. .. Heat - Intermediate rear, intermediate front, and front - Right and left
21	8360478	-	2	SHIELD ASM. .. Heat - Center - right and left
*22	8419225	-	4	SHIELD ASM. .. Heat - Expansion joint - Early 20-645E4,E5, E7,E9 engines only
23	8419243	-	1	SHIELD ASM. .. Heat - Accessory drive end
24	181370	-	15	BOLT .. Heat shield mounting - 3/8 - 24 x 1-1/4 hex. head
25	8261074	-	15	NUT .. Special - 3/8 - 24 hex.
*26	8323288	-	16	BOLT .. Expansion joint heat shield 1/2 - 20 x 2-1/4 hex. head
*27	6101229	-	32	WASHER .. Plain - 1/2

†*See Catalog 321, Parts List 1300 for Heat Shields Applicable to Models MP45, MP45M, MP45B, and HG20E4B*

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Previously Applied Exhaust Chambers Having Blanket Type Inslulation
12,16,20-645E4,E5 Engines

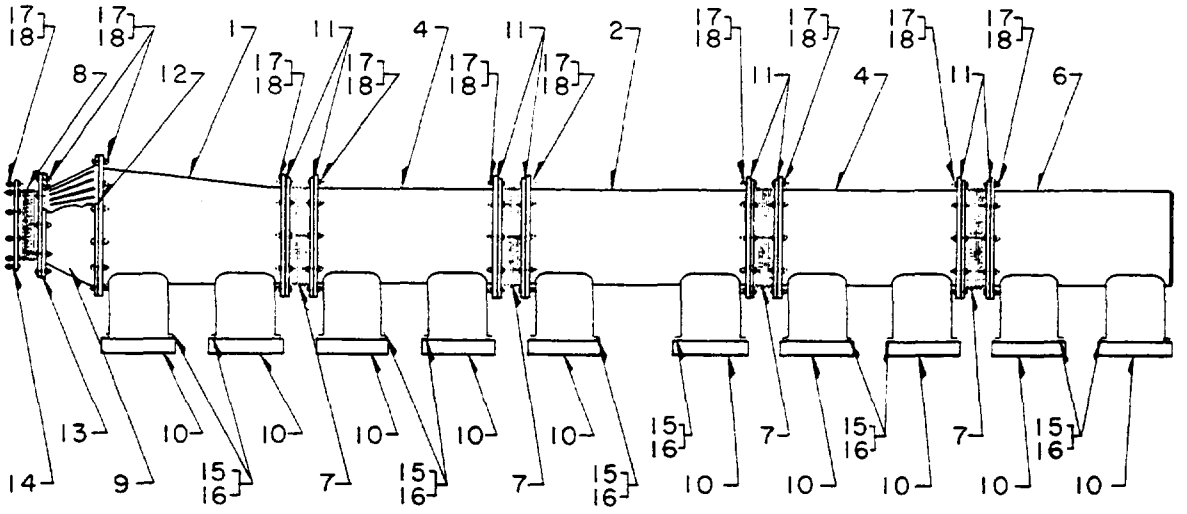


PLATE B72-8

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	12-645E4,E5 engines
		-	B	-	16-645E4,E5 engines
		-	-	C	20-645E4 (incl. Model 999-20) and 20-645E5 engines
†1	8367405	1	-	-	CHAMBER ASM. .. Exhaust } Rear
†1	8365665	-	1	1	CHAMBER ASM. .. Exhaust } Rear
2	8368137	1	-	-	CHAMBER ASM. .. Exhaust } Center
2	8367522	-	-	1	CHAMBER ASM. .. Exhaust } Center
*3	8365662	-	1	-	CHAMBER ASM. .. Exhaust - Intermediate rear
4	8367521	-	-	2	CHAMBER ASM. .. Exhaust - Intermediate - Rear and front
*5	8365663	-	1	-	CHAMBER ASM. .. Exhaust - Intermediate front
6	8365664	1	1	1	CHAMBER ASM. .. Exhaust - Front
7	8408985	2	3	4	JOINT ASM. .. Expansion - Between chambers
8	8408987	1	1	1	JOINT ASM. .. Expansion - Adapter to turbocharger
†9	8328188	1	-	-	SCREEN ASM. .. Adapter - Non trap - Utex 8393922
†9	9557143	-	1	1	SCREEN ASM. .. Adapter - Trap type - Utex 9558715 - Repl's. 8358828 8482700, and 9526331

† Trap Type Adapter Screen 9557143 can be applied to 12 Cylinder Engines using the Non Trap Adapter Screen 8328188 only if the Exhaust Chamber 8367405 is replaced with 8365665 Chamber Assembly and 8358834 Gasket is applied.

10	9337724	6	8	10	GASKET .. Exhaust chamber to crankcase - Replaces 8281295 and 8459714
11	8309214	5	6	8	GASKET .. Expansion joint to chamber
†12	8358834	-	1	1	GASKET .. Exhaust chamber to adapter
13	8309213	1	1	1	GASKET .. Adapter to expansion joint
14	8309212	1	1	1	GASKET .. Expansion joint to turbocharger
ϕ15	8460207	36	48	60	BOLT ASM. .. Chamber to crankcase - Includes spacer - For 1-3/8 in. hold down flange - Formerly 271749 bolt and 8133334 washer
ϕ16	9318052	36	48	60	BOLT ASM. .. Chamber to crankcase - Includes washer - For 2-1/8 in. hold down flange - Replaces 8453449
17	8287827	70	92	112	BOLT .. Expansion joint and adapter mtg. - 1/2 - 20 x 2 hex. head
18	9338626	70	92	112	NUT .. 1/2 - 20 hex. - Stainless steel - Replaces 8284621
19	----	As Required			COMPOUND .. Thread 8278929 .. 1 quart 8315394 .. 4 oz. tube

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

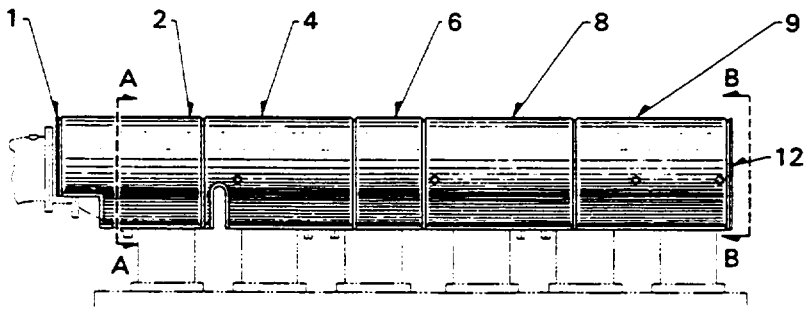
Exhaust Chamber Insulation - Blanket Type
12,16,20-645E4,E5 Engines

PLATE B72-9

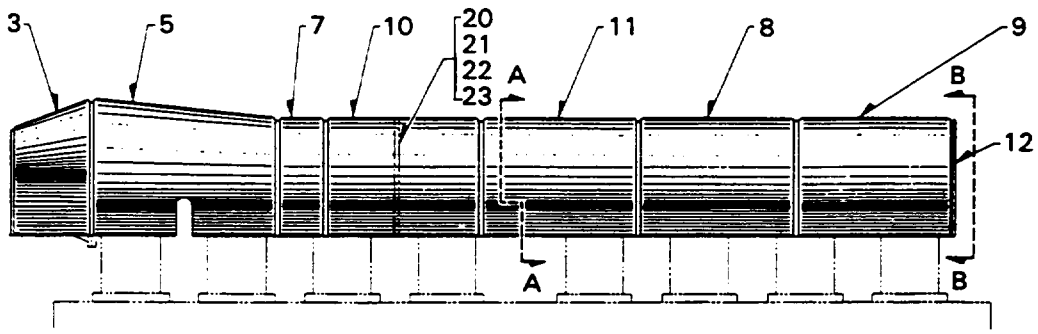
Ref. No.	Part Number	Quantity Required			Description
		A	-	-	12-645E4,E5 engines
		-	B	-	16-645E4,E5 engines
		-	-	C	20-645E4 (incl. Model 999-20) and 20-645E5 engines
1	8349890	1	-	-	INSULATION .. Exhaust chamber - Camshaft drive end
2	8349884	1	-	-	INSULATION .. Exhaust chamber - Side
3	8366157	-	1	1	INSULATION .. Exhaust chamber - Side
4	8349885	1	-	-	INSULATION .. Exhaust chamber - Side
5	8366156	-	1	1	INSULATION .. Exhaust chamber - Side
6	8368311	1	-	-	INSULATION .. Exhaust chamber - Side
7	8366155	-	1	-	INSULATION .. Exhaust chamber - Side
7	8368555	-	-	1	INSULATION .. Exhaust chamber - Side
8	8349888	1	1	2	INSULATION .. Exhaust chamber - Side
9	8349889	1	1	1	INSULATION .. Exhaust chamber - Side
10	8349886	-	1	1	INSULATION .. Exhaust chamber - Side
11	8349887	-	1	1	INSULATION .. Exhaust chamber - Side
12	8349891	1	1	1	INSULATION .. Exhaust chamber - Accessory drive end
13	3328702	3	4	5	BRACKET .. Insulation support
14	8323288	6	8	10	BOLT .. Bracket to exhaust chamber - 1/2 - 20 x 2-1/4 hex. head
15	8116249	As Required			WIRE .. Lock - No. 16 - 50 ft. length
*15A	103343	-	2	2	WASHER .. Plain - 1/2
16	3328701	4	4	5	SPACER ASM. .. Insulation
17	181364	8	8	10	BOLT .. 3/8 - 24 x 1 hex. head
18	103321	8	8	10	WASHER .. Lock - 3/8
19	103026	8	8	10	NUT .. 3/8 - 24 hex.
20	8365155	1	1	1	SPACER ASM. .. Insulation
21	181364	2	2	2	BOLT .. 3/8 - 24 x 1 hex. head
22	103321	2	2	2	WASHER .. Lock - 3/8
23	103026	2	2	2	NUT .. 3/8 - 24 hex.
*24	6923644	4	5	6	SPACER .. Insulation
*25	180126	4	5	6	BOLT .. 3/8 - 16 x 1-1/2 hex. head
*26	120390	4	-	6	WASHER .. Plain - 1/2

P.L. No. B72

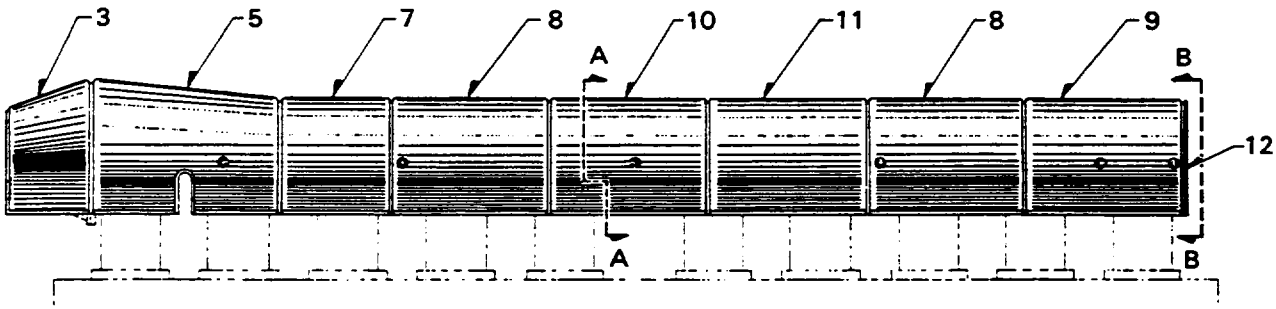
EXHAUST CHAMBER ASSEMBLY



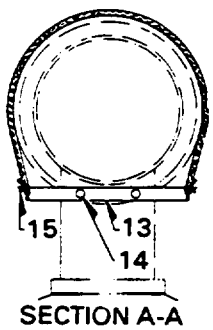
12-645E4,E5 engines



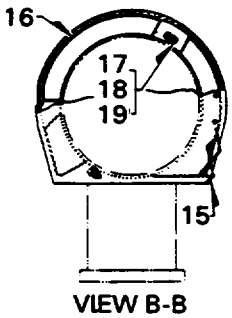
16-645E4,E5 engines



20-645E4,E5 engines



SECTION A-A



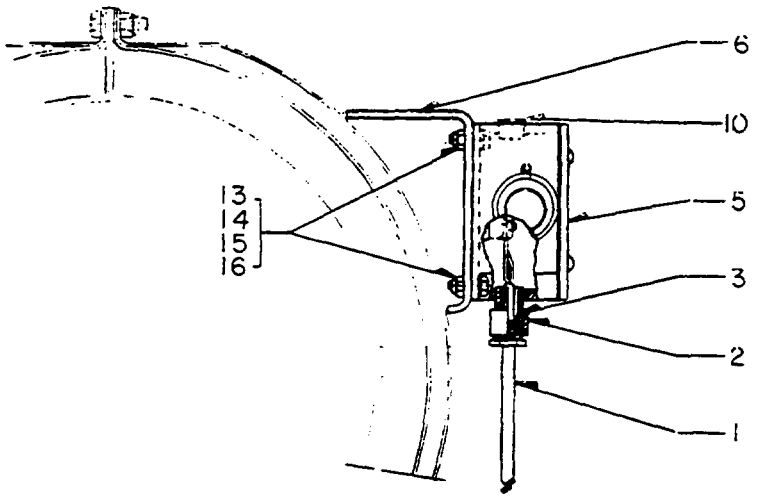
VIEW B-B

PLATE B72-9

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Thermocouple Application with Ungrounded Hot Junction and Rigid Conduit
8-645E2,E5,E6,E7,12,16-645E2,E5,E6,E7,E8 and 20-645E4,E5,E7,E9 Engines



VIEW A-A

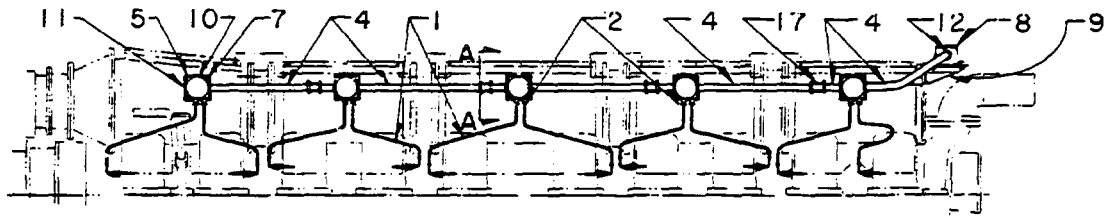


PLATE B72-10

Ref. No.	Part Number	Quantity Required								Description
		A	-	-	-	-	-	-	-	8-645E2,E6 engines
		-	B	-	-	-	-	-	-	8-645E5,E7 engines
		-	-	C	-	-	-	-	-	12-645E2,E6,E8 engines
		-	-	-	D	-	-	-	-	12-645E5,E7 engines
		-	-	-	-	E	-	-	-	16-645E2,E6,E8 engines
		-	-	-	-	-	F	-	-	16-645E5,E7 engines
		-	-	-	-	-	-	G	-	20-645E4 engines
		-	-	-	-	-	-	-	H	20-645E5,E7,E9 engines
1	8462981	9	8	13	12	17	16	20	20	THERMOCOUPLE .. Exhaust man.-Repl. 8390776
2	8390498	9	8	13	12	17	16	20	20	TUBE .. Terminal - Thermocouple
3	8427361	As Required								PACKING .. 1/8 in. sq. - Approx. 100 ft. per roll
4	8122056	As Required						-	A.R.	CONDUIT .. 3/4 in. rigid stl. - 1.05 O.D. x .824 I.D. - 10 ft.
4	8116936	-	-	-	-	-	-	A.R.	-	PIPING .. 3/4 in. std. wrought stl. - 20 ft.
5	8427304	4	4	8	6	8	8	10	10	BOX .. Outlet
6	8450915	4	-	8	-	8	-	-	-	BRACKET .. Outlet box mounting
6	8432087	-	2	-	4	-	6	8	8	BRACKET .. Outlet box mounting
7	8433017	-	1	-	1	-	1	1	1	BRACKET .. Outlet box mounting - Right side
*7	8433016	-	1	-	1	-	1	1	1	BRACKET .. Outlet box mounting - Left side
8	8427305	1	1	1	1	1	1	1	1	BOX .. Outlet - Accessory drive end
9	8451145	1	1	1	1	1	1	1	1	BRACKET .. Outlet box mtg. - Repl. 8427454
10	8348619	3	4	8	6	6	8	20	10	PLUG .. Pipe - 3/8 M.P.T.
11	8198592	4	4	4	4	4	4	2	4	PLUG .. Pipe - 3/4 M.P.T.
12	8038546	2	2	2	2	2	2	2	2	UNION .. Pipe - 3/4 M.P.T.
13	180081	12	12	20	16	20	20	24	24	BOLT .. 5/16 - 18 x 1-1/4 hex. head
14	6101223	12	12	20	16	20	20	24	24	WASHER .. Plain - 5/16
15	120393	12	12	20	16	20	20	24	24	WASHER .. Plain - .344 I.D. x .688 O.D.
16	8035145	12	12	20	16	20	20	24	24	NUT .. 5/16 - 18 hex.
17	8457714	2	2	6	4	6	6	-	8	COUPLING .. Flexible - Conduit connection

8450914B, 8451331B, 8451365B, 8451484C, 8451377B, 8451488C, 8451493C, 8451494C, 8451577

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY
Thermocouple Application with Ungrounded Hot Junction and Flexible Conduit
8,12,16-645E2,E5,E6,E7,E7B,E7C and 20-645E5,E7,E7B,E7C Engines

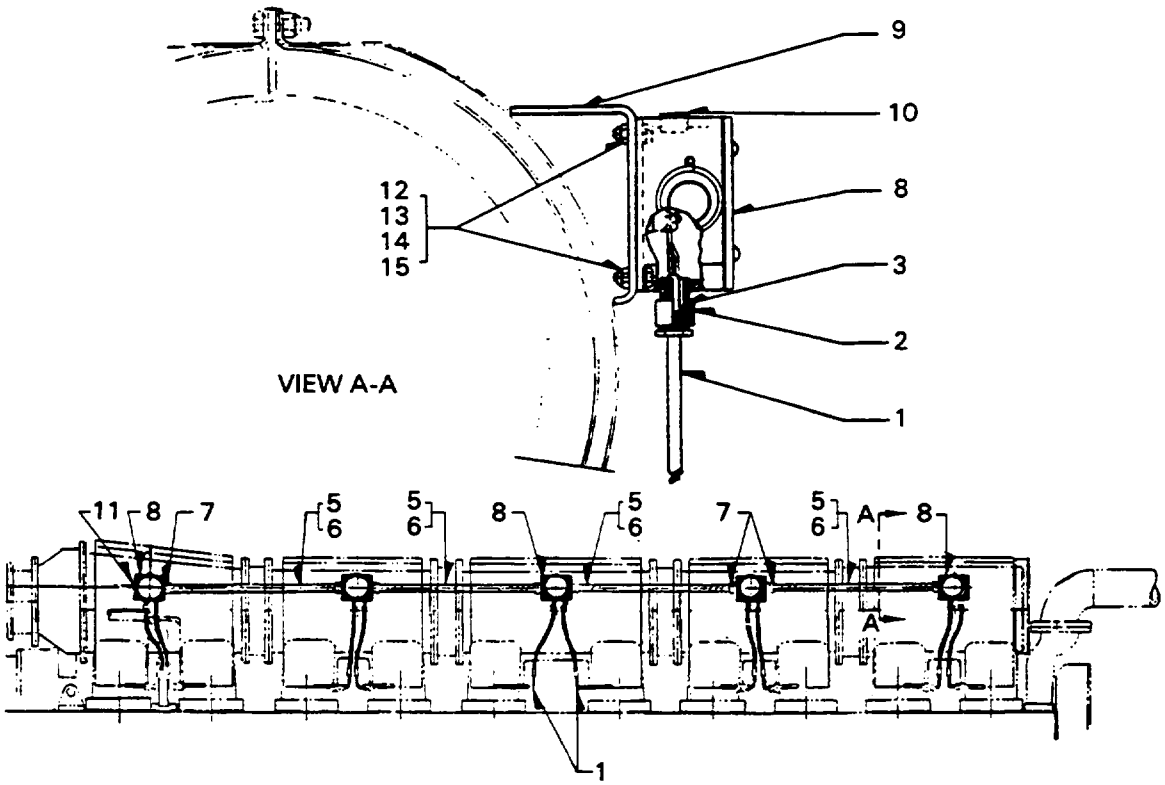


PLATE B72-11

Ref. No.	Part Number	Quantity Required							Description
		A	-	-	-	-	-	-	8-645E2,E6 engines
		-	B	-	-	-	-	-	8-645E5,E7,E7B,E7C engines
		-	-	C	-	-	-	-	12-645E2,E6 engines
		-	-	-	D	-	-	-	12-645E5,E7,E7B,E7C engines
		-	-	-	-	E	-	-	16-645E2,E6 engines
		-	-	-	-	-	F	-	16-645E5,E7,E7B,E7C engines
		-	-	-	-	-	-	G	20-645E5,E7,E7B,E7C engines
1	8462981	9	8	13	12	17	16	20	THERMOCOUPLE .. Exhaust manifold - Repl. 8390776
2	8390498	9	8	13	12	17	16	20	TUBE .. Terminal - Thermocouple
3	8427361	As Required							PACKING .. 1/8 in. square - Approx. 100 ft. per roll
*4	9334086	2	-	-	-	2	-	-	CONDUIT ASM. .. Flexible metal - 46-1/2 in. long
5	9334088	-	2	4	4	4	6	8	CONDUIT ASM. .. Flexible metal - 32-1/2 in. long
6	9334213	As Required							CONDUIT .. 3/4 in. flexible metal - Sold per foot
7	9334212	4	4	8	8	12	12	16	COUPLING .. Flexible conduit - 3/4 in.
8	8427304	4	4	6	6	8	8	10	BOX .. Outlet
*9	8450915	4	-	6	-	8	-	-	BRACKET .. Outlet box mounting
9	8432087	-	4	-	6	-	8	10	BRACKET .. Outlet box mounting
10	8348619	4	4	6	6	8	8	10	PLUG .. Pipe - 3/8 M.P.T.
11	8198592	2	2	2	2	2	2	2	PLUG .. Pipe - 3/4 M.P.T.
12	180081	8	8	12	12	16	16	20	BOLT .. 5/16 - 18 x 1-1/4 hex. head
13	6101223	8	8	12	12	16	16	20	WASHER .. Plain - 5/16
14	120393	8	8	12	12	16	16	20	WASHER .. Plain - .344 I.D. x .688 O.D.
15	8035145	8	8	12	12	16	16	20	NUT .. 5/16 - 18 hex.

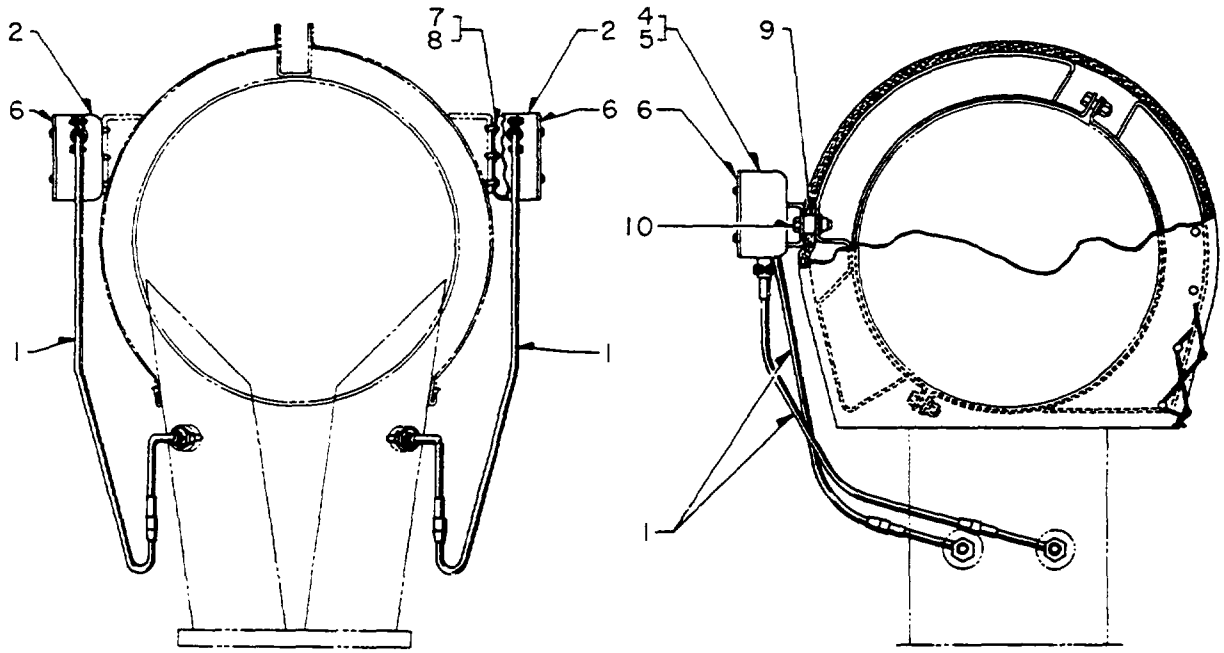
9334076A, 9334077A, 9334078A, 9334079A, 9334080A, 9334081A, 9334082A

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Thermocouple Application with Grounded Hot Junction

8-645E2,12-645E2,E5,16-645E2,E4,E5 and 20-645E5 Engines



Normally Aspirated Engines

Turbocharged Engines

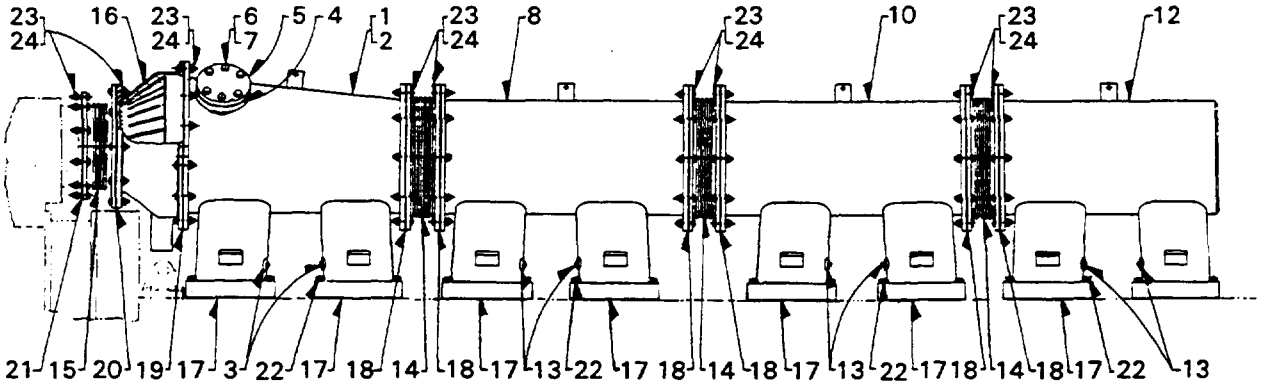
PLATE B72-12

Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	8-645E2 engines
		-	B	-	-	-	-	12-645E2 engines
		-	-	C	-	-	-	16-645E2 engines
		-	-	-	D	-	-	12-645E5 engines
		-	-	-	-	E	-	16-645E4,E5 engines
		-	-	-	-	-	F	20-645E5 engines
1	8346679	9	13	17	12	16	20	THERMOCOUPLE .. Exhaust manifold
2	8162961	4	8	8	-	-	-	BOX .. Outlet - Incl. brkt. mtg. holes - Formerly 8346680
3	8347258	4	8	8	-	-	-	BRACKET .. Outlet box mounting
4	8368314	-	-	-	1	-	-	BOX ASSEMBLY .. Includes mounting channel
4	8365322	-	-	-	-	1	-	BOX ASSEMBLY .. Includes mounting channel
4	8369144	-	-	-	-	-	1	BOX ASSEMBLY .. Includes mounting channel
5	8346680	-	-	-	4	5	6	BOX .. Outlet - Welds to channel
6	8346681	4	8	8	4	5	6	COVER .. Outlet box
7	132830	16	32	32	-	-	-	SCREW .. Box mounting - No. 10-24 x 3/8 rd. hd. slotted
8	120217	16	32	32	-	-	-	WASHER .. Lock - No. 10
9	6923644	-	-	-	4	5	6	SPACER .. Box assembly mounting
10	180126	-	-	-	4	5	6	BOLT .. Box asm. mounting - 3/8 - 16 x 1-1/2 hex. head

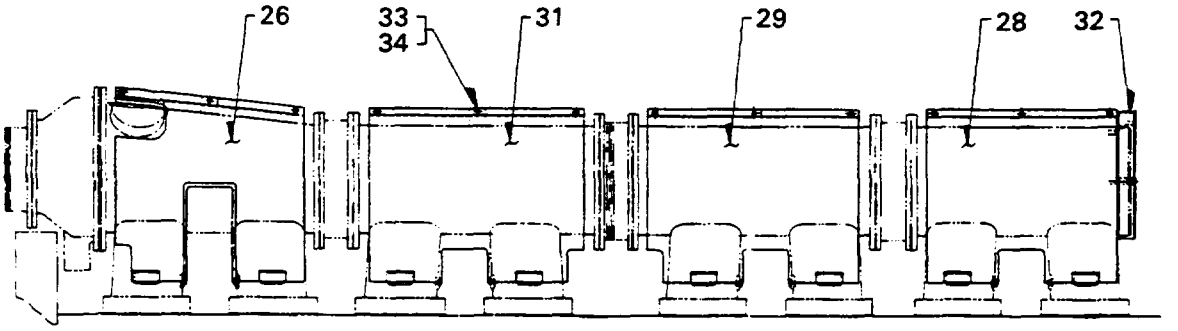
8347261A, 8368315, 8347260B, 8365156A, 8347259B, 8369145

EXHAUST CHAMBER ASSEMBLY

Exhaust Chamber And Heat Shield Application
16,20-645F4B, F7B Engines



Exhaust Manifold Application



Heat Shield Application

Camshaft Drive End — Accessory Drive End

PLATE A72-13

Ref. No.	Part Number	Qty. Req.		Description
		A	-	16-645F4B,F7B Engines
		-	B	20-645F4B,F7B Engines
1	9553652	1	1	CHAMBER ASM. .. Exhaust - Rear
2	9553506	1	1	CHAMBER .. Exhaust
3	8348620	4	4	PLUG .. Pipe - 1/2 M.P.T
4	9316672	1	1	GASKET .. Cover flange to manifold flange
5	9316673	1	1	FLANGE .. Cover
6	8287827	6	6	BOLT .. Cover flange to manifold flange - 1/2-20 x 2 hex. head
7	9338626	6	6	NUT .. 1/2-20 hex.
8	9517566	1	-	CHAMBER ASM. .. Exhaust - Intermediate rear
*9	9524165	-	2	CHAMBER ASM. .. Exhaust - Intermediate front and rear
10	9517567	1	-	CHAMBER ASM. .. Exhaust - Intermediate front
*11	9518709	-	1	CHAMBER ASM. .. Exhaust - Center
12	9517568	1	1	CHAMBER ASM. .. Exhaust - Front
13	8348620	12	16	PLUG .. Pipe - 1/2 M.P.T.
14	8408985	3	4	JOINT ASM. .. Expansion - Between chambers
15	8408987	1	1	JOINT ASM. .. Adapter to turbocharger
16	9557143	1	1	SCREEN ASM. .. Adapter
17	9337724	8	10	GASKET .. Chamber to crankcase
18	8309214	6	8	GASKET .. Expansion joint to chamber

P.L. No. B72

EXHAUST CHAMBER ASSEMBLY

Ref. No.	Part Number	Qty. Req.		Description
		A	-	16-645F4B,F7B Engines
		-	B	20-645F4B,F7B Engines
19	8358834	1	1	GASKET .. Chamber to adapter
20	8309213	1	1	GASKET .. Adapter to expansion joint
21	8309212	1	1	GASKET .. Expansion joint to turbocharger
22	9318052	48	60	BOLT ASM. .. Chamber to crankcase - Includes washer
23	8287827	92	112	BOLT .. Expansion joint and adapter mounting - 1/2-20 x 2 hex. head
24	9338626	92	112	NUT .. 1/2-20 hex. - Stainless steel
*25	----	As Req.		COMPOUND .. Thread 8278929 .. 1 Quart 8315394 .. 4 oz. Tube
26	9320186	1	1	SHIELD ASM. .. Heat - Rear right - Includes cut-out for inspection port
*27	8358827	1	1	SHIELD ASM. .. Heat - Rear left
28	8351254	2	6	SHIELD ASM. .. Heat 16-645F4B,F7B engines - Front - Right and left 20-645F4B,F7B engines - Intermediate rear, intermediate front, and front - Right and left
29	9326966	2	-	SHIELD ASM. .. Heat - Intermediate rear left and intermediate front right
*30	8360478	-	2	SHIELD ASM. .. Heat - Center - right and left
31	9326969	2	-	SHIELD ASM. .. Heat - Intermediate right rear and intermediate left front
32	8419243	1	1	SHIELD ASM. .. Heat - Accessory drive end
33	181370	12	15	BOLT .. Heat shield mounting - 3/8-24 x 1-1/4 hex. head
34	8261074	12	15	NUT .. Special - 3/8-24 hex.

Parts List No. B74

TURBOCHARGER APPLICATION

Turbocharger, Aftercooler, Air Duct And Auxiliary Generator Drive
All 645 Turbocharged Engines
PLATE B74-1

Ratchet Clutch Turbocharger Reference Chart

Standard Height Exhaust Duct

Ratchet clutch turbochargers, previously furnished on marine and some industrial engines, are no longer available. When replacement is necessary, it is advised to use the corresponding roller clutch turbocharger. The original replacement roller clutch turbochargers for marine engines, as indicated by the (ǂ) symbol below have been replaced by the fuel efficient "EB" design turbochargers. See the reference chart for roller clutch turbochargers - standard height exhaust duct for the appropriate part numbers. All ratchet clutch turbochargers returned to Electro-Motive for remanufacture will be converted to the latest roller clutch design. Unit exchange turbocharger part numbers include the change out gasket kits.

Engine Model Application	Discontinued Ratchet Clutch Turbocharger Part Number New	Discontinued Ratchet Clutch Turbocharger Part Number Unit Exch.	Discontinued Ratchet Clutch Turbocharger Gear Ratio	Replacement Roller Clutch Turbocharger Part Number New	Replacement Roller Clutch Turbocharger Part Number Unit Exch.	Replacement Roller Clutch Turbocharger Gear Ratio	Turbocharger Change Out Gasket Kit Part Number	Aftercooler Change Out Gasket Kit Part Number
L8-645E5,E7	8431867	8437419	19.7:1	ǂ9319023	ǂ9319025	19.7:1	8414907	8372925
R8-645 E5,E7	8432523	8433894	19.9:1	ǂ9319024	ǂ9319026	19.9:1	8414907	8372925
L12-645E4	8438542	8439538	18:1	9330368	8413708	18:1	8414907	8372925
L12-645E4	8432043	8439688	19.7:1	ǂǂ	ǂǂ	19.7:1	8414907	8372925
L12-645E5,E7	8412598	8413713	18:1	ǂ8369662	ǂ8379296	18:1	8414907	8372925
R12-645E5,E7	8412599	8413714	18.2:1	ǂ8369663	ǂ8379297	18.2:1	8414907	8372925
L16-645E5,E7	8411799	8413709	18:1	ǂ8363759	ǂ8379294	18:1	8380244	8365646
R16-645E5,E7	8411800	8413710	18.2:1	ǂ8363760	ǂ8379295	18.2:1	8380244	8365646
L20-645E5,E7	8412429	8413711	18:1	ǂ8374985	ǂ8380124	18:1	8380244	8365646
R20-645E5,E7	8412430	8413712	18.2:1	ǂ8374986	ǂ8380125	18.2:1	8380244	8365646

ǂǂ No corresponding roller clutch turbocharger; if replacement is required, turbocharger is to be rebuilt, but with a roller clutch.

Roller Clutch Turbocharger Reference Chart

Standard Height Exhaust Duct

Unit Exchange Turbocharger Part Numbers Include The Change Out Gasket Kits

Engine Model Application	Roller Clutch Turbocharger Part Number New	Roller Clutch Turbocharger Part Number Unit Exch.	Roller Clutch Turbocharger Gear Ratio	Replacement Roller Clutch Turbocharger Part Number New	Replacement Roller Clutch Turbocharger Part Number Unit Exch.	Replacement Roller Clutch Turbocharger Gear Ratio	Turbocharger Change-Out Gasket Kit Part Number	Aftercooler Change-Out Gasket Kit Part Number
L8-645E4	8480050		19.7:1	8408094	8413906	19.7:1	8414907	8372925
L8-645E4B	9096492	9317665	19.7:1				8414907	8372925
L8-645E4B	9503218	9529905	19.7:1	9096492	9317665	19.7:1	8414907	8372925
L8-645E5,E7	9319023	9319025	19.7:1	9096492	9317665	19.7:1	8414907	8372925
R8-645E5,E7	9319024	9319026	19.9:1	9503220	9526869	19.9:1	8414907	8372925
L8-645E7B	9503219	9526868	19.7:1	9096492	9317665	19.7:1	8414907	8372925
R8-645E7B	9503220	9526869	19.9:1				8414907	8372925
L12-645E4	8396055	8413708	18:1	8410283	8413707	18:1	8414907	8372925
L12-645E4	9330368	8413708	18:1	8410283	8413707	18:1	8414907	8372925
R12-645E4	8369663	8379297	18.2:1	9553290		16.8:1	8414907	8372925
L12-645E4B	8491383	8492060	16.8:1				8414907	8372925
R12-645E4B	9326195	9084531	16.8:1	9553290		16.8:1	8414907	8372925

(Continued on Next Page)

P.L. No. B74

TURBOCHARGER APPLICATION

Roller Clutch Turbocharger Reference Chart

Standard Height Exhaust Duct
(Continued)

Engine Model Application	Roller Clutch Turbocharger Part Number New	Roller Clutch Turbocharger Part Number Unit Exch.	Roller Clutch Turbocharger Gear Ratio	Replacement Roller Clutch Turbocharger Part Number New	Replacement Roller Clutch Turbocharger Part Number Unit Exch.	Replacement Roller Clutch Turbocharger Gear Ratio	Turbocharger Change Out Gasket Kit Part Number	Aftercooler Change Out Gasket Kit Part Number
L12-645E4B	9515699	9521991	17.9:1				8414907	8372925
L12-645E5,E7	8369662	8379296	18:1	9515699	9521991	17.9:1	8414907	8372925
R12-645E5,E7	8369663	8379297	18.2:1	9534189	9536274	17.9:1	8414907	8372925
L12-645E7B	9328969	9084530	16.8:1	9515699	9521991	17.9:1	8414907	8372925
R12-645E7B	9326195	9084531	16.8:1	9534189	9536274	17.9:1	8414907	8372925
L12-645E7B	9515699	9521991	17.9:1				8414907	8372925
R12-645E7B	9534189	9536274	17.9:1				8414907	8372925
L12-645E9,E9B	8491383	8492060	16.8:1				8414907	8372925
L16-645E4	8368223	8372778	18:1	8358500	8368596	18:1	††††8380244	8365646
L16-645E4	9330369	8372778	18:1	8358500	8368596	18:1	8380244	8365646
L16-645E4	8391504	8418818	19.7:1				8380244	8365646
L16-645E4	8491823	8492060	16.8:1				8380244	8365646
R16-645E4	8363760	8379295	18.2:1	9509654	9526871	16.8:1	8380244	8365646
R16-645E4	9084533	9087158	16.8:1	9509654	9526871	16.8:1	8380244	8365646
L16-645E4B	9508755	9526865	16.8:1	9525504	9529906	16.8:1	8380244	8365646
R16-645E4B	9509654	9526871	16.8:1				8380244	8365646
L16-645E4B	9500419	9526864	17.9:1				8380244	8365646
R16-645E4B	9526473	9529908	17.9:1				8380244	8365646
L16-645E5,E7	8363759	8379294	18:1	9500419	9526864	17.9:1	8380244	8365646
R16-645E5,E7	8363760	8379295	18.2:1	9526473	9529908	17.9:1	8380244	8365646
L16-645E5,E7	9084532	9087159	16.8:1	9500419	9526864	17.9:1	8380244	8365646
R16-645E5,E7	9084533	9087158	16.8:1	9526473	9529908	17.9:1	8380244	8365646
L16-645E7B	9525504	9529906	16.8:1				8380244	8365646
L16-645E7B	9509652	9526870	16.8:1	9500419	9526864	17.9:1	8380244	8365646
R16-645E7B	9509654	9526871	16.8:1	9526473	9529908	17.9:1	8380244	8365646
L16-645E7B	9500419	9526864	17.9:1				8380244	8365646
R16-645E7B	9526473	9529908	17.9:1				8380244	8365646
L16-645E9	8491823	8492061	16.8:1				8380244	8365646
L16-645E9B	9525504	9529906	16.8:1				8380244	8365646
L16-645E10B	9525504	9529906	16.8:1				8380244	8365646
L20-645E4	8366072	8377586	18:1				††††8380244	8365646
R20-645E4	8374986	8380125	18.2:1	9509660	9526873	16.8:1	8380244	8365646
R20-645E4	9085863	9093612	16.8:1	9509660	9526873	16.8:1	8380244	8365646
L20-645E4B	9509656	9524439	16.8:1				††††8380244	8365646
L20-645E4B	9525506	9529907	16.8:1				8380244	8365646
R20-645E4B	9509660	9526873	16.8:1				8380244	8365646
L20-645E4B	9500420	9526867	17.9:1				8380244	8365646
R20-645E4B	9526472	9529909	17.9:1				8380244	8365646
L20-645E5,E7	8374985	8380124	18:1	†††9553291		17.9:1	8380244	8365646
R20-645E5,E7	8374986	8380125	18.2:1	†††9553292		17.9:1	8380244	8365646
L20-645E5,E7	9085862	9093611	16.8:1	†††9553291		17.9:1	8380244	8365646
R20-645E5,E7	9085863	9093612	16.8:1	†††9553292		17.9:1	8380244	8365646
L20-645E5,E7	8491825	8492062	16.8:1	†††9553291		17.9:1	8380244	8365646
L20-645E7B	9509658	9526872	16.8:1	†††9553291		17.9:1	8380244	8365646
R20-645E7B	9509660	9526873	16.8:1	†††9553292		17.9:1	8380244	8365646
L20-645E9	8491825	8492062	16.8:1				8380244	8365646
L20-645E9B	9525506	9529907	16.8:1				8380244	8365646
L20-645E10B	9509656	9524439	16.8:1				8380244	8365646

†††Replacement turbocharger has reduced height exhaust duct and requires application of adapter spacer 9546891. See Parts List B82.

††††For models MP36, MP45 and 999-20, one roll of 8133199 tape is required for application to turbocharger hatch.

TURBOCHARGER APPLICATION

Roller Clutch Turbocharger Reference Chart

Reduced Height Exhaust Duct

Engine Model Application	Roller Clutch Turbocharger Part Number New	Roller Clutch Turbocharger Part Number Unit Exch.	Roller Clutch Turbocharger Gear Ratio	Replacement Roller Clutch Turbocharger Part Number New	Replacement Roller Clutch Turbocharger Part Number Unit Exch.	Replacement Roller Clutch Turbocharger Gear Ratio	Turbocharger Change Out Gasket Kit Part Number	Aftercooler Change Out Gasket Kit Part Number
L8-645E4B	9554353		19.7:1				8414907	8372925
L8-645E7,E7B	9554353		19.7:1				8414907	8372925
R8-645E7,E7B	9554354		19.9:1				8414907	8372925
L8-645E7C	9546861	9551898	19.7:1				8414907	8372925
R8-645E7C	9546863		19.9:1				8414907	8372925
L12-645E4B	9531217		16.8:1				8414907	8372925
L12-645E7,E7B	9554345		17.9:1				8414907	8372925
R12-645E7,E7B	9554344		16.8:1	9547276	9557028	17.9:1	8414907	8372925
R12-645E7B	9547276	9557028	17.9:1				8414907	8372925
L12-645E7C	9554355		16.8:1	9547273	9557027	17.9:1	8414907	8372925
R12-645E7C	9547272		16.8:1	9547276	9557028	17.9:1	8414907	8372925
L12-645E7C	9547273	9557027	17.9:1				8414907	8372925
R12-645E7C	9547276	9557028	17.9:1				8414907	8372925
L12-645E9B	9531217		16.8:1				8414907	8372925
L16-645E4B	9512453	9524134	16.8:1				8380244	8365646
R16-645E4B	9554351		16.8:1				8380244	8365646
L16-645E7B	9554346		17.9:1				8380244	8365646
R16-645E7B	9554350		17.9:1				8380244	8365646
L16-645E7C	9546632	9552711	16.8:1	9528223	9543498	17.9:1	8380244	8365646
R16-645E7C	9546634	9553341	16.8:1	9546633	9553209	17.9:1	8380244	8365646
L16-645E7C	9528223	9543498	17.9:1				8380244	8365646
R16-645E7C	9546633	9553209	17.9:1				8380244	8365646
L16-645E9B	9512453	9524134	16.8:1				8380244	8365646
L16-645E10B	9512453	9524134	16.8:1				8380244	8365646
L20-645E4B	9554348		16.8:1				††††8380244	8365646
L20-645E4B	9554349		16.8:1				8380244	8365646
R20-645E4B	9554352		16.8:1				8380244	8365646
L20-645E7B	9553291		17.9:1				8380244	8365646
R20-645E7B	9554352		16.8:1	9553292		17.9:1	8380244	8365646
R20-645E7B	9553292		17.9:1				8380244	8365646
L20-645E7C	9546525	9553197	16.8:1	9546635	9553210	17.9:1	8380244	8365646
R20-645E7C	9546719	9553342	16.8:1	9546528	9553208	17.9:1	8380244	8365646
L20-645E7C	9546635	9553210	17.9:1				8380244	8365646
R20-645E7C	9546528	9553208	17.9:1				8380244	8365646
L20-645E9B	9554349		16.8:1				8380244	8365646
L20-645E10B	9554348		16.8:1				8380244	8365646

††††For Model MP45B, one roll of 8133199 tape is required for application to turbocharger hatch.

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	All 8 and 12-645 Turbocharged Engines
		-	B	-	All 16 and 20-645 Turbocharged Engines Except 20-645E10B
		-	-	C	20-645E10B Turbocharged Engine
1	- - - -	1	1	1	TURBOCHARGER ASM. .. Engine - See above tables
2	8451659	1	1	1	GASKET .. Turbocharger mounting - Replaces 8185583
3	181429	22	22	22	BOLT .. Turbocharger mounting - 1/2 - 20 x 1-1/4 hex. head
4	181431	4	4	4	BOLT .. Turbocharger to camshaft housing - 1/2 - 20 x 1-1/2 hex. head

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TURBOCHARGER APPLICATION

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	All 8 and 12-645 Turbocharged Engines
		-	B	-	All 16 and 20-645 Turbocharged Engines Except 20-645E10B
		-	-	C	20-645E10B Turbocharged Engines
5	8260114	2	2	2	WASHER .. Plain - 1/2
6	186342	4	4	4	BOLT .. Turbocharger to camshaft housing - 1/2 - 20 x 6 hex. head
7	6101229	30	30	30	WASHER .. Flat - 1/2
8	8261288	6	6	6	BOLT .. Turbocharger to camshaft housing - 3/4 - 16 x 11-5/16 hex. head
9	8140912	6	6	6	WASHER .. Hardened - 3/4
10	8354101	6	6	6	DAMPER
11	8116738	As Req.			WIRE .. Lock - 3/64 dia. - 500 ft. length
ϕ12	8460738	1	1	1	DRIVE ASM. .. Auxiliary generator - See Parts List B62
*ϕ+12	8271725	1	1	1	PLATE .. Cover - Applied when auxiliary drive is not required
13	8261200	1	1	1	GASKET .. Auxiliary drive or cover plate mounting
*14	8348617	1	1	1	PLUG .. Pipe - 1/8 M.P.T. square socket - Headless - Applied to cover plate
ϕ15	186339	2	2	-	BOLT .. Auxiliary drive mounting - 1/2 - 20 x 5-1/4 hex. head
*ϕ15	186338	2	2	2	BOLT .. Cover plate mounting - 1/2 - 20 x 5 hex head
16	6101229	2	2	2	WASHER .. Flat - 1/2
ϕ17	179845	9	9	-	BOLT .. Auxiliary drive mounting - 3/8 - 16 x 1-3/4 hex. head
*ϕ17	179841	9	9	9	BOLT .. Cover plate mounting - 3/8 - 16 x 1-1/4 hex. head
18	6101225	9	9	9	WASHER .. Flat - 3/8
19	8288974	2	-	-	AFTERCOOLER ASM. .. Turbocharger - UTEX No. 8296301
†19	8409891	-	2	-	AFTERCOOLER ASM. .. Turbocharger - UTEX No. 8398024
19	8435459	-	-	2	AFTERCOOLER ASM. .. Turbocharger
20	8288847	2	-	-	HEADER .. Aftercooler core - Outer
20	8357355	-	2	2	HEADER .. Aftercooler core - Outer
21	8282174	2	-	-	COVER ASM. .. Aftercooler core - Inner
21	8357354	-	2	-	COVER .. Aftercooler core - Inner
21	8439498	-	-	2	COVER .. Aftercooler core - Inner
22	8282179	4	-	-	PIN .. Dowel - Locating
23	8284598	2	-	-	CORE ASM. .. Aftercooler (Young) - Replaces 8529762
ϕ23	8352305	-	2	-	CORE ASM. .. Aftercooler (Young) - See Ref. No. 27 for optional core
ϕ23	8435460	-	-	2	CORE ASM. .. Aftercooler (Young) - See Ref. No. 27 for optional core
*24	8296701	8	-	-	ROD .. Air baffle
*24	8405520	-	8	8	ROD .. Air baffle
*25	8405519	-	8	8	PLUG .. Expansion end
*26	9428566	16	8	8	SCREW .. Cap - 5/16 - 24 x 7/8 hex. socket - Includes nylon insert
ϕ27	8534519	-	2	-	CORE ASM. .. Aftercooler (Harrison) - See Ref. No. 23 for optional core
ϕ27	8534979	-	-	2	CORE ASM. .. Aftercooler (Harrison) - See Ref. No. 23 for optional core
*28	8405600	-	8	8	ROD .. Air baffle
*29	8405599	-	8	8	PLUG .. Expansion end
*30	9428566	-	8	8	SCREW .. Cap - 5/16 - 24 x 7/8 hex. socket - Includes nylon insert
31	9087078	2	-	-	GASKET .. Outer header to core - Replaces 8357299
31	8403485	-	2	2	GASKET .. Outer header to core - Replaces 8357357
32	8499569	2	-	-	GASKET .. Inner cover to core - Replaces 8261245
32	9087079	-	2	2	GASKET .. Inner cover to core - Replaces 8357356
33	454914	104	-	-	BOLT .. Core mounting - 3/8 - 24 x 1-1/2 hex. head - Replaces 9422262
33	427563	-	56	56	BOLT .. Core mounting - 3/8 - 24 x 1-1/4 hex. head
34	193930	12	-	-	BOLT .. Header to core - 3/8 - 24 x 3-1/2 hex. head - Replaces 9422263
34	9423205	-	16	16	BOLT .. Header to core - 3/8 - 24 x 3-1/4 hex. head
35	103341	116	-	-	WASHER .. Plain - 3/8
35	6101225	-	72	72	WASHER .. Flat (Washer is Cadmium plated) - 3/8

† All current production 16 and 20 cylinder engine turbocharger aftercoolers have 1 inch support dowels and mating tapping pads 8399695. Previously, aftercoolers had 5/8 inch support dowels and tapping pads 8282175. It is recommended, if aftercoolers having these 5/8 inch support dowels are removed for cleaning, that these 5/8 dowels be replaced with stepdown support dowel 5/8 inch to 1 inch and that tapping pad 8282175 be replaced with 8399695. Inner cover 8357354 has been redesigned for 1 inch dowels 8399786. When ordering new or unit exchange aftercoolers, tapping pad 8399695 is included.

TURBOCHARGER APPLICATION

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	All 8 and 12-645 Turbocharged
		-	B	-	All 16 and 20-645 Turbocharged Engines Except 20-645E10B
		-	-	C	20-645E10B Turbocharged Engines
-	- - - -	2	2	2	AFTERCOOLER ASM. .. Turbocharger (continued)
∤36	8399786	-	4	4	PIN .. Dowel - .9970 x 1-7/16 in. long - One end drilled - 3/8 - 24 - formerly 8282179 - See Note on Page 4
∤36	8399694	-	4	-	PIN .. Dowel - Stepdown - 5/8 to 1 inch - One end drilled - applied only to inner covers with 5/8 straight support dowels - See Note on Page 4
37	186485	-	8	8	BOLT .. Header to cover - 3/8 - 24 x 1-3/4 hex. head
38	6101225	-	8	8	WASHER .. Flat - 3/8
39	103026	-	8	8	NUT .. 3/8 - 24 hex. - For shipping purposes only
∤40	8399695	-	4	-	PAD .. Tapping - 1 inch dowel holes - See Note on Page 4
41	8357298	2	-	-	GASKET .. Aftercooler mounting
41	8403484	-	2	2	GASKET .. Aftercooler mounting
42	181364	32	-	-	BOLT .. Aftercooler mounting - 3/8 - 24 x 1 hex. head
42	186485	-	52	52	BOLT .. Aftercooler mounting - 3/8 - 24 x 1-3/4 hex. head
43	6101225	32	52	52	WASHER .. Plain - 3/8
44	8282175	2	-	-	PAD .. Tapping - 5/8 inch dowel holes
45	8399695	-	2	2	PAD .. Tapping - 1 inch dowel holes
46	8282176	2	-	-	GASKET .. Pad mounting
47	8282177	4	-	-	BOLT .. Pad mounting - 5/8 - 18 x 1-3/4 hex. head drilled
48	8400470	-	4	4	BOLT .. Pad mounting - 5/8 - 18 x 1-5/8 hex. head drilled
49	8282178	4	4	4	WASHER .. Special - 5/8
50	8269985	1	-	-	AIR DUCT .. Heat exchanger } Right Bank
51	8460309	-	1	1	AIR DUCT .. Heat exchanger } Right Bank
*52	8460240	-	6	6	NUT .. Spline - 7/16 - 14 } Right Bank
53	9530105	1	-	-	AIR DUCT .. Heat exchanger - Replaces 8343252
ϕ54	8460334	-	1	1	AIR DUCT .. Heat exchanger - 16,20-645E4,E5,E7,E9 engines and 16,20-645E4B,E7B,E9B,E10B engines prior to May, 1980
*55	8460240	-	7	7	NUT .. Spline - 7/16 - 14 } Left Bank
ϕ56	9327567	-	1	1	AIR DUCT .. Heat exchanger - 16,20-645E4B,E7B, E9B,E10B engines after May, 1980 and 16,20-645E7C engines
*57	8460240	-	7	7	NUT .. Spline - 7/16 - 14 } Left Bank
58	8460205	2	2	2	GASKET .. Air duct to compressor scroll
59	8416803	2	-	-	GASKET .. Air duct to air box
60	8416804	-	2	2	GASKET .. Air duct to air box
61	9418045	8	13	13	BOLT .. Air duct to scroll - 7/16 - 14 x 1-7/8 hex. head
*62	427560	4	-	-	BOLT .. Air duct to scroll - 7/16 - 14 x 1-1/2 hex. head
*63	446681	4	-	-	BOLT .. Air duct to scroll - 7/16 - 14 x 2-1/4 hex. head
64	193221	-	3	3	BOLT .. Air duct to scroll - 7/16 - 14 x 1-1/4 hex. head
*65	9416515	12	-	-	NUT .. Lock - 7/16 - 14 hex.
66	8460239	28	16	16	WASHER .. Plain - .479 I.D. x 3/4 O.D. x 1/8 in. thick - Hardened
67	181429	23	21	21	BOLT .. Air duct to air box - 1/2 - 20 x 1-1/4 hex. head
68	6101229	23	21	21	WASHER .. Flat - 1/2
69	8261198	1	1	1	COVER .. Stubshaft
70	8261282	1	1	1	GASKET .. Cover mounting
71	8294874	1	1	1	SEAL .. Stubshaft
72	179841	6	6	6	BOLT .. Cover mounting - 3/8 - 16 x 1-1/4 hex. head
73	6101225	6	6	6	WASHER .. Flat - 3/8
74	8289350	1	1	1	TUBE ASM. .. Drain
75	8098595	As Req.			TUBING .. 1/2 O.D. x .035 wall - Copper brazed steel - Sold by the foot – 20 ft. minimum
76	120141	1	1	1	NUT .. 1/2 in. tube
77	8027428	1	1	1	CONNECTOR .. 1/2 M.P.T. x 1/2 tube
78	8289576	1	1	1	CLIP .. Tube support
THERMOCOUPLE .. Turbocharger					
*79	8462981	1	1	-	THERMOCOUPLE .. Turbocharger - 645E7,E7B,E7C marine engines
*80	9317298	A.R.		-	WIRE .. Thermocouple - Sold per foot - Approximately 50 ft. required

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TURBOCHARGER APPLICATION

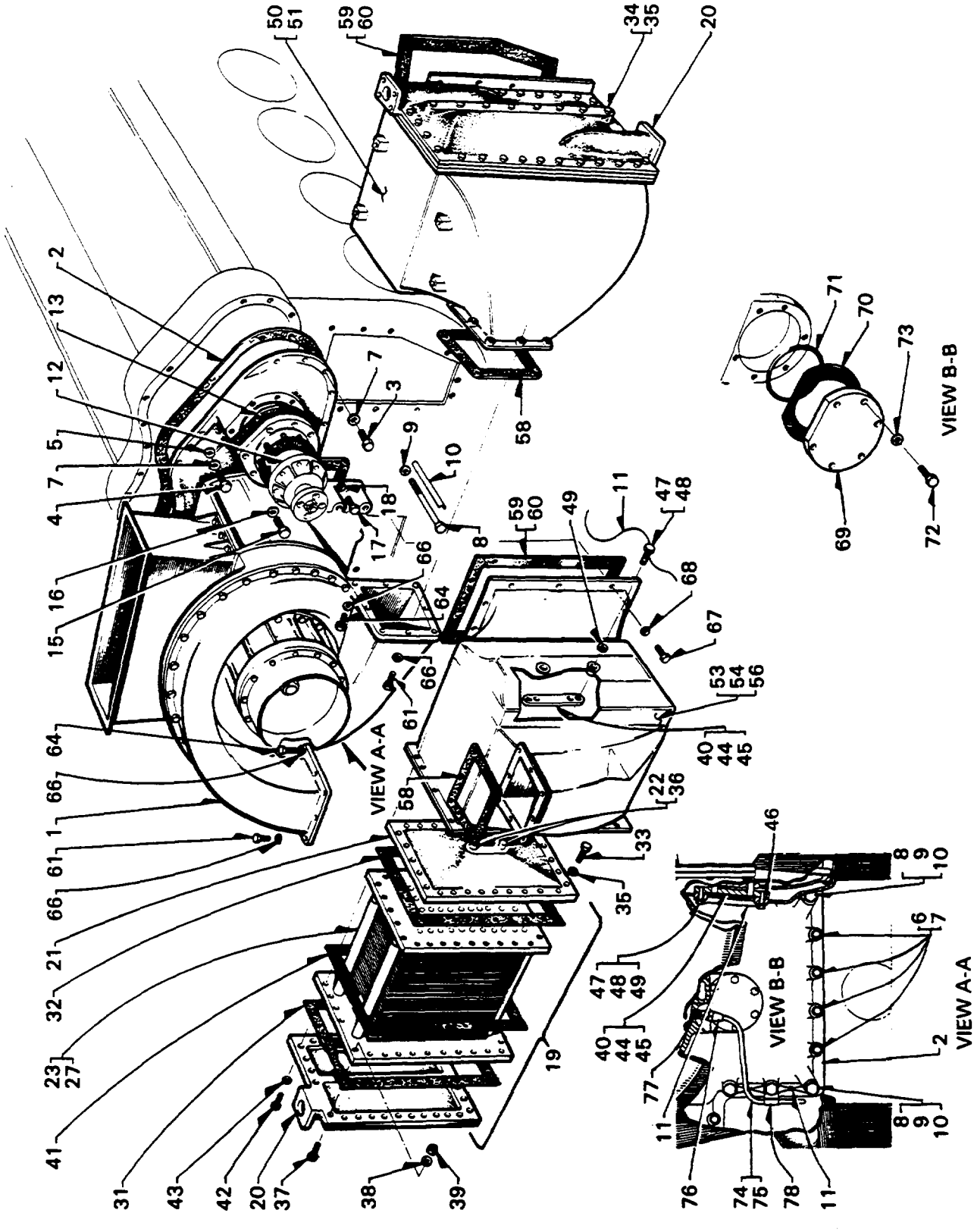

PLATE B74-1

TURBOCHARGER APPLICATION

Marine Turbocharger Conversion Kits
(Not Illustrated)

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645 engine turbochargers
		-	B	-	12,16,20-645 engine turbochargers with 16.8:1 gear train
		-	-	C	12,16,20-645 engine turbochargers with 17.9:1 gear train

Refer to M.I. 276, Revision B for details on turbocharger rotation conversion.

Turbocharger Rotation Conversion Kits - Left to Right

1	9548053	1	-	-	KIT .. Turbocharger rotation conversion - Left hand (19.7:1) to right hand (19.9:1)
2	9548050	-	1	-	KIT .. Turbocharger rotation conversion - Left hand to right hand - 16.8:1 high capacity gear train
3	9557428	-	-	1	KIT .. Turbocharger rotation conversion - Left hand to right hand - 17.9:1 high capacity gear train
4	8387223	3	3	7	WASHER .. 1/2 in. hardened
5	8364009	7	7	8	BOLT .. Idler shaft mounting - 1/2 - 13 x 3-3/4 hex. head - Drilled
6	8363958	1	1	1	PLATE .. Retainer - Drive idler gear - Formerly 8463958
7	8425304	1	-	-	GEAR .. Carrier drive
8	8411280	1	1	1	STUBSHAFT .. Idler
9	8364017	1	1	1	GEAR AND BEARING ASSEMBLY .. Carrier idler
10	8261102	4	4	4	WASHER .. Thrust
11	8364016	1	1	1	GEAR AND BEARING ASSEMBLY .. Drive idler
12	8425303	1	1	-	PLATE .. Retainer - Carrier idler gear
13	9538682	-	-	1	PLATE .. Retainer - Carrier idler gear
14	8467289	1	1	-	STUBSHAFT .. Idler - Carrier gear
15	9534379	-	-	1	STUBSHAFT .. Idler - Carrier gear
16	8460229	-	-	1	BOLT .. 1/2 - 13 x 1-1/4 with 1/2 socket head

Turbocharger Rotation Conversion Kits - Right to Left

17	9548054	1	-	-	KIT .. Turbocharger rotation conversion - Right hand (19.9:1) to left hand (19.7:1)
18	9548051	-	1	-	KIT .. Turbocharger rotation conversion - Right hand to left hand - 16.8:1 high capacity gear train
19	9557427	-	-	1	KIT .. Turbocharger rotation conversion - Right hand to left hand - 17.9:1 high capacity gear train
20	100803	4	-	-	SCREW .. Thrust washer - No. 6 - 32 x 1/2 flat head
21	8358567	4	3	2	BOLT .. Idler shaft mounting - 1/2 - 13 x 3-1/2 hex. head - Drilled
22	8358580	-	1	2	BOLT .. Idler shaft mounting - 1/2 - 13 x 4-3/4 hex. head - Drilled
23	9319944	-	-	1	BOLT .. Idler shaft mounting - 1/2 - 13 x 3-1/2 - 12 pt. drilled
24	8358573	1	1	1	RING .. Retaining - Idler gear
25	8358574	1	-	-	PLATE .. Retainer - Idler gear
26	8493678	-	1	-	PLATE .. Retainer - Idler gear
27	9319942	-	-	1	PLATE .. Retainer - Idler gear
28	8358571	1	-	-	SPACER .. Bearing - Front
29	8391273	1	-	-	GEAR .. Carrier drive
30	8358579	1	-	-	WASHER .. Thrust
31	8358582	1	1	1	SPACER .. Bearing
32	8314057	4	4	4	BOLT .. Cover plate - 1/2 - 13 x 1-1/4 hex. head - Drilled
33	8363847	1	1	1	COVER .. Blind - Idler gear
34	9550156	1	-	-	GEAR ASSEMBLY .. Idler
35	9550157	-	1	-	GEAR ASSEMBLY .. Idler
36	9557579	-	-	1	GEAR ASSEMBLY .. Idler

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TURBOCHARGER APPLICATION

Ma[illegible]e Turbochager Conversion Kits

Ref. No.	Part Number	Qty. Req.	Description
Gear Ration Conversion Kits - 16.8:1 to 17.9:1			
1	9552607	1	KIT .. Gear ratio conversion - 12,16,20-645 right hand rotating engine turbocharger with 16.8:1 gear train
2	8358575	1	GEAR .. Carrier drive
3	9538682	1	PLATE .. Retainer
4	9534379	1	STUBSHAFT ASSEMBLY .. Idler gear
5	9553456	1	TAG .. Identification - Turbocharger conversion
6	8364009	1	BOLT .. 1/2 - 13 x 3-3/4 hex. head - Drilled
7	9552608	1	KIT .. Gear ratio conversion - 12,16,20-645 left hand rotating engine turbocharger with 16.8:1 gear train
8	8358575	1	GEAR .. Carrier drive
9	9319942	1	PLATE .. Retainer
10	9319941	1	STUBSHAFT ASSEMBLY .. Idler gear
11	9553456	1	TAG .. Identification - Turbocharger conversion

Parts List No. B78

ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Air Intake Adapter and Mounting
8-645E2,E6 Marine Engines

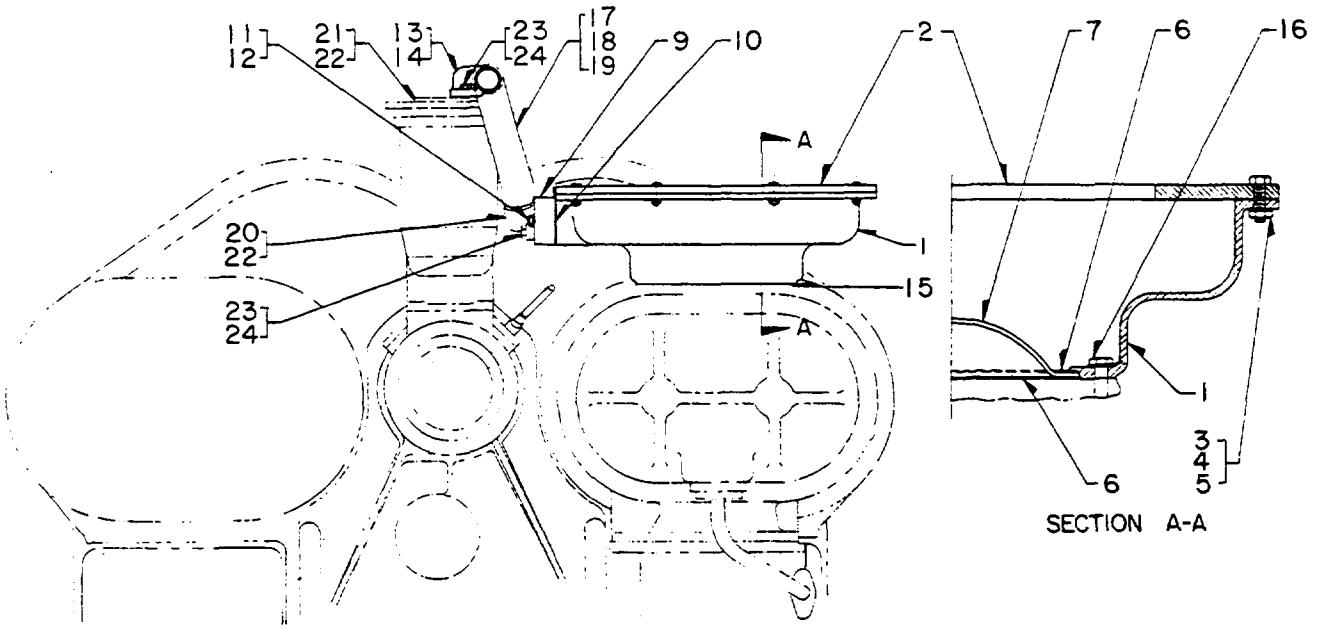

PLATE A78-1

Ref. No.	Part Number	Qty. Req.	Description
1	3266200	1	ADAPTER .. Blower housing - Replaces 8070169
2	3317178	1	PLATE .. Adapter air intake
3	181374	8	BOLT .. 3/8 - 24 x 1-1/2 hex. head
4	103321	8	WASHER .. Lock - 3/8
5	103026	8	NUT .. 3/8 - 24 hex.
6	8059565	2	SPACER .. Adapter
7	8055154	1	SCREEN .. Adapter
8	6101229	10	WASHER .. Plain - 1/2
9	8218452	1	ADAPTER .. Flange
10	8070199	1	GASKET .. Adapter
11	179848	2	BOLT .. 3/8 - 16 x 2-1/4 hex. head
12	103321	2	WASHER .. Lock - 3/8
ϕ13	8165250	1	FLANGE ASM. .. Adapter to oil separator
ϕ14	8243790	1	ELBOW .. Flanged - Adapter to oil separator
15	8024287	1	GASKET .. Filter adapter to blower
16	179885	10	BOLT .. 1/2 - 13 x 1-1/2 hex. head
17	8040167	1	HOSE .. Oil separator to filter adapter - 36 in. long - Use 18 in. long - Replaces 8131113
18	8131112	1	SPRING .. Hose
19	8374760	2	CLAMP .. Hose - Replaces 8132042
20	8084420	1	ELBOW .. Flanged
21	8048967	1	FLANGE .. Blind
22	8084407	3	GASKET .. Elbow to adapter
23	181433	6	BOLT .. Flanged elbow mounting - 1/2 - 20 x 1-3/4 hex. head
24	6101229	6	WASHER .. Plain - 1/2
*25	9537542	1	CONNECTOR .. 1/8 - 27 F.P.T.
*26	9331510	1	INDICATOR .. Pressure - Mechanical

P6328, P8682, P8683, M1237
8231111A, 9544675

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ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Air Intake Adapter and Mounting
12-645E1 Industrial Engine

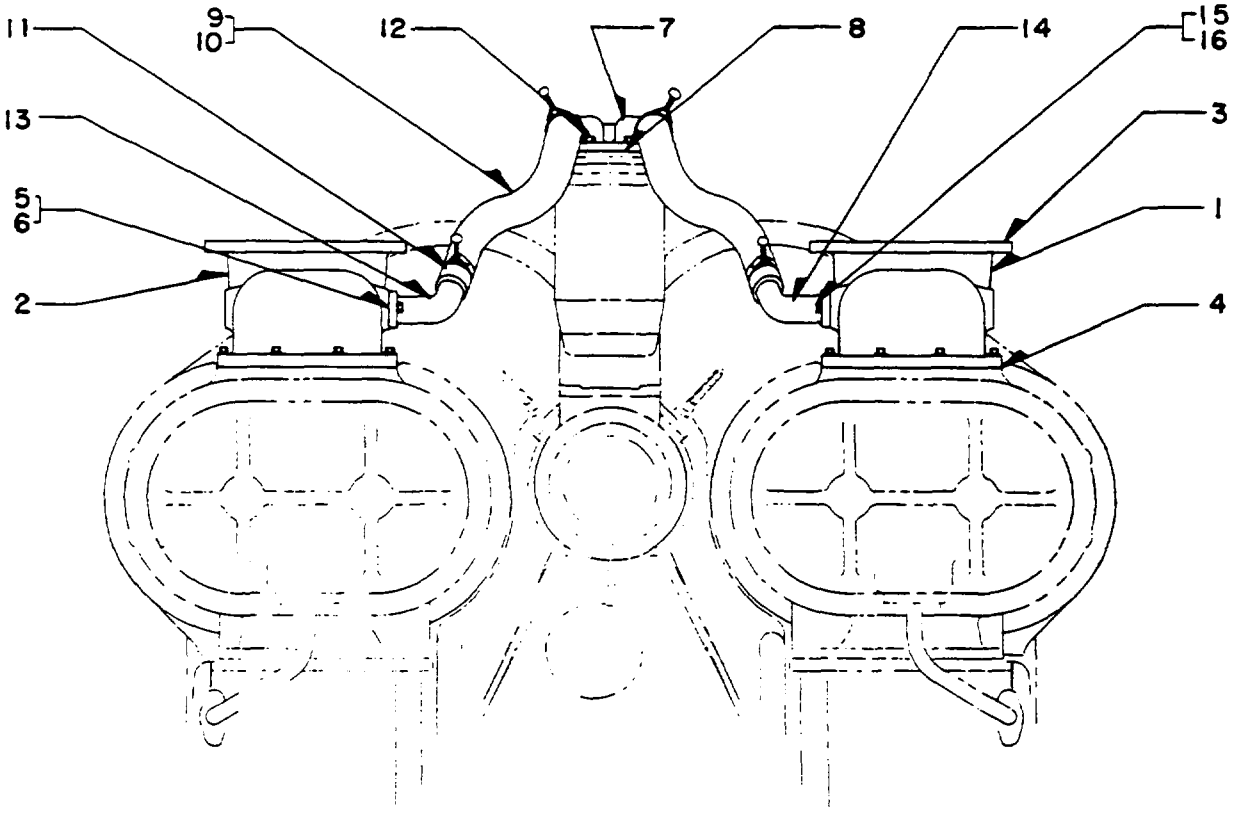

PLATE A78-2

Ref. No.	Part Number	Qty. Req.	Description
1	8173148	1	ADAPTER ASM. .. Blower housing - Right side
2	8173149	1	ADAPTER ASM. .. Blower housing - Left side
3	8172101	2	GASKET .. Frame mounting
4	8024287	2	GASKET .. Adapter mounting
5	8084407	6	GASKET .. Flange mounting
6	8203718	2	PLATE .. Orifice
7	8155201	1	ELBOW .. Oil separator double tube outlet
8	8155202	1	GASKET .. Double tube outlet elbow
9	8040167	2	HOSE .. Rubber - 1-1/2 I.D. x 2-1/16 O.D. x 36 in. long - Use 18 in. long - Replaces 8131113
10	8131112	2	SPRING .. Hose
11	8374760	4	CLAMP .. Hose - Replaces 8132042
12	181433	4	BOLT .. 1/2 - 20 x 1-3/4 hex. head
13	8164482	1	ELBOW .. Flanged
14	8164483	1	ELBOW .. Flanged
15	181429	4	BOLT .. 1/2 - 20 x 1-1/4 hex. head
16	6101229	8	WASHER .. Plain - 1/2

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ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Siamese Air Intake Adapter and Mounting
12-645E1,16-645E1,E8 Industrial Engines
12-645E2,E6 and 16-645E6 Marine Engines

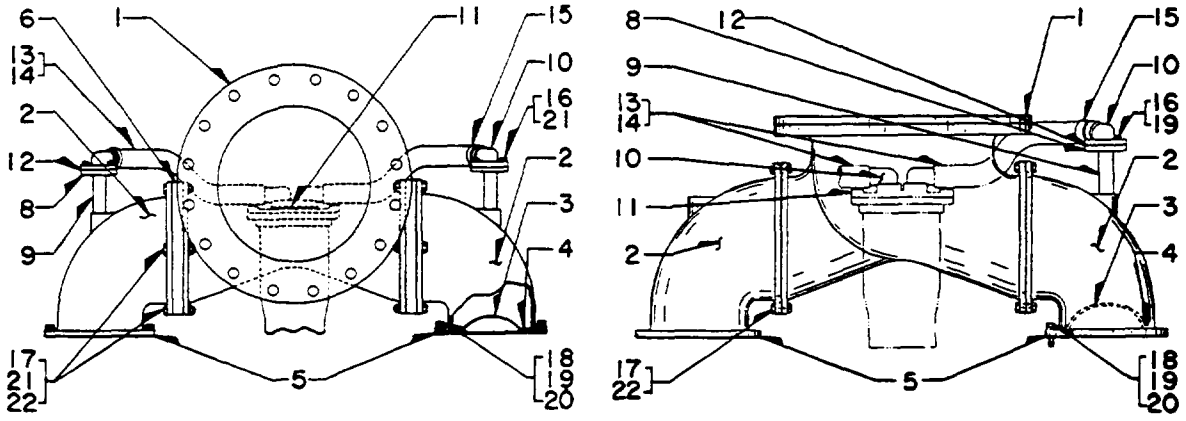


PLATE A78-3

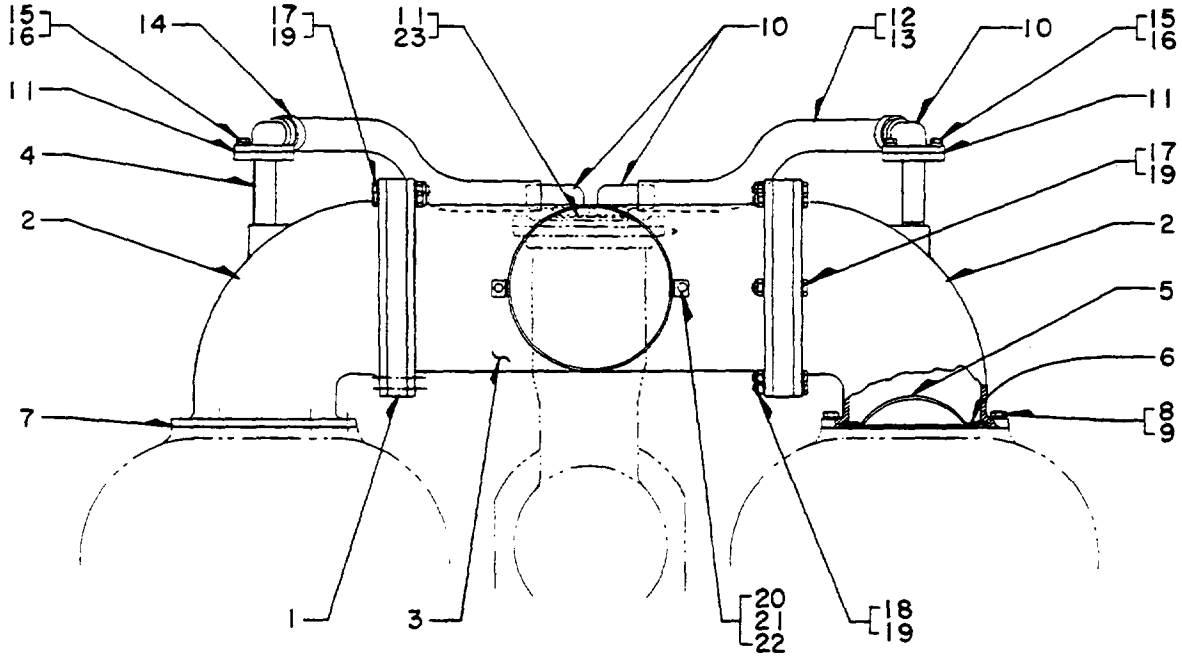
Ref. No.	Part Number	Qty. Req.		Description
		A	-	12-645E1 industrial engine and 12-645E2,E6 marine engines
		-	B	16-645E1,E8 industrial and 16-645E6 marine engines
1	3328846	1	1	ADAPTER .. Air intake
2	3328847	2	2	ELBOW .. Air intake blower housing
3	8055154	2	2	SCREEN .. Adapter - 20-5/16 x 8-11/16 - 2 in. depth
4	8059565	4	4	SPACER .. Screen - 20-5/16 x 8-11/16 x 3/8 x 11 ga.
5	8024287	2	2	GASKET .. Adapter mounting
6	3328845	2	-	SPACER .. Elbow
*7	8233284	2	2	FLANGE ASM. .. Pipe
8	8144987	2	2	FLANGE .. Pipe
9	8153145	2	2	NIPPLE .. Pipe - 1 x 4-1/2 in. long - Threaded on one end only
10	8084420	4	4	ELBOW .. Flanged
11	3326965	2	2	PLATE .. Orifice - 3/8 I.D.
12	8084407	6	6	GASKET .. Elbow and flange mounting
13	8040167	2	2	HOSE .. Rubber - 1-1/2 I.D. x 2-1/16 O.D. x 36 in. long - Use 18 in. long - Replaces 8131113
14	8131112	2	2	SPRING .. Hose
15	8374760	4	4	CLAMP .. Hose - Replaces 8132042
16	181429	4	8	BOLT .. Flange mounting - 1/2 - 20 x 1-1/4 hex. head
17	181443	16	-	BOLT .. 1/2 - 20 x 3-1/4 hex. head
17	181433	-	16	BOLT .. 1/2 - 20 x 1-3/4 hex. head
18	179887	20	20	BOLT .. 1/2 - 13 x 1-3/4 hex. head
19	103323	20	28	WASHER .. Lock - 1/2
20	103343	20	20	WASHER .. Plain - 1/2
21	6101229	20	-	WASHER .. Plain - 1/2
22	8032719	16	16	NUT .. Lock - 1/2 - 20 hex.

P7157, 8381305B, 8326028D,
P9609, P9930, P9931

P.L. No. B78

ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Siamese Air Intake Adapter and Mounting
12,16-645E6 Marine Engines



END VIEW

PLATE A78-4

Ref. No.	Part Number	Qty. Req.	Description
1	3328845	2	SPACER .. Air intake elbows to adapter - Applicable to 12-645E6 engines only
2	3328847	2	ELBOW .. Air intake - Blower to adapter
3	9097122	1	ADAPTER .. Air intake
4	8233284	2	FLANGE ASM. .. Elbow to hose
5	8055154	4	SCREEN .. Elbow
6	8059565	4	SPACER .. Screen to elbow
7	8024287	2	GASKET .. Blower to elbow
8	179885	20	BOLT .. 1/2 - 13 x 1-1/2 hex. head
9	6101229	20	WASHER .. Plain - 1/2
10	8084420	4	ELBOW .. Flanged
11	8084407	6	GASKET .. Elbow to lube oil separator and elbow to flange
12	8040167	2	HOSE .. Oil separator to flanged elbow - 36 in. long - Use 18 in. long - Replaces 8131113
13	8131112	2	SPRING .. Hose
14	8374760	4	CLAMP .. Hose - Replaces 8132042
15	181429	4	BOLT .. 1/2 - 20 x 1-1/4 hex. head
16	6101229	4	WASHER .. Plain - 1/2
17	179894	16	BOLT .. 1/2 - 13 x 3-1/4 hex. head - Applicable to 12-645E6 engines
17	179889	16	BOLT .. 1/2 - 13 x 2 hex. head - Applicable to 16-645E6 engines
18	8032745	16	NUT .. 1/2 - 13 hex. - Self locking
19	6101229	32	WASHER .. Plain - 1/2
20	9097118	2	RETAINER .. Duct
21	179833	2	BOLT .. 3/8 - 16 x 1/2 hex. head
22	6101225	2	WASHER .. Plain - 3/8
23	3326965	2	PLATE .. Orifice
24	103877	1	PLUG .. Pipe - 1/8 square head

P7363, P7423, P7484, P7485, P9148,
9097020A, 9097021A

ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Engine Silencer and Duct Assembly
12,16,20-645E4, 16-645E4B L.H. and R.H. Rotating and 16,20-645E9B Industrial Engines
8-645E5,E7B; 12,16,20-645E5,E7 and E7B Marine Engines
PLATE B78-5

Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	12-645E4 industrial and 12-645E5,E7,E7B marine engines
		-	B	-	-	-	-	16,20-645E4 industrial and 16,20-645E5,E7,E7B marine engines
		-	-	C	-	-	-	16,20-645E4 R.H. and L.H. rot. and 16,20-645E9B industrial engines
		-	-	-	D	-	-	20-645E7 marine engines
		-	-	-	-	E	-	8-645E5,E7B marine engines
		-	-	-	-	-	F	12-645E4 R.H. rotation industrial engines
1	8343635	1	-	-	-	-	-	SILENCER ASM. .. Engine - Formerly 8333635, 8343625
1	8365341	-	1	-	-	-	-	SILENCER ASM. .. Engine
*1	8393811	-	-	1	-	-	-	SILENCER ASM. .. Engine
*1	8419524	-	-	-	1	-	-	SILENCER ASM. .. Engine
1	8424216	-	-	-	-	1	-	SILENCER ASM. .. Engine
*1	8454059	-	-	-	-	-	1	SILENCER ASM. .. Engine
2	8344208	1	1	-	-	1	-	BOX ASM. .. Retainer
*2	8393964	-	-	1	-	-	1	BOX ASM. .. Retainer
*2	8419494	-	-	-	1	-	-	FRAME ASM. .. Air intake
3	8343666	1	1	-	-	1	-	GASKET .. Retainer box to duct
*3	8393971	-	-	1	-	-	1	GASKET .. Retainer box to duct
*3	8419288	-	-	-	1	-	-	GASKET .. Retainer box to duct
4	8343665	1	-	-	-	-	-	DUCT .. Air
4	8365340	-	1	-	-	-	-	DUCT .. Air
*4	8393972	-	-	1	-	-	-	DUCT .. Air
*4	8419290	-	-	-	1	-	-	DUCT .. Air
4	8424199	-	-	-	-	1	-	DUCT .. Air
*4	8454058	-	-	-	-	-	1	DUCT .. Air
*5	8393969	-	-	2	-	-	2	COVER .. Silencer
*6	8393970	-	-	2	-	-	2	GASKET .. Cover
7	8356175	12	-	-	-	12	-	PAD .. Tapping
7	8368211	-	12	-	-	-	12	PAD .. Tapping
8	179835	16	16	60	-	16	-	BOLT .. Air duct to silencer box - 3/8 - 16 x 5/8 hex. head
*8	179838	-	-	-	22	-	-	BOLT .. Air duct to frame asm. - 3/8 - 16 x 7/8 hex. head
9	103321	16	16	60	22	16	-	WASHER .. Lock - 3/8
*10	8265412	AR	AR	AR	-	AR	-	INSULATION .. Fiberglass - 1/2 in. thick - Sold per foot approx. 21 sq. ft. req. for Col. A,B & E - 28 sq. ft. req. for Col. C
11	8355865	AR	AR	-	-	AR	-	SHIM .. Silencer mounting - No. 11 gauge
*11	8348607	-	-	AR	AR	-	-	SHIM .. Silencer mounting - No. 11 gauge
12	8355863	AR	AR	-	-	AR	-	SHIM .. Silencer mounting - No. 16 gauge
*12	8348608	-	-	AR	AR	-	-	SHIM .. Silencer mounting - No. 16 gauge
13	8355864	AR	AR	-	-	AR	-	SHIM .. Silencer mounting - No. 20 gauge
*13	8348609	-	-	AR	AR	-	-	SHIM .. Silencer mounting - No. 24 gauge
14	179883	4	4	-	-	4	-	BOLT .. Silencer mounting - 1/2 - 13 x 1-1/4 hex. head
*14	180173	-	-	4	-	-	-	BOLT .. Silencer mounting - 1/2 - 13 x 1 hex. head
*14	179881	-	-	-	7	-	-	BOLT .. Silencer and bracket mounting - 1/2 - 13 x 1 hex. head
15	6101229	4	4	-	7	4	-	WASHER .. Plain - 1/2
*15	120384	-	-	4	-	-	-	WASHER .. Lock - 1/2
16	8264513	1	-	-	-	-	1	DUCT .. Air - 8-3/4 I.D. x 9-1/4 O.D. x 3-1/2 in. long
16	8347632	-	1	-	1	-	-	DUCT .. Air - 10-1/8 I.D. x 10-5/8 O.D. x 5 in. long
*16	9531047	-	1	-	-	-	-	DUCT .. Air 10-1/16 I.D. x 29-1/32 in. long - 20-645E7B only
*16	8365038	-	-	1	-	-	-	DUCT .. Air 10-3/32 I.D. x 6-11/16 in. long
16	8408178	-	-	-	-	1	-	DUCT .. Air - 7-1/2 I.D. x 8 O.D. x 3-1/2 in. long - 8-645E5 only
*16	9508096	-	-	-	-	1	-	DUCT .. Air - 8-5/16 I.D. x 3-1/2 in. long - 8-645E7B only
17	8375876	2	-	-	-	-	2	CLAMP .. Air duct - 8.94 in. to 9.60 in. adjustment diameter
17	8373018	-	2	2	2	-	-	CLAMP .. Air duct - 10.12 in. to 10.78 in. adjustment diameter
17	8422314	-	-	-	-	2	-	CLAMP .. Air duct - 7.79 in. to 8.09 in. adjustment diameter
*17	9096140	-	-	-	-	2	-	CLAMP .. Air duct - T-bolt - 8-645E7B only

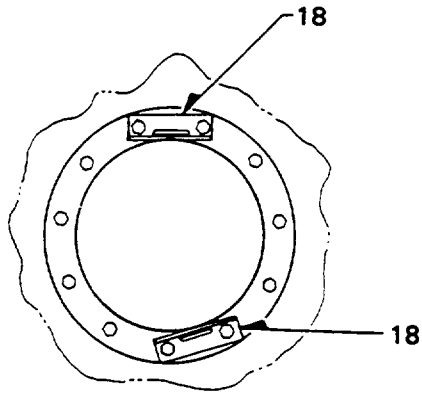
P4509, P4694, P4815, P5674, P6079, P6124, P6535, P6537, P6660, P6664, P7295, P8556, P8830, P9051, P9068, P9179, P9593, M1062

P.L. No. B78

ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	12-645E4 industrial and 12-645E5,E7,E7B marine engines
		-	B	-	-	-	-	16,20-645E4 industrial and 16,20-645, E5,E7,E7B marine engines
		-	-	C	-	-	-	16,20-645E4 R.H. and L.H. rot. and 16,20-645E9B industrial engines
		-	-	-	D	-	-	20-645E7 marine engines
		-	-	-	-	E	-	8-645E5,E7B marine engines
		-	-	-	-	-	F	12-645E4 R.H. rotation industrial engines
18	8374278	-	2	2	2	-	-	RETAINER .. Air duct
19	8411075	1	-	-	-	1	-	ADAPTER ASM. .. Silencer - 17-1/2 in. sq. x 20-3/8 in. dia. duct
19	8412681	-	1	1	-	-	-	ADAPTER ASM. .. Silencer - 17-1/2 in. sq. x 24-3/8 in. dia. duct
*19	8394412	-	-	1	1	-	-	ADAPTER ASM. .. Silencer - 22-3/8 in. sq. x 24-3/8 in. dia. duct
20	8343666	1	1	1	-	1	-	GASKET .. Adapter mounting - Col. C applied with adapter 8412681
*20	8393970	-	-	1	1	-	-	GASKET .. Adapter mounting - Col. C applied with adapter 8394412
21	179837	16	16	16	-	16	-	BOLT .. Adapter mounting - 3/8 - 16 x 3/4 hex. head - Col. C applied with adapter 8412681
*21	180121	-	-	20	-	-	-	BOLT .. Adapter mounting - 3/8 - 16 x 7/8 hex. head - Col. C applied with adapter 8394412
*21	179839	-	-	-	20	-	-	BOLT .. Adapter mounting - 3/8 - 16 x 1 hex. head
22	6101225	16	16	-	20	16	-	WASHER .. Plain - 3/8
*22	103321	-	-	20	-	-	-	WASHER .. Lock - 3/8
*23	8394416	-	-	1	-	-	-	BRACKET .. Mounting - Silencer
*23	8419483	-	-	-	1	-	-	BRACKET .. Mounting - Silencer to gear clutch guard
*24	179885	-	-	-	2	-	-	BOLT .. Silencer to bracket - 1/2 - 13 x 1-1/2 hex. head
*25	6101229	-	-	-	4	-	-	WASHER .. Plain - 1/2
*26	8032745	-	-	-	2	-	-	NUT .. Lock - 1/2 - 13 hex.
*27	9537542	1	1	-	-	-	-	CONNECTOR .. 1/8 - 27 F.P.T.
*28	9331510	1	1	-	-	-	-	INDICATOR .. Pressure - Mechanical

ENGINE AIR INTAKE SILENCERS AND ADAPTERS



VIEW A-A

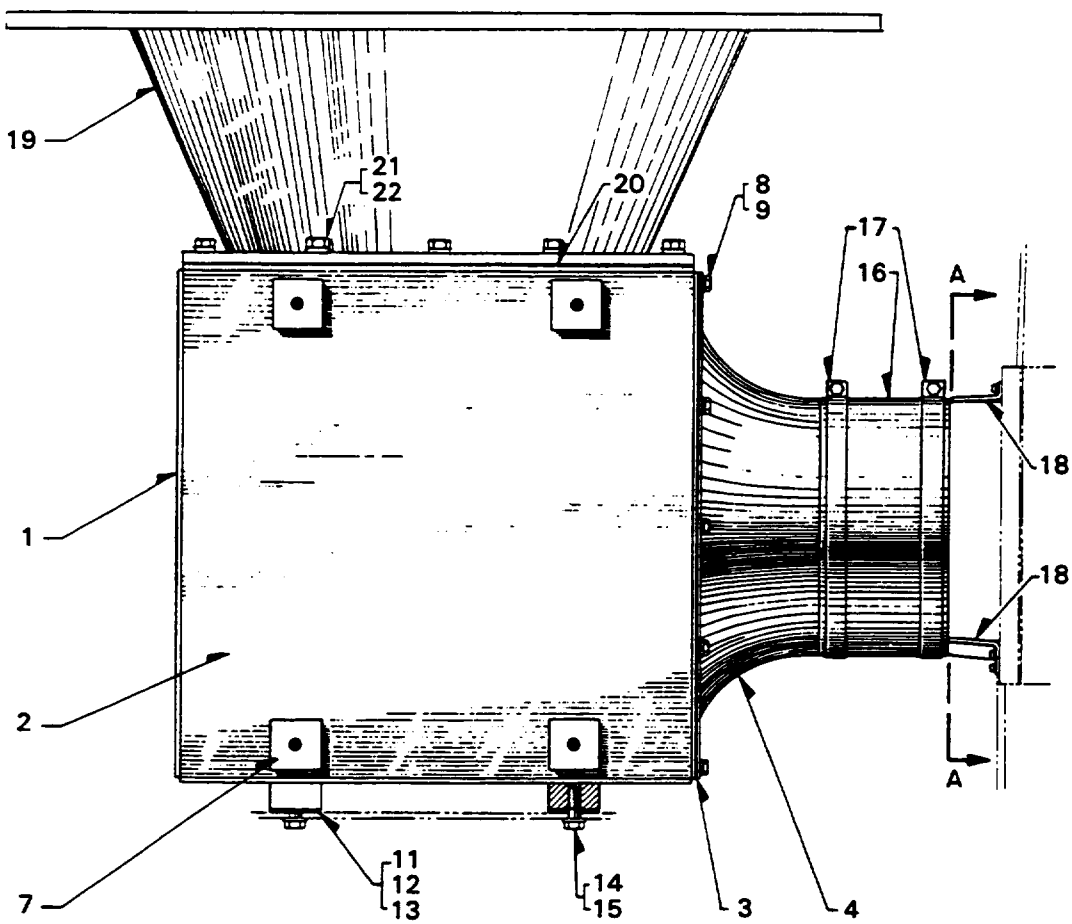


PLATE B78-5

P.L. No. B78

ENGINE AIR INTAKE SILENCERS AND ADAPTERS

Engine Silencer And Duct Assembly With Restriction Indicator
16,20-645F4B,F7B Engines

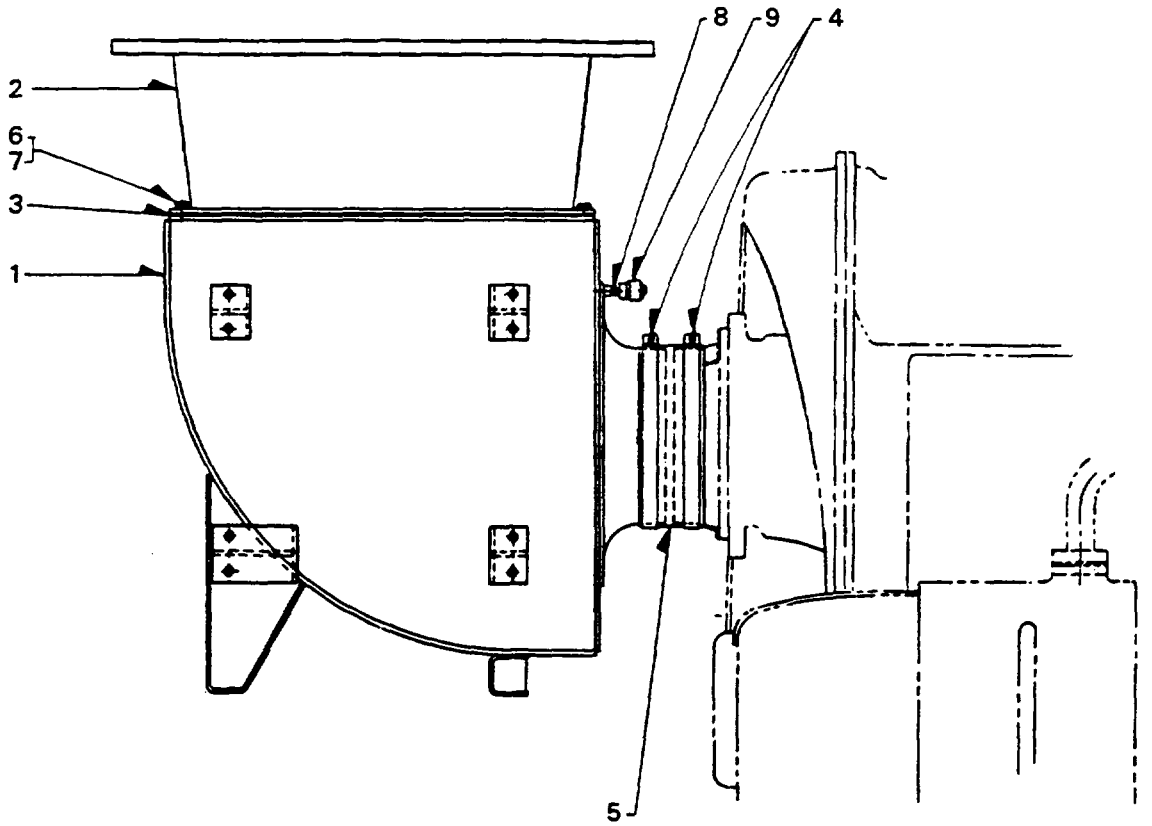


PLATE B78-6

Ref. No.	Part Number	Qty. Req.	Description
1	9558511	1	SILENCER ASSEMBLY .. Engine - 16,20-645F7B engines
1	9541247	1	SILENCER ASSEMBLY .. Engine - 16,20-645F4B engines - Formerly 9514247
2	8394412	1	ADAPTER ASM. .. Silencer - 22-3/8 in. sq. x 24-3/8 in. dia. duct
3	8393970	1	GASKET .. Adapter to silencer
4	8373018	1	CLAMP .. Air duct - 10.12 in. to 10.78 in. adjustment diameter
5	9558513	1	DUCT .. Air - 10-1/8 I.D. x 10-5/8 O.D. x 3-3/4 in. long - 16,20-645F7B engines
5	8347632	1	DUCT .. Air - 10-1/8 I.D. x 10-5/8 O.D. x 5 in. long - 16,20-645F4B engines
6	179837	20	BOLT .. Adapter mounting - 3/8-16 x 3/4 hex. head
7	6101225	20	WASHER .. Flat 3/8
8	9537542	1	CONNECTOR .. Restriction indicator - 1/8 - 27 FPT x 1 in. long
9	9331510	1	INDICATOR .. Restriction - 1/8-27 MPT

M1939, 9566166,M1089,9541413

M1939, 9566166

Parts List No. B80

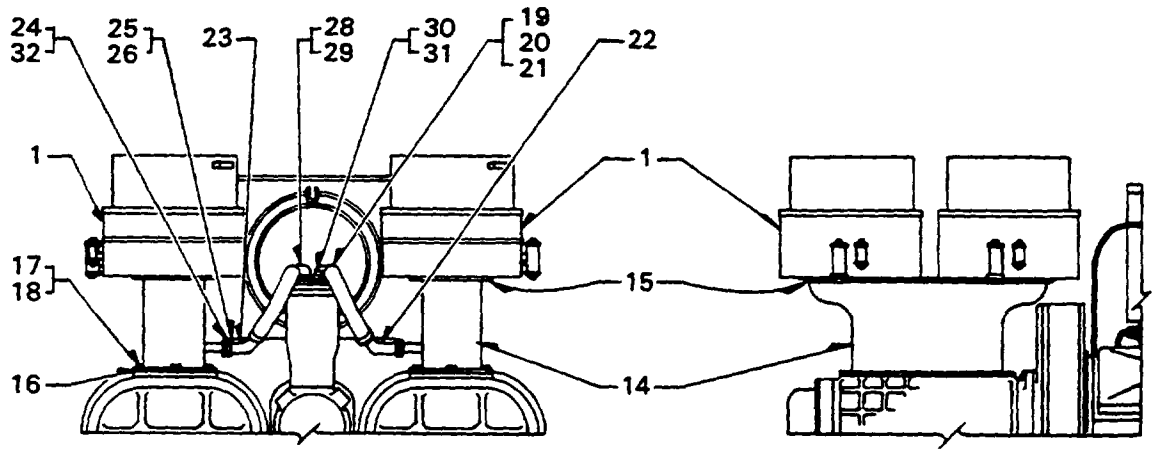
OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Oil Bath Air Intake Filter, Manifold and Mounting
8-645E2,E6; 12-645E2,E6 and 16-645E2,E6 Marine Engines
PLATE B80-1

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E2,E6 engines
		-	B	-	12-645E2,E6 engines
		-	-	C	16-645E2,E6 engines
1	8366947	1	-	2	FILTER ASSEMBLY .. Air intake - Oil bath
1	8366948	-	2	-	FILTER ASSEMBLY .. Air intake - Oil bath
2	8381306	2	-	4	FILTER ASSEMBLY .. Oil bath
2	8328461	-	4	-	FILTER ASSEMBLY .. Oil bath
3	8381376	2	-	4	ELEMENT .. Oil bath
3	8240657	-	4	-	ELEMENT .. Oil bath
4	8259977	2	-	4	GASKET .. Element to top cover
4	8259974	-	4	-	GASKET .. Element to top cover
5	8328594	2	-	4	GASKET .. Element support plate
5	8328596	-	4	-	GASKET .. Element support plate
6	8240658	2	4	4	GASKET .. Manifold
7	9559504	2	-	4	BOWL .. Filter
7	9559496	-	4	-	BOWL .. Filter
8	8402111	2	4	4	GLASS .. Inspection plate
9	8255412	2	4	4	CAP .. Glass retaining
10	8255413	2	4	4	NIPPLE .. Inspection plate
11	9559503	2	-	4	COVER .. Filter element
11	9559497	-	4	-	COVER .. Filter element
12	271612	2	4	4	BOLT .. Center - 3/4 - 10 x 2-1/4 hex. head
13	103346	2	4	4	WASHER .. Plain - 13/16 I.D. x 1-1/2 O.D.
14	8414814	1	2	2	MANIFOLD .. Filter
15	179883	8	16	16	BOLT .. Manifold to filter - 1/2 - 13 x 1-1/4 hex. head
16	8024287	1	2	2	GASKET .. Filter manifold to blower
17	179885	10	20	20	BOLT .. Filter manifold to blower - 1/2 - 13 x 1-1/2 hex. head
18	6101229	10	20	20	WASHER .. Plain - 1/2 - Formerly 103323
19	8131113	1	2	2	HOSE .. Oil separator to filter manifold - No longer furnished - Use: 1 - 8040167 hose which will yield 2 pieces after cutting
20	8131112	1	2	2	SPRING .. Hose
21	8374760	2	4	4	CLAMP .. Hose - Replaces 8132042
22	8164483	1	1	1	ELBOW .. Flanged - Right bank
23	8164482	-	1	1	ELBOW .. Flanged - Left bank
24	8084407	2	4	4	GASKET .. Elbow to orifice plate and orifice plate to manifold
25	179885	2	4	4	BOLT .. Elbow to manifold - 1/2 - 13 x 1-1/2 hex. head
26	6101229	2	4	4	WASHER .. Plain - 1/2
*27	8048967	1	-	-	FLANGE .. Blind - Lube oil separator
*28	8165250	1	-	-	FLANGE .. Hose to lube oil separator
28	8155201	-	1	1	FLANGE .. Hoses to lube oil separator
*29	8084407	2	-	-	GASKET .. Flange to lube oil separator
29	8155202	-	1	1	GASKET .. Flange to lube oil separator
30	181433	4	4	4	BOLT .. Flange mounting - 1/2 - 20 x 1-3/4 hex. head
31	6101229	4	4	4	WASHER .. Plain - 1/2
32	8347779	1	2	2	PLATE .. Orifice

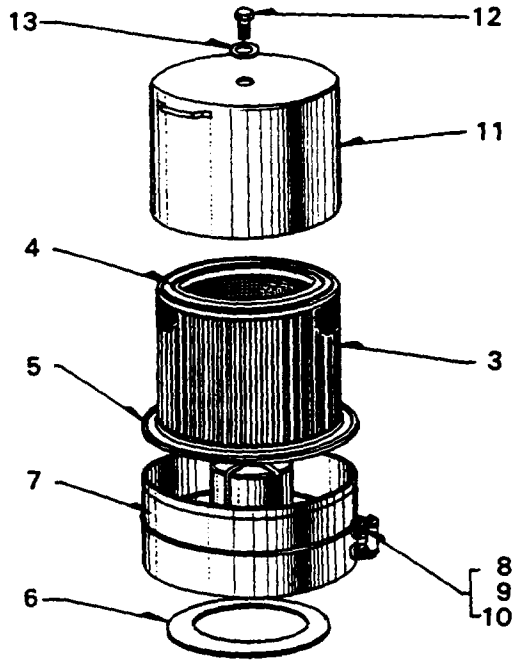
P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS



End View

Side View

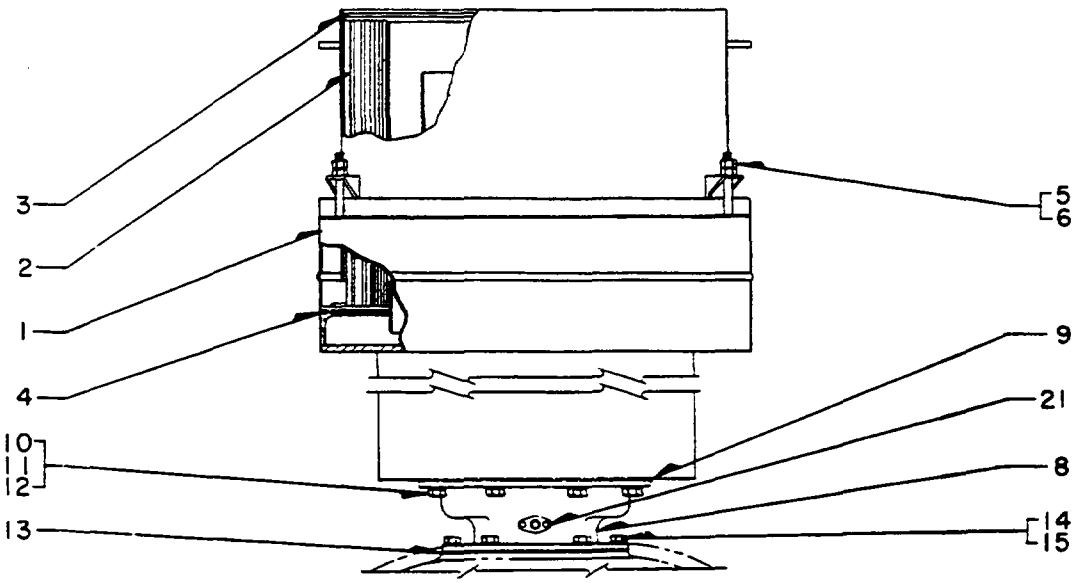


Ref. No. 2

PLATE B80-1

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Oil Bath Air Intake Filter and Silencer Assembly
12-645E2 Marine Engine



END VIEW

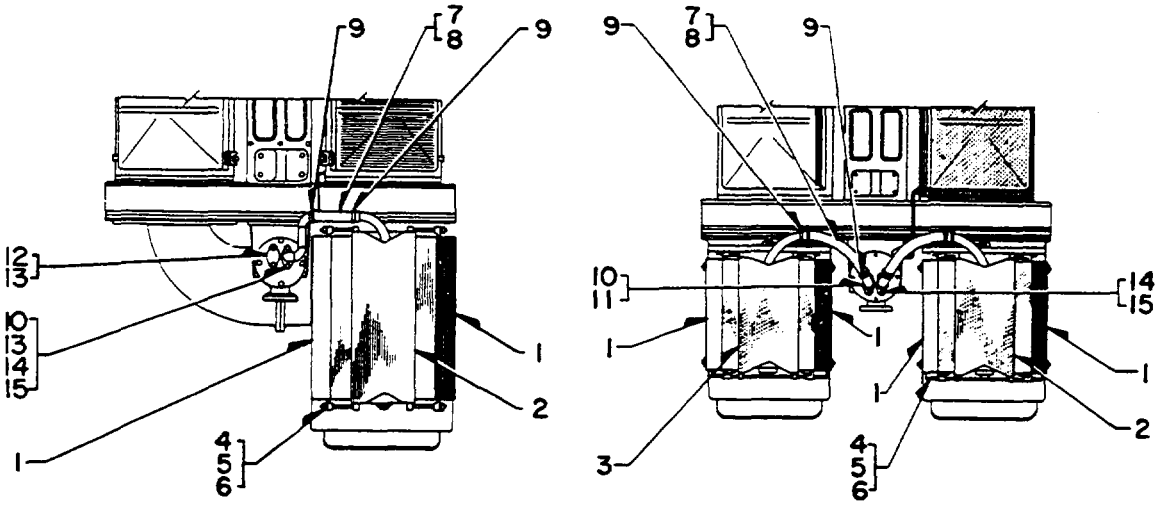
PLATE A80-2

Ref. No.	Part Number	Qty. Req.	Description
1	3329086	1	FILTER ASSEMBLY .. Air intake - Includes silencer
2	8241725	1	ELEMENT .. Filter
3	8259976	1	GASKET .. Filter element - Upper
4	8328598	1	SEAL .. Filter element - Lower
5	103343	3	WASHER .. Plain - 1/2
6	102637	6	NUT .. 1/2 - 13 hex.
*7		1	BOWL ASSEMBLY .. Filter - With silencer
8	8348311	1	ADAPTER ASSEMBLY .. Air filter
9	8348312	1	GASKET .. Adapter to silencer
10	271556	8	BOLT .. 5/8 - 11 x 1-1/4 hex. head
11	103345	8	WASHER .. Plain - 5/8
12	103325	8	WASHER .. Lock - 5/8
13	8024287	2	GASKET .. Filter manifold to blower
14	179885	20	BOLT .. Filter manifold to blower - 1/2 - 13 x 1-1/2 hex. head
15	6101229	20	WASHER .. Plain - 1/2 - Formerly 103323
*16	8131113	2	HOSE .. Oil separator to filter manifold - No longer furnished - Use: 1 - 8040167 hose which will yield 2 pieces after cutting
*17	8131112	2	SPRING .. Hose
*18	8374760	4	CLAMP .. Hose - Replaces 8132042
*19	8164483	1	ELBOW .. Flanged - Filter to separator - Right bank
*20	8164482	1	ELBOW .. Flanged - Filter to separator - Left bank
21	8084407	2	GASKET .. Elbow to filter adapter flange
*22	181429	4	BOLT .. Elbow to filter adapter flange - 1/2 - 20 x 1-1/4 hex. head
*23	6101229	4	WASHER .. Plain - 1/2
*24	8155201	1	FLANGE .. Hoses to lube oil separator
*25	8155202	1	GASKET .. Flange to lube oil separator
*26	181433	4	BOLT .. Flange mounting - 1/2 - 20 x 1-3/4 hex. head
*27	6101229	4	WASHER .. Plain - 1/2

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Panel Type Oil Bath Air Intake Filter and Mounting
8,12,16-645E1 and E8 Industrial Engines



8-645E1,E8 Engines

12,16-645E1,E8 Engines

PLATE A80-3

Ref. No.	Part Number	Qty. Req.			Description
		A	-	-	8-645E1,E8 engines
		-	B	-	12-645E1,E8 engines
		-	-	C	16-645E1,E8 engines
1	8356192	2	4	4	FILTER ASM. .. Oil bath - Panel type - 19-1/2 in. x 24-1/2 in. - Column B 12-645E1 only
1	8356193	-	4	-	FILTER ASM. .. Oil bath - Panel type - 19-1/2 in. x 20-1/2 in.
2	8394274	1	-	1	ADAPTER ASM. .. Filter - Replaces 8351114
2	8387506	1	-	-	ADAPTER ASM. .. Filter - Includes rainshield - SR11E1 models only } Right Bank
ϕ2	8394272	-	1	-	ADAPTER ASM. .. Filter - Replaces 8380137
ϕ2	8456197	-	1	-	ADAPTER ASM. .. Filter - 12-645E1 only
ϕ3	8394273	-	1	-	ADAPTER ASM. .. Filter - Replaces 8380138
ϕ3	8387506	-	1	-	ADAPTER ASM. .. Filter - 12-645E1 only } Left Bank
3	8394275	-	-	1	ADAPTER ASM. .. Filter - Replaces 8351113
4	8024287	1	2	2	GASKET .. Adapter mounting
5	179885	10	20	20	BOLT .. Adapter mounting - 1/2 - 13 x 1-1/2 hex. head
6	103323	10	20	20	WASHER .. Lock - 1/2
7	8131113	1	2	2	HOSE .. Oil separator to filter - No longer furnished - Use: 1 - 8040167 hose which will yield 2 pieces after cutting
7	8388597	1	2	-	HOSE .. Oil separator to filter - No longer furnished - Use: 1 - 8480932 hose which will yield 2 pieces after cutting - Col. A - SR11E1 models only - Col. B - 12-645E1 only
8	8131112	1	2	2	SPRING .. Hose
9	8374760	2	4	4	CLAMP .. Hose - Replaces 8132042
10	8280233	1	2	2	ELBOW ASM. .. Swivel flange
11	8081568	1	2	2	GASKET .. Elbow mounting
12	8048967	1	-	-	FLANGE .. Blind
13	8084407	1	2	-	GASKET .. Elbow and blind flange mounting
14	181433	4	4	4	BOLT .. 1/2 - 20 x 1-3/4 hex. head
15	6101229	4	4	4	WASHER .. Plain - 1/2

8396345P, 8380016T, 8380834U, 8468481N, 8396211R, 8383313S, 8476592L, 9539761, 8376100T, 8365764V, 8468479L, P9003, 9540215, 9541054

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Panel Type Oil Bath Air Intake Filter and Mounting
12-645E4 Industrial Engine

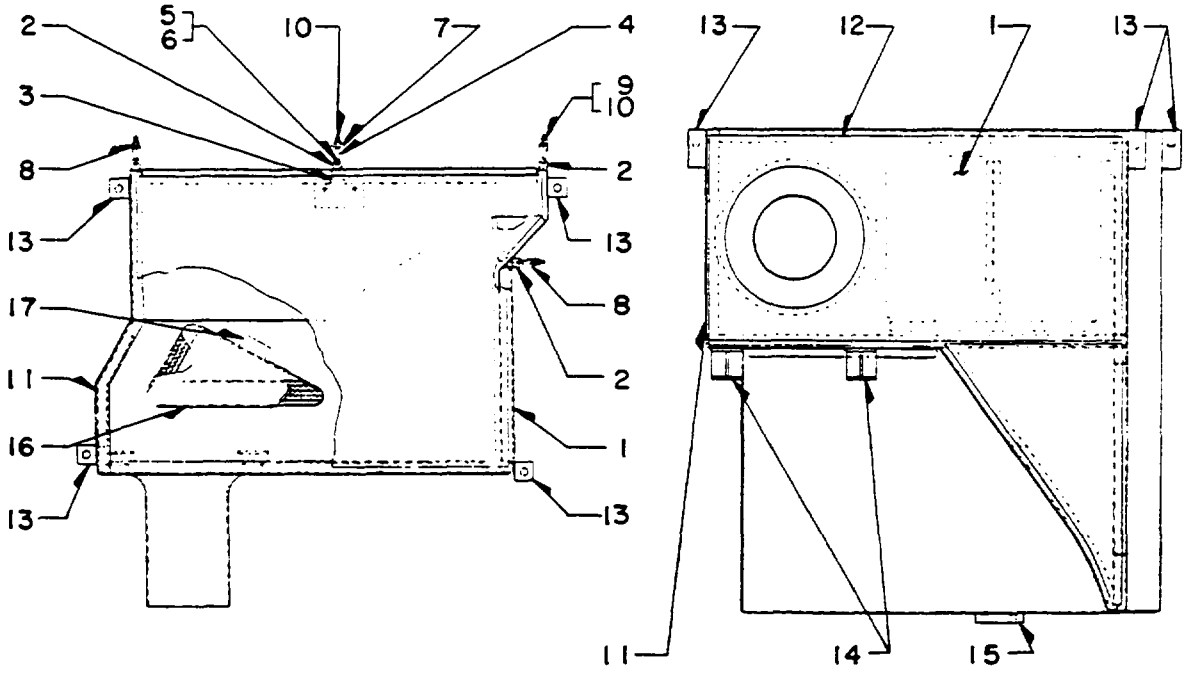


PLATE A80-4

Ref. No.	Part Number	Qty. Req.	Description
1	8397149	1	HOUSING ASSEMBLY .. Air intake filter
2	8380182	20	FASTENER ASSEMBLY .. Air intake filter
3	8380184	1	CHANNEL .. Fastener
4	8380183	1	BOLT .. Eye
5	8014331	1	PIN .. Clevis
6	103373	1	PIN .. Cotter
7	8380185	4	RETAINER .. Fastener
8	8380186	16	RETAINER .. Fastener
9	103341	16	WASHER .. Plain - 3/8
10	8032743	20	NUT .. Lock - 3/8 - 16 hex.
11	8397248	1	INSULATION .. Closing - 21 in. x 30-1/8 in. x No. 11 ga. thick
12	8397249	1	INSULATION .. Closing - 21 in. x 42-5/8 in. x 3/16 in. thick
13	8369372	4	BLOCK .. Lifting
14	8368639	2	BRACKET .. Support
15	8255030	1	PAD .. Filter support
16	8397250	1	BAFFLE .. Filter
17	8279062	1	ANGLE .. Baffle
*18	8273655	A.R.	SEAL .. Rubber - Sold per foot - 29 ft. required
*19	8255268	A.R.	ADHESIVE .. Gasket - 1 quart can
*20	8356193	6	FILTER ASSEMBLY .. Oil bath - Panel type - 19-1/2 in. x 20-1/2 in.
*21	8264513	1	DUCT .. Air
*22	8375876	2	CLAMP .. Hose

8397232A

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Panel Type Oil Bath Air Intake Filter and Mounting
16-645E4 Industrial Engine Except Model MP36

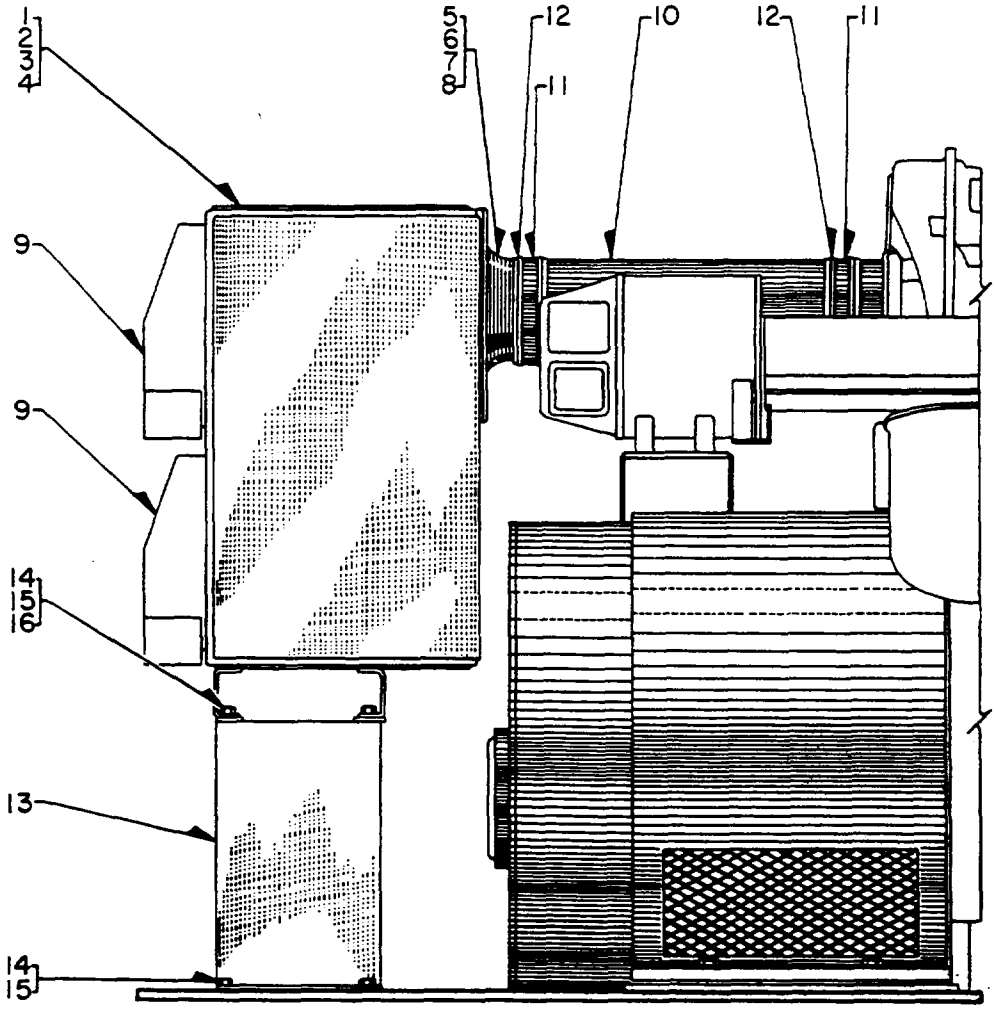


PLATE A80-5

Ref. No.	Part Number	Qty. Req.	Description
1	8341278	1	HOUSING ASSEMBLY .. Filter
2	8281874	24	FASTENER ASSEMBLY .. Filter housing
3	8273655	A.R.	SEAL .. Rubber - Sold per foot - Approximately 500 ft. required
4	8255268	A.R.	ADHESIVE .. Gasket - Sold in 1 quart cans
5	8364028	1	DUCT ASSEMBLY .. Air
6	8264026	1	GASKET .. Duct to box
7	179838	26	BOLT .. Duct mounting - 3/8 - 16 x 7/8 hex. head
8	103321	26	WASHER .. Lock - 3/8
9	8356192	5	FILTER ASSEMBLY .. Oil bath - Panel type - 19-1/2 in. x 24-1/2 in.
*9A	8341530	1	PANEL .. Filter blanking
10	8382225	1	DUCT .. Air - 16 ga. x 31-27/32 in. long
11	8347632	2	DUCT .. Air - 10-3/32 I.D. x 5 in. long
12	8373018	4	CLAMP .. Hose
13	8341334	2	SUPPORT ASSEMBLY .. Filter
14	179885	16	BOLT .. 1/2 - 13 x 1-1/2 hex. head
15	103323	16	WASHER .. Lock - 1/2
16	102637	8	NUT .. 1/2 - 13 hex.

8382226, P2512

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Panel Type Oil Bath Air Intake Filter and Mounting
16-645E4 Industrial Engine - Model MP36

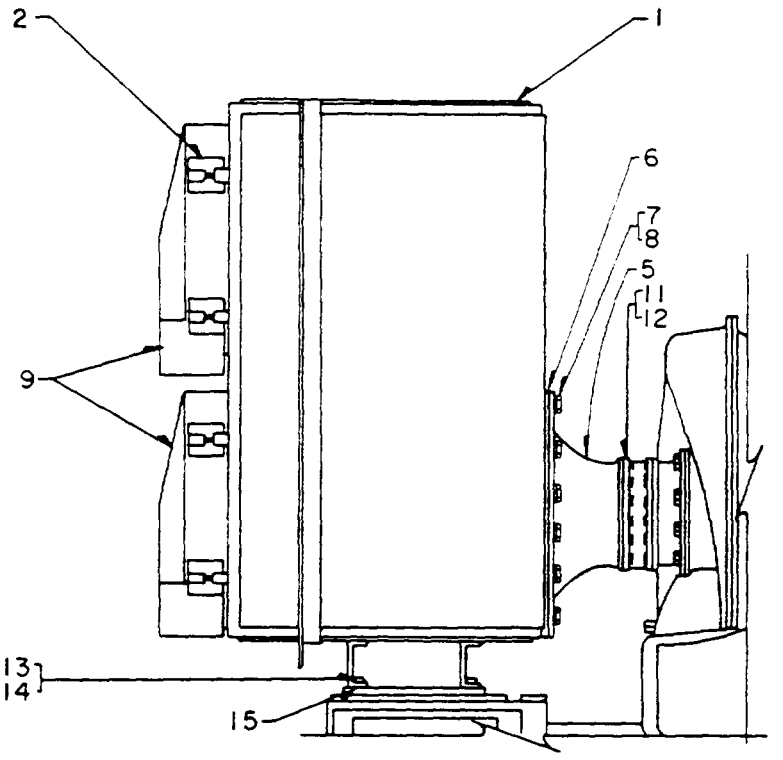


PLATE A80-6

Ref. No.	Part Number	Qty. Req.	Description
1	8332843	1	BOX ASSEMBLY .. Filter
2	8281874	24	FASTENER ASSEMBLY .. Filter housing
*3	8273655	-	SEAL .. Rubber - Sold per foot - Approx. 50 ft. required
*4	8255268	A.R.	ADHESIVE .. Gasket - 1 quart - Formerly 8255258
5	8373529	1	DUCT .. Air
6	8264026	1	GASKET .. Air duct
7	179838	26	BOLT .. 3/8 - 16 x 7/8 hex. head
8	103321	26	WASHER .. Lock - 3/8
9	8356192	6	FILTER ASSEMBLY .. Oil bath - Panel type - 19-1/2 x 24-1/2
*10	8341530	-	PANEL .. Filter blanking (1 req. only when 5 filters are applied)
11	8347632	1	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long - Formerly 8365038 - 10-3/32 x 6-11/16 in. long
12	8373018	2	CLAMP .. Air duct
13	271558	4	BOLT .. 5/8 - 11 x 1-1/2 hex. head
14	103325	4	WASHER .. Lock - 5/8
15	8342875	A.R.	SHIM .. Filter box mounting - 20 ga. x 2-1/2 in. x 12-1/4 in. long

8335419K, P-2242C

P.L. No. B80

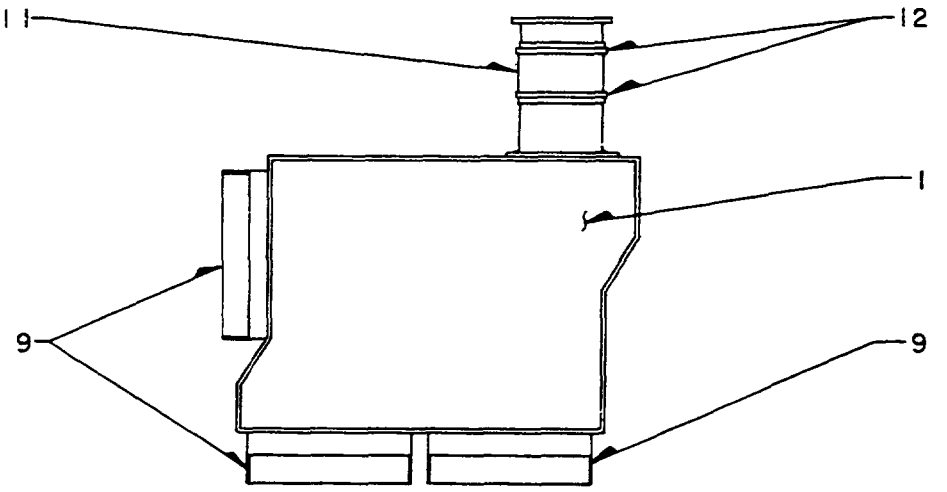
OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Panel Type Oil Bath Air Intake Filter and Mounting
12-645E4B and 20-645E4,E4B Industrial Engines
PLATE A80-7

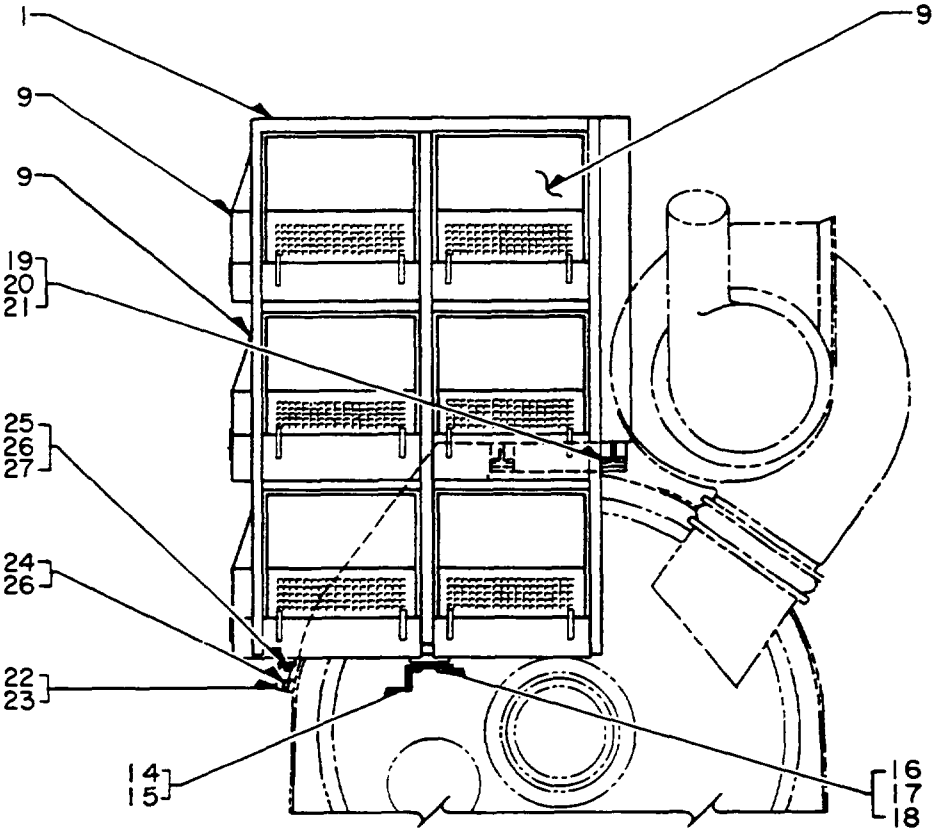
Ref. No.	Part Number	Quantity Required					Description
		A	-	-	-	-	Model S12E4B
		-	B	-	-	-	Models MP45,MP45B,MP45M,999-20
		-	-	C	D	-	Models S20E4 and S20E4GW
		-	-	-	-	E	Models S20E4B and HG20E4B
*1	9534300	1	-	-	-	-	BOX ASM. .. Air intake filter
1	8368301	-	1	1	1	-	BOX ASM. .. Air intake filter
*1	9501090	-	-	-	-	1	BOX ASM. .. Air intake filter
*2	8380182	20	30	30	30	30	FASTENER ASM .. Filter holding - Formerly 8281874
*3	8380185	4	6	6	6	6	RETAINER .. 1-3/8 x 2-1/2 in. long
*4	8380186	16	24	24	24	24	RETAINER .. 7/8 x 2-1/2 in. long - Slotted
ϕ*5	8032743	16	30	30	30	30	NUT .. Lock - 3/8 - 16 hex. - Non-metallic insert
ϕ*5	9416513	16	30	30	30	30	NUT .. Lock - 3/8 - 16 hex. - "CLT" - All metal
ϕ*5	9335108	16	30	30	30	30	NUT .. Lock - 3/8 - 16 hex. - "OVAL" - All metal
*6	103341	16	24	24	24	24	WASHER .. Plain - 3/8
*7	8273655	As Required					SEAL .. Rubber - Sold per foot - Approx. 58 ft. required Column A approx. 29 ft. required
*8	8255268	As Required					ADHESIVE - Gasket - Sold in 1 quart can
9	8356193	6	9	9	9	9	FILTER ASM. .. Oil bath - Panel type - 19-1/2 in. x 20-1/2 in.
*10	8383319	-	A.R.	-	-	-	PANEL .. Filter blanking (2 required when 7 filters are applied)
*11	9086022	1	-	-	-	-	DUCT .. Air - 8-3/4 O.D. x 6-1/2 in. long - Steel
11	8365038	-	1	1	1	1	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 6-11/16 in. long
*11	8264513	2	-	-	-	-	DUCT .. Air - Neoprene inner liner - 8-3/4 I.D. x 3-1/2 in. long
*12	8375876	4	-	-	-	-	CLAMP ASM. .. "T" - Bolt - Stainless steel
12	8373018	-	2	2	2	2	CLAMP .. Air Duct
*13	8374278	-	2	2	2	2	RETAINER .. Air duct
14	8368392	1	-	1	-	-	BRACKET ASM. .. Box mounting
14	8379531	-	1	-	-	-	BRACKET ASM. .. Box mounting
14	8368393	-	-	-	1	-	BRACKET ASM. .. Box mounting
*14	8488694	1	-	-	-	1	BRACKET .. Box mounting
15	----	-	As Required			-	SHIM .. Box to bracket - 3 in. x 5 in. 8368339 .. 11 ga. 8368338 .. 16 ga. 8368337 .. 24 ga.
16	179883	2	2	4	2	2	BOLT .. Bracket mounting - 1/2 - 13 x 1-1/4 hex. head
*16	179881	2	-	-	-	2	BOLT .. Pad mounting - 1/2 - 13 x 1 hex. head
*17	6101229	4	-	-	-	4	WASHER .. Flat - Aircraft - 1/2
17	103323	-	2	4	2	-	WASHER .. Lock - 1/2
18	103343	2	2	4	2	2	WASHER .. Plain - 1/2
19	----	A.R.	A.R.	-	A.R.	A.R.	SHIM .. Box to generator - 2 in. x 3 in. 8348607 .. 11 ga. 8348608 .. 16 ga. 8348609 .. 24 ga.
*20	179883	4	-	-	-	4	BOLT .. Box to generator - 1/2 - 13 x 1-1/4 hex. head
20	179887	-	4	-	4	-	BOLT .. Box to generator - 1/2 - 13 x 1-3/4 hex. head
*21	6101229	4	-	-	-	4	WASHER .. Flat - Aircraft - 1/2
21	103323	-	4	-	4	-	WASHER .. Lock - 1/2
22	8368392	-	1	-	1	1	BRACKET .. Box mounting
23	----	A.R.	A.R.	-	A.R.	A.R.	SHIM .. Bracket to generator - 1-1/2 in. x 5 in. 8368340 .. 11 ga. 8368341 .. 16 ga. 8368342 .. 24 ga.
24	179881	2	2	2	2	2	BOLT .. Bracket mounting - 1/2 - 13 x 1 hex. head
25	179883	2	2	4	2	2	BOLT .. Bracket mounting - 1/2 - 13 x 1-1/4 hex. head
*26	6101229	4	-	-	-	4	WASHER .. Flat - Aircraft - 1/2
26	103323	-	4	-	4	-	WASHER .. Lock - 1/2
27	103343	2	2	-	2	2	WASHER .. Plain - 1/2
*28	8366314	3	2	-	1	3	PAD .. Tapping - 3/4 x 1-1/2 x 5 in. long - Two 1/2 - 13 tapped holes
*29	102635	-	1	-	-	-	NUT .. 3/8 - 16 hex.
*30	6101225	-	2	-	-	-	WASHER .. Plain - 3/8
*31	179837	-	1	-	-	-	BOLT .. 3/8 - 16 x 3/4 hex. head
*32	179887	-	-	4	-	-	BOLT .. Bracket mounting - 1/2 - 13 x 1-3/4 hex. head
*33	103323	-	-	4	-	-	WASHER .. Lock - 1/2
*34	103343	-	-	4	-	-	WASHER .. Plain - 1/2

8393685, 8423349B, 9518790, 9534301,
P4041, P4060, P4240, P4871, P8817, P9562

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS



TOP VIEW



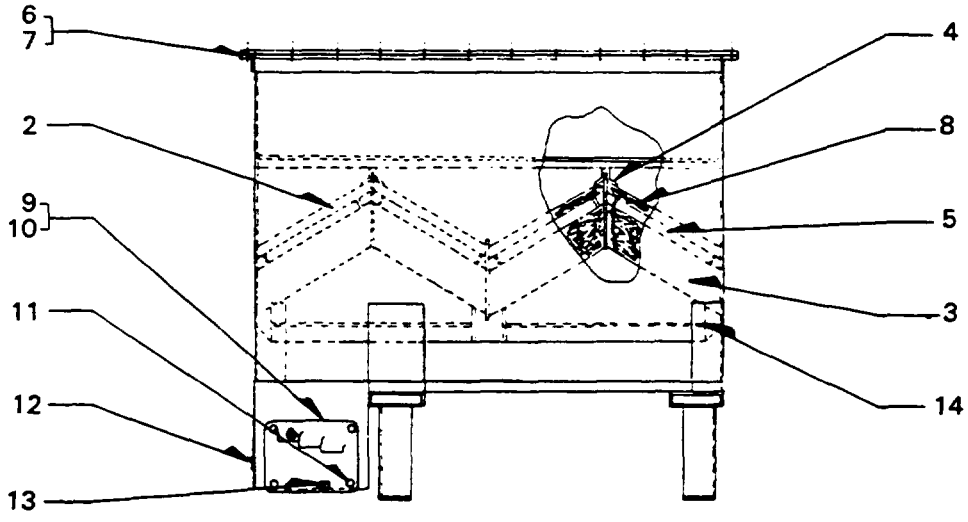
END VIEW

PLATE A80-7

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Cycoil Oil Bath Air Inlet Filter Assembly Less Rainshield
12-645E2,E5; 16-645E2,E5 and 20-645E5 Marine Engines



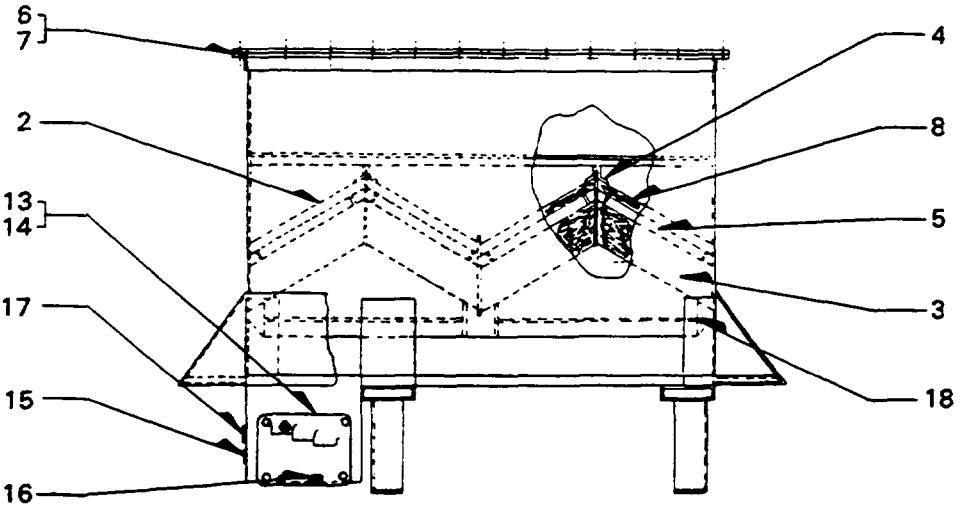
Ref. No. 1
PLATE B80-8

Ref. No.	Part Number	Quantity Required							Description	Reservoir Capacity	Engine Application
1	8349352	A	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	7.0 Gals.	12-645E5
1	8378285	-	B	-	-	-	-	-	FILTER ASM. .. Air - Oil bath - Replaced by 8412789 - See Page 11	7.3 Gals.	12-645E2,E5
1	8405301	-	-	C	-	-	-	-	FILTER ASM. .. Air - Oil bath	7.3 Gals.	12-645E2,E5
1	8366320	-	-	-	D	-	-	-	FILTER ASM. .. Air - Oil bath	9.0 Gals.	16-645E2,E5
1	8400445	-	-	-	-	E	-	-	FILTER ASM. .. Air - Oil bath	9.0 Gals.	16-645E2,E5
1	8407292	-	-	-	-	-	F	-	FILTER ASM. .. Air - Oil bath - Replaced by 8412789 - See Page 11	9.0 Gals.	16-645E5
1	8392845	-	-	-	-	-	-	G	FILTER ASM. .. Air - Oil bath	11.25 Gals.	20-645E5
2	8395785	4	4	4	-	-	-	-	PAD .. Filter		
2	8425266	-	-	-	4	4	4	-	PAD .. Filter } Upper		
2	9512191	-	-	-	-	-	-	4	PAD .. Filter		
3	8395784	4	4	4	-	-	-	-	PAD .. Filter		
3	8425267	-	-	-	4	4	4	-	PAD .. Filter } Lower		
3	9512190	-	-	-	-	-	-	4	PAD .. Filter		
4		2	2	2	-	-	-	-	RETAINER .. Pad		
4	8425265	-	-	-	2	2	2	-	RETAINER .. Pad		
4		-	-	-	-	-	-	2	RETAINER .. Pad		
5		4	4	4	-	-	-	-	SPACER .. Pad		
5	8425273	-	-	-	4	4	4	-	SPACER .. Pad		
5		-	-	-	-	-	-	4	SPACER .. Pad		
6	8425264	2	2	2	2	2	2	-	GASKET .. Top plate		
6		-	-	-	-	-	-	2	GASKET .. Top plate		
7		2	2	2	-	-	-	-	GASKET .. Top plate		
7	8425263	-	-	-	2	2	2	2	GASKET .. Top plate		
8		4	4	4	-	-	-	-	BAFFLE .. Pad		
8		-	-	-	4	4	4	-	BAFFLE .. Pad		
8		-	-	-	-	-	-	4	BAFFLE .. Pad		
9		2	2	2	2	2	2	2	DOOR .. Clean out		
10	8425268	4	4	-	4	4	4	4	GASKET .. Clean out door		
10		-	-	2	-	-	-	-	GASKET .. Clean out door		
11		As Required							WASHER .. Copper - .406 I.D. x .812 O.D. x .065 in. thick		
12	8412895	2	2	2	2	2	2	2	GAUGE .. Sight		
13	103870	2	-	2	2	-	-	-	PLUG .. Pipe - 1 M.P.T.		
14	8429874	2	2	2	-	-	-	-	VALVE ASM. .. Variflow } Includes 8391258 retainer clips and 8391257 discs		
14	8429871	-	-	-	2	2	2	-	VALVE ASM. .. Variflow }		
14	8429872	-	-	-	-	-	-	2	VALVE ASM. .. Variflow }		

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Cycoil Oil Bath Air Inlet Filter Assembly With Rainshield
8-645E2,E5,E6; 12-645E2,E5,E6,E7,E7B; 16-645E2,E5,E6,E7,E7B,E7C and 20-645E5,E7,E7B,E7C Marine Engines
16-645E4,E4B and 20-645E4 Industrial Engines Except Models MP36,MP45 and 999-20



Ref. No. 1

PLATE B80-9

Ref. No.	Part Number	Quantity Required										Description	Reservoir Capacity	Engine Application
1	8378284	A	-	-	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	7.3 Gals.	12-645E2,E5
1	8392134	-	B	-	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	7.3 Gals.	12-645E2
1	8404152	-	-	C	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	7.3 Gals.	12-645E2,E5
1	8366319	-	-	-	D	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	9.0 Gals.	16-645E2,E5
1	8382176	-	-	-	-	E	-	-	-	-	-	FILTER ASM. .. Air - Oil bath	9.0 Gals.	16-645E2,E5
1	8371625	-	-	-	-	-	F	-	-	-	-	FILTER ASM. .. Air - Oil bath - Repl. by 8415645	11.25 Gals.	20-645E4,E5
1	8404237	-	-	-	-	-	-	G	-	-	-	FILTER ASM. .. Air - Oil bath	11.25 Gals.	20-645E5
1	8415643	-	-	-	-	-	-	-	H	-	-	FILTER ASM. .. Air - Oil bath	17.5 Gals.	8-645E2,E6
1	8415644	-	-	-	-	-	-	-	-	J	-	FILTER ASM. .. Air - Oil bath	26.25 Gals.	8-645E5,E6,E7 12-645E2,E6
1	8412789	-	-	-	-	-	-	-	-	-	K	FILTER ASM. .. Air - Oil bath - Repl. 8378285 & 8407292	35 Gals.	12-645E2,E5 E7,E7B; 16-645E2,E4, E4B,E5,E6,E7, E7B,E7C
1	8415645	-	-	-	-	-	-	-	-	-	L	FILTER ASM. .. Air - Oil bath - Replaces 8371625	43.5 Gals.	20-645E5,E7, E7B,E7C
2	8395785	4	4	4	-	-	-	-	-	-	-	PAD .. Filter		
2	8425266	-	-	-	4	4	-	-	4	-	4	PAD .. Filter } Upper		
2	9512191	-	-	-	-	-	4	4	-	-	-	PAD .. Filter } Upper		
2		-	-	-	-	-	-	-	-	4	-	PAD .. Filter } Upper		
3	8395784	4	4	4	-	-	-	-	-	-	-	PAD .. Filter		
3	8425267	-	-	-	4	4	-	-	4	-	4	PAD .. Filter } Lower		
3	9512190	-	-	-	-	-	4	4	-	-	-	PAD .. Filter } Lower		
3		-	-	-	-	-	-	-	-	4	-	PAD .. Filter } Lower		
4		2	2	2	-	-	-	-	-	-	-	RETAINER .. Pad		
4	8425265	-	-	-	2	2	-	-	2	-	2	RETAINER .. Pad		
4		-	-	-	-	-	2	2	-	-	-	RETAINER .. Pad		
4		-	-	-	-	-	-	-	-	2	-	RETAINER .. Pad		
5		4	4	4	-	-	-	-	-	-	-	SPACER .. Pad		
5	8425273	-	-	-	4	4	-	-	4	-	4	SPACER .. Pad		

P.L. No. B80

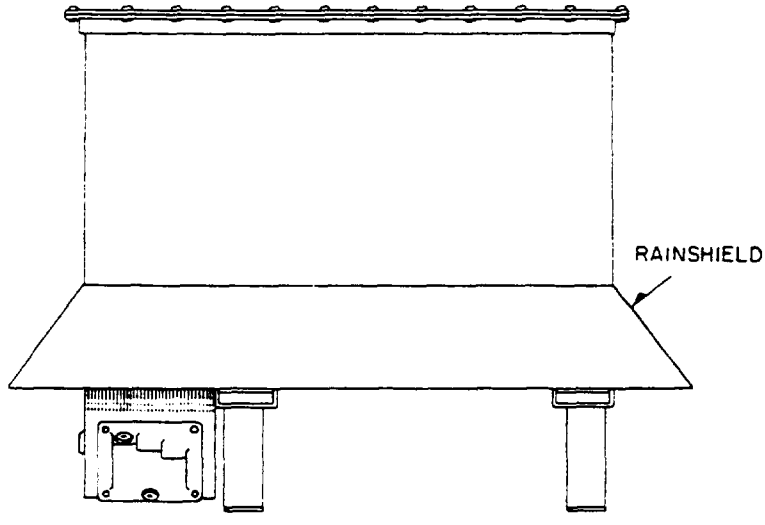
OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Ref. No.	Part Number	Quantity Required											Description
	8378284	A	-	-	-	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8392134	-	B	-	-	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8404152	-	-	C	-	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8366319	-	-	-	D	-	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8382176	-	-	-	-	E	-	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8371625	-	-	-	-	-	F	-	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8404237	-	-	-	-	-	-	G	-	-	-	-	FILTER ASM. .. Air - Oil bath
	8415643	-	-	-	-	-	-	-	H	-	-	-	FILTER ASM. .. Air - Oil bath
	8415644	-	-	-	-	-	-	-	-	J	-	-	FILTER ASM. .. Air - Oil bath
	8412789	-	-	-	-	-	-	-	-	-	K	-	FILTER ASM. .. Air - Oil bath
	8415645	-	-	-	-	-	-	-	-	-	-	L	FILTER ASM. .. Air - Oil bath
5		-	-	-	-	-	4	4	-	-	-	4	SPACER .. Pad
5		-	-	-	-	-	-	-	-	4	-	-	SPACER .. Pad
6		2	2	2	-	-	-	-	-	-	-	-	GASKET .. Top plate
6	8425263	-	-	-	2	2	2	2	-	2	2	2	GASKET .. Top plate
6		-	-	-	-	-	-	-	2	-	-	-	GASKET .. Top plate
7	8425264	2	2	2	2	2	-	-	-	-	-	-	GASKET .. Top plate
7		-	-	-	-	-	2	2	-	-	-	-	GASKET .. Top plate
7		-	-	-	-	-	-	-	2	-	2	-	GASKET .. Top plate
7		-	-	-	-	-	-	-	-	2	-	-	GASKET .. Top plate
7		-	-	-	-	-	-	-	-	-	-	2	GASKET .. Top plate
8		4	4	4	-	-	-	-	-	-	-	-	BAFFLE .. Pad
8		-	-	-	4	4	-	-	4	-	4	-	BAFFLE .. Pad
8		-	-	-	-	-	4	4	-	-	-	4	BAFFLE .. Pad
8		-	-	-	-	-	-	-	-	4	-	-	BAFFLE .. Pad
*9		-	-	-	-	-	-	-	2	2	2	2	TUBE .. Long
*10		-	-	-	-	-	-	-	2	2	2	2	TUBE .. Short
*11		-	-	-	-	-	-	-	2	-	2	-	SCREEN .. Trash - End
*11		-	-	-	-	-	-	-	-	2	-	2	SCREEN .. Trash - End
*12		-	-	-	-	-	-	-	2	-	-	-	SCREEN .. Trash - Side
*12		-	-	-	-	-	-	-	-	2	-	-	SCREEN .. Trash - Side
*12		-	-	-	-	-	-	-	-	-	2	-	SCREEN .. Trash - Side
*12		-	-	-	-	-	-	-	-	-	-	2	SCREEN .. Trash - Side
13		2	2	2	2	2	2	2	2	2	2	2	DOOR .. Clean out
14		4	4	4	-	-	4	-	2	2	2	2	GASKET .. Door mounting
14	8425268	-	-	-	4	4	4	4	-	-	-	-	GASKET .. Door mounting
15	8412895	2	2	2	2	2	2	2	2	2	2	2	GAUGE .. Sight
16	103870	2	-	2	2	-	-	2	2	2	2	2	PLUG .. Pipe - 1 M.P.T.
17	187056	-	-	-	-	-	-	-	1	1	1	1	PLUG .. Pipe - 2 M.P.T.
18	8429874	2	2	2	-	-	-	-	-	-	-	-	VALVE ASM. .. Variflow } Includes 8391258 retainer clips and 8391257 disc
18	8429871	-	-	-	2	2	-	-	2	-	2	-	VALVE ASM. .. Variflow
18	8429872	-	-	-	-	-	2	2	-	-	-	2	VALVE ASM. .. Variflow
18	8429873	-	-	-	-	-	-	-	-	2	-	-	VALVE ASM. .. Variflow

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Cycoil Oil Bath Air Inlet Filter and Silencer Assembly
With Rainshields
20-645E4 Industrial Engine - Model 999-20



Ref. No. 1

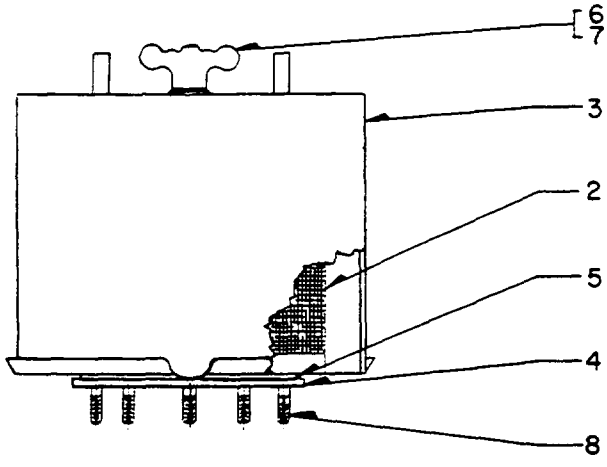
PLATE A80-10

Ref. No.	Part Number	Qty. Req.	Description
1	8419843	1	FILTER ASM. .. Air intake - Includes rainshield - 91-9/16 in. x 117-1/2 in. long
*2	8418738	1	SILENCER .. Inline - 37-1/2 x 33 in. long - 24 in. dia. opening
*3	8399622	1	HOSE .. Flexible - 32 in. dia. x 30 in. long - 24 in. hose diameter
*4	8396046	1	CONNECTION .. Exhaust - Flexible - 24 in. x 29-1/2 in. long - 19-3/4 in. hose diameter
ϕ*5	8385890	1	SILENCER ASSEMBLY .. Exhaust - 36 in. O.D. x 146-1/2 in. long
ϕ*6	8367102	1	SILENCER ASSEMBLY .. Exhaust - 36-1/4 in. O.D. x 149 in. long

P.L. No. B80

OIL BATH AND IMPINGEMENT TYPE ENGINE AIR INTAKE FILTERS

Oil Wetted Impingement Type Air Intake Filter Assembly
12-645E5 Marine Engine



Ref. No. 1

PLATE A80-11

Ref. No.	Part Number	Qty. Req.	Description
1	8413650	1	FILTER ASSEMBLY .. Air intake
2		1	ELEMENT .. Filter
3		1	HOOD .. Element retaining
4		1	BASE .. Element support
5		2	GASKET .. Element
6	8042721	3	NUT .. Wing - Cover retaining
7	103343	3	WASHER .. Plain - 1/2
8		10	STUD .. Filter mounting
*9		1	PLATE .. Name
*10	8366802	1	PLATE .. Name - Model number

Parts List No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Paper Element Engine Air Intake Filter Application
8,12,16-645E2,E6 Engines

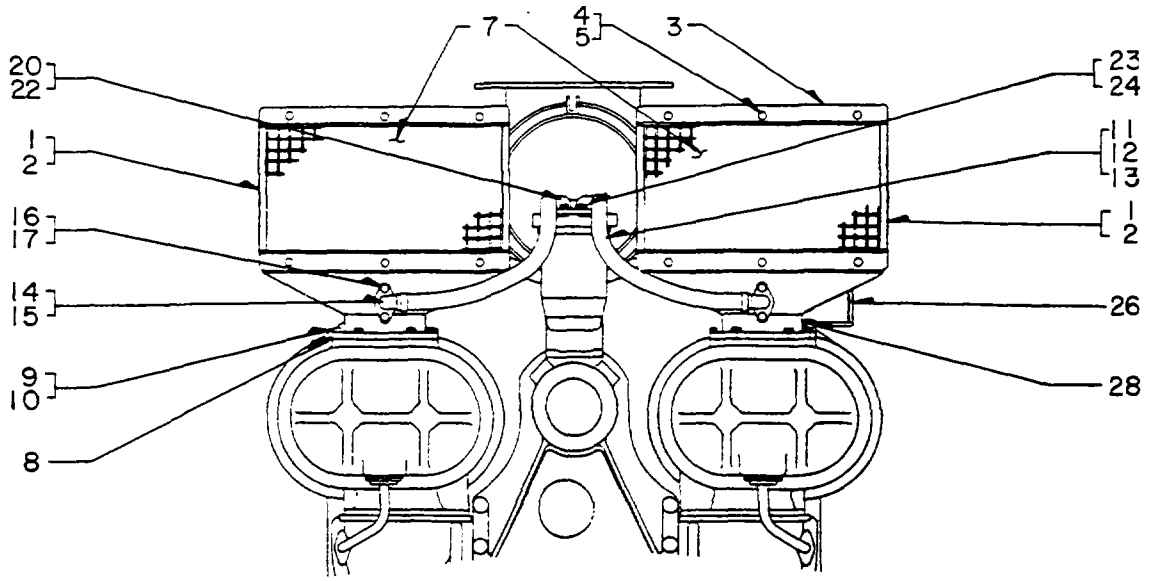


PLATE A81-1

Ref. No.	Part Number	Qty. Req.		Description
		A	-	8-645E2,E6 engines
		-	B	12-645E2,E6 and 16-645E2,E6 engines
†1	8419666	1	2	FILTER ASSEMBLY .. Air intake
2	8453241	1	2	HOUSING .. Filter
3	8453242	1	2	FRAME .. Retainer
4	180122	6	12	BOLT .. 3/8 - 16 x 1 hex. head
5	120382	6	12	WASHER .. Lock - 3/8
*6	117244	1	2	PLUG .. Pipe - 1/4 M.P.T. square head
7	9316812	4	8	ELEMENT .. Filter - 6-3/16 in. x 14 in. x 22-1/2 in. long - Replaces 8424753
8	8024287	1	2	GASKET .. Filter to blower
9	179885	10	20	BOLT .. 1/2 - 13 x 1-1/2 hex. head
10	6101229	10	20	WASHER .. Plain - 1/2
11	8040167	1	2	HOSE .. Oil separator - Replaces 8420047 - Cut length three inches
12	8420046	1	2	SPRING .. Hose
13	8132042	2	4	CLAMP .. Hose
14	8084420	1	2	ELBOW .. Flanged
15	8084407	1	2	GASKET .. Elbow
16	179885	2	4	BOLT .. 1/2 - 13 x 1-1/2 hex. head
17	6101229	2	4	WASHER .. Plain - 1/2
*18	8048967	1	-	FLANGE .. Blind
*19	8165250	1	-	ELBOW .. Flanged
20	8155201	-	1	ELBOW .. Flanged
*21	8084407	2	-	GASKET .. Elbow mounting
22	8155202	-	1	GASKET .. Elbow mounting
23	181433	4	4	BOLT .. 1/2 - 20 x 1-3/4 hex. head
24	6101229	4	4	WASHER .. Plain - 1/2
*25	8415273	1	1	SWITCH .. Vacuum - Setting 11 inches at rising vacuum
26	8420048	1	1	TUBE ASSEMBLY .. Switch to filter
*27	118755	1	1	ELBOW .. 3/8 tube x 1/4 M.P.T.
28	118750	1	1	CONNECTOR .. 3/8 tube x 1/4 M.P.T.
*29	179795	3	3	BOLT .. 1/4 - 20 x 3/4 hex. head
*30	8035130	3	3	NUT .. Lock - 1/4 - 20 hex.

† *8419666 Filter Assembly is no longer available. For replacement, use 1-8366947 oil bath air filter for 8 cyl. engines, 2-8366948 filters for 12 cyl. engines and 2-8366947 filters for 16 cyl. engines. See Parts List 80, Page 1. Contact our Service Department for details and required mounting modification.*

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Paper Element Engine Air Intake Filter Application With Vacuum Switch
8,12-645E5,12,16,20-645E7 Engines

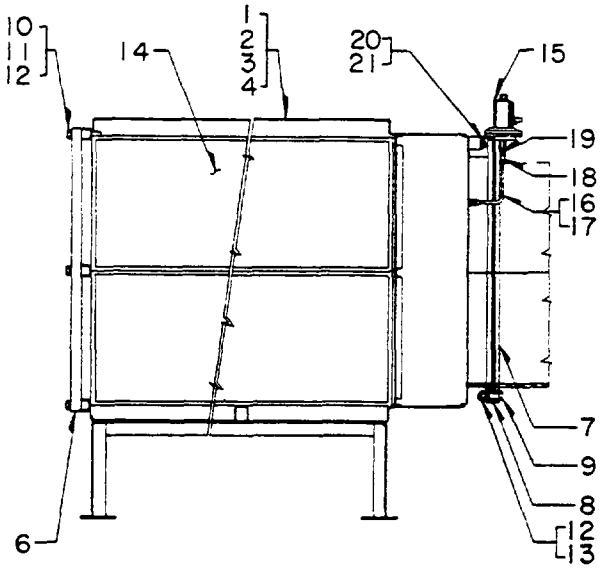


PLATE A81-2

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description
1	8425597	1	-	FILTER ASSEMBLY .. Air intake - 8-645E5,12-645E5,E7 engines
2	8419726	-	1	FILTER ASSEMBLY .. Air intake - 20-645E5,E7 engines
3		1	-	HOUSING ASSEMBLY .. Filter
4		-	1	HOUSING ASSEMBLY .. Filter
*5	143935	1	1	PLUG .. Pipe - 1/2 M.P.T. square head
6		1	-	FRAME .. Retaining
6		-	1	FRAME .. Retaining
7		1	-	FLANGE .. Mounting
7		-	1	FLANGE .. Mounting
8		1	-	GASKET .. Flange
8		-	1	GASKET .. Flange
9	180179	12	12	BOLT .. 1/2 - 13 x 1-3/4 hex. head
10	180193	6	-	BOLT .. 1/2 - 13 x 3-3/4 hex. head
11	180188	-	9	BOLT .. 1/2 - 13 x 2-3/4 hex. head
12	9427388	18	21	WASHER .. Lock - 1/2
13	120378	12	12	NUT .. 1/2 - 13 hex.
14	9093587	8	12	ELEMENT .. Air intake filter - 6-3/16 in. x 14 in. x 45-1/8 in. long - Replaces 8377042
15	8415273	1	1	SWITCH .. Vacuum - Setting 11 inches at rising vacuum
16	8425878	1	1	TUBE ASSEMBLY .. Switch to filter
17	8098593	A.R.		TUBING .. 1/4 O.D. x .028 in. wall - Copper brazed steel - 20 ft. length - Approx. 8 in. required
18	116452	2	2	NUT .. 1/4 tube
19	116436	2	2	CONNECTOR .. 1/4 tube x 1/4 M.P.T.
20	179795	3	3	BOLT .. 1/4 - 20 x 3/4 hex. head
21	109084	3	3	NUT .. 1/4 - 20 hex.

P3943, 8429952A, P4373, 8425879A

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Paper Element Engine Air Intake Filter Application With Vacuum Switch
12,20-645E4,E4B; 12-645E9; 16-645E9,E9B, and 20-645E9 Engines

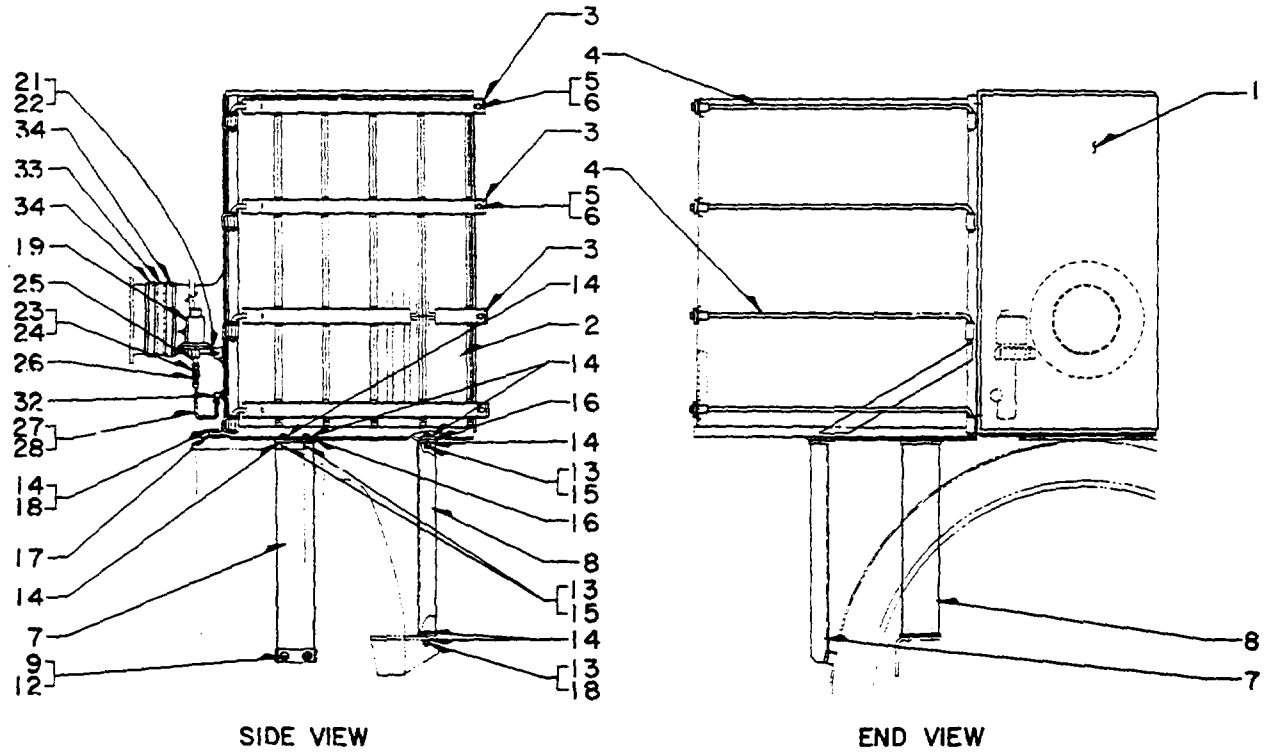
PLATE A81-3

Ref. No.	Part Number	Quantity Required						Description
		A	-	-	-	-	-	12-645E4 engine
		-	B	-	-	-	-	12-645E4,E9 engines
		-	-	C	-	-	-	16,20-645E4B; 16-645E9B; 20-645E4 engines
		-	-	-	D	-	-	16-645E9 engine
		-	-	-	-	E	-	20-645E4,E9 engines
		-	-	-	-	-	F	20-645E4 engine - Model MP45,MP45B,MP45M
1	8446087	1	1	-	-	-	-	HOUSING .. Filter
1	8411275	-	-	1	1	1	1	HOUSING .. Filter
2	9093588	15	15	15	15	15	15	ELEMENT .. Filter - Paper - Replaces 8375073
3	8410611	4	4	4	4	4	4	CHANNEL ASM. .. Element support
4	8410618	4	4	4	4	4	4	ROD ASM. .. Element support
5	181429	4	4	4	4	4	4	BOLT .. 1/2 - 20 x 1-1/4 hex. head
6	103343	4	4	4	4	4	4	WASHER .. Plain - 1/2
7	8411087	-	1	1	1	1	1	CHANNEL ASM. .. Filter housing to generator
ϕ8	8411086	-	1	-	-	1	1	CHANNEL ASM. .. Filter housing to generator
*ϕ8	8472724	-	1	-	1	1	-	CHANNEL ASM. .. Filter housing to generator - Applied to A20T6 and A20U24 generators
*8	9501133	-	-	1	-	-	-	BRACKET ASM. .. Filter housing to generator
9	8366314	-	1	1	1	1	1	PAD .. Tapping - 3/4 x 1-1/2 x 5 in. long - Two 1/2 - 13 tapped holes
*10	8490277	-	-	1	1	1	-	PAD .. Tapping - 3/4 x 1-1/4 x 6-1/4 in. long - Three 1/2 - 13 tapped holes
*11	179880	-	-	3	3	3	-	BOLT .. 1/2 - 13 x 7/8 hex. head
12	179881	-	2	2	2	2	2	BOLT .. 1/2 -13 x 1 hex. head
13	179885	-	6	4	4	6	6	BOLT .. 1/2 - 13 x 1-1/2 hex. head
14	103343	-	18	18	17	18	18	WASHER .. Plain - 1/2
15	8032745	-	6	4	4	6	6	NUT .. Lock - 1/2 - 13 hex.
16	----	-	As Required					SHIM .. Housing mounting - 3 in. x 5 in. 8368337 .. 24 ga. 8368338 .. 16 ga. 8368339 .. 11 ga.
17	----	-	As Required					SHIM .. Housing mounting - 2 in. x 3 in. 8348607 .. 11 ga. 8348608 .. 16 ga. 8348609 .. 24 ga.
18	179887	-	4	4	4	4	4	BOLT .. 1/2 - 13 x 1-3/4 hex. head
19	8415273	1	1	1	1	1	1	SWITCH .. Vacuum - Setting - 11 inches at rising vacuum
20	8411094	1	-	-	-	1	1	BRACKET .. Switch mounting - Formerly applied to stationary Generating and industrial drill rig units
21	179795	3	3	3	3	3	-	BOLT .. 1/4 - 20 x 3/4 hex. head - Formerly 179796
21	179796	-	-	-	-	-	3	BOLT .. 1/4 - 20 x 7/8 hex. head
22	8035130	3	3	3	3	3	3	NUT .. Lock - 1/4 - 20 hex.
23	105417	1	1	1	1	1	1	TEE .. Pipe - 1/4 F.P.T.
24	103878	1	1	1	1	1	1	PLUG .. Pipe - 1/4 M.P.T.
25	8060971	1	1	1	1	1	1	NIPPLE .. Pipe - 1/4 M.P.T. x 1-1/4 in. long - Threaded both end
26	116436	1	1	1	1	1	-	CONNECTOR .. 1/4 tube x 1/4 M.P.T.
27	8098593	As Required						TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 foot length
28	116452	2	2	2	2	2	4	NUT .. 1/4 tube
29	8173802	2	-	-	-	2	2	CLAMP .. Tube } Formerly applied to stationary generating & ind. drill rig units
30	9419644	2	-	-	-	2	2	SCREW .. Tapping - No. 10-24 x 1/2 hex. } Formerly applied to stationary generating & ind. drill rig units
31	106260	2	-	-	-	2	2	WASHER .. Plain - 1/4 } Formerly applied to stationary generating & ind. drill rig units
32	116453	1	1	1	1	1	2	ELBOW .. 1/4 tube x 1/4 M.P.T.
33	8264513	1	1	-	-	-	-	DUCT .. Air - 8-3/4 I.D. x 9-1/4 O.D. x 3-1/2 in. long
33	8365038	-	-	1	1	1	1	DUCT .. Air - 10-3/32 I.D. x 6-11/16 in. long
34	8375876	2	2	-	-	-	-	CLAMP .. Hose
34	8373018	-	-	2	2	2	2	CLAMP .. Hose
*35	8374278	-	-	2	2	2	2	RETAINER .. Hose
36	8160443	-	-	-	-	-	1	ELBOW .. Bulkhead - 1/4 tube
37	272131	-	-	-	-	-	1	NUT .. 7/16 - 20 hex.

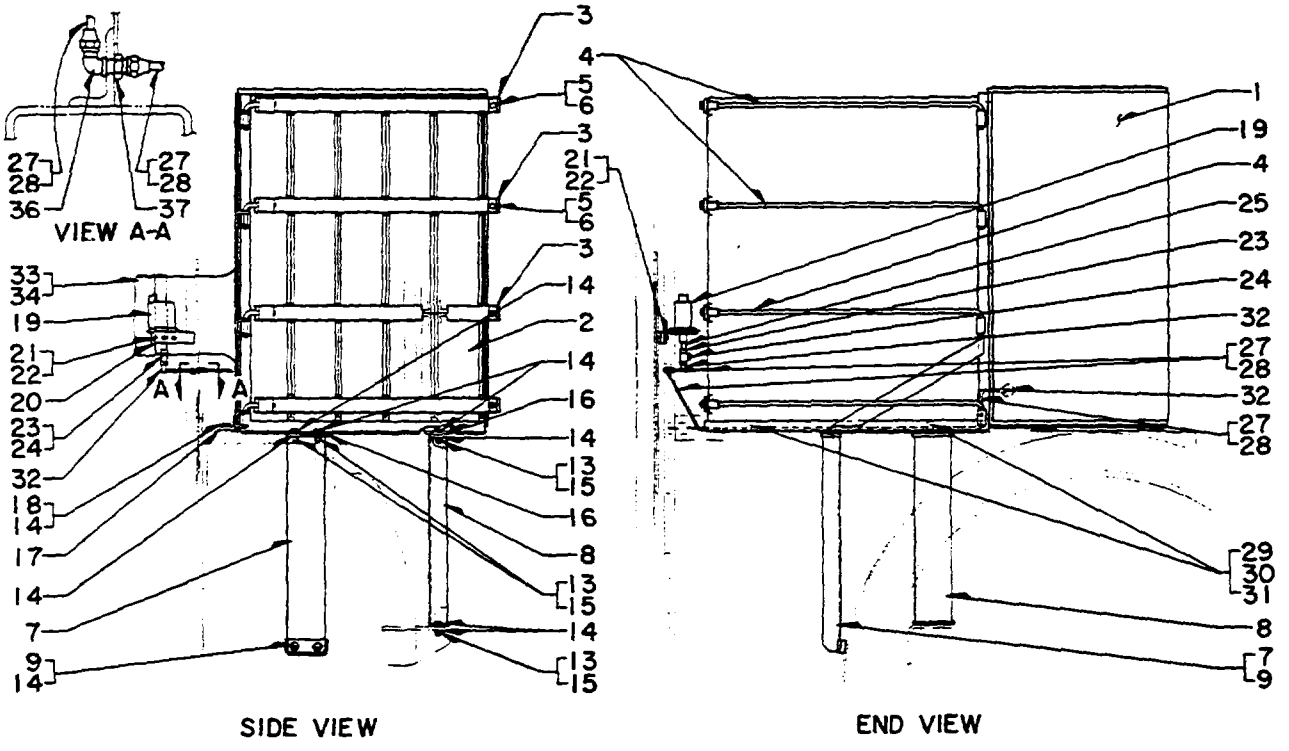
P3556, P4033, P5584, P8723, 8411207F, 8431197C, 8446089C, 8472725C, 9515775

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS



Industrial Application Except MP45



MP45 Application

PLATE A81-3

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application
With Restriction Indicator
8-645E1,E2,E6,E8 and 12,16-645E1,E6,E8 Engines

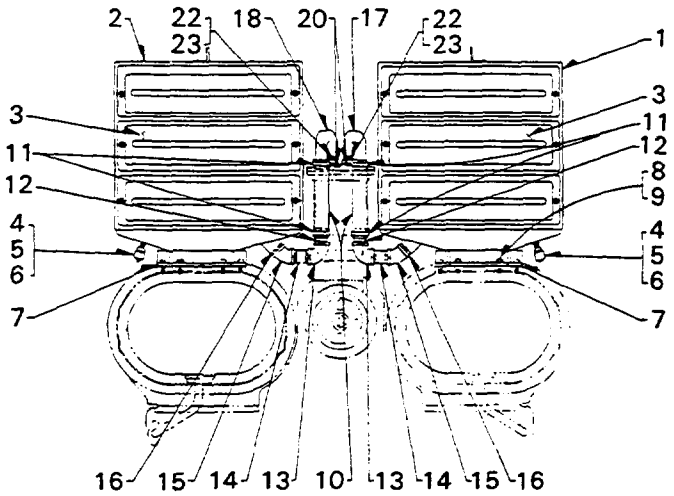


PLATE B81-4

Ref. No.	Part Number	Quantity Required			Description
		A	-	-	8-645E1,E2,E6,E8 engines
		-	B	-	12-645E1,E6,E8 engines
		-	-	C	16-645E1,E6,E8 engines
ϕ1	9522004	1	-	1	HOUSING .. Filter - Air intake - Right bank
*ϕ1	9501673	1	-	-	HOUSING .. Filter - Weather louver - Air intake - Right bank
*ϕ1	9522002	-	1	-	HOUSING .. Filter - Air intake - Right bank
*ϕ1	9522018	-	1	-	HOUSING .. Filter - Weather louver - Air intake - Right away
*ϕ2	9522003	-	1	-	HOUSING .. Filter - Air intake - Left bank
*ϕ2	9522019	-	1	-	HOUSING .. Filter - Weather louver - Air intake - Left bank
2	9522005	-	-	1	HOUSING .. Filter - Air intake - Left bank
3	9522063	3	4	6	ELEMENT .. Filter - Fiberglass bag-type - 19-3/8 in. long x 21-3/8 in. high x 4-3/4 in. wide
4	112877	1	2	2	BUSHING .. 1/4
5	9537542	1	2	2	CONNECTOR .. 1/8 - 27 F.P.T.
6	9331510	1	2	2	INDICATOR .. Restriction - 1/8 - 27 M.P.T.
7	8024287	1	2	2	GASKET .. Filter to blower
8	179885	10	20	20	BOLT .. 1/2 - 13 x 1-1/2 hex. head
9	6101229	10	20	20	WASHER .. Plain - 1/2
10	8040166	As Req.			HOSE .. Oil separator to filter - 36 in. length - Approx. 10 in. reqd for 8 cyl. engine and 20 in. for 12 and 16 cyl. engines - Replaces 8291949
11	8374760	2	4	4	CLAMP .. Oil separator hose
12	8153236	1	2	2	NIPPLE .. 1-1/4 x 2-1/2 in. long - Threaded one end only
13	137971	1	2	2	ELBOW .. 1-1/4 F.P.T. - 90°
14	8060976	1	-	2	NIPPLE .. 1-1/4 x 2-1/2 in. long - Threaded both ends
*14	8105889	-	2	-	NIPPLE .. 1-1/4 x 4 in. long - Threaded both ends
15	144133	1	2	2	ELBOW .. 1-1/4 F.P.T. - 45°
16	8060930	1	2	2	NIPPLE .. 1-1/4 close - Threaded both ends
17	9501077	1	1	1	PIPE ASM. .. Hose to oil separator
18	9523379	-	1	1	PIPE ASM. .. Hose to oil separator
19	8084407	3	2	4	GASKET .. Pipe to oil separator
*20	9510766	1	-	-	PLATE .. Orifice
20	8407198	-	-	2	PLATE .. Orifice - Formerly 8436986
*21	8048967	1	-	-	FLANGE .. Cover - Left bank
22	181429	4	4	4	BOLT .. 1/2 - 20 x 1-1/4 hex. head
23	6101229	4	4	4	WASHER .. Plain - 1/2

9527517B, 9523380B, 9537598A

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-type Engine Air Filter Application with Vacuum Switch
And Restriction Indicator
8-645E5,E7,E7B,E7C Engines

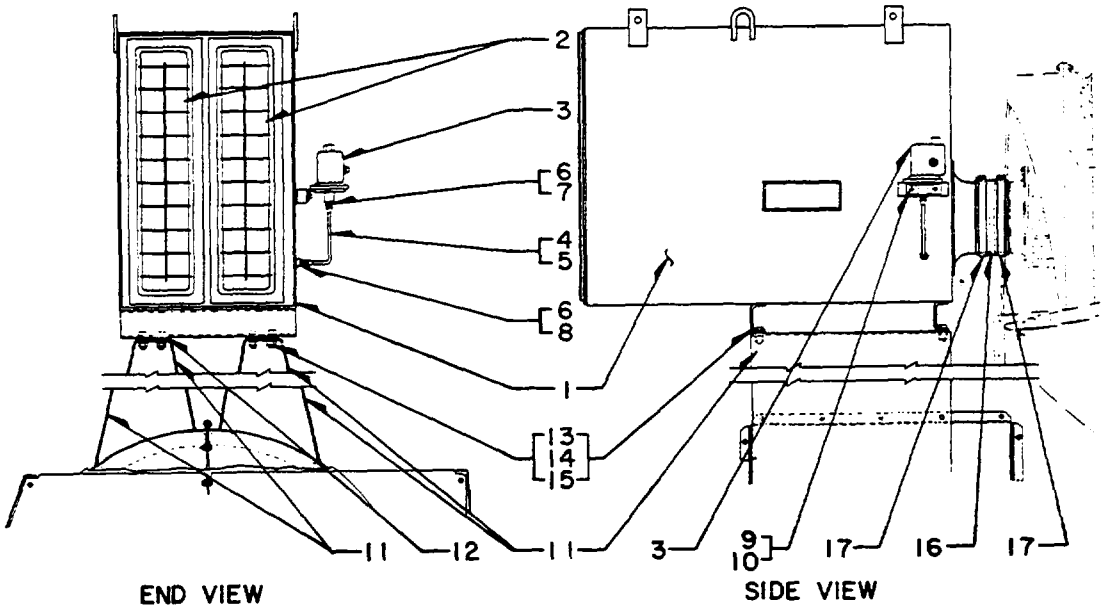


PLATE B81-5

Ref. No.	Part Number	Qty. Req.	Description	
1	8479771	1	HOUSING .. Filter - Air intake	
2	8470903	2	ELEMENT .. Filter - Fiberglass bag-type	
3	8460801	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	Formerly applied prior to September 1981
4	8460770	1	TUBE ASSEMBLY .. Switch to filter housing	
5	8098593	A.R.	TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required	
6	116452	2	NUT .. 1/4 tube	
7	116436	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
8	118748	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
9	179795	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
10	8035130	2	NUT .. Lock - 1/4 - 20 hex.	
11	8483670	2	BRACKET .. Housing mounting - Left and right sides	
12	----	A.R.	SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.	
13	179885	8	BOLT .. Housing mounting - 1/2-13 x 1-1/2 hex. head	
14	6101229	8	WASHER .. Plain - 1/2	
15	8032745	8	NUT .. Lock - 1/2 - 13 hex.	
16	9508096	1	DUCT .. Air - Neoprene impregnated - 8-5/16 I.D. - Form. 8408178	
17	9096140	2	CLAMP .. Air duct - T bolt - Formerly 8422314	
*18	9537542	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied after Sept. 1981
*19	9331510	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

P6581, 8483303D, 8479768D, P8774, P7191, 8469860D

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
And Restriction Indicator
8-645E5,E7B; 12-645E5,E6,E7,E7B,E7C; and 16-645E6 Engines

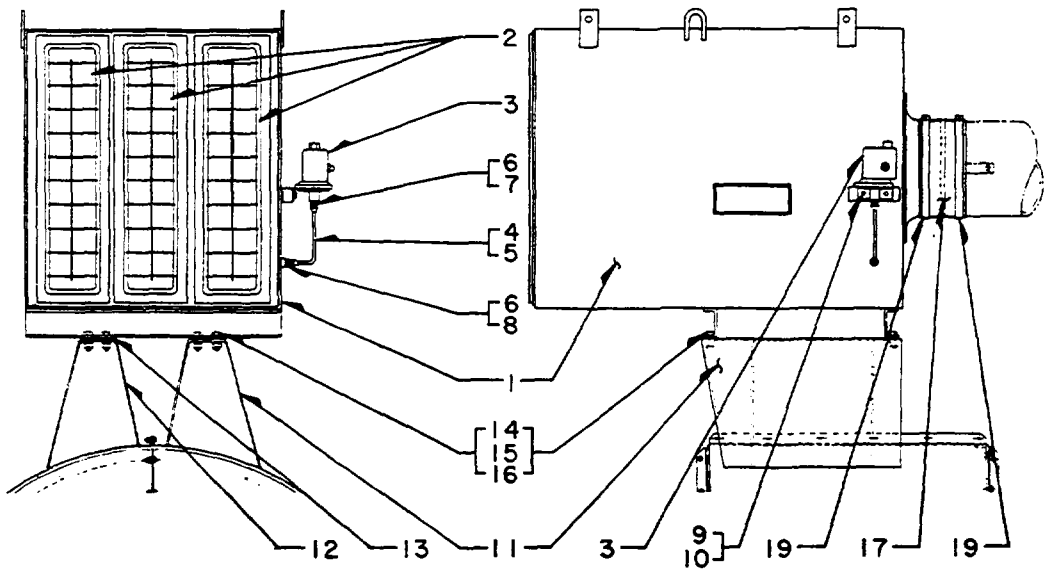


PLATE B81-6

Ref. No.	Part Number	Quantity Required				Description	
		A	-	-	-	12-645E6 engine	
		-	B	-	-	16-645E6 engine	
		-	-	C	-	8-645E5,E7B; 12-645E5,E7,E7B,E7C engines	
		-	-	-	D	12-645E5,E7 engines	
1	9098491	1	1	-	-	HOUSING .. Filter - Air intake	
1	8477157	-	-	1	1	HOUSING .. Filter - Air intake	
2	8470903	3	3	3	3	ELEMENT .. Filter - Fiberglass bag-type	
3	8460801	1	1	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
4	8460770	1	1	1	1	TUBE ASSEMBLY .. Switch to filter housing	Columns C & D formerly applied prior to September, 1981
5	8098593	As Required				TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel 20 ft. length - Approx. 9 in. required	
6	116452	2	2	2	2	NUT .. 1/4 tube	
7	116436	1	1	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
8	118748	1	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
9	179795	2	2	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
10	8035130	2	2	2	2	NUT .. Lock - 1/4 - 20 hex.	
11	9098207	1	-	-	-	BRACKET .. Housing mounting - Right side	
11	9097430	-	1	-	-	BRACKET .. Housing mounting - Right side	
11	8483669	-	-	1	-	BRACKET .. Housing mounting - Right side	
12	9098208	1	-	-	-	BRACKET .. Housing mounting - Left side	
12	9097431	-	1	-	-	BRACKET .. Housing mounting - Left side	
12	8483669	-	-	1	-	BRACKET .. Housing mounting - Left side	
13	----	A.R.				SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.	
14	179885	8	8	8	-	BOLT .. Housing mounting - 1/2 - 13 x 1-1/2 hex. head	
15	6101229	8	8	8	-	WASHER .. Plain - 1/2	
16	8032745	8	8	8	-	NUT .. Lock - 1/2 - 13 hex.	
17	8347632	1	1	-	-	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long	
17	8264513	-	-	1	2	DUCT .. Air - Neoprene impregnated - 8-3/4 I.D. x 3-1/2 in. long	
*18	8476474	-	-	-	1	DUCT .. Air - Steel - Offset - 8-3/4 O.D. x 32-3/4 in. long x 11 ga.	
19	8373018	2	2	-	-	CLAMP .. Air duct - 10.12 to 10.78 in. diameter	
19	8375876	-	-	2	4	CLAMP .. Air duct - 8.94 to 9.60 in. diameter	
*20	9537542	-	-	1	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied since September, 1981
*21	9331510	-	-	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

P5785, P6583, P6782, P6890, P7364, P7424

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
And Restriction Indicator
16,20-645E5,E7,E7B engines

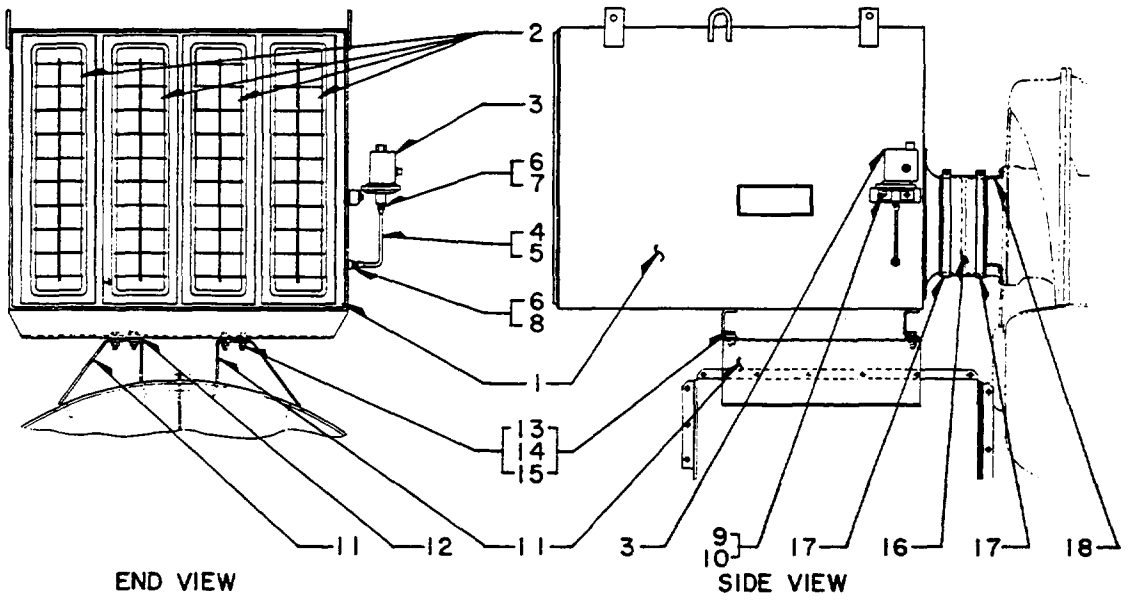


PLATE B81-7

Ref. No.	Part Number	Quantity Required		Description
		A	-	16-645E5,E7,E7B engines
		-	B	20-645E5,E7,E7B engines
1	8477158	1	1	HOUSING .. Filter - Air intake
2	8470903	4	4	ELEMENT .. Filter - Fiberglass bag-type
3	8460801	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum
4	8460770	1	1	TUBE ASSEMBLY .. Switch to filter housing
5	8098593	A.R.		TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required
6	116452	2	2	NUT .. 1/4 tube
7	116436	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.
8	118748	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
9	179795	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head
10	8035130	2	2	NUT .. Lock - 1/4 - 20 hex.
11	8483669	2	-	BRACKET .. Housing mounting - Left and right sides
11	8479052	-	2	BRACKET .. Housing mounting - Left and right sides
12	----	A.R.		SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.
13	179885	8	8	BOLT .. Housing mounting - 1/2 - 13 x 1-1/2 hex. head
14	6101229	8	8	WASHER .. Plain - 1/2
15	8032745	8	8	NUT .. Lock - 1/2 - 13 hex.
16	8347632	1	1	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long
17	8373018	2	2	CLAMP .. Air duct - 10.12 to 10.78 in. diameter
18	8374278	2	2	RETAINER .. Duct
*19	9537542	1	1	CONNECTOR .. 1/8 - 27 F.P.T.
*20	9331510	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.

Formerly applied prior to September, 1981

Currently applied after September 1981

P6484, P6653, P6894, P9206, 8496060D, 8479045D, P6585, P6892, P9118, 9083802C, 8483301C

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch And Restriction Indicator
8-645E4; 12-645E4,E4B,E7B,E9,E9B Engines

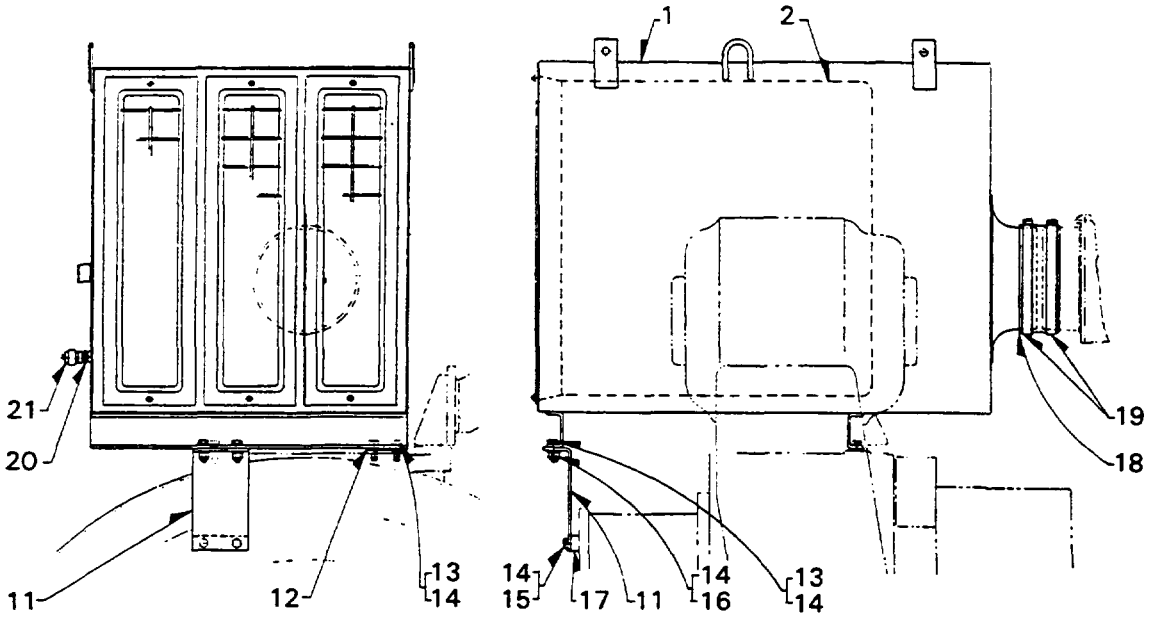


PLATE B81-8

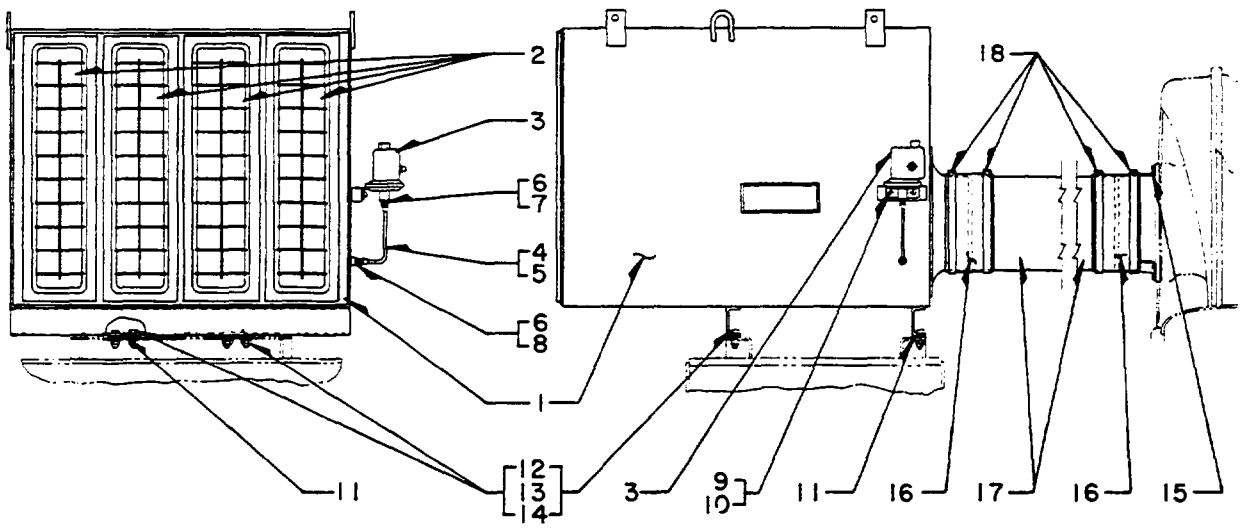
Ref. No.	Part Number	Qty. Req.			Description	
		A	-	-	8-645E4B engine	
		-	B	-	12-645E4,E9 engines	
		-	-	C	12-645E4B,E7B,E9B engines	
*1	8489824	1	-	-	HOUSING .. Filter - Air intake	
ϕ1	8489825	-	1	1	HOUSING .. Filter - Air intake	
ϕ1	9522025	-	-	1	HOUSING .. Filter - Weather louver - Air intake - 12-645E4B only	
2	8470903	2	3	3	ELEMENT .. Filter - Fiberglass bag-type	
*3	8460801	1	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
*4	8460770	1	1	1	TUBE ASM. .. Switch to filter housing	Formerly applied prior to September, 1981
*5	8098593	A.R.			TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required	
*6	116452	2	2	2	NUT .. 1/4 tube	
*7	116436	1	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
*8	118748	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
*9	179795	2	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
*10	8035130	2	2	2	NUT .. Lock - 1/4 - 20 hex.	
11	8488487	1	1	-	BRACKET .. Housing mounting	
11	9527547	-	-	1	BRACKET .. Housing mounting	
12	----	A.R.			SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.	
13	179885	6	6	6	BOLT .. Housing mounting - 1/2 - 13 x 1-1/2 hex. head	
14	6101229	10	10	8	WASHER .. Plain - 1/2	
15	179880	2	2	-	BOLT .. Bracket mounting - 1/2 - 13 x 7/8 hex. head	
16	8032745	2	2	2	NUT .. 1/2 - 13 hex.	
17	8486441	1	1	-	PAD .. Tapping - 1-1/4 x 5 in. long	
18	9508096	1	-	-	DUCT .. Air - Neoprene impregnated - 8-5/16 I.D.	
18	8264513	-	1	1	DUCT .. Air - Neoprene impregnated - 8-3/4 I.D. x 3-1/2 in. long	
19	9096140	2	-	-	CLAMP .. Air duct - T bolt	
19	8375876	-	2	2	CLAMP .. Air duct	
20	9537542	1	1	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied after September, 1981
21	9331510	1	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

P6417, P8322, P8604, P8789, P9284, P9754, 8488654B, 8488655B, 9510106B

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch And Restriction Indicator
16-645E7,E7B; 20-645E7,E7B,E7C Engines



END VIEW SIDE VIEW

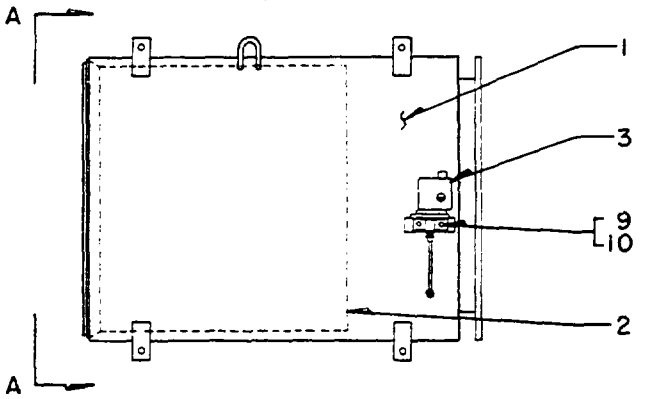
PLATE B81-9

Ref. No.	Part Number	Quantity Required				Description	
		A	-	-	-	16-645E7,E7B engines	
		-	B	-	-	20-645E7 engines	
		-	-	C	-	20-645E7,E7C engines	
		-	-	-	D	20-645E7B engines	
1	8477158	1	1	1	1	HOUSING .. Filter - Air intake	
2	8470903	4	4	4	4	ELEMENT .. Filter - Fiberglass bag-type	
3	8460801	1	1	1	-	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
4	8460770	1	1	1	-	TUBE ASM. .. Switch to filter housing	Formerly applied prior to September, 1981
5	8098593	As Required			-	TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required	
6	116452	2	2	2	-	NUT .. 1/4 tube	
7	116436	1	1	1	-	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
8	118748	1	1	1	-	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
9	179795	2	2	2	-	BOLT .. 1/4 - 20 x 3/4 hex. head	
10	8035130	2	2	2	-	NUT .. Lock - 1/4 - 20 hex.	
11	----	A.R.		-	A.R.	SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.	
12	179885	8	-	-	8	BOLT .. Housing mounting - 1/2 - 13 x 1-1/2 hex. head	
12	179887	-	8	-	-	BOLT .. Housing mounting - 1/2 - 13 x 1-3/4 hex. head	
13	6101229	8	16	-	8	WASHER .. Plain - 1/2	
14	8032745	8	8	-	8	NUT .. Lock 1/2 - 13 hex.	
15	8374278	2	2	2	-	RETAINER .. Duct	
16	8347632	2	2	2	2	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long	
ϕ17	9315024	1	-	-	-	DUCT .. Air - Steel - 10-1/16 O.D. x 31-1/8 in. long - 11 ga.	
ϕ17	9525542	1	-	-	-	DUCT .. Air - Steel - 10-1/16 O.D. x 5 in. long - 11 ga.	
17	8493037	-	1	-	-	DUCT .. Air - Steel - 10-1/16 O.D. x 32-3/4 in. long - 11 ga.	
ϕ17	9085723	-	-	1	-	DUCT .. Air - Offset - Steel - 10-1/16 O.D. x 22-3/4 in. long - 16 ga.	
ϕ17	9087114	-	-	1	-	DUCT .. Air - Offset - Steel - 10-1/16 O.D. x 7 ft. 8-5/8 in. long - 16 ga.	
17	9549083	-	-	-	1	DUCT .. Air - Steel - 10-1/16 O.D. x 17-17/64 in. long - 11 ga.	
18	8373018	4	4	4	4	CLAMP .. Air duct - Formerly 8473018	
*19	9537542	1	1	1	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied after September, 1981
*20	9331510	1	1	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

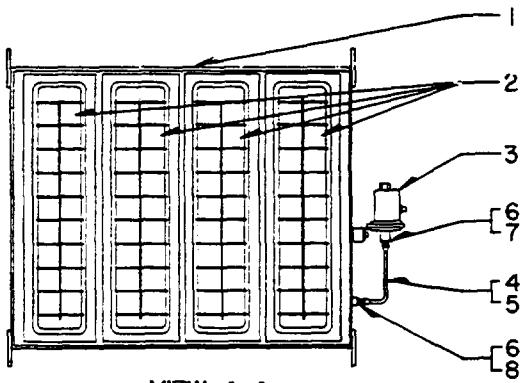
P6543, P6892, P9206, 8479053D, 9083802C, P6544, P6902, M1464, 8492998D, 9549025, P6609, P7478, 9099801A

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
8-645E6,E7B; 12-645E5,E7; 16-645E5,E7,E7B; 20-645E5,E7 Engines

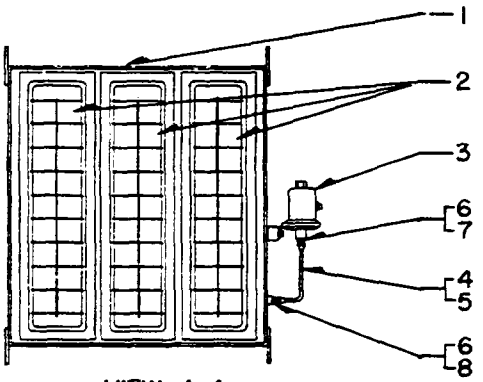


SIDE VIEW



VIEW A-A
END VIEW

16-645E5,E7,E7B and 20-645E5,E7 Engines



VIEW A-A
END VIEW

12-645E5,E7 Engines

PLATE B81-10

Ref. No.	Part Number	Qty. Req.			Description	
		A	-	-	8-645E6,E7B marine engines	
		-	B	-	12-645E5,E7 marine engines	
		-	-	C	16-645E5,E7,E7B and 20-645E5,E7 engines	
*1	8479770	1	-	-	HOUSING .. Filter - Air intake	
1	8479509	-	1	-	HOUSING .. Filter - Air intake	
1	8479070	-	-	1	HOUSING .. Filter - Air intake	
2	8470903	2	3	4	ELEMENT .. Filter - Fiberglass bag-type	
3	8460801	1	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
4	8460770	1	1	1	TUBE ASM. .. Switch to filter housing	Formerly applied prior to September, 1981
5	8098593	A.R.			TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required	
6	116452	2	2	2	NUT .. 1/4 tube	
7	116436	1	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
8	118748	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
9	179795	2	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
10	8035130	2	2	2	NUT .. Lock - 1/4 - 20 hex.	
*11	8410134	-	-	1	DUCT .. Air - Silencer to turbocharger - 10-1/16 in. dia. x 22-1/4 in. Long x 11 ga. steel - Includes baffle	
*12	8347632	-	-	2	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long	
*13	8373018	-	-	4	CLAMP .. Air duct - 10.12 to 10.78 in. diameter	

P5905, P5965, P7227, P8885, P9488, 8479764B, 8479765B, 8479766B

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
16-645E6,E7B,E7C,F7B and 20-645E7B Engines

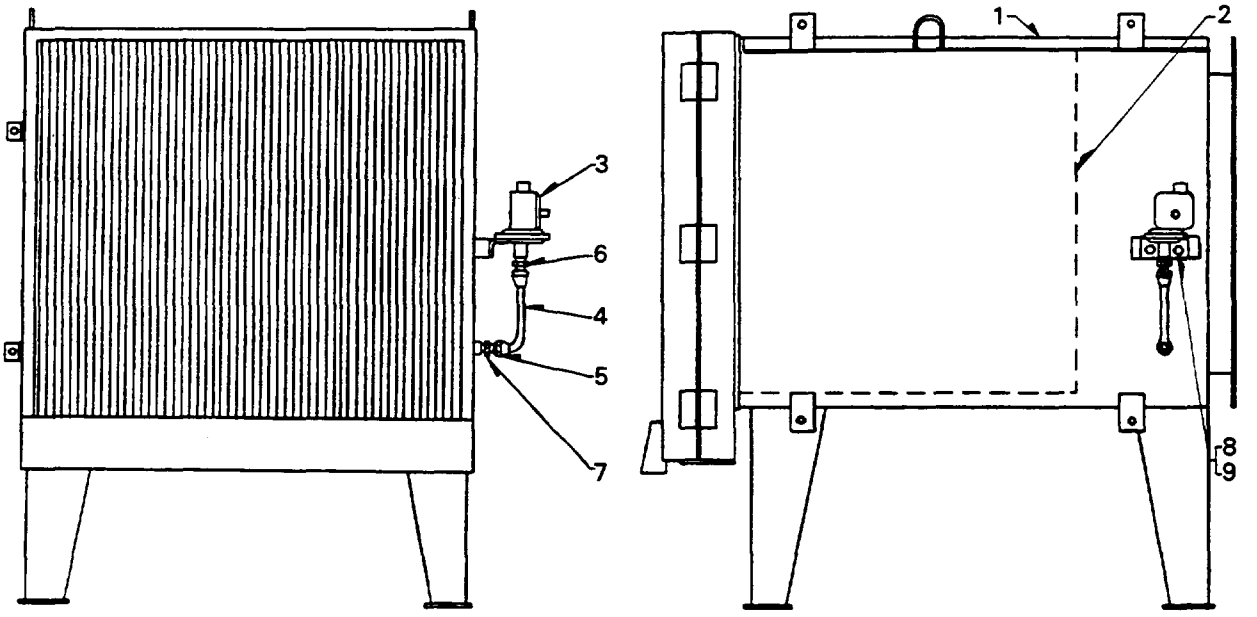


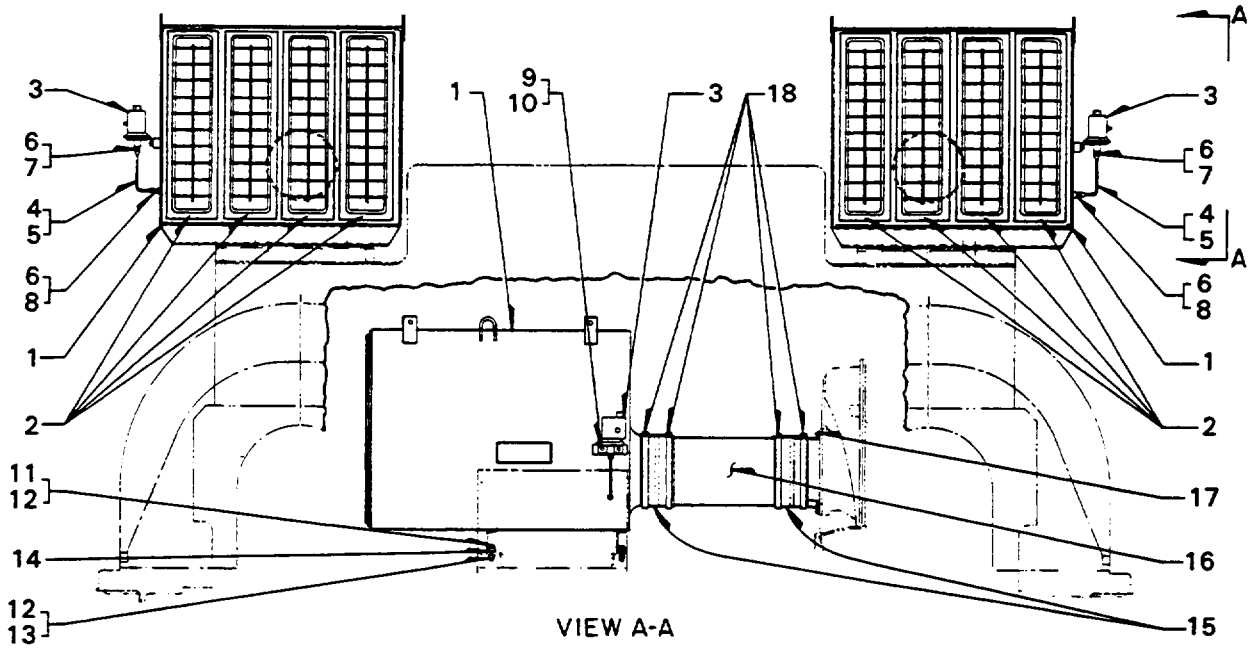
PLATE B81-11

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Qty. Req. C	Description	
		A	-	-	16-645E6 engine	
		-	B	-	16-645E7B,E7C,F7B, and 20-645E7B engines	
		-	-	C	20-645E7B engine	
*1	9526699	1	-	-	HOUSING .. Filter - Air intake - Horizontal mounted	
1	9526698	-	1	-	HOUSING .. Filter - Air intake - Horizontal mounted	
*1	9533284	-	-	1	HOUSING .. Filter - Air intake - Vertical mounted	
2	8470903	3	4	4	ELEMENT .. Filter - Fiberglass - Bag-Type	
3	8460801	1	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
4	8098593	As Req.			TUBING .. 1/4 O.D. x .028 wall - copper brazed steel - 20 ft. length - Approx. 9 in. required	Column A - Formerly applied prior to September, 1981
5	116452	2	2	2	NUT .. 1/4 tube	
6	116436	1	1	-	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
*6	116453	-	-	1	ELBOW .. 1/4 tube x 1/4 M.P.T. - 90°	
7	118748	1	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
8	179795	2	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
9	8035130	2	2	2	NUT .. Lock - 1/4 - 20 hex.	

P9307, P9316, P9591, M1382, 9526806A, 9526807A, 9533692, 9546765

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
And Restriction Indicator - Twin Engine Marine Drive
16-645E7,E7B and 20-645E7 Engines



VIEW A-A

PLATE A81-12

Ref. No.	Part Number	Qty. Req. A	Qty. Req. B	Description	
†1	8460575	1	-	HOUSING .. Filter - Air intake - Vacuum switch mounting on right side	
†1	8460574	-	1	HOUSING .. Filter - Air intake - Vacuum switch mounting on left side	
2	8470903	4	4	ELEMENT .. Filter - Fiberglass bag-type	
3	8460801	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
4	8460770	1	1	TUBE ASM. .. Switch to filter housing	Formerly applied prior to September, 1981
5	8098593	A.R.		TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 in. required	
6	116452	2	2	NUT .. 1/4 tube	
7	116436	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
8	118748	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
9	179795	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
10	8035130	2	2	NUT .. Lock - 1/4 - 20 hex.	
ϕ11	179887	8	8	BOLT .. Housing mounting - 1/2 - 13 x 1-3/4 hex. head	
ϕ11	179883	8	8	BOLT .. Housing mounting - 1/2 - 13 x 1-1/4 hex. head	
12	6101229	A.R.		WASHER .. Plain - 1/2 - 8 required with bolt 179883 16 required with bolt 179887	
13	8032745	8	8	NUT .. Lock - 1/2 - 13 hex. - Not required for filters mounted in tapping pads	
14	----	A.R.		SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 ga. 8479048 .. 16 ga. 8479049 .. 20 ga.	
15	8347632	2	2	DUCT .. Air - Neoprene impregnated - 10-3/32 I.D. x 5 in. long	
ϕ16	8490064	1	1	DUCT .. Air - Steel - 10-1/16 dia. x 20 in. long - 11 ga.	
ϕ16	9310501	1	1	DUCT .. Air - Steel - 10-1/16 dia. x 25-3/16 in. long - 11 ga.	
ϕ16	9530337	1	1	DUCT .. Air - Steel - 10-1/16 dia. x 12-29/32 in. long - 11 ga.	
17	8374278	2	2	RETAINER .. Duct	
18	8373018	4	4	CLAMP .. Air duct	
*19	9537542	1	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied after September, 1981
*20	9331510	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

† *The above housings, filter assemblies are also applied to single engine drive units. The required filter is dependent upon specific customer application and vacuum switch mounting location.*

P6399, P6886, P6888, P9367, 8490605B, 9097478D, 9098400C, 9326118B, 9530167A

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
And Restriction Indicator
16,20-645E4,E4B,E7B,E9,E9B Engines

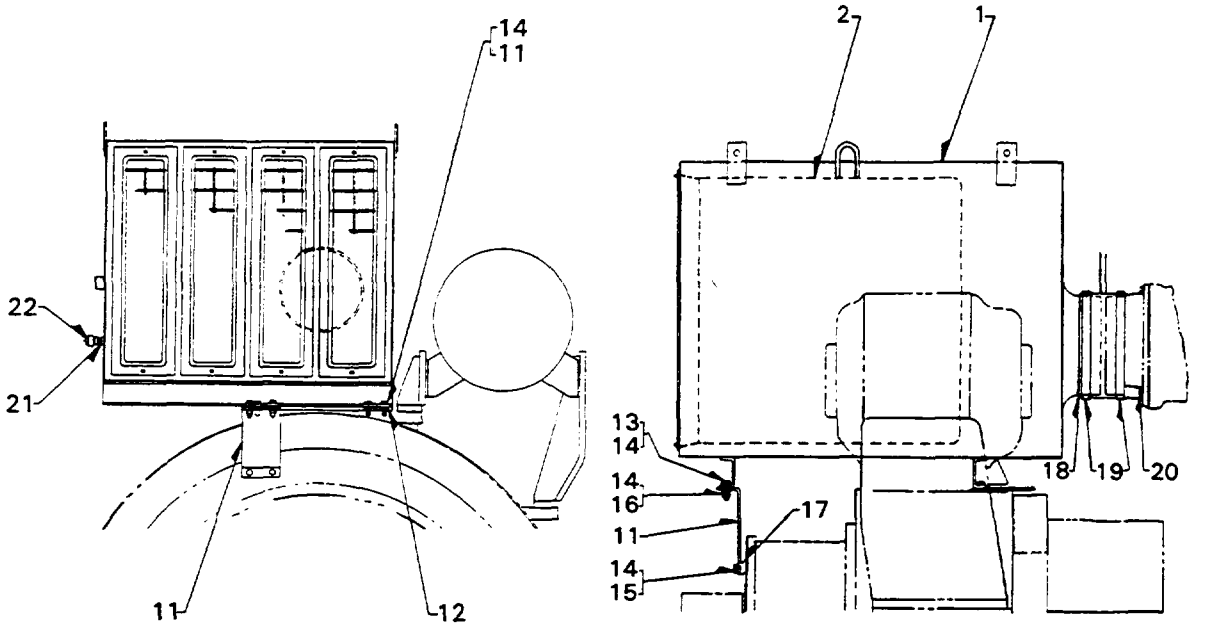


PLATE A81-13

Ref. No.	Part Number	Qty. Req.		Description	
		A	-	16,20-645E4,E9 engines	
		-	B	16,20-645E4B,E7B,E9B engines	
1	8489826	1	1	HOUSING .. Filter - Air intake	
2	8470903	4	4	ELEMENT .. Filter - Fiberglass bag-type - 29-3/8 in. long x 26-7/8 in. high x 6 in. wide	
*3	8460801	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum	
*4	8460770	1	1	TUBE ASM. .. Switch to filter housing	Formerly applied prior to September, 1981
*5	8098593	A.R.		TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 inches required	
*6	116452	2	2	NUT .. 1/4 tube	
*7	116436	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.	
*8	118748	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.	
*9	179795	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head	
*10	8035130	2	2	NUT .. Lock - 1/4 - 20 hex.	
11	8488487	1	-	BRACKET .. Housing mounting	
*11	9510036	-	1	BRACKET .. Housing mounting	
12	----	A.R.		SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 gauge 8479048 .. 16 gauge 8479049 .. 20 gauge	
13	179885	6	6	BOLT .. Housing mounting - 1/2 - 13 x 1-1/2 hex. head	
14	6101229	10	8	WASHER .. Plain - 1/2	
15	179880	2	-	BOLT .. Bracket mounting - 1/2 - 13 x 7/8 hex. head	
16	8032745	2	2	NUT .. 1/2 - 13 hex.	
17	8486441	1	-	PAD .. Tapping - 1-1/4 x 5 in. long	
18	8347632	1	1	DUCT .. Air - Neoprene impregnated - 10-3/32 x 5 in. long	
19	8373018	2	2	CLAMP .. Air duct	
20	8374278	2	2	RETAINER .. Duct	
21	9537542	1	1	CONNECTOR .. 1/8 - 27 F.P.T.	Currently applied After September, 1981
22	9331510	1	1	INDICATOR .. Restriction - 1/8 - 27 M.P.T.	

P6396, P7864, P8598, 8488447B, 9510037B

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application With Vacuum Switch
And Louver Assembly
12,20-645E7 Engines

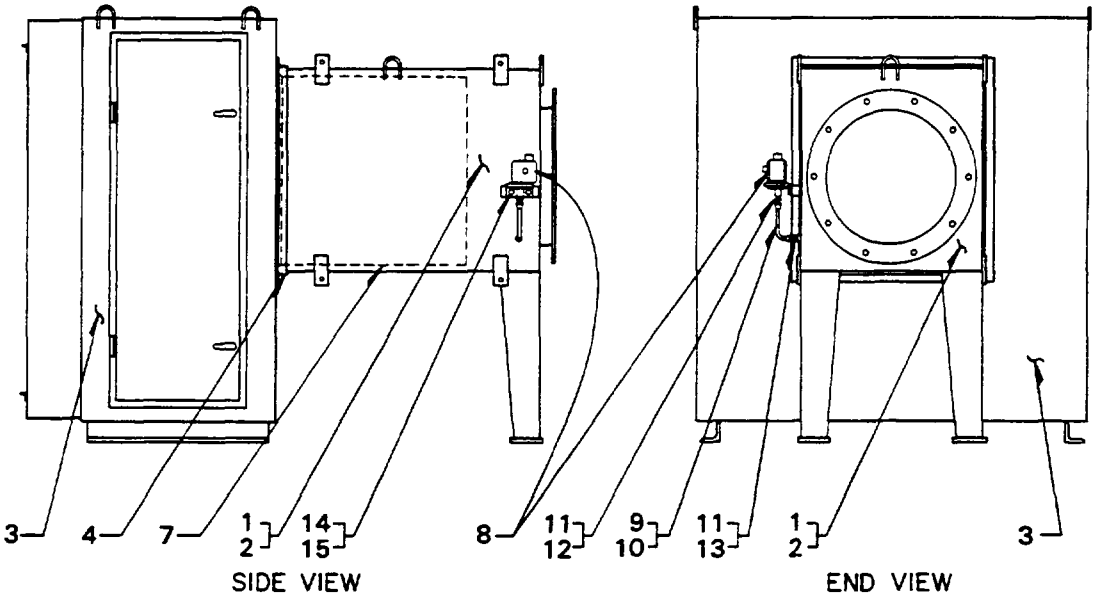


PLATE A81-14

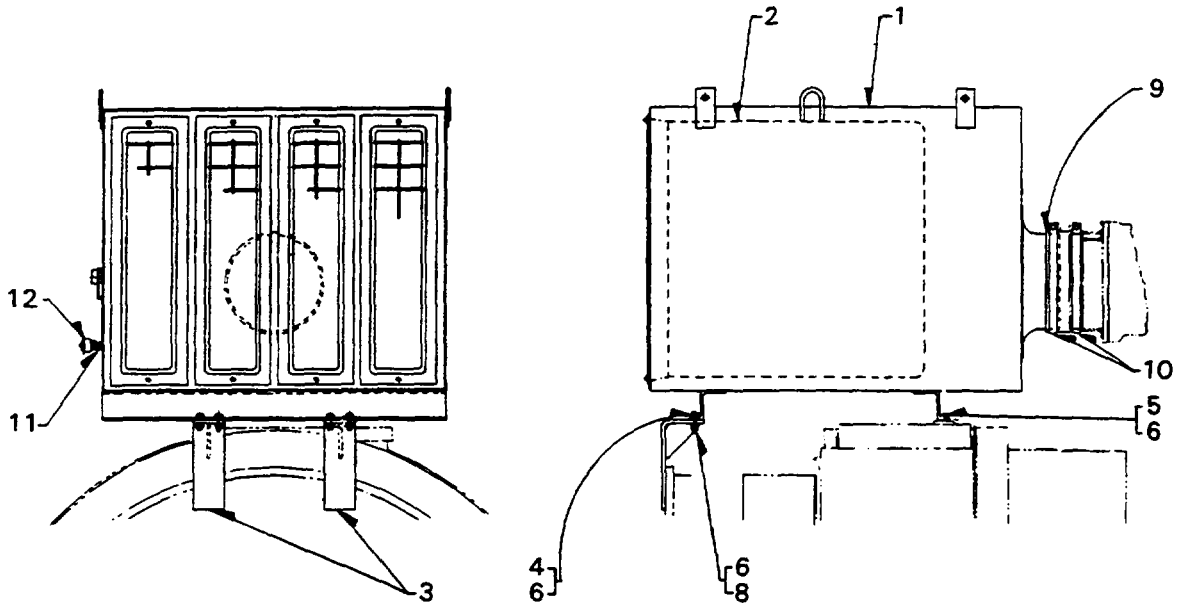
Ref. No.	Part Number	Qty. Req.		Description
		A	-	12-645E7 engine
		-	B	20-645E7 engine
1	9084036	1	-	FILTER AND LOUVER ASSEMBLY
1	8495737	-	1	FILTER AND LOUVER ASSEMBLY
2	9084038	1	-	FILTER ASM.
2	8495738	-	1	FILTER ASM.
3	9084039	1	-	LOUVER ASM.
3	8495739	-	1	LOUVER ASM.
4	9511924	4	-	STRIP .. Sponge rubber - 3/16 x 1-1/2 x 38-1/8 in. long - Replaces 9084040
4	8495741	-	1	KIT .. Gasket - Filter to louver
*5	180079	24	24	BOLT .. 5/16 - 18 x 1 hex. head } Replaces 8495740 kit
*6	9417953	24	24	WASHER .. Spring lock - 5/16 } Replaces 8495740 kit
7	8470903	3	4	ELEMENT .. Filter - Fiberglass bag-type - 29-3/8 in. long x 26-7/8 in. High x 6 in. wide
8	8460801	1	1	SWITCH .. Vacuum - Setting 7 inches at rising vacuum
9	8460770	1	1	TUBE ASM. .. Switch to filter housing
10	8098593	A.R.		TUBING .. 1/4 O.D. x .028 wall - Copper brazed steel - 20 ft. length - Approx. 9 inches required
11	116452	2	2	NUT .. 1/4 tube
12	116436	1	1	CONNECTOR .. 1/4 tube x 1/4 M.P.T.
13	118748	1	1	CONNECTOR .. 1/4 tube x 1/8 M.P.T.
14	179795	2	2	BOLT .. 1/4 - 20 x 3/4 hex. head
15	8035130	2	2	NUT .. Lock - 1/4 - 20 hex.

P6634, P6981, 8495372A, 9085140A

P.L. No. B81

PAPER AND FIBERGLASS ENGINE AIR INTAKE FILTERS

Fiberglass Element Bag-Type Engine Air Filter Application
With Restriction Indicator
16-645F4B, 20-645F4B,F7B Engines



END VIEW SIDE VIEW

PLATE A81-15

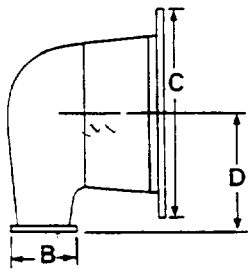
Ref. No.	Part Number	Qty. Req.		Description
		A		20-645F7B Engines
			B	16,20-645F4B Engines
1	8477158	1	-	HOUSING .. Filter
1	9562298	-	1	HOUSING .. Filter
2	8470903	4	4	ELEMENT .. Filter - Fiberglass bag-type - 29-3/8 in. long x 26-7/8 in. high x 6 in. wide
3	9562599	-	2	BRACKET .. Housing mounting
4	179885	-	4	BOLT .. Hex. head 1/2-13 x 1-1/2 - Housing mounting
5	179887	-	4	BOLT .. Hex. head 1/2-13 x 1-3/4 - Housing mounting
6	6101229	-	12	WASHER .. Flat
7	----	-	AR	SHIM .. Housing mounting - 1-1/2 x 3-1/2 in. 8479047 .. 11 Ga. 8479048 .. 16 Ga. 8479049 .. 20 Ga.
8	8032745	-	4	NUT .. Hex. lock 1/2-13 - Housing mounting
9	9558513	1	1	DUCT .. Air - 10-1/8 I.D. x 10-5/8 O.D. x 3-3/4 in. long - Neoprene impregnated
10	8373018	2	2	CLAMP .. Air duct - 10.12 to 10.78 in. adjustment diameter
11	9537542	1	1	CONNECTOR .. Restriction indicator - 1/8-27 FPT x 1 in. long
12	9331510	1	1	INDICATOR .. Restriction - 1/8-27 MPT

P6609, 9565455, M1835, 9564501, M1935, 9564205, 9562601

Parts List No. B82

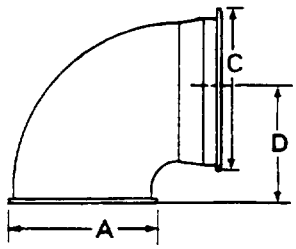
EXHAUST STACK ADAPTER ASSEMBLY

8,12,16,20-645 Turbocharged Engines



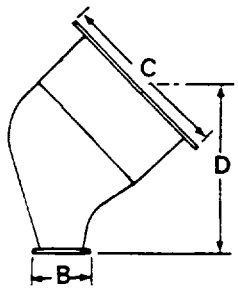
90°
Fore or Aft

Ref. Nos. 1 thru 7



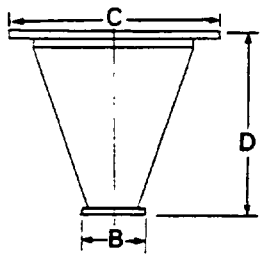
90°
Left or Right

Ref. Nos. 8 thru 10



45° (135° Included Angle)
Fore or Aft

Ref. Nos. 11 and 12



0°
Up

Ref. Nos. 13 and 14

PLATE B82-1

Dimension A 32-3/4 inches - All Adapters
Dimension B 9-9/32 inches - All Adapters

Ref. No.	Part Number	Qty. Req.	Description	Dimension (inches) C	Dimension (inches) D	Application
1	8289272	1	ADAPTER ASM. .. Exhaust - 90° fore and aft	18	14-27/32	16-645E4 engine (MP36)
2	8366591	1	ADAPTER ASM. .. Exhaust - 90° fore and aft	20	17-1/2	20-645E4,E4B,E10B engines (MP45, SG20E4,SG20E10B, HG20E4B)
3	8299000	1	ADAPTER ASM. .. Exhaust 90° fore and aft	27-1/2	16-29/32	8-645E4B,12-645E4, E5,16-645E4 engines
4	8365118	1	ADAPTER ASM. .. Exhaust - 90° fore and aft - Replaced by 8392508	29-1/2	16-29/32	16-645E5 engine
5	8392508	1	ADAPTER ASM. .. Exhaust - 90° fore and aft - Replaces 8365118	29-1/2	20-11/16	16-645E4,E5,E7,E7B,E7C, E9,E9B,20-645E4, E4B,E5,E9 engines
6	9549893	1	ADAPTER ASM. .. Exhaust - 90° fore and aft	29-1/2	22.68	16,20-645E7C engines
7	9550053	1	ADAPTER ASM. .. Exhaust - 90° fore and aft	18.90	27-1/2	8,12-645E7C engines
8	8321795	1	ADAPTER ASM. .. Exhaust - 90° left and right	25.394	20-9/16	12-645E7 engine
9	8442039	1	ADAPTER ASM. .. Exhaust - 90° left and right	27-1/2	20-9/16	8-645E7C,12-645E7, E7B,E7C engines
10	8387111	1	ADAPTER ASM. .. Exhaust - 90° left and right	29-1/2	20-9/16	16,20-645E4,E7, E7B engines

(Continued)

P.L. No. B82

EXHAUST STACK ADAPTER ASSEMBLY

Ref. No.	Part Number	Qty. Req.	Description	Dimension (inches) C	Dimension (inches) D	Application
11	8350668	1	ADAPTER ASM. .. Exhaust - 45° fore and aft	27-1/2	23-3/4	8-645E5,E7C,12-645E5, E7,E7B,E7C,E9 engines
12	8365267	1	ADAPTER ASM. .. Exhaust - 45° fore and aft	29-1/2	23-3/4	16-645E5,E7,E7C,E9, 20-645E5,E7,E7B, E9,E9B engines
13	8298999	1	ADAPTER ASM. .. Exhaust - 0° straight up	27-1/2	26-1/2	8-645E4,E5,E7,E7B,E7C, 12-645E4,E5,E7,E7C, E9,E9B,16-645E4,E4B, E7C,20-645E4,E4B engines
14	8365027	1	ADAPTER ASM. .. Exhaust - 0° straight up	29-1/2	26-1/2	12-645E4B,E5,16-645E5,E7, E7C,E9,20-645E4, E5,E7,E7C engines
†*15	9546891	1	ADAPTER .. Spacer - Exhaust duct - 33-1/8 x 9-21/32 x 2 inches thick			

† Spacer Adapter 9546891 is applied between turbo exhaust duct and exhaust adapter on those turbochargers having the short exhaust duct. See Parts List B74, Pages 1 and 1, for those affected turbochargers. A quantity of two (one on each side) of 8322023 Gasket (Ref. No. 16) is required when applying 9546891 Spacer Adapter.

*16	8322023	A.R.	GASKET .. Adapter mounting - Applied between turbocharger exhaust duct and exhaust adapter(s)
ϕ*17	457000	18	BOLT .. Adapter to exhaust duct - 1/2 - 20 x 1-3/4 hex. head - Stainless steel
ϕ*17	9416368	18	BOLT .. Adapter to exhaust duct - 1/2 - 20 x 2 hex. head - Stainless steel
ϕ*17	9531636	18	BOLT .. Adapter to exhaust duct - 1/2 - 20 x 2-1/2 hex. head
ϕ*17	8259128	17	BOLT .. Adapter to exhaust duct - 1/2 - 20 x 2-15/16 hex. head
ϕ*17	9527104	17	BOLT .. Adapter to exhaust duct - 1/2 - 20 x 4-1/2 hex. head
*18	8260114	A.R.	WASHER .. 17/32 I.D. x 1-1/16 O.D.
*19	9338626	A.R.	NUT .. 1/2 - 20 hex. - Stainless steel - Replaces 8284621 locknut
*20	----	A.R.	COMPOUND .. Thread sealing - Adapter mounting bolts are to be coated with thread compound prior to application

8278929 .. 1 quart container 8315394 .. 4 oz. tube

Parts List No. B85

ROOTS BLOWER AND BLOWER SUPPORT

Air Duct, Blind Cover, Blower and Blower Support Mounting Application
8-645E1,E2,E6 and E8 Engines

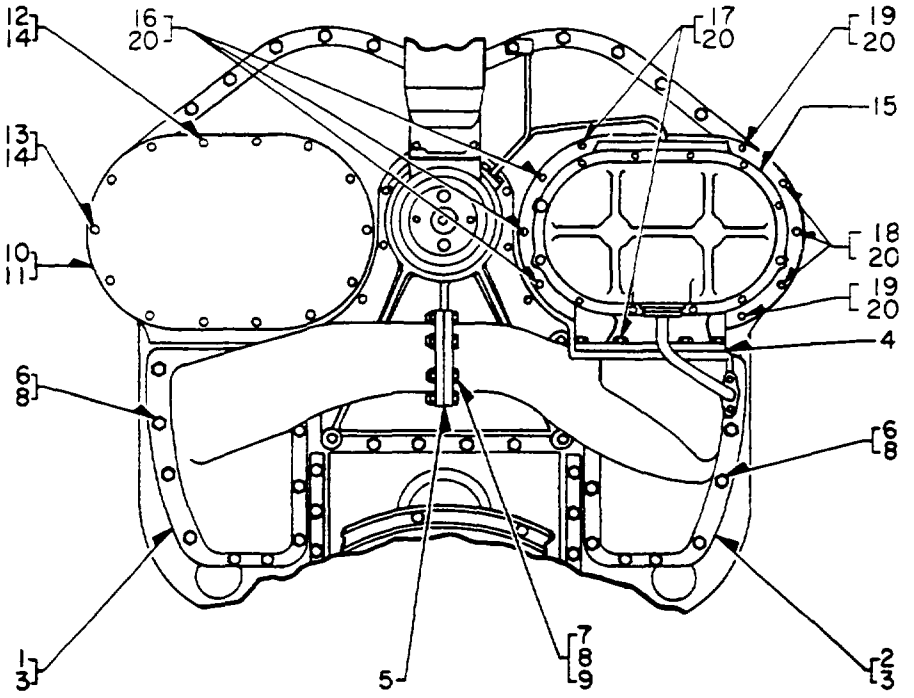
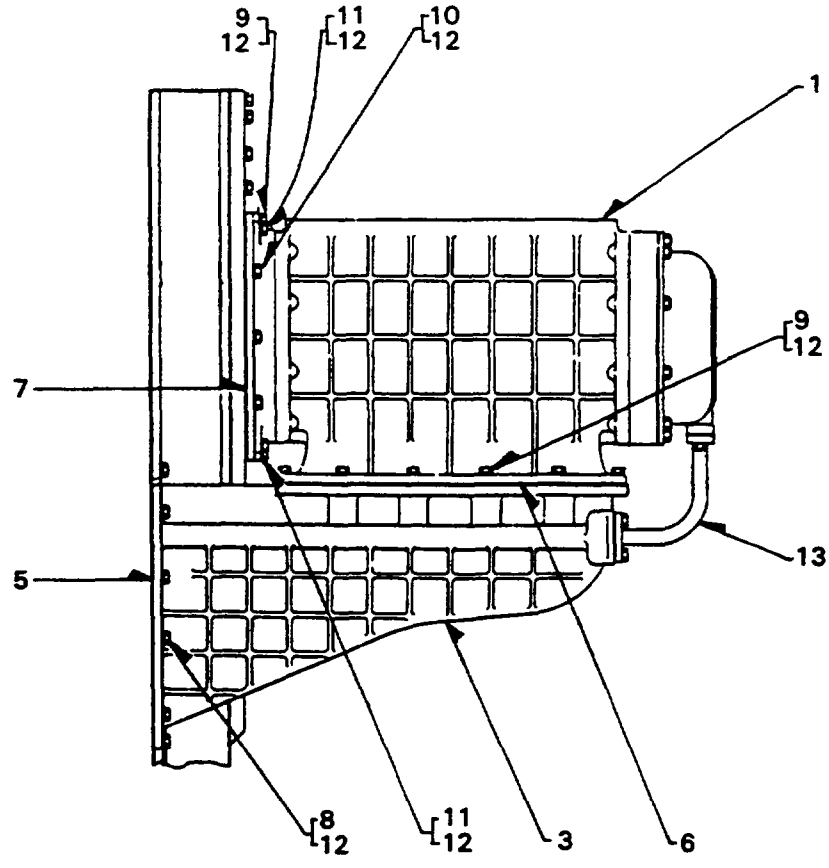


PLATE A85-1

Ref. No.	Part Number	Qty. Req.	Description
1	9523881	1	DUCT .. Air - Left bank - Replaces 8371463
2	9523883	1	SUPPORT .. Blower - Right bank - Replaces 8371473
3	8416803	1	GASKET .. Air duct - Replaces 8261226
3	8095027	1	GASKET .. Blower support to crankcase
4	8028465	1	GASKET .. Blower to support
5	8371461	1	GASKET .. Air duct to blower support
6	181429	24	BOLT .. Air duct and support to crankcase - 1/2 - 20 x 1-1/4 hex. head
7	181436	12	BOLT .. Air duct to blower support - 1/2 - 20 x 2-1/4 hex. head
8	6101229	36	WASHER .. Flat - 1/2
9	8032719	12	NUT .. Lock - 1/2 - 20 hex.
10	8075785	1	COVER .. Blind
11	8028148	2	GASKET .. Blind cover and blower to crankcase
12	181429	6	BOLT .. Blind cover to crankcase - 1/2 - 20 x 1-1/4 hex. head
13	181435	8	BOLT .. Blind cover to crankcase - 1/2 - 20 x 2 hex. head
14	6101229	14	WASHER .. Flat - 1/2
15	8369676	1	BLOWER ASM. .. Right bank - See Page 3
16	181429	3	BOLT .. Blower to drive housing cover - 1/2 - 20 x 1-1/4 hex. head
17	181433	15	BOLT .. Blower to support and drive housing cover - 1/2 - 20 x 1-3/4 hex. head
18	181436	3	BOLT .. Blower to drive housing cover - 1/2 - 20 x 2-1/4 hex. head
19	181441	5	BOLT .. Blower to drive cover - 1/2 - 20 x 2-3/4 hex. head
20	6101229	26	WASHER .. Flat - 1/2
*21	8178639	A.R.	CEMENT .. Blower and support gasket - 1 pint can

P.L. No. B85

ROOTS BLOWER AND BLOWER SUPPORT
Roots Blower Application
12,16-645E1,E2,E6,E8 Engines



Left Bank Blower Application
PLATE B85-2

Ref. No.	Part Number	Qty. Req.		Description
		A	-	12-645E1,E2,E6,E8 engines
		-	B	16-645E1,E2,E6,E8 engines
1	8369677	1	1	BLOWER ASM. .. Roots - Left bank
*2	8369676	1	1	BLOWER ASM. .. Roots - Right bank
3	8098038	1	-	SUPPORT .. Blower - Left bank
3	8084574	-	1	SUPPORT .. Blower - Left bank
*4	8098037	1	-	SUPPORT .. Blower - Right bank
*4	8084575	-	1	SUPPORT .. Blower - Right bank
5	8095027	2	2	GASKET .. Support to crankcase
6	8028465	2	2	GASKET .. Blower to support
7	8028148	2	2	GASKET .. Blower to drive housing
8	181429	30	30	BOLT .. Hex. head - 1/2 - 20 x 1-1/4
9	181433	30	30	BOLT .. Hex. head - 1/2 - 20 x 1-3/4
10	181436	6	6	BOLT .. Hex. head - 1/2 - 20 x 2-1/4
11	181441	10	10	BOLT .. Hex. head - 1/2 - 20 x 2-3/4
12	6101229	76	76	WASHER .. Flat - 1/2
13	----	2	2	LINE .. Lube oil - See Parts List 34
*14	8178639	A.R.		CEMENT .. Blower and support gasket - 1 pint can

ROOTS BLOWER AND BLOWER SUPPORT

Roots Blower Assembly
8,12,16-645E1,E2,E6 and E8 Engines
PLATE B85-3

Ref. No.	Part Number	Qty. Req.		Description
		A	-	8-645E1,E2,E6,E8 engines
		-	B	12,16-645E1,E2,E6,E8 engines

BLOWER ASSEMBLY

1	8369677	-	1	BLOWER ASSEMBLY .. Left bank
2	8369676	1	1	BLOWER ASSEMBLY .. Right bank

The following components are applicable to left and right bank blower assemblies, Ref. Nos. 1 and 2.

HOUSING .. Blower

3	8189438	1	HOUSING .. Blower
4	8028715	12	STUD .. Rear end plate - 1/2 x 3-5/8 in. long 8123072 .. .002 O.S. 8126927 O.S. 8123073 .. .005 O.S. 8126928 O.S. 8126926 .. .015 O.S.
5	8028741	4	DOWEL .. End plate - 1/2 x 1-1/4 in. long - Inner and outer
6			Reference number not used
7	8028710	12	STUD .. Front end plate - 1/2 x 4-1/4 in. long 8123070 .. .002 O.S. 8126921 .. .017 O.S. 8123071 .. .005 O.S. 8126922 .. .019 O.S. 8126920 .. .015 O.S.

PLATE .. Rear End

8	8189439	1	PLATE .. End - Rear
9	8028709	8	STUD .. Bearing - 1/2 - 13 - 20 x 2 in. long 8115277 .. .002 O.S. 8115280 .. .017 O.S. 8115278 .. .004 O.S. 8115281 .. .019 O.S. 8115279 .. .015 O.S.
10	8029137	2	STUD .. Oil line to end plate - 3/8 - 16 - 24 x 1-3/4 in. long 8115306 .. .002 O.S. 8115309 .. .017 O.S. 8115307 .. .004 O.S. 8115310 .. .019 O.S. 8115308 .. .015 O.S.
11	8434196	2	SEAL .. Oil - Blower shaft - Replaces 8327049
12	8054404	2	GASKET .. Oil seal
13	110487	12	SCREW .. 10 - 24 x 1/2 fil. head
14	106497	12	WASHER .. Lock - No. 10

BEARING .. Rotor Plate

15	8206553	2	BEARING .. Rotor plate
16	9530309	8	NUT .. Lock 1/2 - 20 Hex. - Formerly 102647 slotted nut
17	8116738	A.R.	WIRE .. Lock - 3/64 dia. x 500 ft. - No longer applied - Use Ref. 16
18	103343	12	WASHER .. Plain - 1/2
19	8055819	A.R.	CEMENT .. Gasket - Non-hardening - 1 pint
20	8400148	A.R.	THREAD .. Silk - 100 yd. spool

PLATE ASSEMBLY .. Front End

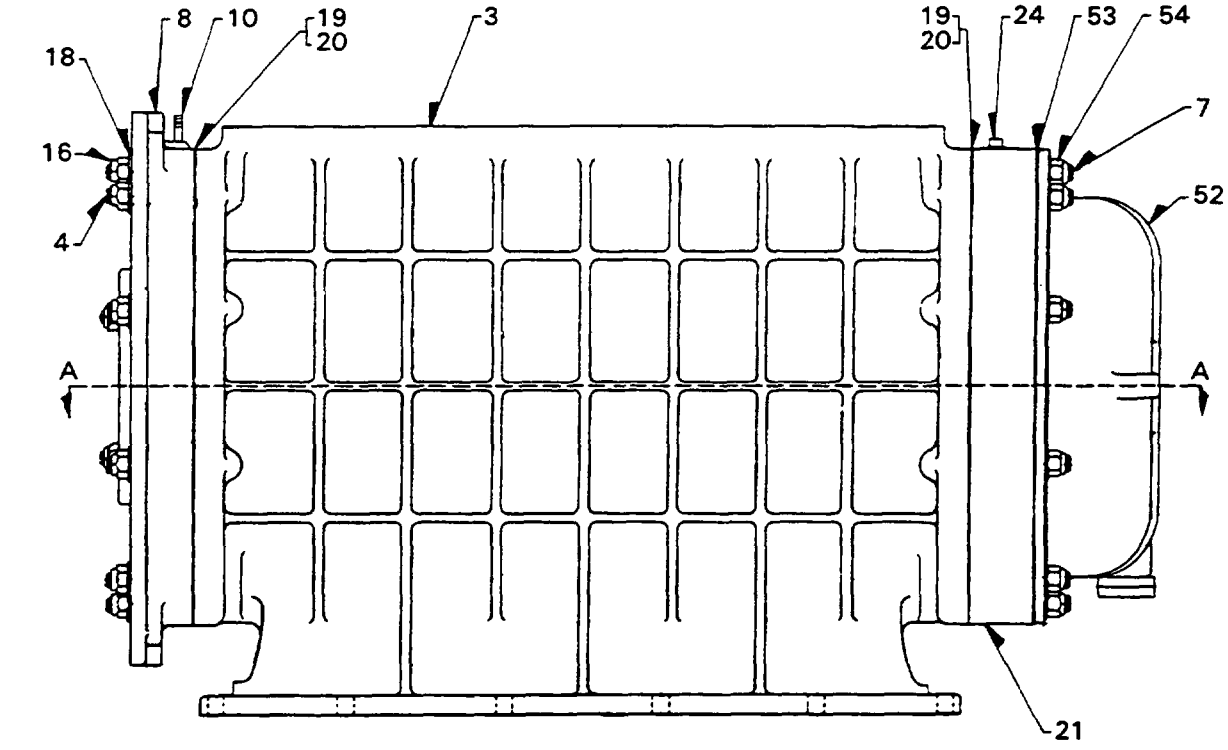
21	8070342	1	PLATE ASSEMBLY .. Front end
22	8204451	1	PLATE .. End - Front
23	8028709	8	STUD .. 1/2 - 13 - 20 x 2 in. long
24	103878	1	PLUG .. Pipe - 1/4 M.P.T.
25	8434196	2	SEAL .. Oil - Blower shaft - Replaces 8327049
26	8054404	2	GASKET .. Oil seal
27	110487	12	SCREW .. 10 - 24 x 1/2 fil. head
28	106497	12	WASHER .. Lock - No. 10

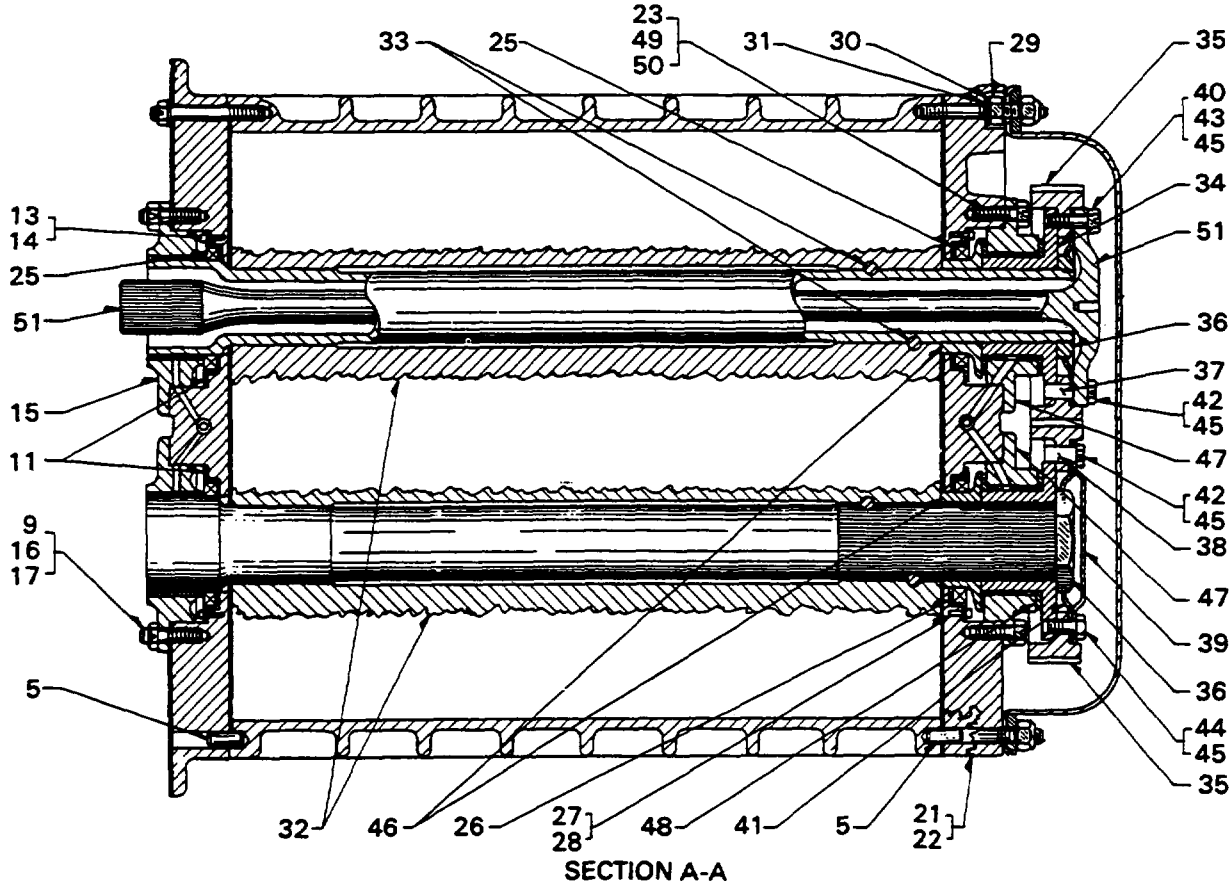
P.L. No. B85

ROOTS BLOWER AND BLOWER SUPPORT

Ref. No.	Part Number	Qty. Req.		Description
		A	-	8-645E1,E2,E6,E8 engines
		-	B	12,16-645E1,E2,E6,E8 engines
	8369677	-	1	BLOWER ASSEMBLY .. Left bank
	8369676	1	1	BLOWER ASSEMBLY .. Right bank
29	103028	8		NUT .. 1/2 - 20 hex.
30	103323	8		WASHER .. Lock - 1/2
31	103343	8		WASHER .. Plain - 1/2
	ROTOR ASSEMBLY			
32	8048295	1		ROTOR SET .. Matched and balanced - Includes Ref. 33 thru 45
33	100364	8		PIN .. Taper - No. 7 x 2-1/4 in. long
34	8028591	2		HUB .. Gear
35	8454020	1		GEAR SET .. Matched and balanced - Replaces 8081124
36	8028721	2		NUT .. Drive sleeve - 2 - 1/4 - 16 hex.
37	8028735	2		DOWEL .. Quillshaft to hub - 1/2 x 1-9/16 in. long 8084334 .. .005 O.S. 8084335 .. .015 O.S. 8081274 .. .010 O.S.
38	8028736	2		DOWEL .. Gear to hub - 1/2 x 1-1/16 in. long 8082371 .. .005 O.S. 8082369 .. .015 O.S. 8082370 .. .010 O.S.
39	8028464	1		PLATE .. Dowel retaining
40	8039653	1		PLATE .. Retainer
41	8028467	2		PLATE .. Lock
42	8028327	4		BOLT .. 5/16 - 24 x 7/16 hex. head
43	8028295	4		BOLT .. 1/2 - 20 x 1-9/16 hex. head
44	8028291	4		BOLT .. 1/2 - 20 x 1-1/8 hex. head
45	8116738	A.R.		WIRE .. Lock - 3/64 dia. - Available 500 ft. length
	COLLAR .. Thrust			
46	8028466	2		COLLAR .. Thrust
	BEARING ASSEMBLY			
47	8369675	2		BEARING ASSEMBLY .. Blower
48	8369674	4		BUSHING .. Bearing - Precision bored after assembly
49	9530309	8		NUT .. Lock - 1/2 - 20 hex. - Formerly 102647 slotted nut
50	8116738	A.R.		WIRE .. Lock - 3/64 dia. x 500 ft. - No longer applied - Use Ref. 49
	SHAFT .. Quill			
51	8028594	1		SHAFT .. Quill
52	8065752	1		COVER .. Timing gear
53	8204450	1		GASKET .. Cover
54	8032719	24		NUT .. Lock 1/2 - 20 hex.
	BLOWER REPAIR MATERIAL			
*55	8178080	A.R.		SHIM .. End plate - .002 } Required for adjusting rotor to front end play clearance.
*56	8178081	A.R.		SHIM .. End plate - .003 }
*57	8178082	A.R.		SHIM .. End plate - .004 }
*58	8178083	A.R.		SHIM .. End plate - .006 }
*59	9329939	A.R.		SLEEVE .. "Speedi" } For repair of engine blower rotor shafts and thrust collars.
*60	9330997	A.R.		KIT .. Epoxy resin }
*61	9331061	1		TOOL .. Installation }

ROOTS BLOWER AND BLOWER SUPPORT





SECTION A-A

Ref. Nos. 1 and 2

PLATE B85-3

Parts List No. B99

ENGINE GASKET KITS

INDEX

8-645E2 and E6 Normally Aspirated Marine Engines
8-645E5,E7,E7B and E7C Turbocharged Marine Engines
8-645E1 and E8 Normally Aspirated Industrial Engines
8-645E4 and E4B Turbocharged Industrial Engines

Ref. No.	Part Number	Description	Quantity Per Engine 8-645 Engines										Pg. No.	Ref. No.
			E1	E2	E6	E8	E4	4B	E5	E7	7B	7C		
ϕ1	8427111	Cylinder Head	8	8	8	8	8	8	8	8	8	8	5	1
ϕ1	8479836	Cylinder Head	8	8	8	8	8	8	8	8	8	8	5	9
ϕ2	9317971	Power Assembly Installation	8	8	8	8	8	8	8	8	8	-	5	15
ϕ2	9327287	Power Assembly Installation	-	-	-	-	-	-	-	-	-	8	5	15
ϕ3	9320844	Cylinder Liner Installation	8	8	8	8	8	8	8	8	8	-	5	24
ϕ3	9525089	Cylinder Liner Installation	-	-	-	-	-	-	-	-	-	8	5	24
4	8242502	Overspeed Trip Housing	1	-	-	1	1	1	-	-	-	-	5	30
5	8417963	Overspeed Trip Housing	-	1	1	-	-	-	1	1	1	1	6	1
6	8210665	Camshaft Drive Housing	1	1	1	1	-	-	-	-	-	-	6	49
7	8368758	Camshaft Drive Housing	-	-	-	-	1	1	1	1	1	1	7	6
8	8496989	Lube Oil Strainer Element	1	-	1	1	1	1	-	1	1	1	7	12
9	8496990	Lube Oil Suction Strainer	1	-	1	1	1	1	-	1	1	1	7	17
10	8261166	Piston Cooling and	1	1	1	1	-	-	-	-	-	-	7	32
11	8210023	Pressure Pump	-	-	-	-	1	1	1	1	1	1	8	1
†12	8210308	Lube Oil Scavenging and	1	-	1	1	-	-	-	-	-	-	8	30
†13	8210019	Fuel Oil Pump	-	-	-	-	1	1	-	1	1	1	8	34
14	8261172	Lube Oil Separator	1	1	1	1	-	-	-	-	-	-	9	1
15	8306360	Lube Oil Separator	-	-	-	-	1	1	1	1	1	1	9	5
16	8368757	Water Pump	1	-	-	1	2	2	-	-	-	-	9	12
17	8372927	Water Pump	-	1	1	-	-	-	2	2	2	2	9	19
18	8210660	Fuel Oil Manifold	1	-	-	1	1	1	-	-	-	-	9	37
†19	8372926	Fuel Oil Manifold - With threaded connections	-	1	-	-	-	-	1	-	-	-	9	43
20	9564571	Fuel Oil Manifold - With flange connections	-	1	1	-	-	-	1	1	1	1	10	1
21	8340405	Fuel Oil Filter (Viscose & Spin On)	1	-	-	-	1	1	-	-	-	-	10	7
22	8271650	Cylinder Head Cover and Support Frame - Square inside corners	1	1	-	-	-	-	1	-	-	-	10	13
23	9087944	Cylinder Head Cover and Support Frame - Round inside corners	1	1	1	1	1	1	1	1	1	1	10	28
24	8254494	Accessory Drive Housing	1	1	1	1	-	-	-	-	-	-	11	1
25	8261173	Accessory Drive Housing	-	-	-	-	1	1	1	1	1	1	11	14
26	8209989	Auxiliary Generator Drive	1	1	1	1	-	-	-	-	-	-	11	25
27	8336989	Governor Drive	1	1	1	1	1	1	1	1	1	1	11	31
28	8209988	Engine Blower	1	1	1	1	-	-	-	-	-	-	11	36
29	8414907	Turbocharger Changeout	-	-	-	-	1	1	1	1	1	1	12	1
30	8372925	Aftercooler Changeout	-	-	-	-	2	2	2	2	2	2	12	45

† *Refer to individual Gasket Kit component list for possible exceptions and additions.*

P.L. No. B99

ENGINE GASKET KITS

12-645E2 and E6 Normally Aspirated Marine Engines
12-645E5,E7,E7B and E7C Turbocharged Marine Engines
12-645E1 and E8 Normally Aspirated Industrial Engines
12-645E4,E4B,E9,E9B Turbocharged Industrial Engines

Ref. No.	Part Number	Description	Quantity Per Engine 12-645 Engines												Pg. No.	Ref. No.
			E1	E2	E6	E8	E4	4B	E5	E7	7B	7C	E9	9B		
ϕ1	8427111	Cylinder Head	12	12	12	12	12	12	12	12	12	12	12	12	5	1
ϕ1	8479836	Cylinder Head	12	12	12	12	12	12	12	12	12	12	12	12	5	9
ϕ2	9317971	Power Assembly Installation	12	12	12	12	12	12	12	12	12	-	12	12	5	15
ϕ2	9327287	Power Assembly Installation	-	-	-	-	-	-	-	-	-	12	-	-	5	15
ϕ3	9320844	Cylinder Liner Installation	12	12	12	12	12	12	12	12	12	-	12	12	5	24
ϕ3	9525089	Cylinder Liner Installation	-	-	-	-	-	-	-	-	-	12	-	-	5	24
ϕ4	8261161	Overspeed Trip Housing	1	-	-	1	1	1	-	-	-	-	1	1	6	13
ϕ5	8417962	Overspeed Trip Housing	-	1	1	-	-	-	1	1	1	-	-	-	6	27
ϕ6	9564698	Overspeed Trip Housing	1	1	1	1	1	1	1	1	1	1	1	1	6	39
7	8210666	Camshaft Drive Housing	1	1	1	1	-	-	-	-	-	-	-	-	7	1
8	8368758	Camshaft Drive Housing	-	-	-	-	1	1	1	1	1	1	1	1	7	6
9	8496989	Lube Oil Strainer Element	1	-	1	1	1	1	-	1	1	1	1	1	7	12
10	8496990	Lube Oil Suction Strainer	1	-	1	1	1	1	-	1	1	1	1	1	7	17
11	8261166	Piston Cooling and	-	-	-	-	1	1	1	1	1	1	1	1	7	32
12	8210023	Pressure Pump	1	1	1	1	-	-	-	-	-	-	-	-	8	1
†13	8210019	Lube Oil Scavenging and	1	1	1	1	-	-	-	-	-	-	-	-	8	34
†14	8210018	Fuel Oil Pump	-	-	-	-	1	1	1	1	1	1	1	1	8	38
15	8261172	Lube Oil Separator	1	1	1	1	-	-	-	-	-	-	-	-	9	1
16	8306360	Lube Oil Separator	-	-	-	-	1	1	1	1	1	1	1	1	9	5
17	8368757	Water Pump	2	-	-	2	2	2	-	-	-	-	2	2	9	12
18	8372927	Water Pump	-	2	2	-	-	-	2	2	2	2	-	-	9	19
19	8210660	Fuel Oil Manifold	1	-	-	1	1	1	-	-	-	-	1	1	9	37
†20	8372926	Fuel Oil Manifold - With threaded connections	-	1	-	-	-	-	1	-	-	-	-	-	9	43
21	9564571	Fuel Oil Manifold - With flange connections	-	1	1	-	-	-	1	1	1	1	-	-	10	1
22	8340405	Fuel Oil Filter (Viscose & Spin On)	1	-	-	-	1	1	-	-	-	-	-	-	10	7
23	8271651	Cylinder Head Cover and Support Frame - Square inside corners	1	1	-	-	-	-	1	1	-	-	-	-	10	18
24	9087945	Cylinder Head Cover and Support Frame - Round inside corners	1	1	1	1	1	1	1	1	1	1	1	1	10	32
25	8261173	Accessory Drive Housing	1	1	1	1	1	1	1	1	1	1	1	1	11	14
26	8209989	Auxiliary Generator Drive	1	1	1	1	-	-	-	-	-	-	-	-	11	25
27	8336989	Governor Drive	1	1	1	1	1	1	1	1	1	1	1	1	11	31
28	8209988	Engine Blower	2	2	2	2	-	-	-	-	-	-	-	-	11	36
29	8414907	Turbocharger Changeout	-	-	-	-	1	1	1	1	1	1	1	1	12	1
30	8372925	Aftercooler Changeout	-	-	-	-	2	2	2	2	2	2	2	2	12	45

† Refer to individual Gasket Kit component list for possible exceptions and additions.

P.L. No. B99

ENGINE GASKET KITS

16-645E2 and E6 Normally Aspirated Marine Engines
16-645E5,E7,E7B and E7C Turbocharged Marine Engines
16-645E1 and E8 Normally Aspirated Industrial Engines
16-645E4,E4B,E9,E9B and E10B Turbocharged Industrial Engines

Ref. No.	Part Number	Description	Quantity Per Engine 16-645 Engines													Pg. No.	Ref. No.
			E1	E2	E6	E8	E4	4B	E5	E7	7B	7C	E9	9B	10B		
ϕ1	8427111	Cylinder Head	16	16	16	16	16	16	16	16	16	16	16	16	16	5	1
ϕ1	8479836	Cylinder Head	16	16	16	16	16	16	16	16	16	16	16	16	16	5	9
ϕ2	9317971	Power Assembly Installation	16	16	16	16	16	16	16	16	16	-	16	16	16	5	15
ϕ2	9327287	Power Assembly Installation	-	-	-	-	-	-	-	-	-	16	-	-	-	5	15
ϕ3	9320844	Cylinder Liner Installation	16	16	16	16	16	16	16	16	16	-	16	16	16	5	24
ϕ3	9525089	Cylinder Liner Installation	-	-	-	-	-	-	-	-	-	16	-	-	-	5	24
†ϕ4	8261161	Overspeed Trip Housing	1	-	-	1	1	1	-	-	-	-	1	1	1	6	13
ϕ5	8417962	Overspeed Trip Housing	-	1	1	-	-	-	1	1	1	-	-	-	-	6	27
ϕ6	9564698	Overspeed Trip Housing	1	1	1	1	1	1	1	1	1	1	1	1	1	6	39
7	8210665	Camshaft Drive Housing	1	1	1	1	-	-	-	-	-	-	-	-	-	6	49
8	8368758	Camshaft Drive Housing	-	-	-	-	1	1	1	1	1	1	1	1	1	7	6
9	8496989	Lube Oil Strainer Element	1	-	1	1	1	1	-	1	1	1	1	1	1	7	12
10	8496990	Lube Oil Suction Strainer	1	-	1	1	1	1	-	1	1	1	1	1	1	7	17
11	8261166	Piston Cooling and	1	1	1	1	-	-	-	-	-	-	-	-	-	7	32
12	8306356	Pressure Pump	-	-	-	-	1	1	1	1	1	1	1	1	1	8	11
†13	8210018	Lube Oil Scavenging and	1	1	1	1	-	-	-	-	-	-	-	-	-	8	38
†14	8306357	Fuel Oil Pump	-	-	-	-	1	1	1	1	1	1	1	1	1	8	42
15	8261172	Lube Oil Separator	1	1	1	1	-	-	-	-	-	-	-	-	-	9	1
16	8306360	Lube Oil Separator	-	-	-	-	1	1	1	1	1	1	1	1	1	9	5
17	8368757	Water Pump	2	-	-	2	-	-	-	-	-	-	-	-	-	9	12
18	8372927	Water Pump	-	2	2	-	-	-	-	-	-	-	-	-	-	9	19
19	8365648	Water Pump	-	-	-	-	2	2	-	-	-	-	2	2	2	9	26
20	8380246	Water Pump	-	-	-	-	-	-	2	2	2	2	-	-	-	9	32
21	8210660	Fuel Oil Manifold	1	-	-	1	1	1	-	-	-	-	1	1	1	9	37
22	8372926	Fuel Oil Manifold - With threaded connections	-	1	-	-	-	-	1	-	-	-	-	-	-	9	43
23	9564571	Fuel Oil Manifold - With flange connections	-	1	1	-	-	-	1	1	1	1	-	-	-	10	1
24	8340405	Fuel Oil Filter (Viscose & Spin On)	1	-	-	-	1	1	-	-	-	-	-	-	1	10	7
25	8271649	Cylinder Head Cover and Support Frame - Square inside corners	1	1	-	-	1	-	1	1	-	-	-	-	-	10	23
26	9087946	Cylinder Head Cover and Support Frame - Round inside corners	1	1	1	1	1	1	1	1	1	1	1	1	1	10	36
27	8261173	Accessory Drive Housing	1	1	1	1	1	1	1	1	1	1	1	1	1	11	14
28	8209989	Auxiliary Generator Drive	1	1	1	1	-	-	-	-	-	-	-	-	-	11	25
29	8336989	Governor Drive	1	1	1	1	1	1	1	1	1	1	1	1	1	11	31
30	8209988	Engine Blower	2	2	2	2	-	-	-	-	-	-	-	-	-	11	36
†31	8380244	Turbocharger Changeout	-	-	-	-	1	1	1	1	1	1	1	1	1	12	16
†32	8383956	Turbocharger Changeout	-	-	-	-	1	-	-	-	-	-	-	-	-	12	30
33	8365646	Aftercooler Changeout	-	-	-	-	2	2	2	2	2	2	2	2	2	12	50

† Refer to individual Gasket Kit component list for possible exceptions and additions.

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ENGINE GASKET KITS

20-645E5,E7,E7B and E7C Turbocharged Marine Engines
20-645E4,E4B,E9,E9B and E10B Turbocharged Industrial Engines

Ref. No.	Part Number	Description	Quantity Per Engine 20-645 Engines									Pg. No.	Ref. No.
			E4	4B	E5	E7	7B	7C	E9	9B	10B		
ϕ1	8427111	Cylinder Head	20	20	20	20	20	20	20	20	20	5	1
ϕ1	8479836	Cylinder Head	20	20	20	20	20	20	20	20	20	5	9
ϕ2	9317971	Power Assembly Installation	20	20	20	20	20	-	20	20	20	5	15
ϕ2	9327287	Power Assembly Installation	-	-	-	-	-	20	-	-	-	5	15
ϕ3	9320844	Cylinder Liner Installation	20	20	20	20	20	-	20	20	20	5	24
ϕ3	9525089	Cylinder Liner Installation	-	-	-	-	-	20	-	-	-	5	24
†ϕ4	8261161	Overspeed Trip Housing	1	1	-	-	-	-	1	1	1	6	13
ϕ5	8417962	Overspeed Trip Housing	-	-	1	1	1	-	-	-	-	6	27
ϕ6	9564698	Overspeed Trip Housing	1	1	1	1	1	1	1	1	1	6	39
7	8368758	Camshaft Drive Housing	1	1	1	1	1	1	1	1	1	7	6
8	8496989	Lube Oil Strainer Element	1	1	-	1	1	1	1	1	1	7	12
†9	8496990	Lube Oil Suction Strainer	1	1	-	1	1	1	1	1	1	7	17
10	8375381	Piston Cooling and Pressure Pump	1	1	1	1	1	1	1	1	1	8	21
†11	8306357	Lube Oil Scavenging and Fuel Oil Pump	1	1	1	1	1	1	1	1	1	8	42
12	8306360	Lube Oil Separator	1	1	1	1	1	1	1	1	1	9	5
13	8365648	Water Pump	2	2	-	-	-	-	2	2	2	9	26
14	8380246	Water Pump	-	-	2	2	2	2	-	-	-	9	32
15	8210660	Fuel Oil Manifold	1	1	-	-	-	-	1	1	1	9	37
16	8372926	Fuel Oil Manifold - With threaded connections	-	-	1	-	-	-	-	-	-	9	43
17	9564571	Fuel Oil Manifold - With flange connections	-	1	1	1	1	1	-	-	-	10	1
18	8340405	Fuel Oil Filter (Viscous & Spin On)	1	1	-	-	-	-	-	-	1	10	7
19	9087947	Cylinder Head Cover and Support Frame - Round inside corners	1	1	1	1	1	1	1	1	1	10	40
20	8261173	Accessory Drive Housing	1	1	1	1	1	1	1	1	1	11	14
21	8336989	Governor Drive	1	1	1	1	1	1	1	1	1	11	31
†22	8380244	Turbocharger Changeout	1	1	1	1	1	1	1	1	1	12	16
†23	8383956	Turbocharger Changeout	1	-	-	-	-	-	-	-	-	12	30
24	8365646	Aftercooler Changeout	2	2	2	2	2	2	2	2	2	12	50

† Refer to individual Gasket Kit component list for possible exceptions and additions.

ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Cylinder Head			
ϕ1	8427111	1	GASKET KIT .. Cylinder head - Replaces 8472070
2	8442936	1	GASKET .. Cylinder head to liner - Replaces 8410829
3	8392118	1	SEAL KIT .. Cylinder head to liner - Consists of (12) twelve heat dam insulators and (12) twelve grommet seals
4	9558102	1	SEAL KIT .. Gasket
5	8029167	2	GASKET .. Rocker arm oil line to camshaft
6	8328687	1	SEAL .. Cylinder test valve
7	8305815	1	SEAL .. Water outlet elbow
8	9317972	2	SEAL .. Water outlet elbow to crankcase - Repl. 8413892
ϕ9	8479836	1	GASKET KIT .. Cylinder head - With double groove water outlet elbow and integral head gasket
9A	8476400	1	GASKET ASSEMBLY .. Cyl. head - Includes grommet seals
10	9558102	1	SEAL KIT .. Gasket - Formerly 9551802
11	8029167	2	GASKET .. Rocker arm oil line to camshaft
12	8328687	1	SEAL .. Cylinder test valve
13	8305815	1	SEAL .. Water outlet elbow
14	9317972	2	SEAL .. Water outlet elbow to crankcase - Repl. 8413892

GASKET KIT .. Power Assembly Installation

ϕ15	9317971	1	-	GASKET KIT .. Power assembly installation - Replaces 9320843 power assembly installation gasket kit
ϕ15	9327287	-	1	GASKET KIT .. Power assembly installati
16	8228554	1	-	SEAL .. Lower liner - Upper groove
17	9316850	1	2	SEAL .. Lower liner - Lower groove
18	8025988	1	1	GASKET .. Piston cooling tube
19	8305815	2	2	SEAL .. Elbow to cylinder head and jumper line to liner
20	9317972	2	2	SEAL .. Water outlet elbow to crankcase - Replaces 8413892
21	8142354	1	1	GASKET .. Water inlet tube to manifold
22	8328687	1	1	SEAL .. Cylinder test valve
23	8029167	2	2	GASKET .. Rocker arm oil line to camshaft block

GASKET KIT .. Cylinder Liner Installation

ϕ24	9320844	1	-	GASKET KIT .. Cylinder liner installation - Replaces 8284873 cylinder liner gasket kit
ϕ24	9525089	-	1	GASKET KIT .. Cylinder liner installation
25	8228554	1	-	SEAL .. Lower liner - Upper groove
26	9316850	1	2	SEAL .. Lower liner - Lower groove
27	8025988	1	1	GASKET .. Piston cooling tube
28	8305815	1	1	SEAL .. Elbow to cylinder head and jumper line to liner
29	8142354	1	1	GASKET .. Water inlet tube to manifold

GASKET KIT .. Overspeed Trip Housing

30	8242502	1	GASKET KIT .. Overspeed trip housing - With bottom oil drains
31	8160114	2	GASKET .. Fuel lines to manifold blocks - Formerly 8218476
32	8044742	2	GASKET .. Fuel overspeed trip housing to crankcase
33	8235617	2	GASKET .. Fuel overspeed trip housing to accessory drive housing
34	8235618	1	GASKET .. Fuel cover to overspeed trip housing
35	8028765	2	GASKET .. Fuel plate to cover
36	8058257	2	GASKET .. Fuel cover - Tachometer opening
37	8028766	1	GASKET .. Fuel lockshaft plate
38	8028754	1	SEAL .. Oil lockshaft
39	8104300	2	GASKET .. Jumper line
40	8104276	2	GASKET .. Jumper line
41	8143446	2	SEAL .. O-Ring - Retainer sleeve - Bottom groove
42	9095686	2	SEAL .. O-Ring - Retainer sleeve - Viton - Top groove

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ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Overspeed Trip Housing			
1	8417963	1	GASKET KIT .. Overspeed trip housing - With bottom oil drains
2	8235617	2	GASKET .. Overspeed trip housing to crankcase
3	8143446	2	SEAL .. O-Ring - Retainer sleeve - Bottom groove
4	8235618	1	GASKET .. Cover to overspeed trip housing
5	8028765	2	GASKET .. Cover plate
6	8058257	2	GASKET .. Tachometer cover
7	8242408	1	SEAL .. Oil - Shaft
8	8160114	3	GASKET .. Fuel manifold
9	3323759	1	GASKET .. Cover to fuel manifold
10	3323761	2	GASKET .. Fuel pipe to manifold block
11	8028754	1	SEAL .. Oil - Lockshaft
12	9095686	2	SEAL .. O-Ring - Retainer sleeve - Viton - Top groove
†13	8261161	1	GASKET KIT .. Overspeed trip housing - With bottom oil drains
14	8218476	2	GASKET .. Fuel lines to manifold blocks
15	8044742	2	GASKET .. Overspeed trip housing to crankcase
16	8044723	2	GASKET .. Overspeed trip housing to accessory drive cover
17	8049496	1	GASKET .. Cover to overspeed trip housing
18	8028765	2	GASKET .. Plate to cover
19	8058257	2	GASKET .. Cover - Tachometer opening
20	8028766	1	GASKET .. Lockshaft plate
21	8028754	1	SEAL .. Oil - Lockshaft
22	8104300	2	GASKET .. Jumper line
23	8104276	2	GASKET .. Jumper line
24	8143446	2	SEAL .. O-Ring - Retainer sleeve - Bottom groove
25	8160114	2	GASKET .. Crossover pipe to fuel oil manifold
26	9095686	2	SEAL .. O-Ring - Retainer sleeve - Viton - Top groove
27	8417962	1	GASKET KIT .. Overspeed trip housing - With bottom oil drians
28	8044742	2	GASKET .. Overspeed trip housing to crankcase
29	8143446	2	SEAL .. O-Ring - Retainer sleeve - Bottom groove
30	8049496	1	GASKET .. Cover to overspeed trip housing
31	8028765	2	GASKET .. Cover plate
32	8058257	2	GASKET .. Tachometer cover
33	8242408	1	SEAL .. Oil - Shaft
34	8160114	3	GASKET .. Fuel manifold mounting
35	3323759	1	GASKET .. Cover to fuel manifold
36	3323761	2	GASKET .. Fuel pipe to manifold block
37	8028754	1	SEAL .. Oil - Lockshaft
38	9095686	2	SEAL .. O-Ring - Retainer sleeve - Viton - Top groove
39	9564698	1	GASKET KIT .. Overspeed trip housing - With rear oil drains
40	9529800	2	GASKET .. Housing to crankcase
41	9529801	1	GASKET .. Cover to housing
42	8028765	1	GASKET .. Cover plate
43	8058257	1	GASKET .. Tachometer cover
44	8160114	3	GASKET .. Fuel manifold mounting
45	9096523	1	RETAINER .. Oil
46	9529807	2	SEAL .. Oil - Rear drain to crankcase
47	8242408	1	SEAL .. Oil - Shaft
48	8028754	1	SEAL .. Oil - Lockshaft
GASKET KIT .. Camshaft Drive Housing			
49	8210665	1	GASKET KIT .. Camshaft drive housing
50	8081380	1	GASKET .. Camshaft drive housing to crankcase
51	8185923	1	GASKET .. Cover to housing - Upper
52	8175858	1	GASKET .. Oil retainer
53	8095027	2	GASKET .. Blower support to crankcase

† *For MP36, MP45 and 999-20 models, see Parts List 56 for individual gaskets.*

ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Camshaft Drive Housing			
1	8210666	1	GASKET KIT .. Camshaft drive housing
2	8081380	1	GASKET .. Camshaft drive housing to crankcase
3	8451659	1	GASKET .. Cover to housing - Upper - Replaces 8185583
4	8175858	1	GASKET .. Oil retainer
5	8095027	2	GASKET .. Blower support crankcase
6	8368758	1	GASKET KIT .. Camshaft drive housing
7	8081380	1	GASKET .. Camshaft drive housing to crankcase
8	8175858	1	GASKET .. Oil retainer
9	8366331	1	GASKET .. Lube oil manifold to filter mounting
10	8366330	2	GASKET .. Lube oil manifold to manifold
11	8366424	1	GASKET .. Filter to camshaft housing
GASKET KIT .. Lube Oil Strainer Element			
12	8496989	1	GASKET KIT .. Lube oil suction strainer element - Replaces 8210014
13	8085182	2	SEAL .. Piston cooling and main bearing strainer elements to strainer housing
14	8080852	1	GASKET .. Scavenging oil strainer element to strainer
15	8085253	1	GASKET .. Strainer cover to housing
16	8478924	1	SEAL .. Ring - Scavenging oil strainer
GASKET KIT .. Lube Oil Suction Strainer			
†17	8496990	1	GASKET KIT .. Lube oil suction strainer - Replaces 8306358
18	8080850	1	GASKET .. Strainer housing to accessory drive cover
19	8074661	2	GASKET .. Lube oil pipe to strainer
20	8174208	1	GASKET .. Drain plug
21	8366785	1	GASKET .. Oil return elbow to strainer case - Replaces 8347468
22	8269415	1	GASKET .. Relay valve
23	8085182	2	SEAL .. Piston cooling and main bearing strainer element
24	8080852	1	GASKET .. Scavenger oil strainer element to strainer
25	8085253	1	GASKET .. Strainer cover to housing
26	8251951	1	GASKET .. Pipe to scavenging pump
27	8251950	1	GASKET .. Pipe to piston cooling pump
28	8029467	4	GASKET .. Pipe to scavenging pump
29	8029470	2	GASKET .. Elbow to pressure pump
30	8029150	2	GASKET .. Elbow to pressure pump
31	8478924	1	SEAL .. Ring - Scavenging oil strainer
GASKET KIT .. Piston Cooling and Pressure Pump			
32	8261166	1	GASKET KIT .. Lube oil pressure pump - Replaces 8261167
33	8028264	1	GASKET .. Pump to accessory drive cover
34	8074661	1	GASKET .. Strainer to pump elbow
35	8029470	2	GASKET .. Piston cooling pressure portion inlet and outlet to elbow
36	8082965	1	GASKET .. Main bearing pressure portion elbow to accessory drive cover
37	8082586	1	SEAL .. Piston cooling pressure portion elbow to accessory drive cover
38	8082587	1	SEAL .. Main bearing pressure portion elbow to accessory drive cover
39	8082964	1	GASKET .. Piston cooling pressure portion elbow to accessory drive cover
40	8029154	3	GASKET .. Governor drive oil line
41	8029482	2	GASKET .. Piston cooling pressure portion inlet and outlet to elbow
42	8029467	2	GASKET .. Main bearing pressure portion inlet and outlet to elbow

† For 20-645E4, E4B, E9 and E9B Industrial Engines, a quantity of two (2) - 8366785 Gaskets is required in addition to kit.

For MP45 and 999-20 models, one (1) - 8360530 Gasket is required in addition to kit.

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ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Piston Cooling and Pressure Pump			
1	8210023	1	GASKET KIT .. Lube oil pressure pump
2	8028264	1	GASKET .. Pump to accessory drive cover
3	8074661	1	GASKET .. Strainer to pump elbow
4	8082965	1	GASKET .. Main bearing pressure portion elbow to accessory drive cover
5	8082586	1	SEAL .. Piston cooling pressure portion elbow to accessory drive cover
6	8082587	1	SEAL .. Main bearing pressure portion elbow to accessory drive cover
7	8082964	1	GASKET .. Piston cooling pressure portion elbow to accessory drive cover
8	8029154	3	GASKET .. Governor drive oil line
9	8029150	2	GASKET .. Main bearing pressure portion inlet and outlet to elbow
10	8029151	2	GASKET .. Piston cooling pressure portion inlet and outlet to elbow
11	8306356	1	GASKET KIT .. Lube oil pressure pump
12	8029150	2	GASKET .. Piston cooling inlet and outlet elbow
13	8028264	1	GASKET .. Pump mounting
14	8082586	1	SEAL .. Piston cooling elbow to accessory drive housing
15	8082965	1	GASKET .. Elbow to accessory drive housing - Main bearing portion
16	8082587	1	SEAL .. Elbow to accessory drive housing - Main bearing portion
17	8251950	2	GASKET .. Elbow to pump - Main bearing portion
18	8029154	2	GASKET .. Governor drive oil line
19	8074661	1	GASKET .. Strainer to main bearing pump elbow
20	8082964	1	GASKET .. Elbow to accessory drive cover - Piston cooling portion
21	8375381	1	GASKET KIT .. Lube oil pressure pump
22	8360530	2	GASKET .. Piston cooling inlet and outlet elbow
23	8028264	1	GASKET .. Pump mounting
24	8082586	1	SEAL .. Piston cooling elbow to accessory drive housing
25	8082965	1	GASKET .. Elbow to accessory drive housing - Main bearing portion
26	8082587	1	SEAL .. Elbow to accessory drive housing - Main bearing portion
27	8029154	2	GASKET .. Governor drive oil line
28	8074661	1	GASKET .. Strainer to main bearing pump elbow
29	8082964	1	GASKET .. Elbow to accessory drive cover - Piston cooling portion
GASKET KIT .. Lube Oil Scavenging and Fuel Oil Pump			
†30	8210308	1	GASKET KIT .. Scavenging oil pump
31	8028264	1	GASKET .. Pump to accessory drive housing cover
32	8029467	2	GASKET .. Pump to inlet and outlet elbows
33	8074661	1	GASKET .. Strainer pipe to oil strainer housing
†34	8210019	1	GASKET KIT .. Scavenging oil pump
35	8028264	1	GASKET .. Pump to accessory drive housing cover
36	8029150	4	GASKET .. Pump to inlet and outlet elbows
37	8074661	1	GASKET .. Strainer pipe to oil strainer housing
†38	8210018	1	GASKET KIT .. Scavenging oil pump
39	8028264	1	GASKET .. Pump to accessory drive housing cover
40	8029467	4	GASKET .. Pump to inlet and outlet elbows
41	8074661	1	GASKET .. Strainer pipe to oil strainer housing
†42	8306357	1	GASKET KIT .. Scavenging oil pump
43	8028264	1	GASKET .. Pump mounting
44	8074661	1	GASKET .. Strainer to scavenging pump elbow
45	8251951	1	GASKET .. Pipe to scavenging pump

†For those Marine Units with "Y" type lube oil strainers refer to Parts List 34 for appropriate gaskets and seals.

ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Lube Oil Separator			
1	8261172	1	GASKET KIT .. Lube oil separator
2	8084670	1	GASKET .. Oil separator mounting
3	8084407	4	GASKET .. Outlet pipe to blower adapter
4	8173851	1	GASKET .. Housing cover
5	8306360	1	GASKET KIT .. Lube oil separator
6	8028760	1	GASKET .. Inlet elbow flange
7	8306958	2	GASKET .. Elbow to oil separator
8	8271729	2	GASKET .. Elbow to ejector tube
9	8262488	1	GASKET .. Drain tube flange
10	8285733	1	RING ASSEMBLY .. Seal
11	8284874	1	SLEEVE .. Rubber seal
GASKET KIT .. Water Pump			
12	8368757	1	GASKET KIT .. Water pump
13	8028760	1	GASKET .. Pump to accessory drive housing cover
14	8029149	1	GASKET .. Pump outlet to pipe
15	8366787	2	GASKET .. Pump inlet to pipe
16	8347416	1	GASKET .. Pipe to crankcase
17	8029469	1	GASKET .. Water drain pipe to elbow
18	8029163	1	GASKET .. Elbow to intermediate pipe - 8 cylinder only
19	8372927	1	GASKET KIT .. Water pump
20	8028760	1	GASKET .. Water pump mounting
21	8326233	1	GASKET .. Companion flange
22	8347416	1	GASKET .. Water inlet elbow to water manifold
23	8029149	1	GASKET .. Pump to water inlet elbow
24	8366787	2	GASKET .. Water crossover pipe - Replaces 8354344
25	8029163	1	GASKET .. Intermediate pipe to elbow - 8 cylinder only
26	8365648	1	GASKET KIT .. Water pump
27	8028760	1	GASKET .. Pump to accessory drive housing cover
28	8347417	1	GASKET .. Pump outlet to pipe
29	8366785	1	GASKET .. Pump inlet to pipe
30	8347416	1	GASKET .. Pipe to crankcase
31	8029469	1	GASKET .. Water drain pipe to elbow
32	8380246	1	GASKET KIT .. Water pump
33	8028760	1	GASKET .. Water pump mounting
34	8366785	3	GASKET .. Companion flange and water crossover pipe - Replaces 8347468
35	8347416	1	GASKET .. Water inlet elbow to water manifold
36	8347417	1	GASKET .. Pump to water inlet elbow
GASKET KIT .. Fuel Oil Manifold			
37	8210660	1	GASKET KIT .. Fuel oil manifold
38	8165276	2	GASKET .. Supply line to manifold line
39	8160114	2	GASKET .. Supply line to manifold line
40	8104300	2	GASKET .. Connection block
41	8104292	1	GASKET .. Inlet line to filter
42	8104276	2	GASKET .. Flange to filter
43	8372926	1	GASKET KIT .. Fuel oil manifold - With threaded connections
44	8165276	2	GASKET .. Fuel oil manifold mounting
45	8160114	3	GASKET .. Fuel oil manifold to cover
46	3323759	1	GASKET .. Manifold cover mounting
47	3323761	5	GASKET .. Flange mounting

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ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Fuel Oil Manifold			
1	9564571	-	GASKET KIT .. Fuel oil manifold - With flange connections
2	8165276	2	GASKET .. Fuel supply line - Manifold mounting
3	8387784	1	GASKET .. Fuel supply manifold
4	8160114	2	GASKET .. Fuel supply line to manifold
5	8387785	9	GASKET .. Filter and flange mounting
6	8426889	2	GASKET .. Pipe assembly to pump
GASKET KIT .. Fuel Oil Filter - Viscose and Spin On Types			
7	8340405	1	GASKET KIT .. Fuel oil filter - Replaces 9082404
8	8104300	2	GASKET .. Connection block
9	8104276	2	GASKET .. Flange to filter
10	8104292	1	GASKET .. Drain lines to filter
11	8177030	2	SEAL .. Filter housing to body - Required with viscose filter
12	8104055	2	GASKET .. Bowl to filter body
GASKET KIT .. Cylinder Head Cover and Support Frame with Square Inside Corners			
13	8271650	1	GASKET KIT .. Cylinder head cover and support frame
14	8470793	2	GASKET .. Frame to crankcase - Outside - Replaces 8275291
15	8470794	2	GASKET .. Frame to crankcase - Inside - Replaces 8275295
16	8275289	2	GASKET .. Camshaft drive end
17	8271623	2	GASKET .. Cylinder head cover
18	8271651	1	GASKET KIT .. Cylinder head cover and support frame
19	8470795	2	GASKET .. Frame to crankcase - Outside - Replaces 8275296
20	8470796	2	GASKET .. Frame to crankcase - Inside - Replaces 8275290
21	8275289	2	GASKET .. Camshaft drive end
22	8271624	4	GASKET .. Cylinder head cover
23	8271649	1	GASKET KIT .. Cylinder head cover and support frame
24	8470797	2	GASKET .. Frame to crankcase - Outside - Replaces 8275294
25	8470798	2	GASKET .. Frame to crankcase - Inside - Replaces 8275292
26	8275289	2	GASKET .. Camshaft drive end
27	8271623	4	GASKET .. Cylinder head cover
GASKET KIT .. Cylinder Head Cover and Support Frame with Round Inside Corners			
28	9087944	1	GASKET KIT .. Cylinder head cover and support frame - Replaces 8395611
29	8470793	2	GASKET .. Frame to crankcase - Outside - Replaces 8275291
30	8470794	2	GASKET .. Frame to crankcase - Inside - Replaces 8275295
31	9087073	2	SEAL .. Cylinder head cover - Replaces 8380468 and 8473321
32	9087945	1	GASKET KIT .. Cylinder head cover and support frame - Replaces 8395610
33	8470795	2	GASKET .. Frame to crankcase - Outside - Replaces 8275296
34	8470796	2	GASKET .. Frame to crankcase - Inside - Replaces 8275290
35	9087074	4	SEAL .. Cylinder head cover - Replaces 8399083 and 8473322
36	9087946	1	GASKET KIT .. Cylinder head cover and support frame - Replaces 8386814
37	8470797	2	GASKET .. Frame to crankcase - Outside - Replaces 8275294
38	8470798	2	GASKET .. Frame to crankcase - Inside - Replaces 8275292
39	9087073	4	SEAL .. Cylinder head cover - Replaces 8380468 and 8473321
40	9087947	1	GASKET KIT .. Cylinder head cover and support frame - Replaces 8377469
41	8470799	2	GASKET .. Frame to crankcase - Outside - Replaces 8360956
42	8470800	2	GASKET .. Frame to crankcase - Inside - Replaces 8360955
43	9087072	4	SEAL .. Cylinder head cover - Replaces 8373628 and 8473320

ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Accessory Drive Housing			
1	8254494	1	GASKET KIT .. Accessory drive housing
2	8084665	1	GASKET .. Accessory drive housing to crankcase
3	8028760	1	GASKET .. Blind cover - Water pump opening - 8 cylinder
4	8084685	1	GASKET .. Cover - Lube oil relief valve
5	8028763	1	GASKET .. Auxiliary drive cover
6	8055158	1	SEAL .. Oil
7	8029163	3	GASKET .. Water line crossover - 8 cylinder
8	8167060	1	GASKET .. Manifold to crankcase - Lube oil
9	8082586	1	SEAL .. Elbow to accessory drive cover
10	8082587	1	SEAL .. Elbow to accessory drive cover
11	8029165	2	GASKET .. Oil stubshaft to manifold
12	8069445	1	GASKET .. Oil pressure valve to manifold
13	8029469	2	GASKET .. Flange to drain pipe
14	8261173	1	GASKET KIT .. Accessory drive housing
15	8084665	1	GASKET .. Accessory drive housing to crankcase
16	8084685	1	GASKET .. Cover - Lube oil relief valve
17	8028763	1	GASKET .. Auxiliary drive cover
18	8055158	1	SEAL .. Oil
19	8167060	1	GASKET .. Manifold to crankcase - Lube oil
20	8082586	1	SEAL .. Elbow to accessory drive cover
21	8082587	1	SEAL .. Elbow to accessory drive cover
22	8029165	2	GASKET .. Oil stubshaft to manifold
23	8069445	1	GASKET .. Oil pressure valve to manifold
24	8029469	2	GASKET .. Flange to drain pipe
GASKET KIT .. Auxiliary Generator Drive			
25	8209989	1	GASKET KIT .. Auxiliary generator drive
26	8081398	1	GASKET .. Drive to camshaft drive cover
27	8081359	1	GASKET .. Stubshaft cover
28	8081365	1	GASKET .. Cover - Rear
29	8029153	8	GASKET .. Oil line from blowers to auxiliary generator drive housing
30	8081494	1	GASKET .. Split line
GASKET KIT .. Governor Drive			
31	8336989	1	GASKET KIT .. Governor drive
32	8028229	1	GASKET .. Governor drive mounting
33	8028239	1	GASKET .. Governor to governor drive
34	8029154	3	GASKET .. Oil line fitting
35	8028209	1	GASKET .. Governor drive housing cover plate
GASKET KIT .. Engine Blower			
36	8209988	1	GASKET KIT .. Engine blower
37	8028465	1	GASKET .. Blower to blower support
38	8028148	1	GASKET .. Blower to blower drive
39	8024287	1	GASKET .. Air filter adapter to blower housing
40	8029159	2	GASKET .. Blower housing to oil drain line flange
41	8029153	2	GASKET .. Oil line flange to blower housing
42	8084407	2	GASKET .. Oil separator pipe to blower adapter
43	8048058	1	GASKET .. Oil line to drive housing flange
44	8070199	2	GASKET .. Oil separator pipe to blower adapter

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ENGINE GASKET KITS

Ref. No.	Part Number	Qty. Req.	Description
GASKET KIT .. Turbocharger Changeout			
1	8414907	1	GASKET KIT .. Turbocharger changeout
2	8451659	1	GASKET .. Turbocharger to camshaft drive housing - Replaces 8185583
3	8261200	1	GASKET .. Generator and dust bin blower drive to turbocharger
4	8416803	2	GASKET .. Air duct to air box
5	8460205	2	GASKET .. Air duct to compressor scroll - Replaces 8261264
6	8357298	2	GASKET .. Aftercooler mounting to air duct
7	8294874	1	SEAL .. Stubshaft
8	8261282	1	GASKET .. Stubshaft cover
9	8309212	1	GASKET .. Exhaust chamber expansion joint to turbocharger
10	8289171	6	GASKET .. Inlet pipe to aftercooler and engine outlet "Y"
11	8028760	1	GASKET .. Oil separator flange to engine
12	8271729	2	GASKET .. Oil separator to turbocharger
13	8070513	1	GASKET .. Aftercooler pipe to engine water outlet
14	8347396	2	GASKET .. Aftercooler inlet pipe to manifold
15	8282176	2	GASKET .. Pad to air duct
†16	8380244	1	GASKET KIT .. Turbocharger changeout
17	8451659	1	GASKET .. Turbocharger to camshaft drive housing - Replaces 8185583
18	8261200	1	GASKET .. Auxiliary generator drive to turbocharger
19	8416804	2	GASKET .. Air duct to crankcase
20	8460205	2	GASKET .. Air duct to scroll - Replaces 8261264
21	8403484	2	GASKET .. Aftercooler mounting to air duct
22	8294874	1	SEAL .. Outer stubshaft
23	8261282	1	GASKET .. Outer stubshaft cover
24	8309212	1	GASKET .. Exhaust manifold expansion joint to turbocharger
25	8289171	6	GASKET .. Inlet pipe to aftercooler and engine outlet "Y"
26	8028760	1	GASKET .. Oil separator flange to engine
27	8271729	2	GASKET .. Oil separator to turbocharger
28	8070513	1	GASKET .. Aftercooler pipe to engine water outlet
29	8347396	2	GASKET .. Aftercooler inlet pipe to manifold
†30	8383956	1	GASKET KIT .. Turbocharger changeout
31	8451659	1	GASKET .. Turbocharger to camshaft drive housing - Replaces 8185583
32	8261200	1	GASKET .. Generator and dust bin blower drive to turbocharger
33	8416804	2	GASKET .. Air duct to air box - Replaces 8358721
34	8460205	2	GASKET .. Air duct to compressor scroll - Replaces 8261264
35	8403484	2	GASKET .. Aftercooler mounting to air duct - Replaces 8357358
36	8294874	1	SEAL .. Stubshaft
37	8261282	1	GASKET .. Stubshaft cover
38	8309212	1	GASKET .. Exhaust chamber expansion joint to turbocharger
39	8289171	6	GASKET .. Inlet pipe to aftercooler and engine outlet "Y"
40	8028760	1	GASKET .. Oil separator flange to engine
41	8271729	1	GASKET .. Oil separator to turbocharger
42	8070513	1	GASKET .. Aftercooler pipe to engine water outlet
43	8133199	1	TAPE .. Pressure sensitive - 100 ft. roll
44	8347396	2	GASKET .. Aftercooler inlet pipe to manifold
GASKET KIT .. Aftercooler Changeout			
45	8372925	1	GASKET KIT .. Aftercooler changeout
46	8282176	1	GASKET .. Aftercooler to air duct - Inner
47	8357298	1	GASKET .. Aftercooler to air duct - Outer
48	8289171	3	GASKET .. Inlet pipe to aftercooler and engine outlet "Y"
49	8347396	1	GASKET .. Aftercooler inlet pipe to manifold
50	8365646	1	GASKET KIT .. Aftercooler changeout - Replaces 8380245
51	8289171	3	GASKET .. Inlet pipes to aftercooler and engine "Y"
52	8403484	1	GASKET .. Aftercooler air duct
53	8347396	1	GASKET .. Aftercooler inlet pipe to manifold

† Except models MP36, MP45 and 999-20.

†† Models MP36, MP45 and 999-20 only.

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8274797	28	3	1
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8275290	99	10	20
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9550585	8	13	1
9550599	9	3	11
9550600	9	3	12
9550601	9	1	28
9550602	9	1	28
9550603	9	1	27
9550604	9	1	27
9550605	9	2	40.
9550606	9	2	39
9550607	9	3	22
9550608	9	3	21
9551207	9	2	39
9551208	9	2	40
9551462	9	1	18
9551463	9	1	17
9551802	99	5	10
9551898	74	3	0
9552014	10	2	12
9552142	46	5	27
9552513	1	15	2
9552597	1	15	4
9552598	1	15	4
9552607	74	8	1
9552608	74	8	7
9552609	1	15	2
9552711	74	3	0
9552942	25	20	50
9553049	46	4	2
9553050	46	4	1
9553076	33	4	21
9553076	33	5	13
9553076	33	6	22
9553076	33	8	10
9553197	74	3	0
9553208	74	3	0
9553209	74	3	0
9553210	74	3	0
9553258	46	5	35
9553259	46	5	35
9553290	74	1	0
9553291	74	2	0
9553291	74	3	0
9553292	74	2	0
9553292	74	3	0
9553341	74	3	0
9553342	74	3	0
9553456	74	8	5
9553456	74	8	11
9553506	72	19	2
9553652	72	19	1
9554006	59	7	10
9554344	74	3	0
9554345	74	3	0
9554346	74	3	0
9554348	74	3	0
9554349	74	3	0
9554350	74	3	0
9554351	74	3	0
9554352	74	3	0
9554353	74	3	0
9554354	74	3	0
9554355	74	3	0
9555990	8	14	1
9556031	28	11	1
9556032	6	3	13
9556032	6	3	24
9556059	6	3	2
9556060	6	3	1
9556060	9	4	3
9556060	9	4	5
9556097	9	3	3
9556646	33	12	12
9557027	74	3	0
9557028	74	3	0
9557143	72	5	6
9557143	72	7	7
9557143	72	11	8
9557143	72	13	9
9557143	72	19	16
9557427	74	7	19
9557428	74	7	3
9557579	74	7	36
9558102	99	5	4
9558451	10	2	10
9558511	78	8	1
9558513	78	8	5
9558513	81	16	9
9558545	10	2	11
9558592	44	14	6
9558715	72	5	6
9558715	72	7	7
9558715	72	13	9
9558965	4	2	2
9558966	4	2	3
9558967	4	2	4
9558968	4	2	7
9558969	4	2	8
9559294	9	4	2
9559295	9	4	2
9559296	9	4	1
9559297	9	4	1
9559298	9	4	5
9559299	9	4	6
9559496	80	1	7
9559497	80	1	11
9559503	80	1	11
9559504	80	1	7
9559777	67	4	43
9559777	67	17	384
9559892	25	17	11
9559893	25	17	12
9561067	6	3	13
9561067	6	3	24
9561068	6	3	23
9561069	6	3	23
9561148	9	4	4
9561150	9	4	3
9561588	9	4	2
9561589	9	4	1
9561803	9	4	4
9561804	9	4	3
9562298	81	16	1
9562599	81	16	3
9562628	59	12	11
9562629	59	12	21
9564571	99	1	20
9564571	99	2	21
9564571	99	3	23
9564571	99	4	17
9564571	99	10	1
9564583	8	13	2
9564583	8	13	12
9564583	8	14	2
9564698	99	2	6
9564698	99	3	6
9564698	99	4	6
9564698	99	6	39
9566367	25	22	52
9566368	25	22	51
9566369	25	22	40
9566370	25	22	39
9566371	25	22	36
9566372	25	22	34
9566373	25	22	30
9566374	25	22	24
9566375	25	22	25
9566377	25	22	14
9566378	25	22	13
9566379	25	22	10
9566395	25	22	9
9566396	25	22	37
9566397	25	23	62
9566647	67	4	41
9568891	46	2	8
9568892	46	2	7
9571203	28	10	1
9571251	28	10	1
9571252	28	10	1
9571259	28	10	14
9571260	28	10	13
9571261	28	10	12
9571899	28	13	9
9572817	8	13	2
9573312	8	13	12
9573312	8	14	2
8347103	8	4	7