PARTS CATALOG

CONTRACT _____

PURCH. ORDER _____

APPLIES ONLY TO THE FOLLOWING ENGINES

12719

BORE 9" STROKE 12"

NO. CYL. 4 TYPE Marine - R.H.

MODEL _____

WARNING

THIS CATALOG MAY CONTAIN EXTRA GROUP SHEETS WHICH DO NOT APPLY TO THE ENGINES NOTED ABOVE

USE ONLY THOSE SHEETS LISTED ON THE INDEX SHEET

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND CALIF. MATTOON ILL

Printed in U.S.A.

4 CYLINDER MARINE DIESEL ENGINE

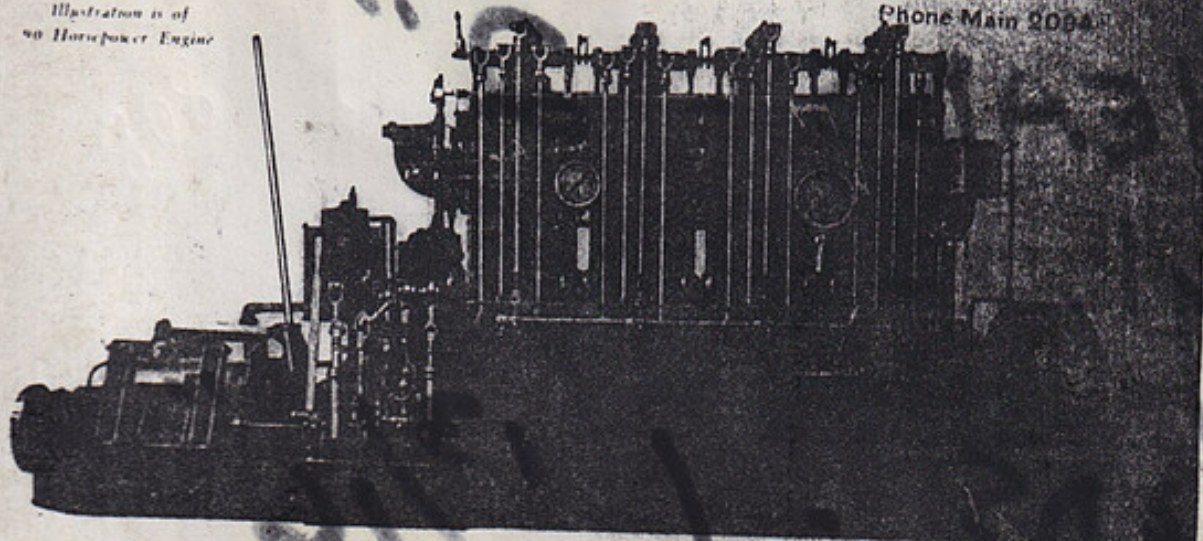
SPECIFICATION NO. 628-12

For 70, 90, 110 Horse Power

ATLAS-IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIFORNIA, U. S. A.

Illustration is of 90 Horsepower Engine



Atlas-Imperial Mechanical (Solid or Airless) Injection Marine Diesel Engine

TYPE—The engine is of the 4-cylinder, full Diesel. Mechanical Injection 4-cycle vertical type, having enclosed oil tight crank case, overhead valves, heavy duty reversing gear clutch, and forced lubricating system.

POWER—Each engine is rated for continuous service at its normal rated speed at sea level and will develop from 10 to 20% above rating on Prony brake on the test stand.

CRANK SHAFT—Is a one piece hammered steel forging of U. S. Navy specifications, approved by Lloyd's for marine shafting, finished in size to and above Lloyd's and American Bureau requirements. The cranks are cut from the solid, set at 180°, finished all over, balanced, and drilled for forced lubrication.

CONNECTING RODS—are made from steel forgings without welds of the same material as the crank shaft. They are fitted for forced lubrication of the wrist pin bearings, are drilled their entire length. At the upper end they are fitted with hard phosphor bronze wrist pin bushings. At the lower end they are fitted with cast steel white bronze lined Marine Type crank pin boxes fitted for forced lubrication. They receive their lubricating oil through the drilled crank shaft. The bearings are fastened to the rods with alloy steel bolts, double nuts, and cotter pins. All bearings are made *interchangeable*, machined, and drilled to jig.

WRIST PINS—are made from special alloy steel, carefully machined, hardened, and ground to size and have large bearing surface in the piston walls.

CYLINDERS—are cast separate, of special nickel alloy semi-steel mixture, having high tensile strength, and provided with large water jackets and ample clean-out openings. They are made interchangeable and held in place by extra heavy studs, fastened in base casting close to main bearings. A cylinder relief valve (or safety valve) is provided on each cylinder as a safeguard against excessive pressure. Cylinders are GROUND by special cylinder grinding machines.

PISTONS—are cast of a special mixture of close-grained gray iron suitable for long wear. They are carefully machined to precision and are of long length to reduce the thrust pressure, insuring minimum wear and long life. The piston rings are properly located to protect them from the heat of the burning fuel.

CYLINDER HEADS—are cast from a special mixture of nickel alloy semi-steel metal. They are carefully designed to allow all parts subjected to heat to be thoroughly water cooled and also to allow them to expand and contract without rupturing any part of the casting. The bossing on the cylinder head is designed to protrude a sufficient distance within the cylinder to protect the copper asbestos gasket from high temperature within combustion chamber. The circulation of water to the heads is by the means of pass-over pipes.

The cylinder heads are easily removed. All of the valve rod arm mechanism is removed with the cylinder head, dismantling of these parts being unnecessary. Heads can be removed without disturbing the intake or exhaust manifolds.

CENTER FRAME—is in one piece, planed to fit on the base within registering or centering joints, it carries the cam shaft, which is bedded in plastic bronze, removable bearings. Large doors are fitted to make the frame oil tight, and are easily removed for inspection of crank bearings.

BED-PLATE—carries the crank shaft, and supports the center frame. All main bearings are reinforced by double webs running the full distance across bed plate, and strengthened by internal brackets.

The main cylinder studs are tapped into the cross sections on each side of main bearings, thus forming a complete yoke around the main bearing and up to the cylinders, making an even distribution of stresses, and tying firmly together in one unit, base, frame, and cylinders.

The bed plate forms an oil tight crank case, which, together with the center frame, forms the oil pit for the lubricating oil system, drainage being provided from end to end for this purpose.

The end bearings are provided with a recess in which a slinger ring on the crank shaft throws into this opening all lubricating oil which would otherwise work out. A drain connects this recess with the main base, thus draining back into the base all lubricating oil which may have a tendency to run out of the ends of the bearings. In addition to this the ends of the bearings are covered with a sheet of fiber to make them dust and water proof.

Bases are carefully machined and bored for the bearing shells. The shells are hand-scraped to fit the base accurately. Internal surfaces are treated to eliminate all scale and sand, after which it is treated with a special preparation, leaving an enamel finish, and a perfect lubricating oil receptacle.

MAIN BEARINGS—are split shells, made extra heavy, machined inside and out, carefully scraped and fitted to seats in the base; they rest rigidly in their carefully machined seats, thus insuring uniform wear. The bearings are flooded with oil from forced lubricating system.

Shells are machined with dove tailed grooves lined with special white bronze cast in under pressure, bored and scraped to an accurate fit. By raising crank shaft slightly, bearing shells can be rolled out for inspection.

VALVES AND VALVE GUIDES—The exhaust and inlet valves are mechanically operated. The inlet and exhaust valves and springs are alike, therefore, strictly INTERCHANGEABLE and are of sufficient diameter to insure long usage. The valves are operated by steel valve lifters provided with large anti-friction rollers; these rollers are special alloy steel, hardened and ground. The cams are ground to gauge in special cam grinding machine which insures accuracy and absolute INTERCHANGEABILITY. They are fastened to the cam shaft with keys (not pins). All the gears driving the cam shaft are of the spur gear type, steel forged and machine cut.

IGNITION—And combustion without explosion solely from the heat of compression; the simplest, most reliable and most efficient principle known to engineering science.

FUEL OIL SYSTEM—is of the CONSTANT PRESSURE TYPE. The pressure is maintained by plunger pumps driven by cranks mounted on the cam shaft. These pumps deliver fuel oil into the high pressure system leading to fuel spray nozzle in the center of the cylinder heads. A branch pipe connects each spray nozzle to the high pressure oil system. An additional branch leads to a pressure regulator and relief valve, which regulates the pressure, and by-passes all oil not required to maintain constant pressure. The operator can adjust the pressure of the oil in the high pressure oil system as may be required, by the aid of a ratchet lever located at a convenient place on the engine. The spray valve is mechanically opened by a cam and properly TIMED with the cycles of operation to gradually inject the fuel at the proper time for ignition.

NO HIGH PRESSURE AIR is used to force the fuel into the cylinder.

LUBRICATION—The engine is provided with a dual system, a primary system and a secondary system. The primary system consists of a mechanical force feed oiler, ratchet driven, which supplies oil to the cylinder walls. New oil is used in this oiler, there is always a small amount of waste oil from cylinder lubrication, which, after being caught up in the oil tight base, is the "make up" oil for the secondary system.

The secondary system supplies oil UNDER PRESSURE to all main bearings, crank bearings and wrist pins. The pressure is maintained by a pump which forces the oil through drilled passages from the middle of main bearings diagonally through the middle of the journal and the webs of the crank shaft and passes to the middle of the crank pins. The connecting rod is hollow. The oil, aside from lubricating the main and the crank pin bearings, is forced through the hollow connecting rod and lubricates the piston pin bearings.

The oil is initially forced through the bottom of the main bearings (instead of the top) permitting a simple arrangement of the oil piping and obviating the necessity of breaking pipe connections when the bearing covers are removed. All the oil pumped through these bearings is collected in the crank pit, flows to a sump through a strainer, is pumped from the sump through COOLER to the filtering tank, and returned to the bearings by positive pressure pump which maintains a pressure of 5 to 10 pounds per square inch. This pressure can be adjusted at the will of the operator.

GOVERNOR—is of the flyball type, gear driven from the cam shaft, is encased within an oil tight frame. This governor regulates the power and speed of the engine by wedge adjustment of the lifters opening the fuel spray valve. The pressure in the fuel oil system being constant, the longer the spray valve is held open, the greater the quantity of fuel is sprayed into the combustion chambers; and in like manner the shorter period of time it is held open, the smaller quantity of oil is injected into the cylinder. The governor regulates this period of opening very accurately, and is extremely sensitive.

SPEED FLEXIBILITY—The engine can be run as slow as the kinetic energy of the flywheel and revolving parts will permit with no manual adjustment whatever except the governor throttle control, and can be run indefinitely with full load, no load or any intermediate point, and at a slow or high speed, as desired by the operator. The governor regulates the speed of the engine to

approximately two per cent of normal and will not have a range of over four per cent from no load to full load, or vice versa, when the load is suddenly applied or removed.

AIR COMPRESSOR—Is mounted on the center frame, driven by an eccentric on the main crank shaft, and capable of compressing air to 250 pounds pressure. A lever, on the compressor head, may be swung over the stem of the air intake valve, thus holding it open, and allowing the piston to be in motion without compressing air or absorbing power. The compressor has a grid between the cylinder and cylinder head, eliminating the danger of a valve dropping. The purpose of this compressor is to replenish the starting air in the storage tanks and furnish supply for whistle in marine installations.

CIRCULATING PUMPS—The engine is equipped with a substantial bronze centrifugal water circulating pump attached to the engine and connected to the cylinders with brass piping.

This pump is SILENT CHAIN DRIVEN off a sprocket on the crank shaft and is provided with a means of taking up wear or slack. There is also a plunger pump on the engine to be used as a bilge pump. This pump is also connected up to the engine to be used as a circulating pump in the event of a mishap to the centrifugal pump.

REVERSE GEAR—Is of the spur gear type. All gears and pinions are made from forged steel and are enclosed in an oil tight case which is filled with lubricating compound and transmission oil. The reverse brake is of the brake post type, with liberal size brake shoes. The go-ahead friction is of the multiple disc type, easy of adjustment and of liberal dimensions.

THRUST BEARING—Is of the navy type, securely bolted to the engine base, lined with the best grade of genuine babbitt. The thrust is taken up by collars turned on the solid center gear extension.

FUEL CONSUMPTION—The consumption of Diesel fuel oil having a mean low heat value of not less than 18,500 British Thermal Units per pound, and sufficiently liquid at normal temperature or when preheated to flow freely to and be handled properly by the fuel pumps, is guaranteed not to exceed the following quantities at or near sea level, to-wit:

At full load: 0.45 lb. per BHP hr. or 6 gal. per 100 BHP hrs.

At ¾ load: 0.47 lb. per BHP hr. or 6⅛ gal. per 100 BHP hrs.

At ½ load: 0.53 lb. per BHP hr. or 7 gal. per 100 BHP hrs.

The fuel oil may be either paraffin or asphaltum base, with a flash point not less than 150° Fahrenheit, free from solid and non-combustible matter, with not more than a trace of acid, nor more than .01% of ash, .5% of water, 1.5% of sulphur or .5% residue. Regular 24° Baume Diesel fuel oil is recommended for best results.

TEST OF PERFORMANCE—Every engine is set up and thoroughly tested before shipment, to demonstrate its good running qualities and fulfillment of the contract requirements as to capacity, efficiency and regulation.

NOTE—*The Engineering Staff and the executives of the Atlas-Imperial Diesel Engine Co. keep informed on new developments and discoveries in Diesel engine mechanics, conduct research work to ascertain and develop tested improvements requiring the alteration of details and design, reserve the right to make suitable alterations in the described construction, as improvements are introduced.*

GENERAL DATA OF 4-CYLINDER ENGINES

H.P.	Bore In.	Stroke In.	Normal R.P.M.	Dia. of Crank Shaft	Dia. & Length of Steel Propeller Shaft	Dia. & Length of Steel Intermediate Shaft	Maximum Propeller Diameter	Approx. Net Weight Engine and Flywheel only Pounds	Approx. Shipping Weight with Equipment A-B-C-D-E	Approx. Shipping Measurement with Equipment A-B-C-D-E
70	7½	10½	400	4½	3" x12'	3" x10'	42" or to suit	10700	15200 Lbs.	345 Cu. Ft.
90	8½	12	325	5⅜	3½" x12'	3½" x10'	48" or to suit	13535	18425 Lbs.	478 Cu. Ft.
110	9	12	325	5⅜	3½" x12'	3½" x10'	50" or to suit	14700	20500 Lbs.	515 Cu. Ft.

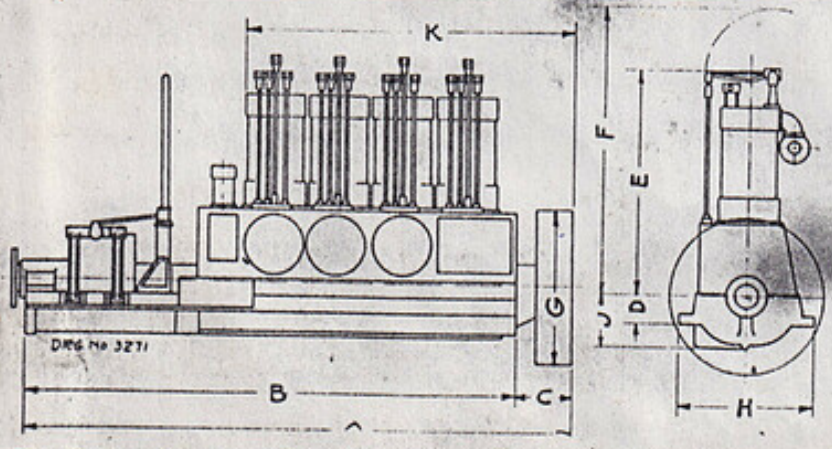
EQUIPMENT "A"

Engine complete as specified including flywheel, water jacketed exhaust manifold, fuel pressure gauge, lubricating oil pressure gauge, cylinder safety valves, air starting globe valve, lubricating oil service tank with inbuilt strainer all on engine also one 12" x36" service (day) fuel tank with inbuilt strainer, one half companion coupling with bolts and nuts to fit reverse gear thrust flange, set of open end engineers steel wrenches and box wrenches, flywheel bar, and following spare parts:

1—Extra complete spray valve
2—Spray valve nozzle tips
6—Spray nozzle gaskets
2—Spray nozzle cam points
4—Spray nozzle cleaning needles
1—Spray valve testing clamp
1—Exhaust valve
1—Exhaust valve spring
1—Set air inlet gaskets
1—Set cylinder head gaskets
1—Spray valve test tube
Metallic packing and rings
1—Steel fuel pipe and unions
1—Punch to remove spray tips
1—Fuel pump plunger
1—Spray tip cleaning plunger

When price is given with Equipment "A" above accessories and spare parts are included.
The following special prices apply only when equipment is SOLD WITH ENGINES and are offered as an inducement to the purchaser to provide the proper equipment for his engine at a minimum cost. On all subsequent orders or replacements, the regular prices will prevail.

AIR EQUIPMENT "B"	70 HP	90 HP	110 HP
1—No. 0 size auxiliary gasoline engine and air compressor	$150.00	$150.00	$150.00
1—18" dia. x 60" air receiver for starting air	72.00		
2—18" dia. x 60" air receivers for starting air		144.00	144.00
1—Heavy type Globe valve for air receiver	4.50		
2—Heavy type Globe valves for air receiver		12.00	12.00
1—Air pop safety valve	6.00	6.00	6.00
1—Air gauge	7.50	7.50	7.50
1—Air whistle and valve	9.00	9.00	9.00
Total Price EQUIPMENT "B"	$249.00	$328.50	$328.50
PROPELLER EQUIPMENT "C"			
1—3 Blade bronze propeller	$ 97.00	$153.00	$163.00
1—12 Ft. long steel propeller shaft with 2 bronze sleeves and propeller nut and coupling	133.00	160.00	160.00
1—10 Ft. long steel intermediate shaft and coupling	60.00	70.00	70.00
1—Brass stern bearing and lag studs with nuts	57.00	75.00	75.00
1—Brass stuffing box with lag studs and nuts	28.00	54.00	54.00
Total Price EQUIPMENT "C"	$375.00	$512.00	$522.00
SEA WATER FITTINGS. EQUIPMENT "D"			
2—Brass sea valves	$ 19.00	$ 19.00	$ 19.00
2—Brass cast sea nipples and flanges	18.00	18.00	18.00
2—Brass cast sea strainers	6.00	6.00	6.00
Total Price EQUIPMENT "D"	$ 43.00	$ 43.00	$ 43.00
SUNDRIES. EQUIPMENT "E"			
1—Exhaust Muffler	$ 27.50	$ 38.75	$ 38.75
1—Set galvanized foundation lags and nuts	4.00	6.25	6.25
1—Oil filler and 2 squirt cans	1.50	1.50	1.50
Total Price EQUIPMENT "E"	$ 33.00	$ 46.50	$ 46.50
Total for EQUIPMENT B, C, D, E	$700.00	$930.00	$940.00



"F" is clearance necessary to raise rocker to remove spray valve, and to draw pistons.

TABLE OF APPROXIMATE DIMENSIONS IN TERMS OF INCHES

	70 HP	90 HP	110 HP
A	129	145	153
B	109	123	130
C	14	16	17
D	6	8	8
E	56	58	61
F	70	72	76
G	34	43	43
H	34	36	38
J	12	15	15
K	73	83	91

Certified Prints Should Be Used for Installations.

Printed in U. S. A.

#8251

PARTS CATALOG

CONTRACT _____

PURCH. ORDER _____

APPLIES ONLY TO THE FOLLOWING ENGINES

12719

BORE 9" STROKE 12"

NO. CYL. 4 TYPE Marine - R.H.

MODEL _____

WARNING

THIS CATALOG MAY CONTAIN EXTRA GROUP SHEETS WHICH DO NOT APPLY TO THE ENGINES NOTED ABOVE

USE ONLY THOSE SHEETS LISTED ON THE INDEX SHEET

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND CALIF. MATTOON ILL

Printed in U.S.A.

31 January 1995

Ms. Jean Gerards
DIESEL PARTS OF CALIFORNIA
1900 East 12th St. 534-9716
Oakland, CA 94606

Dear Jean:

I am writing to thank you and your associates for your warm reception and very thoughful assistance when I stopped by your office late last Friday (the 20th) to discuss engine parts for the Atlas 4HM763 installed new in my 1924 built 86 ft. motoryacht----the WESTWARD.

Enclosed is a photo of the boat taken recently; WESTWARD has been her name all of her life, it is only a coincidence that she shares a name with the above company-----which I started in 1982, fully 11 years prior to my purchase of WESTWARD.

The copy which you made for me of the original parts book/operating-maintenance manual for my 9 x 12 engine was a generous and invaluable contribution on your part to our efforts to keep the engine well maintained and running in top-form; thank you.

I will be cruising the WESTWARD in Mexico and Central America (and perhaps beyond) over the next few months; we will certainly be in touch, either directly or via Dan Grinstad of Ace Towboat in Seattle, when any parts needs arise. You can be certain of prompt payment by this office of any amounts that may be owing to you for your support. Please contact Nina Hernandez here if you have any questions or needs for credit info in my absence.

Thank you again for your past and recent support of (reportedly!) the oldest Atlas engine still in service; and thank you in advance for the future service and support that the WESTWARD can and will rely upon from you in future.

Yours Very Truly,
WESTWARD TRAWLERS, INC.

Hugh Reilly

TC6-Ed1(1)

TABLE OF CONTENTS

The material in the Instructions has been arranged in sections each dealing with a specific subject or subdivision of the engine. The sections are arranged alphabetically and the Titles and main contents are listed below.

	Section	Page In Section
GENERAL ENGINE DATA	A	
FUEL AND LUBRICATING OILS	B	
INSTALLATION INSTRUCTIONS	C	
OPERATING INSTRUCTIONS	D	
LOWER BASE, CRANKSHAFT AND BEARINGS	F	
Main Bearings		1
Crankshaft Alignment		1
CYLINDER AND LINER, CYLINDER HEAD AND VALVES	H	
Cylinder and Liner		1
Cylinder Head and Valves		1
Air Starting Valves		2
PISTON AND CONNECTING ROD	K	
Connecting Rod Bearings		2
CAMSHAFT AND VALVE OPERATING GEAR	L	
Camshaft, Camshaft Removal and Disassembly		1
Camshaft Assembly, Lifter and Push Rods		2
Valve Timing Table, Flywheel Markings		3
Inlet & Exhaust Valve Timing		4
Starting Air Valve Timing		4
FUEL SUPPLY SYSTEM	N	
Fuel Transfer Pump		1
Day Tank and Filter		1
FUEL INJECTION SYSTEM	O	
High Pressure Fuel Pump		1
Fuel Rail and Tubing		2
Fuel Pressure Regulating Valve		3
Spray Valve and Servicing		4
Spray Valve Timing		8
Balancing Engine for Cyl. Load Distribution		9
GOVERNOR	Q	
REVERSE GEAR AND THRUST BEARING	S	
Planetary Transmission		2
Clutch		3
Reverse Gear Brakes		4
Thrust Bearing		4
Dismantling and Adjustment		5
LUBRICATING OIL SYSTEM	T	
Lubricating Oil Pumps		1
Filter		2
Oil Cooler, Lubricator and Drive		3
COOLING WATER SYSTEM	W	
Circulating Water Pump		1
AIR COMPRESSOR	X	
MAINTENANCE AND INSPECTION	Z	
Smoky Exhaust		1
Maintenance Routine		2
PARTS CATALOG (Sub-Assemblies, Auxiliary Equipment)		

GENERAL ENGINE DATA

The Atlas Imperial Diesel Engine described herein is of the heavy duty, solid injection, full Diesel type, designed especially for reliability and a long life of trouble-free operation. It operates on the four stroke cycle, the sequence of operation being as follows:

1st Stroke — On the downward or suction stroke of the piston, the inlet valve is open and pure air is drawn into the cylinder through the air inlet manifold.

2nd Stroke — On the second or compression stroke, this air is compressed to about 400 lbs. per square inch, the heat of compression raising the air temperature to a point above the ignition temperature of the fuel. Just before the piston reaches top center, the injection is completed shortly after the piston has passed the top dead center.

3rd Stroke — On the power stroke the injected fuel oil burns, increasing the pressure within the cylinder, and driving the piston down through its working stroke. Shortly before bottom center position is reached, the exhaust valve opens.

4th Stroke — As the piston returns toward the head, the burned gases are discharged through the exhaust valve, and as the piston reaches top center the exhaust valve is closed, the inlet valve is opened, and the cycle is repeated.

The following engine data applies to engines covered by this book:-

	MARINE		STATIONARY	
MODEL ⟶	3HM763	4HM763	3HS763	4HS763
NO. OF CYL.	3	4	3	4
BORE	9"	9"	9"	9"
STROKE	12"	12"	12"	12"
RATED OPERATING SPEED	325 RPM	325 RPM	400 RPM	400 RPM
HORSEPOWER RATING	75	110	90	120
PISTON SPEED (FEET PER MIN.)	650	650	800	800
LUBE OIL PUMP PRESSURE (GEAR TYPE)	4.3 G.P.M.	4.3 G.P.M.	5.4 G.P.M.	5.4 G.P.M.
LUBE OIL PUMP SUMP (GEAR TYPE)	5.9 G.P.M.	5.9 G.P.M.	6.2 G.P.M.	6.2 G.P.M.
FUEL TRANS. PUMP (GEAR TYPE)	1.6 G.P.M.	1.6 G.P.M.	1.9 G.P.M.	1.9 G.P.M.
APPROX. WEIGHT (WITH FLYWHEEL)	12600 LBS.	14760 LBS.	13385 LBS.	15470 LBS.

High Pressure Fuel Pump - Single Acting

Operating Speed	1/2 Engine RPM
Bore	1/2"
Stroke - 3 Cyl.	1 1/4"
Stroke - 4 Cyl.	1"
No. of Pumps - 3 Cyl.	1
No. of Pumps - 4 Cyl.	2

DATA FOR ATTACHED AUXILIARIES:

Air Compressor - Single Acting	
Bore	4"
Stroke	3½"
Operating Speed	Engine R.P.M.
Circulating Water Pump - Centrifugal	
Operating Speed	4 Times Engine R.P.M.
Bilge Pump - Single Acting	
Bore	3"
Stroke	3-1/4"
Operating Speed	1/2 Engine R.P.M.

PRESSURES:

Lubricating Oil Pressure	30 to 45 lbs./Sq.In.
Cooling Water (at pump discharge)	20 lbs./Sq.In.MAX.
Fuel Oil (at transfer pump disch.)	10 lbs./Sq.In.MAX.
Fuel Oil (in rail)	1500 to 4500 lbs./Sq.In.
Starting Air Pressure	125 to 250 lbs./Sq.In.

TEMPERATURES:

Cooling Water (Engine Outlet) - direct cooling	125° F. Max.
Cooling Water (Engine Outlet) - Indirect cooling	160° F. Max.
Lubricating Oil (Cooler Outlet)	130° F. Max.
Exhaust Temperature (at full load full speed)	750° F. Max.

EXPLANATION OF TERMS "RIGHT" AND "LEFT" HAND WHEN APPLIED TO COMPLETE ENGINES

Atlas engines are built and designated as Right or Left Hand Engines. This designation has no bearing as to the engine location or arrangement in a vessel or power plant. An engine can be easily identified by facing the governor or gear end of the engine and if the governor is to the Left of the observer, the engine is Right Hand. If the Governor is to the Right of the observer the engine is Left Hand.

FUEL AND LUBRICATING OILS

1. RECOMMENDED FUEL OIL SPECIFICATION

Viscosity	35 to 70 S.U. Seconds at 100° F.
Gravity (A.P.I.)	Minimum 24°
Conradson Carbon (A.S.T.M.-D189)	Maximum 0.5%
Ash	Maximum 0.05%
B.S.&W.	Maximum 0.1%
Sulphur (A.S.T.M.-D129)	Maximum 1.0%
Ignition Quality	40 to 60 Cetane Number or equivalent in other ignition index.

2. EFFECT OF FUEL PROPERTIES ON PERFORMANCE

As adjusted at the factory the engine will operate satisfactorily on fuels with viscosities per above specification. It is possible to use thinner fuels but the operation is apt to be "snappy" and it may be difficult to maintain even cylinder load balance at varying loads. Fuels with viscosities less than 35 S.U.S. may also require special spray tips with smaller orifice holes than standard or the fuel pressure may have to be reduced. On the other hand fuels with high viscosities may require larger spray orifices than standard, increased fuel pressure and in extreme cases longer period of injection. To insure good operation it is recommended that the viscosity be held to the specification.

The gravity is of secondary importance. A minimum of 24° A.P.I. is merely given since heavier fuels generally require special treatment, such as heating and centrifuging, before they can be burned successfully.

The "Conradson Carbon" or "Carbon Residue" in the oil is an index to the amount of carbon which will form in the combustion chamber. Fuels with high "Conradson Carbon" may cause carbon to build up on the spray valve tips to such an extent that the fuel sprays are deflected causing poor operation and smoky exhaust. The higher the Conradson Carbon the more frequently will it be necessary to clean the spray valve tips. Experience also indicates that maintenance costs will be higher when fuels with high "Carbon Residues" are used.

The Ash content of a fuel is a measure of the amount of mineral material it contains. After burning the mineral residues are abrasive and it is consequently important that the Ash content be limited to 0.05%. If the content is higher rapid wear of cylinder liners, pistons and rings will result.

The item B.S.&W. (Bottom Sediment and Water) is an index to the fuel's cleanliness. It is good economy to use clean fuel and store it in clean tanks. Cleanliness in handling the fuel is also important (See paragraph entitled "Importance of Cleanliness in Fuel Handling" in Section N).

When the fuel oil is consumed in the engine Sulphur burns to Sulphur-dioxide. Under normal operating conditions most of this gas is ejected with the exhaust gases. If, however, temperature conditions are low enough, that is, if the engine is idling at low speed and under cold conditions, the sulphur-dioxide gas combines with condensed water vapors to form a corrosive acid which will attack metals used in the engine and exhaust system. It is consequently particularly important to hold the sulphur content low in fuels used for engines subject to variable loads with long periods of idling and also for engines subject to frequent starting and stopping.

The Cetane number of a fuel is an index of the ignition quality. Low Cetane values produce excessive knocking. Excessively high Cetane fuels cause high exhaust temperatures and smokiness of the exhaust.

Although the Flash Point does not affect the suitability of a diesel fuel it is well to specify a minimum of 150° F. since state laws and Classification Societies generally require this minimum. The Pour Point of the fuel should be at least 15° F. below the lowest temperature to which the fuel storage tank is subjected.

3. LUBRICATING OIL

We recommend that a good grade of Marine type pure mineral oil be used in these engines. The oil should be stable under the temperature conditions encountered in the engine and should be resistant to oxidation and sludging. In general, regarding quality of lubricating oil we refer you to a Lubrication Instruction Book which will be sent to any customer or operator requesting it. This book contains some good pointers on the selection and care of lubricating oils.

It is not necessary to use compounded oils, i.e., oils containing additives, inhibitors, anti-oxidants, carbon removers, etc. in Atlas Engines. There are, however, many good compounded oils on the market and these may be used providing extreme caution is exercised and the action of the oil in the engine is observed closely.

When a pure or "straight" mineral oil is used some carbon or other deposits will generally be found in the crankcase and sump tank. The amount of these deposits depend greatly on the quality of the oil which has been used and for good grades of oil the deposits are not excessive and in any way harmful to the engine. The chemicals contained in the compounded oils enable these oils to carry the carbon and other constituents of the usual crankcase deposits in suspension. The compounded oils also have a strong tendency to break loose and carry away any existing crankcase deposits and since there is a limit to the amount that can be carried in suspension clogging of filters and oil lines may result. It is consequently of utmost importance to thoroughly clean out the crankcase, oil lines and sump tank before changing from a straight mineral oil to a compounded oil. As an added precaution we suggest that the first batch of compounded oil be used only for about 25 hours and then drained off. These precautions apply also when changing from one compounded oil to another compounded oil of different make or brand.

If a compounded oil is used the non-corrosiveness of this oil must be looked into very carefully. In this connection the Engineering Dept. of the Atlas Imperial Diesel Engine Co. is available for consultation and they will be glad to advise whether or not an oil is suitable for use in this engine.

With regard to viscosity grade our recommendations are that the viscosity at 130° F. be between 235 and 270 Secs. Saybolt Universal. This corresponds to an S.A.E. viscosity rating of 30 to 40. In other words, the oil to be used should be a heavy S.A.E. 30 or a light S.A.E. 40 oil.

In regard to drainage periods we suggest that the first batch of oil be drained after 100 hours of service. Thereafter the suggested drainage period is 200 to 250 hours. This period may be lengthened somewhat on engines which are equipped with waste packed filters. In that case if the filter cartridge is changed before the oil is badly discolored and loaded up with insolubles or foreign particles, drainage periods of 400 to 600 hours can be used. In the cases where no waste packed filters are used the oil will of course not be "worn out" after 200 hours of service if it is of a good grade. It will, however, be dirty and will contain insolubles which should be removed from the lubricating oil before it is re-used.

The same lubricating oil as used in the crankcase of the engine is also suitable for use in the mechanical lubricator. In the case of the mechanical lubricator, however, it is highly desirable that new oil be used.

INSTALLATION INSTRUCTIONS

1. PREPARING THE ENGINE BED

The success of a Marine engine installation depends greatly upon the construction of the foundation and upon the care exercised in lining up the engine to the propeller shafting. Poor installations will result in excessive vibration and continual change in engine alignment. The result is poor performance and failure of vital parts. For this reason Atlas Imperial Diesel Engine Co. cannot guarantee an engine unless the engine foundation (engine bed) is strong and rigid enough to prevent vibration and changes in alignment.

The importance of rigidity in the engine foundation cannot be over-emphasized and it must be securely fastened to the hull of the vessel so as to be virtually a part of the hull construction. For installations in old hulls, where the rigidity of the hull is questionable, the foundation should be extended fore and aft as far as possible; twice the length of the engine is suggested. Stiffeners should be fitted to prevent the foundation from twisting and weaving. In twin screw installations it is advisable that both foundations be stiffly connected and braced to each other and to the hull. Steel foundations should be welded or riveted. Avoid bolts or screws which may work loose.

When preparing the engine foundation always obtain certified outline prints. Do not use figures or cuts in bulletins or sales literature. The top faces of the foundation must be straight and should be lined up so that they are parallel to the propeller shafting. Athwartships the two top faces should be level. The foundation should be constructed so as to allow 1" to 1½" thick shims or chocks between the engine supporting flanges and the top faces.

2. INSTALLING THE ENGINE

The engine should be lowered onto the foundation and allowed to rest on the leveling screws. For wooden foundations provide steel plates of sufficient area and thickness for the leveling screws to rest on. (Min. 4" x 4" x ¼" to 3/4" thick.) Shift the engine sideways until the centerline of the crankshaft lines up with the centerline of the propeller shafting. Then by means of the leveling screws adjust the height until the centerline of the crankshaft exactly lines up with the centerline of the propeller shafting. Also level the base athwartships. When alignment in all planes is at hand the following check should be made.

a. Turning over shaft there should be no binding between the centering spigot and recess of the two coupling halves.

b. The faces of the coupling halves should be parallel regardless of the angle through which either or both shafts are turned. With the propeller coupling half held against the engine coupling half, but not bolted, it should not be possible to insert a 0.003 in. feeler at any point between them. Check at top and bottom and the two sides before bolting flanges together.

If engine has been installed before launching it is advisable to temporarily bolt it to the foundation at this time. It is not advisable to proceed any further before launching unless the hull is extremely rigid. When the vessel is afloat the alignment should again be checked and if found satisfactory a chock should be carefully fitted at each holding down bolt. This applies to steel foundations. In wooden foundations careful measurements should be taken of the distance between the bottom of the engine supporting flanges and the top of the foundation. A continuous wooden shim should then be prepared and this shim should exactly fit the space between the foundation and the engine supporting flanges. The shims should be at least as wide as the supporting flanges.

After the engine is resting on the chocks or wooden shims it is advisable to check that the foundation is supporting the engine evenly over the entire length. This is best done with a #696 Starrett Strain Gage. Check the distance between the inside faces of the crankwebs with the corresponding crank on upper and lower centers. (See figure in Section F for strain gage location.) Readings for any one crank should not differ more than .003". Distortion of the last two cranks only indicates that the crankshaft is out of line with the propeller shafting. (When making this check the engine and propeller shaft couplings should be bolted together.) Check the last two cranks in the two horizontal positions also. If misalignment or uneven support is indicated determine the cause and correct.

When the final alignment has been accomplished permanent foundation bolts should be fitted. For steel foundations drill and ream for fitted bolts. Spaces between the foundation bolt chocks can then be filled with type metal.

3. SERVICE PIPING

Plan all piping carefully and use as short and direct lines as possible. To improve the general appearance of the installation, piping should be laid below the engine room floor when it is possible to do so. Removable floor plates should be provided and care should be taken that all piping is accessible.

4. FUEL AND LUBRICATING OIL PIPING

See Section N for pipe sizes and arrangement of the fuel day tank. See Section T for lubricating oil day tank connections. Pipe sizes are stated in these Sections. Provide drain valves and vent valves where necessary and remove all scale and dirt from pipes and fittings before installing.

5. COOLING WATER PIPING

Locate the sea chest far enough below the water line to prevent uncovering when the vessel rolls. It should be provided with a coarse grating. Inside the hull a strainer of ample size should be provided with gate valves on each side so that it can be isolated for cleaning. For engines equipped with centrifugal circulating water pumps it is particularly important that the resistance in the sea chest, strainer and piping be as small as possible. Use as few bends as possible and do not make either suction or discharge piping longer than necessary. Locate the overboard discharge not more than 3' above the water line. All valves should be gate valves - not globe valves. Use pipe sizes called for on the outline drawing.

6. STARTING AIR PIPING

Air tanks should conform to A.S.M.E. specifications and should have ample strength for 250 lbs. per square inch pressure. Each tank should be equipped with a safety valve and a globe valve for isolation. A drain valve should also be provided at the lowest point and this valve should be accessible.

Tanks should be connected to the engine starting air header using the pipe size called for on the outline drawing. Provide a globe valve next to the engine. All valves and fittings should be of heavy pattern for at least 250 lbs. per sq. inch pressure. The air compressor on the engine should be connected to the tanks with pipe of the size called for on the outline drawing and valves and fittings of heavy pattern. The air compressor discharge pipe should preferably be run to the air tank. It should not be connected to the piping between the tank and the starting air header. Air compressor unloader should preferably be connected to the tank with its own piping or tubing. Under no circumstances should it be connected to the compressor discharge line.

7. EXHAUST SYSTEM

All exhaust piping should be installed in the shortest and most direct manner possible. When bends are necessary use long sweep fittings. Use the pipe size called for on the outline drawing for lengths up to 20' containing a maximum of three bends. For 3 to 6 bends increase the pipe to the next nominal size and for each additional 30' length increase by one pipe size.

In order to protect the engine and piping from undue strains a length of flexible metal tubing should be installed as near to the engine as possible. It is also recommended that flanged connections be used for ease of dismantling and cleaning. For twin screw installations it is recommended that separate exhaust lines be used. If exhaust lines are combined and only one engine is running, soot and carbon will be blown into the other engine through the open exhaust valve.

OPERATING INSTRUCTIONS

Before the operator attempts to run the engine, he should carefully study the chapters dealing with the mechanical details, especially the governor. After familiarizing himself with the principles involved, the operator will understand the significance of the various movements of the control levers and will be able to handle the engine intelligently.

1. STARTING AIR LEVER

Observe the construction of the starting air lever, which is connected to the rocker shaft on one of the end cylinders. See Fig. D-1. The lever is held in the running position by a spring loaded latch which engages a notch in the quadrant. It may be moved to the starting position by pressing down on a pin in the handle.

The starting air rockers are mounted eccentrically on their fulcrum shafts. The ends of these shafts are connected together between the cylinders, so that the starting lever actuates all the shafts. When the shafts and lever are in the "Run" position the eccentrics are up, with the outer ends of the rockers raised. The lifters are then held up clear of the cams by springs. When the shafts are turned to the "Start" position the lifter rollers are pulled down into contact with the cams, which then actuate the starting air valves as the cam shaft rotates.

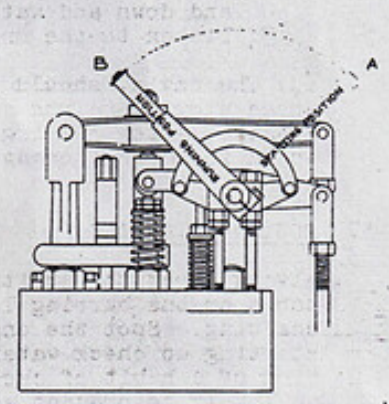


FIG. D-1

2. INITIAL STARTING AND STARTING AFTER PROLONGED SHUTDOWN

(a) A final check should be given all fuel, air, lubricating oil and water lines, giving attention to the location and position of shut-off valves, check valves, etc. It is well to trace each system through making sure that there are no short circuits or blockages.

(b) For the initial starting it is well, although not absolutely necessary, to fill the pressure lines and passages of the lubricating oil system. For this purpose a small hand operated gear pump or piston pump can be used. When the pressure lines are full, a slight pressure will register on the pressure gauge. This procedure will insure lubricating oil pressure immediately upon starting.

(c) Hand oil the engine at all the points listed under "4-HOUR ROUTINE" in the "Maintenance & Inspection" Section. Fill the mechanical lubricator and turn its crank several revolutions.

(d) In engines having less than six cylinders the starting position of the piston cycles do not overlap. In other words there are dead spots at certain points where no air starting valve is opened. When starting these engines it is therefore necessary to bar the engines over - always open the cylinder relief valves - to spot one of the pistons at a point slightly past top center on the power stroke. When on the power stroke both intake and exhaust valves are closed.

(e) Open the small vents on top of the outlet fittings of the high pressure fuel pump and operate the hand priming pump until fuel flows from both of these points. Then close these vents and pump up the fuel pressure to approximately 1500 lbs. per sq. inch by means of the priming pump handle on the high pressure fuel pump.

(f) See that valves in starting air piping between air receiver and engine are open and that there is sufficient air pressure available. (If the engine has previously been timed by means of fuel pressure or if it has been barred over it is good practice to close the spray valve isolating valves and open the compression release valves and then turn the engine over on air until any excess fuel in the combustion chambers has been blown out.)

(g) Set the governor control lever at the center of the sector.

(h) Disengage the propeller shaft clutch.

(i) Move the starting air handle to the start position. The engine will then turn over on air. As soon as firing commences, move the starting air handle back to the running position. Run the engine slowly at first and control the speed by means of the governor control lever. Adjust the fuel pressure to about 2000 to 2500 lbs. per sq. inch. Then <u>immediately</u> check and watch the following:

1. Lubricating oil pressure and circulation. Observe oil level in day tank or sump tank. Engine will absorb several gallons when started up.
2. Circulation of cooling water. Do not run the engine longer than 2 minutes or at high speed unless water circulation has started. In some instances priming of the water pump will be necessary but do not prime until the engine is cool.
3. Oil and water leakage from external lines and fittings.
4. Hot bearings. Feel covers at intervals to locate any hot areas which would indicate hot oil from a hot bearing.
5. Feel water jackets and manifolds for even water circulation.
6. Check the response of the fuel pressure relief valve by moving the handle up and down and watching the pressure gauge.
7. Listen to the engine for evenness of firing and mechanical knocks.

(j) The engine should then be gradually brought up to full speed. Increase the speed slowly and run at each new speed, checking the items under (i) at each increase. After running for a few minutes at full speed without load, reduce the speed to idling, engage the clutch and again slowly build up the speed, increasing the fuel pressure to 4000-4500 lbs. sq.in. as full speed is reached.

3. ROUTINE STARTING

Always check the positions of oil and water shut-off valves and make certain that no tools or the barring lever have been left where they can interfere with flywheel or shafting. Spot the engine in starting position. See (d) under Paragraph 2. After starting up check water circulation, lubricating oil level and pressure. The formation of a habit of checking these items automatically whenever the engine is started is likely to prevent accidents and serious damage. For routine starting it is only necessary to apply steps (d), (f), (g) and (i) in Paragraph 2 whereupon the fuel pressure can immediately be raised to 4000 lbs., and the engine brought up to full speed. The engine is usually started with the clutch disengaged, but if desired it may be started with the clutch engaged.

4. RUNNING

The following items should be watched and regulated if necessary:

(a) Oil Pressure. The lubricating oil pressure should be maintained between 30 lbs. per square inch and 45 lbs. per square inch.

(b) Cooling Water Temperature. For Seawater Cooling the outlet temperature should not exceed 125° F. If a Fresh Water Cooling System is used the outlet temperature may safely reach 150° F.

(c) Fuel Pressure. The fuel pressure should be varied with the engine load. At full load a pressure of around 4000 to 4500 lbs. per square inch will give the best results. However, as the load is reduced the fuel pressure should also be lowered to prevent too great a withdrawal of the wedges. Too high a fuel pressure at low speeds causes very short injection periods resulting in roughness and uneven engine operation. About 2000 to 2500 lbs. per sq. inch is suitable for idling.

(d) Mechanical Lubricator. The feed from the mechanical lubricator should be adjusted to 15 to 20 drops per minute per feed.

(e) Exhaust Temperature. The normal full load and speed exhaust temperature should not exceed the value stated in Section A. If the temperatures for all cylinders are above the stated value overload is at hand. If the exhaust temperature for any one cylinder is too high or too low the injection system is probably at fault. (See Section on "Smoky Exhaust" under "Maintenance & Inspection".)

(f) Exhaust Appearance. Observe the exhaust appearance. If it is smoky investigate the cause. In most cases the spray valves are responsible for smoke. (See section on "Smoky Exhaust" under "Maintenance & Inspection".)

5. TO STOP THE ENGINE

Turn the wedge shaft control lever located on top of the governor drive housing. This lever is connected by linkage to rotate the wedge shaft, pulling out the wedges and shutting off the fuel. The lever must be held in the stop position until the engine comes to rest. A latch release mechanism permits withdrawal of the wedges by means of the control lever without interference from the governor.

faces will wear, with the result that these measurements will gradually increase. As long as they all increase by the same amount the shaft will still be in line however, and there need be no worry even though they do not agree with the original readings stamped on the bridge gauge. But if at any time the "wear down" or difference between the current readings and the original readings stamped on the gauge differs by more than .004" between two adjacent bearings, the low shell should be replaced at once and the crankshaft re-aligned. This job should be undertaken only by an experienced mechanic. A careful record should be kept of all bridge gauge readings taken from time to time.

The bridge gauge measurements described above should be made successively, removing one bearing cap at a time and replacing it before proceeding to the next bearing. When making measurements the crankshaft journal must be forced down against the shell by means of a jack bearing against the centerframe. Protect the shaft journal with a piece of wood or sheet copper. An indication of low bearing shells will usually be given by looseness of the shell in the saddle. If it is possible to freely rotate one of the lower shells by hand when adjacent bearing caps are bolted down, it is quite probable that this shell is unduly worn and it should be checked with the bridge gauge at once.

If a bridge gauge is not available, crankshaft alignment may be checked with a gap or strain gage as follows: Stamp two center punch marks as shown in Fig. F-1 on all cranks. Starting with No. 1 cylinder crank remove adjacent main bearing caps and locate the crank as near lower center as gap gage will permit. Using jack screws between bearing journal and center frame force shaft against lower bearing half (protect shaft with a piece of wood or sheet copper) and record the gap gauge reading. Then loosen jackscrews and bar over until crank is on upper dead center. Again tighten jack screws and record the gauge reading. Repeat on all other cranks.

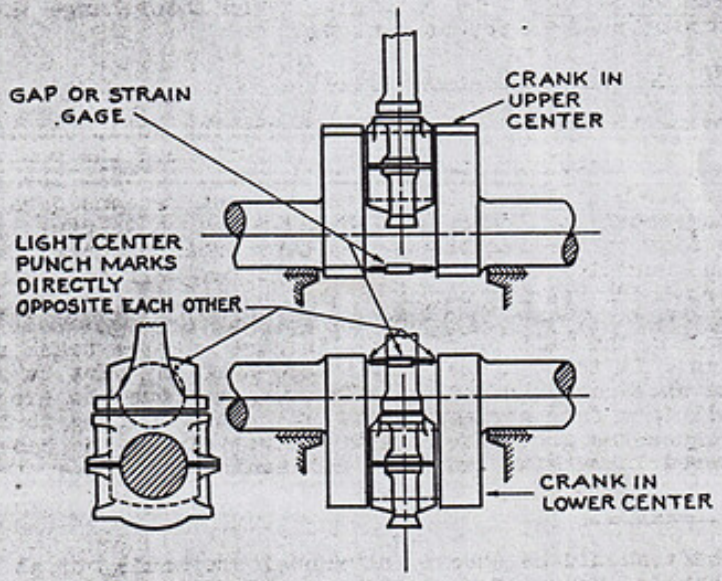


FIG. F-1

Comparison of gauge measurements in upper and lower centers will indicate crankshaft alignment conditions. Normally the measurements for the cranks in top position are slightly larger than measurements for the same cranks in the bottom position. However, the difference in measurement for any one crank should not exceed .0005" per inch of shaft diameter. If this is the case, realignment of the crankshaft bearings is indicated.

THRUST BEARING

1. MULTI-COLLAR TYPE

All loads in a fore and aft direction resulting from propeller thrust are carried by the thrust bearing. This bearing is located aft of the flywheel on pads at the end of the lower base. Water jackets are provided in the bearing castings and a small supply of cold water is bled from the main water inlet manifold to the bearing. A positive supply of oil is fed to the bearing from the mechanical lubricator located at the forward end of the engine.

In general the thrust bearing assembly consists of three parts: the bearing, the cap and the thrust shaft. Both the bearing and the cap are water jacketed. Each contains dovetailed circumferential grooves which when lined with babbitt about $\frac{1}{4}$" thick form grooves for the thrust shaft collars. Between the grooves the cylindrical areas are also lined with babbitt so that sufficient journal area to carry a substantial radial load is incorporated in the bearing.

In the erection of the engine at the factory the thrust bearing is treated as if it were an additional main bearing. After all the lower main bearing shells have been scraped into alignment the thrust shaft is bolted to the crankshaft and tested for trueness. It is required that the total run out of the thrust shaft at the aft end does not exceed .002". In the meantime the thrust bearing (lower half) is installed temporarily on the base. The thrust shaft is then coated with blueing and the whole shaft assembly is lowered into position. The bearing is then shimmed up or down, moved forward or backward, to one side or the other and scraped until the bearing is satisfactorily located. The finished bearing must be in line with the main bearings. The thrust shoulders on the shaft must be a close fit in the grooves but at the same time have clearance. An end play of approximately .005" to .010" is desirable. The location of the bearing should be such that the crankshaft is slightly aft of its central position in the base since the normal wear on the thrust bearing will allow the crankshaft to move forward slightly.

When the foregoing conditions have been met the thrust bearing (lower half) is doweled to the base. The thrust bearing cap is then scraped in and adjusted for clearance with shims.

2. KINGSBURY TYPE

Referring to Fig. G-1 the standard style GH Kingsbury thrust bearing is equipped with two pairs of thrust shoes (3) (two shoes for ahead and two for astern thrust). These shoes are individually adjustable fore and aft by jackscrews (5) which are locked by lock wrench (6). A journal bearing, babbitted directly in lower thrust bearing housing (1) and upper housing (2) is also incorporated. The journal bearing is located on the flywheel end of the thrust bearing.

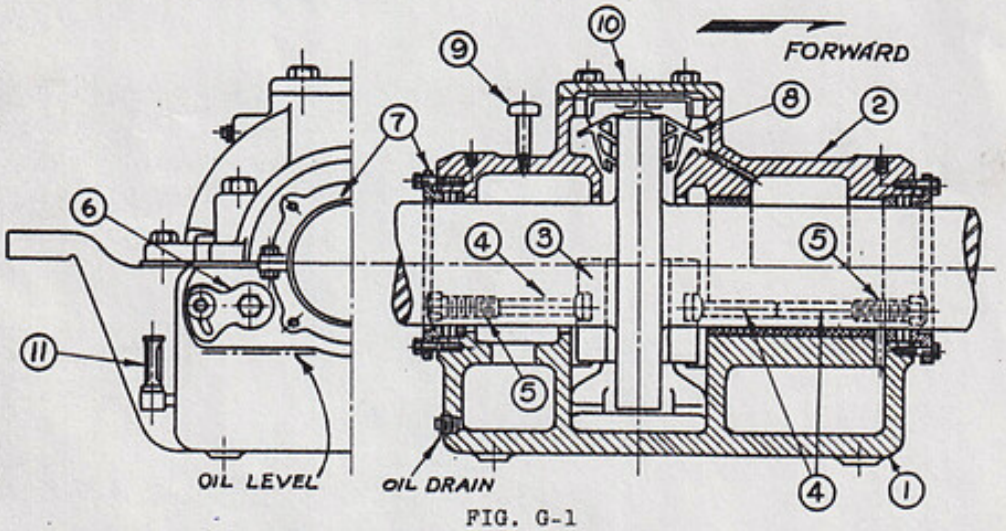


FIG. G-1

There is only one thrust collar which is forged integrally with the thrust shaft. Lubrication is self-contained and automatic. The lower housing contains the lubricating oil supply, the oil level being of such height that the lower part of the thrust collar dips into it. The oil is then carried to the top where scraper (8) distributes it over the collar thrust surfaces and takes off some oil for lubrication of the journal bearing. Oil is retained in the bearing by stuffing boxes at

both ends. Do not take up hard on stuffing box glands (7), as this will cause unnecessary heating of the shaft.

To allow for oil films between thrust bearing surfaces, and for expansion by heat, it is strictly necessary to provide longitudinal end play in accordance with the following table:

Engine Bore	End Play
14½ and 15"	.017"
13"	.015"
11½"	.014"
10"	.012"
9"	.012"

Using the jackscrews, adjust for end play as follows: Keeping thrust collar in desired fore and aft position, set up firmly on forward-end jackscrews so ahead shoes will bear equally against collar. Lock the screws. Next set up on after-end jackscrews, using a "feeler" gauge, with thickness equal to end play, back of the pivotal support of each shoe. Lock the jackscrews and remove the "feelers".

For average installation of propeller thrust bearings, a heavy turbine or engine oil should be used. The oil should be chosen with due regard to viscosity. If it is too light, the lubricating film may be dangerously thin. If it is too heavy, the friction is needlessly high. Specific advice as to proper viscosity for any definite installation is regularly marked on bearing nameplate. As a rule the viscosity should be about 200 seconds Saybolt at operating temperature of the oil bath.. The oil must be clean and free from grit and other injurious substances. Fine grit has a scouring action and may gradually wear down the bearing surfaces. Poor oil may cause corrosion. Oil of good quality does not "wear out" by use in these bearings, but lasts indefinitely if not contaminated.

It is vitally important to maintain the oil at a suitable level. Oil level plates are attached to both sides of housing, with "High" and "Low" oil levels noted. If necessary fill housing with oil to "High" mark when not running. A slight draw down of oil level will be noted when bearing is running. Occasionally oil should be added to make up for leakage and evaporation. Be sure the make up oil is clean. The air vent holes (9) should be kept open. Oil gauge (11) may be placed on either side of housing.

CYLINDER AND LINER, CYLINDER HEAD AND VALVES

1. CYLINDER

The individual cast iron cylinders are secured to the centerframe and base by four studs which are screwed into the base adjacent to the main bearing saddles. The cylinders are located transversely and are aligned to the centerframe by machined pads along one side which register with a step on the top of the centerframe. Crankcase sealer is used between the cylinders and the centerframe. If this joint is disturbed the old sealer must be scraped off and replaced by fresh sealer before tightening the cylinder nuts. Glyptal Lacquer is recommended for sealer.

On engines with 6½" to 8" bore the cylinder bore is machined directly in the cylinder casting, which is made of a special alloy iron, heat treated to relieve stresses and secure the correct hardness. A cored space between the cylinder barrel and the outside wall forms the cooling water jacket, pipe plugs in the outside wall providing access for inspection and cleaning.

2. CYLINDER LINER (Engines with 9" or larger bore)

On the larger engines replaceable cylinder liners are used, mounted in the cast iron cylinders. Hand hole covers in the cylinder wall provide access to the water jackets.

The cylinder liners are special alloy iron castings, heat treated to relieve stresses and secure correct hardness. They are accurately machined to close tolerances and should be handled carefully and care taken not to damage the fits at top and bottom. Spare liners should always be stored in a vertical position and should be securely fastened down if stored on board ship. The water seal at the bottom of the liner consists of two rubber grommets which should always be replaced with new ones whenever a liner is pulled. When lowering a liner into place, grease the grommets freely with cup grease and use care to enter the grommets into the cylinder fit or they may be pinched and damaged. The liner has from .003" to .005" clearance in the cylinder at both top and bottom fits and no difficulty should be encountered in installing a new liner. A paper gasket .010" thick is used for the upper water seal between the liner and cylinder and a new gasket should always be used when replacing a liner. The fits and shoulders on both liner and cylinder should be carefully scraped and wiped clean to assure a water tight joint. Care must be taken not to damage these shoulders, as a water leak will result.

A copper gasket, 1/32" thick, forms the gas seal between the liner and the head. The gasket and both sealing surfaces must be carefully wiped free of all dirt when assembling.

3. CYLINDER HEAD

The individual cast iron cylinder heads are carefully designed to assure uniform cooling. On the smaller engines pipe plugs provide access to the head jackets, and cover plates are used on the larger engines.

The cylinder head is centered by means of a spigot which engages the bore at the top of the cylinder or liner. The face of this spigot bears upon the copper gasket forming the gas seal. In the larger engines in which cylinder liners are used, brass bushings screwed into the cylinder and extending up into the head carry the cooling water. They are sealed by rubber grommets. Passover pipes, connecting parts in cylinder and head make the connection in the smaller engines.

When a cylinder head is removed it should be placed on wooden blocks, never on concrete floor or steel deck. The rubber grommets should always be replaced by new ones and all dirt should be wiped from the bottom of the head before it is lowered onto the cylinder.

4. INLET AND EXHAUST VALVES

Two types of intake and exhaust valves are used on Atlas Imperial Diesel engines. One may be termed one-piece forged type and the other two-piece cast head type.

The two-piece cast head type consists of a valve head cast of special heat resisting alloy iron and a steel stem which is screwed and riveted to the head. Inlet and exhaust valves of the two-piece construction are interchangeable and the same valve may be used for either intake or exhaust.

On engines where valves of the one-piece forged type are used the exhaust valves are of a special heat resistant alloy steel and may be distinguished from the inlet

valves by the "EXH." and "INL." stamped on the valve heads. The inlet valves are forged of chrome nickel steel and are not suitable for exhaust valves. The one piece valves should never be used interchangeably except in an emergency.

The ends of the valve stems are threaded for retaining nuts which secure the valve springs in place. The valves seat directly in the cylinder head castings and the stems work in renewable guides pressed into the heads. If the guides are replaced they should be pressed in the same distances as the ones originally in the head and should be reamed after pressing in place. Use a standard reamer which produces a hole with a diameter to size or .0005" oversize. For example the valve stem diameter on the 6½" bore engine is 5/8" and a standard 5/8" reamer should be used which should then ream the hole to .6250" - .6255" diameter.

When grinding valves always finish the grinding with fine compound, and take particular care not to get any grinding compound into the guide. Thoroughly clean all traces of the grinding compound from valve and seat before reassembling.

Lubricate valve stem with clean engine oil before placing in guide. If valve faces are badly pitted they should be refaced in a lathe, as excessive grinding to remove pits will wear down the seats unnecessarily and will also cut a groove in the valve face. Badly pitted seats should also be refaced before grinding. Care must be taken to keep the seat concentric and square with the bore of the guide.

5. STARTING AIR VALVES

The starting air valve is guided in the head by a bushing which is clamped to the valve stem and works freely in the head. Two piston rings form the air seal between bushing and head. A nut on the stem secures the bushing and a spacer to the stem and also serves as retaining nut for the spring. The lower end of the spring is supported by a washer, bearing against the cylinder head. The starting air rocker is mounted eccentrically on the rocker shaft. The rocker shafts are connected between the cylinder heads, forming one complete shaft, and when the engine is to be started the entire shaft is rotated by means of a hand lever or an air cylinder on one end, the eccentrics bringing the push rod lifters (or latches) (on 6 cyl. 9 x 12 marine engines) down into engagement with the cams. When the engine is running the push rod lifters (or latches on 6 cyl. 9 x 12 marine engines) are held up free of the cams by springs.

6. PRESSURE RELIEF VALVES

Two pressure relief valves are provided for each cylinder, located near the bottom of the head on the operating side of the engine. These include a manually operated relief or "snifter valve", and a spring loaded safety valve.

The valves are mounted in a tee screwed into the cylinder head. The snifter valve is in the top of the tee pointing up and safety valve in the bottom.

7. SNIFTER VALVE

The hand operated relief or "snifter" valves are small needle valves for release of the compression when barring over the engine. They are also used as shut-off valves when indicating or taking compression pressures.

8. SAFETY VALVE

The safety valves are spring loaded relief valves for the purpose of relieving excessive cylinder pressures. They act as telltales to indicate that the pressure is too high, and the popping of these valves is a definite indication that something is wrong and should be investigated at once. The valves are adjustable by tightening the spring retaining cover, and should be set to relieve at 800 lbs. per square inch. A setscrew locks the cover to maintain the setting. They should be tried out occasionally by prying up the lower spring washer with a screw driver to assure that they are in operating condition.

PISTON AND CONNECTING ROD

1. PISTON

The pistons which are of the one-piece, solid-skirt type are made of high grade cast iron and are heat treated to relieve stresses and to obtain proper hardness. The piston is ground straight, that is without taper, from the bottom up to the ring belt. The clearance in the liner is .001" per inch of bore diameter. Due to manufacturing tolerances the total clearance of the piston skirt may vary .001" up or down from the above value. For example: the piston skirt clearance in a 13" bore engine should be between .012" and .014". The head of the piston being exposed to high temperatures is given a larger clearance, approximately .0055" to .006" per inch of bore diameter.

2. PISTON PIN

The case hardened and ground piston pin is stepped, with differential fits in the piston pin bosses. The fits are about .0005" to .0015" press on the small end and metal to metal to .0015" loose on the large end. Rotation of the pin in the piston is prevented by the engagement of a dowel which projects radially from the large end of the pin with a groove in the bottom of the boss. A setscrew threaded into the smaller pin boss enters an indentation in the pin to act as a retainer. The setscrew is in turn secured by a locknut.

3. PISTON RINGS

Six piston rings are used per piston, an oil ring above and below the piston pin and four compression rings. Always assemble the oil rings with the bevel up, to slide over the oil film on the upstroke and scrape it down on the return. When overhauling pistons, thoroughly clean all carbon from rings and grooves and top of piston. Fuel deposit on the piston skirt can best be dissolved with cleaning solvent or paint remover. Be sure oil drain holes below oil rings are open.

Check rings for side clearance in grooves and end clearance, as measured in place in the liner. Side clearance should be .003" to .005" with new pistons and rings and end or gap clearance .005" per inch of bore diameter for the two top rings. For the other rings the gap clearance should be .003" per inch of bore diameter.

Rings should be discarded when the side clearance exceeds .008" and the end clearance .007" to .008" per inch of bore diameter. It is also a good policy to discard any rings which have been stuck for any length of time as they are apt to be out of round and may not hold compression. Always check new rings, measuring the side clearance, in the groove in which the ring is to run, with feeler gauge, and the end clearance with the ring in the liner at the smallest diameter. Never install rings with less clearance than that given above. As the oil rings wear the width of the flat increases, with consequent decrease in width of bevel and oil scraping ability. Experience will determine permissible wear without excessive oil pumping.

4. CONNECTING ROD

The connecting rods are steel forgings, rifle drilled to carry oil to the piston pins. Shims between foot of rod and crankpin box provide adjustment to balance compression pressures in the cylinders to the desired value. The distance "X" (see Fig. K-1), between the top of the piston and the top of the liner should be in accordance with the tabulation below. If liners are not used, dimension X should be measured from the extreme top face of the cylinder, not from the recess for the copper gasket.

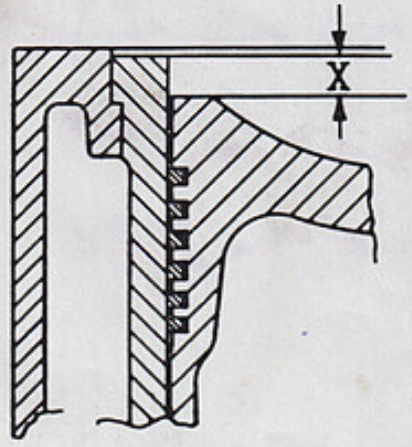


FIG. K-1

Engine Bore and Stroke	Dimension "X"
6½ x 8½	13/16
7½ x 10½	31/32
8 x 10½	31/32
9 x 12	3/4

When taking measurement "X" the piston should be at top dead center and the cylinder liner must be securely clamped down into the cylinder. The cylinder stud nuts must also be tight when making this adjustment. Connecting rod shim adjustment in accordance with the above tabulation should be used for altitudes from sea-level to 1500' and will then produce compression pressures of 400 to 410 pounds per square inch. If the engine is located at higher altitudes than 1500 feet above

sea-level dimension "X" should be smaller than the tabulated values. The Engineering Department of Atlas Imperial Diesel Engine Co. will advise the proper adjustment if the engine serial number and altitude is stated.

A bronze bushing for the piston pin is pressed in the upper end of the rod. If this bushing is replaced it must be reamed to allow a piston pin clearance of .0015" to .0025" on 6½" to 8" bore engines and .0020" to .0035" on engines with 9" bore. Care must be taken to keep the reamed hole exactly parallel with the foot of the rod. The oil grooving in the bushing is carefully designed for correct lubrication, and new bushings must be inserted in rod with the relief grooves on the horizontal axis of the pin. A ball check valve at the bottom of the rod prevents return of the column of oil in the rod. Examine these valves at annual overhauls. The ball lift should not exceed 3/32".

5. CONNECTING ROD BEARINGS

The crankpin boxes are steel castings with babbitt lining centrifugally cast and accurately bored. No attempt should be made to rebabbitt these boxes in the field. New boxes may be obtained from A.I.D.E. Co. and a credit allowance will be made for old boxes returned. Bearing adjustment is by means of shims between halves of bearing. Bearing clearances when adjusted should be .0008" to .0009" per inch of bearing diameter.

Clearances are best measured with a lead wire compressed between bearing and journal, as described in Section F. Keep the shim thickness equal on the two sides. Inspect the bearing surfaces for even bearing. Areas which are not bearing on the shaft will be discolored, and such bearings as well as new ones should be carefully scraped to secure even bearing over at least 3/4 of the entire area. End clearance is .007" to .015" and should not be allowed to exceed .025".

6. CONNECTING ROD BOLTS

The connecting rod bolts, fitting in reamed holes, hold the two halves of the crankpin boxes together and to the foot of the rod. The nuts should be kept pulled up tightly but not overstressed. They should not be sledged but should be pulled up by hand with a pipe about four feet long on the wrench. It is good practice to keep a record of the length of connecting rod bolts, measured with a micrometer at annual overhauls and to discard bolts that show more than .010" increase in length. It is further recommended that all connecting rod bolts be replaced every two years, assuming the engine to have had continuous service during that time, say 8000 hours or more. It is nearly always old bolts that have been in service for some time and have been overstressed by pulling up the nuts too tightly that fail. Replacing bolts as suggested above is cheap insurance against the possibility of wrecking an engine through connecting rod bolt failure. Replace cotter pins carefully, always using new cotter pins. Be sure that they are a close fit in the hole and bend the ends back tightly against the sides of the nut. If this work is left to inexperienced mechanics it should be very carefully inspected at the completion of the job. Always replace rods, bearings and pistons in the cylinders from which they were removed. All parts are numbered.

CAMSHAFT AND VALVE OPERATING GEAR

1. CAMSHAFT

The camshaft is made of ground steel shafting, 1½" dia. for the 6½" bore engines and 2" dia. for the 7½" and larger bore engines. The keyways in the shaft are indexed for the firing sequence stamped on the engine nameplate. The high pressure fuel pump crankshaft is part of the camshaft assembly and is bolted to a coupling flange which has been shrunk on and keyed to the end of the camshaft.

2. CAMSHAFT BEARINGS

The camshaft bearings are accurately machined cast iron blocks with pressed in bronze bushings. Bearing bore in bushing is reamed to allow a running clearance of .002" - .004" on 6½" bore engines and .004" - .006" on 7½" and larger bore engines. If replaced the bushings must be reamed and oil and mounting holes drilled through after pressing in. A groove must be chipped to communicate with the oil hole if it does not intersect the groove in the bushing. The bearing blocks are held in machined seats cut in the webs of the centerframe and are secured by capscrews.

The camshaft thrust is taken by the bearing on the gear end. The camshaft gear hub and the lubricator eccentric which is pressed on the end of the shaft against a shoulder, bear against alternate ends of the bronze bearing. (On the 9" bore engines a thrust washer is inserted between the gear hub and bearing.) The gear hub is clamped to the shaft and should be located to allow .015" to .025" thrust clearance. Both this bearing and the bearing on the opposite end of the camshaft are supplied with oil from the pressure lubricating oil system. The intermediate bearings are lubricated from reservoirs in the top of the bearings, filled by splash from the connecting rods. Drilled holes in the end of the camshaft and in the fuel pump crankshaft feed oil to the fuel pump connecting rods from the after camshaft bearing.

3. CAMS

The cams are accurately ground to shape after being case hardened. The fuel valve cam consists of a case hardened steel disc which is bolted to the after end of the exhaust cam hub. A case hardened steel toe is inserted and this toe controls the action of the spray valve, the disc serving as a base circle. On 6½", 7½" and 9" bore right hand engines, and on 6½" bore left hand engines, the inlet and air starting cams are machined on opposite ends of a common hub. On 7½" and 9" bore left hand engines, however, the air starting cams are separate pieces, bolted to the ends of hubs formed by the exhaust cams. The Cam sequence, progressing toward the Fuel Pump End of the Engine is as follows:-

Right Hand	6½ x 8½	Engines -- Exhaust - Fuel - Air Starting - Inlet
Left Hand	6½ x 8½	Engines -- Inlet - Air Starting - Fuel - Exhaust
Right Hand	7½-8 x 10½	Engines -- Exhaust - Fuel - Air Starting - Inlet
Left Hand	7½-8 x 10½	Engines -- Inlet - Fuel - Air Starting - Exhaust
Right Hand	9 x 12	Engines -- Exhaust - Fuel - Air Starting - Inlet
Left Hand	9 x 12	Engines -- Inlet - Fuel - Air Starting - Exhaust

See Section "A" Engine Data for explanation of Right and Left Hand Engines.
The cams are a sliding or light tap fit on the camshaft and are held in place by taper keys, driven home after the cams have been lined up with the lifter rollers.

4. CAMSHAFT REMOVAL

(a) Remove centerframe covers, including housings for rotary pump drive and governor drive.
(b) Disconnect bilge pump connecting rod and remove high pressure fuel pump connecting rods.
(c) Remove push rods and valve lifters. (Lifters and guides may be left in place if lifters are raised clear of cams and clamped in place)
(d) Remove camshaft bearing retaining screws.
(e) Loosen the cylinder nuts on the camshaft side of the engine.
(f) Remove the camshaft. Sledge each bearing block out of its seat a little at a time using a timber inserted through the openings on the exhaust manifold side. The end of the timber should be placed against the camshaft as close to the bearing as possible. When the camshaft has been partially removed it will be possible to withdraw the connecting rods and crossheads of the fuel pump downward.

5. CAMSHAFT DISASSEMBLY

After the camshaft has been removed from the engine it should be disassembled as follows. The lubricator eccentric is removed either by a suitable puller or by driving with a babbitt hammer. Then, after removing the first bearing the clamping bolts of the camshaft gear hub are loosened and the whole assembly slid off. Bear-

ings and cams are then removed successively from the gear end of the camshaft. FOR ALL RIGHT HAND ENGINES THE CAMS ARE LOOSENED BY DRIVING THE KEYS WITH A DRIFT TOWARD THE GOVERNOR END OF THE ENGINE. FOR LEFT HAND ENGINES WITH 6½" BORE THE CAMS ARE LOOSENED BY DRIVING THE KEYS TOWARD THE FUEL PUMP END OF THE ENGINE, AND FOR LEFT HAND 7½" AND 9" BORE ENGINES THE KEYS ARE DRIVEN AWAY FROM THE CYLINDER CENTER LINES. THAT IS, THE INLET CAM KEYS ARE DRIVEN TOWARD THE GOVERNOR END OF THE ENGINE AND THE EXHAUST CAM KEYS TOWARD THE FUEL PUMP END. The cams should slide freely on the shaft after the keys have been removed, but if it should be necessary to drive them off, only a babbitt hammer or brass drift should be used. Any burrs, particularly at keyways, must be dressed down with a file. If this precaution is not taken the cams may seize as they are removed, and forcing the cams the remainder of the distance will score the shaft.

6. CAMSHAFT ASSEMBLY & INSTALLATION

When the camshaft is being reassembled the same precautions with regard to burrs apply. Coating the bores of the cams with white lead will aid materially in sliding the cams into place without scratching the shaft. The bores of either new or old cams should be inspected carefully for any defects likely to scratch the shaft. Bearings and cams are installed successively from the after end but are not keyed to the shaft until later. The hub and cam gear are assembled on the shaft and clamped tightly. The camshaft gear should be located to allow .015" to .025" end clearance for the thrust bearing.

The assembled camshaft is then installed in the engine. After starting each cam bearing in its seat the bearings are driven into place a little at a time with a heavy brass bar. Each bearing should be driven a little and then left until all the others have been knocked in the same amount so that the camshaft will not be bent. The cam bearings will seat more easily if the cylinder nuts are loose.

The connecting rods and crossheads of the high pressure fuel pump must be assembled as the camshaft is being driven into place. The crossheads should be inserted in the holes in the centerframe before the camshaft has been driven in any appreciable distance. When the camshaft has been partially installed it will be possible to place the connecting rods on their respective cranks. After this last step the connecting rods and crossheads need no further attention as the cam bearings are being seated.

After the cam bearings have been securely bolted the cams are ready for keying. Starting with Number 1 (governor end) cylinder place each set of cams directly under the proper lifter rollers and secure the cams to the shaft by inserting the taper keys. Drive the keys IN THE OPPOSITE DIRECTION from that given in Paragraph 5 under CAM SHAFT DISASSEMBLY. Always insert the keys in the cams so that the driving is against the large end of the key. Complete this procedure with each set of cams before going on to the next and work aft from the forward end of the engine.

The engine should next be timed, in accordance with the detailed instructions in Paragraphs 14 to 16 after which the rotary pump and governor assemblies may be reassembled on engine. For Fuel Spray Valve timing see Section O.

7. VALVE LIFTERS

The steel valve lifters work in cast iron guides bolted to the top of the centerframe and carry case hardened rollers on steel pins on their lower ends. Clearance between lifters and guides is .0015" to .0025", between rollers and pins is .001" to .0025". Roller pins are a light press fit in the valve lifters. After roller pins have been assembled the hole in the lifter should be peened over with a 3/16" wide drift at top and bottom to secure the pin. Dress down the outside diameter with a file if necessary in order to secure a sliding fit in the lifter guide.

8. PUSH RODS

The push rods for the inlet, exhaust and starting air valves are steel rods. The lower ends fit into sockets in the lifters and the upper ends are threaded into the rocker forks. Drilled holes through the rods permit inserting a drift to hold the rod when adjusting the forks, and jam nuts lock the adjustment. On the 6½" bore engine sockets are used on the upper ends of the rods instead of forks, bearing against ball studs which are inserted in the ends of the rockers. The fuel push rods are fabricated of seamless steel tubing with steel ends welded into place.

The steel pins which link the forks to the rockers on the 7½" and larger bore engines have -.0005" to +.0027" clearance in the forks and .000" to .0025" clearance in the rocker ends. The pins are retained by ball checks which are pressed into the rocker ends and which engage circumferential grooves at the centers of the pins. The pins may be removed by tapping with a hammer and drift.

Before proceeding with the discussion on valve timing the following instructions regarding the correct method of spotting a piston should be considered. Whenever a piston is to be spotted for valve setting it should be brought into position by turning the engine in the direction of ahead rotation in order to take up all gear back-lash. If the engine is turned past the desired position, it should be turned well back in the opposite direction, and then again brought up to the required point.

12. FLYWHEEL MARKINGS *

NOTE: The following data is intended for a general description of the markings only. For actual figures for valve timing see paragraph 10 above.

The position of the piston may be determined from the flywheel pointer and the markings stamped on the flywheel rim. Top center of each piston is marked and stamped with the corresponding piston numbers, and degree marks are stamped for 25° on each side of top center. These markings are sufficient for all valve timings. The intake valves normally open 10° B.T.C. (Before Top Center) and the exhaust valves close 5° A.T.C. (After Top Center) and these points can of course be determined directly from the degree markings adjacent to the top center marking of the corresponding cylinder.

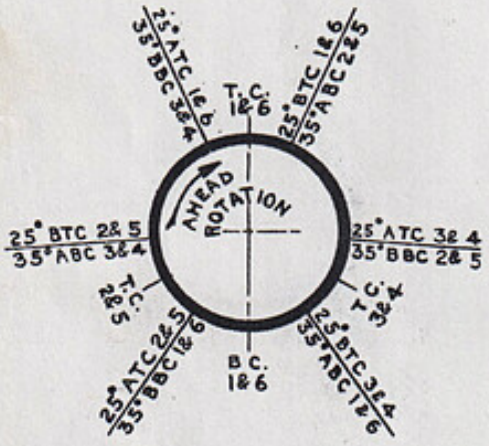


FIG. L-1

The intake valves normally close 35° A.B.C. and the exhaust valves open 35° B.B.C. Referring to Fig. L-1, these points may be obtained on the flywheel as follows. Since the crankshaft has three throws 120° apart the top centers of the three pairs of cylinders will be 120° apart. Bottom center of any pair of cylinders is 180° from top center. Therefore the bottom center of any pair of cylinders is 60° from the top centers of the other two pairs. As previously stated, each top center is marked for 25° in either direction. Subtracting this 25° from the above 60° leaves 35°. Hence each 25° A.T.C. point is also the 35° B.B.C. point for the preceding pair of cylinders and similarly each 25° B.T.C. point is also the 35° A.B.C. point for the following pair of cylinders.

13. POINTER LOCATION

The location of the flywheel pointer should be checked occasionally by "splitting the center". With one of the cylinder heads removed crank the engine to a point about 20° off top center. Measure the exact distance from the top of the liner down to the piston and observe the pointer reading on the flywheel. Then set the piston to the same distance below the top of the liner on the other side of top center and observe the flywheel pointer reading. If the readings do not agree adjust the pointer to give equal readings on each side. These readings should preferably be taken with an indicator and in each case the piston should be cranked upward into position.

14. CAMSHAFT TIMING

* NOTE
THIS SECTION L.12 COPIED FROM ELMORE BOOK
COVERING 6 cyl 9 x 12 # 12964

9. VALVE ROCKERS

The rockers for the inlet, exhaust and starting air valves are fulcrumed on a shaft which is supported by bearings at each end. The bearings are mounted on studs screwed into the cylinder heads and are held between nuts on the studs. By screwing the nuts up or down the rocker shaft can be raised or lowered.

The three rockers are bronze bushed at their fulcrums and the bushings are reamed for .001" to .003" clearance with the rocker shaft after pressing in. On 7½" and larger bore engines case hardened rollers at the valve end of the exhaust, inlet and air starting rockers work directly on the valve stems and turn on steel pins riveted in the rocker forks. The clearance of the rollers on the pins is .0005" to .0015". On 6½" bore engines case hardened steel buttons are used instead of the rollers.

The fuel valve rocker is not carried on the shaft with the other three rockers. A support located on the manifold side of the cylinder head acts as a fulcrum. The steel fulcrum pin, retained by cotter pins at each end, has a clearance of .000" to .0017" in both pieces.

10. VALVE TIMING

The correct valve timing for the engine is given in the following table.

Starting Air Valve Opens	5° B.T.C.
" " " Closes	45° B.B.C.
Inlet Valve Opens	10° B.T.C.
" " Closes	35° A.B.C.
Exhaust Valve Opens	35° B.B.C.
" " Closes	5° A.T.C.
Fuel Spray Valve Opens	see engine name plate
" " " Closes	see engine name plate

11. SPOTTING THE PISTON

Before proceeding with the discussion on valve timing the following instructions regarding the correct method of spotting a piston should be considered. Whenever a piston is to be spotted for valve setting it should be brought into position by turning the engine in the direction of rotation in order to take up all gear backlash. If the engine is turned past the desired position, it should be turned well back in the opposite direction, and then again brought up to the required point.

12. FLYWHEEL MARKINGS

The position of the piston may be determined from the flywheel pointer and the markings stamped on the flywheel rim. Top center of each piston is marked and stamped with the corresponding piston numbers, and degree marks are stamped on each side of top center.

13. POINTER LOCATION

The location of the flywheel pointer should be checked occasionally by "splitting the center". With one of the cylinder heads removed, crank the engine to a point about 20° off top center. Measure the exact distance from the top of the liner down to the piston and observe the pointer reading on the flywheel. Then set the piston to the same distance below the top of the liner on the other side of top center and observe the flywheel pointer reading. If the readings do not agree adjust the pointer to give equal readings on each side. These readings should preferably be taken with an indicator and in each case the piston should be cranked upward into position.

14. CAMSHAFT TIMING

In order to time the engine it is necessary to determine the correct relation between the crankshaft and camshaft. This is done by positioning the camshaft gear on its hub, and then adjusting the push rods to open and close the valves at the correct points. Unless the crankshaft gear, camshaft gear or camshaft gear hub have been replaced, the camshaft can be correctly timed after overhauling as follows. Before breaking the gear train spot No. 1 piston exactly on firing top center. With a steel scale bearing firmly against the machined side of the centerframe scribe a line across the side of the camshaft gear parallel to the centerframe face. When reassembling, mesh the gears with the crankshaft and camshaft in the same relative positions, that is, with No. 1 piston on firing top center and the line on the camshaft gear in line with the centerframe face.

If the crankshaft gear, camshaft gear or the camshaft gear hub is replaced, the camshaft may be timed as follows:

(a) Spot No. 1 piston 2½° B.T.C.
(b) Set the camshaft gear relative to its hub so that clamping bolts are approximately in the center of the slots. Orient camshaft gear so that old dowel holes will not interfere with redowelling.
(c) Turn the camshaft (with intermediate gear out of mesh) so that the inlet and exhaust lifters of No. 1 cylinder are each raised an equal distance. (NOTE: The piston was set at 2½° B.T.C. as this is the mean position between the 10° B.T.C., opening of the inlet valve, and the 5° A.T.C., closing of the exhaust valve, and at this position both valves should be open an equal distance.)
(d) Holding crankshaft and camshaft in above positions and allowing camshaft gear to slip on its hub as required, mesh the intermediate gear and tighten the clamp bolts between the camshaft gear and hub. After all valves have been timed and checked, drill 31/64" holes through gear in line with dowel holes in hub and ream to .497" - .498" for dowels. On 6½" bore engines use 23/64 drill and ream .372"-.373".

After determining the correct relation between the camshaft and crankshaft the push rods must be adjusted as follows: (See Section O for timing of fuel spray valve.)

15. INLET & EXHAUST VALVE TIMING

(a) Spot piston at 10° B.T.C. at the end of the exhaust stroke.
(b) Adjust inlet push rod so that valve is just opening.
(c) Spot piston at 5° A.T.C. on the suction stroke.
(d) Adjust exhaust pushrod so that valve is just closing.
(e) Check clearance between valve stems and rocker rollers. The cams are designed for 1/32" clearance with the valves set as above and with the engine cold, but this will vary somewhat due to manufacturing tolerances. When making the adjustments aim at the opening and closing points but keep the clearances between .020" and .040", varying the opening and closing points slightly if necessary. Excessive clearances mean a noisy engine and increased wear on parts. Insufficient clearances prevent valves from seating properly, with consequent blowby and destruction of valves and seats.
(f) Check and record closing point of inlet valve and opening point of exhaust valve. These points should fall within 5° of the position given in the timing table.
(g) Adjust and record inlet and exhaust valves for the other cylinders as above.

16. STARTING AIR VALVE TIMING

(a) Block the valve rocker shaft in its starting position (handle against the stop).
(b) Spot piston at 5° B.T.C. at the end of the compression stroke and adjust the pushrod so that the valve is just opening. Check the closing point, which should fall within 5° of the position given in the table. (See Paragraph 10) On 7½" and larger bore left hand engines the air starting cam is a separate piece, bolted to the end of the inlet cam hub. Before making the push rod adjustment clamp the two cams together, indexing them with the clamp bolts approximately at the centers of the elongated holes in the air starting cam.
(c) Adjust and record starting air valves for the other cylinders as above.

17. CAMSHAFT GEARING

The camshaft is driven from a gear on the crankshaft by means of an intermediate gear. The crankshaft gear is shrunk on the shaft adjacent to the forward crank web. If replaced the new gear should be heated to approximately 600° F. and slipped over the shaft. On 6½" bore engines use a temporary spacer to locate the gear ¼" from the crank web. On 7½" and 9" bore engines locate the gear against the shoulder on the shaft. Do not overheat the gear, as this will damage the steel structure, and once it is started on the shaft move it immediately to the final position, as it

The intermediate gear has replaceable bronze bushings and rotates on a case hardened steel shaft. The intermediate gear bracket in which the shaft is mounted is bolted

[illegible] to allow .006" - .008" gear backlash. If replaced the intermediate gear bushings should be reamed to 1.5000" - 1.5005" dia. after pressing in, which allows .002" - .004" running clearance. The bearing is lubricated by oil from

If the crankshaft gear, camshaft gear or the camshaft gear hub is replaced, the camshaft may be timed as follows:

(a) Spot No. 1 piston 2½° B.T.C.
(b) Set the camshaft gear relative to its hub so that clamping bolts are approximately in the center of the slots. Orient camshaft gear so that old dowel holes will not interfere with redowelling.
(c) Turn the camshaft (with intermediate gear out of mesh) so that the inlet and exhaust lifters of No. 1 cylinder are each raised an equal distance. (NOTE: The piston was set at 2½° B.T.C. as this is the mean position between the 10° B.T.C., opening of the inlet valve, and the 5° A.T.C., closing of the exhaust valve, and at this position both valves should be open an equal distance.)
(d) Holding crankshaft and camshaft in above positions and allowing camshaft gear to slip on its hub as required, mesh the intermediate gear and tighten the clamp bolts between the camshaft gear and hub. After all valves have been timed and checked, drill 31/64" holes through gear in line with dowel holes in hub and ream to .497" - .498" for dowels. On 6½" bore engines use 23/64 drill and ream .372"-.373".

After determining the correct relation between the camshaft and crankshaft the push rods must be adjusted as follows: (See Section O for timing of fuel spray valve.)

15. INLET & EXHAUST VALVE TIMING

(a) Spot piston at 10° B.T.C. at the end of the exhaust stroke.
(b) Adjust inlet push rod so that valve is just opening.
(c) Spot piston at 5° A.T.C. on the suction stroke.
(d) Adjust exhaust pushrod so that valve is just closing.
(e) Check clearance between valve stems and rocker rollers. The cams are designed for 1/32" clearance with the valves set as above and with the engine cold, but this will vary somewhat due to manufacturing tolerances. When making the adjustments aim at the opening and closing points but keep the clearances between .020" and .040", varying the opening and closing points slightly if necessary. Excessive clearances mean a noisy engine and increased wear on parts. Insufficient clearances prevent valves from seating properly, with consequent blowby and destruction of valves and seats.
(f) Check and record closing point of inlet valve and opening point of exhaust valve. These points should fall within 5° of the position given in the timing table.
(g) Adjust and record inlet and exhaust valves for the other cylinders as above.

16. STARTING AIR VALVE TIMING

(a) Block the valve rocker shaft in its starting position (handle against the stop).
(b) Spot piston at 5° B.T.C. at the end of the compression stroke and adjust the pushrod so that the valve is just opening. Check the closing point, which should fall within 5° of the position given in the table. (See Paragraph 10) On 7½" and larger bore left hand engines the air starting cam is a separate piece, bolted to the end of the inlet cam hub. Before making the push rod adjustment clamp the two cams together, indexing them with the clamp bolts approximately at the centers of the elongated holes in the air starting cam.
(c) Adjust and record starting air valves for the other cylinders as above.

17. CAMSHAFT GEARING

The camshaft is driven from a gear on the crankshaft by means of an intermediate gear. The crankshaft gear is shrunk on the shaft adjacent to the forward crank web. If replaced the new gear should be heated to approximately 600° F. and slipped over the shaft. On 6½" bore engines use a temporary spacer to locate the gear ¼" from the crank web. On 7½" and 9" bore engines locate the gear against the shoulder on the shaft. Do not overheat the gear, as this will damage the steel structure, and once it is started on the shaft move it immediately to the final position, as it will be impossible to move it further once it begins to cool and seize the shaft.

The intermediate gear has replaceable bronze bushings and rotates on a case hardened steel shaft. The intermediate gear bracket in which the shaft is mounted is bolted and doweled to the centerframe cover on the governor end of the engine. It is adjusted before doweling to allow .006" - .008" gear backlash. If replaced the intermediate gear bushings should be reamed to 1.5000" - 1.5005" dia. after pressing in, which allows .002" - .004" running clearance. The bearing is lubricated by oil from the pressure pump.

FUEL SUPPLY SYSTEM

The complete fuel system may be conveniently divided into two parts, the fuel supply system and the fuel injection system. The fuel supply system is made up of the fuel transfer pump, the fuel day tank and the fuel filter, while the fuel injection system includes the high pressure fuel pumps, the fuel rail, the accumulator, the fuel pressure regulating valve, the fuel spray valves, and the necessary connecting tubing.

1. IMPORTANCE OF CLEANLINESS IN FUEL HANDLING

The high pressure fuel pumps and fuel spray valves have been referred to as the heart of the Diesel engine and the proper functioning of these parts is necessary for the successful operation of the engine. These pumps depend upon lapped plungers working in cylinders with clearances measured in hundred thousandths of an inch and it is vital that the fuel entering these parts be kept free of any grit or foreign matter. The engine is equipped with filters for this purpose but it is also necessary for the operators to use every possible care in getting clean fuel oil and in keeping it clean until it is delivered to the engine. Fuel tanks and piping should be thoroughly cleaned when installed and should be kept covered at all times.

The fuel filter should be periodically cleaned and serviced according to the detail instructions given in Paragraph 3. The best filters obtainable will be useless if dirt is introduced into the fuel after it has passed through them, and it is therefore of great importance that every effort be made to protect the fuel pipes after the filter during repairs and overhauls. Cleanliness in handling fuel, piping and injection equipment is of vital importance and will pay good dividends in trouble-free operation. Many times mysterious and expensive pump and fuel spray valve troubles have been traced to careless handling of fuel and carelessness in storing and installing spare parts.

2. FUEL TRANSFER PUMP

The gear type fuel transfer pump, together with the lubricating oil sump and pressure pumps, is mounted on one of the centerframe doors. It supplies fuel under pressure to the day tank and high pressure fuel pump, sucking from the fuel service tank. The three pumps are grouped together into one unit, gear driven from the camshaft. The drive is described in Section T under Lubricating Oil System. The fuel transfer pump is clamped in a saddle on the centerframe door, assuring correct alignment of the shaft.. The packing gland should not be kept tighter than necessary, allowing a very slight leakage for lubrication of the shaft.

3. FUEL OIL DAY TANK & FILTER

The fuel oil day tank and filter are shown in Fig. N-1. A continuous flow of fuel oil from the fuel transfer pump enters the unfiltered fuel compartment (4) through tube (1). Metal edge type fuel filter (2) is mounted in the side of tank (6). It has .003" spacing and is provided with a cleaning knife (3), operated by

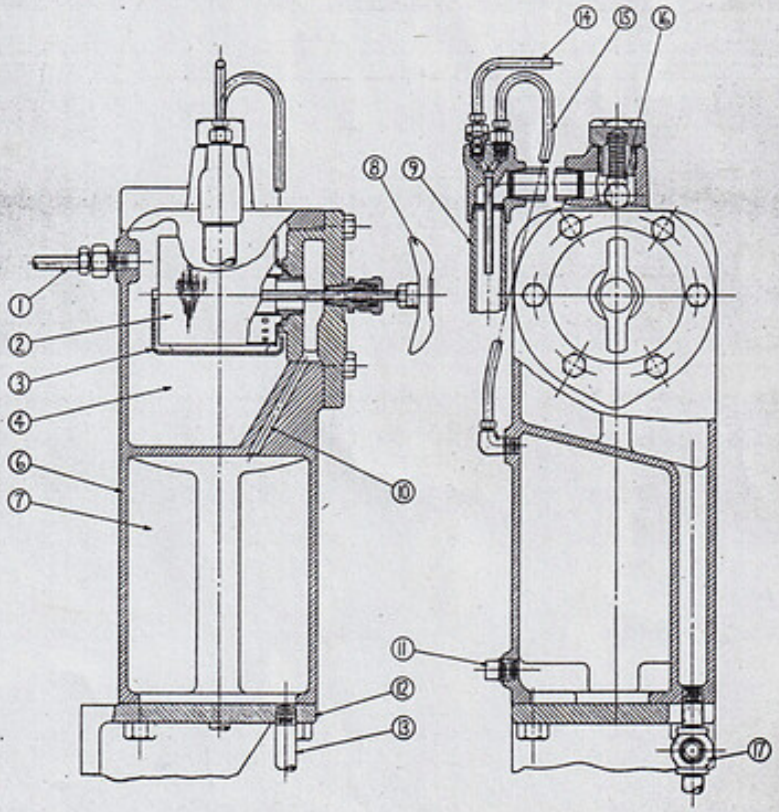


FIG. N-1

handle (8), which scrapes the dirt and muck off the outside of the cleaning spool. The handle should be turned every four or five hours, and should always be turned immediately after stopping the engine, as the dirt can then settle freely through the quiescent fuel. The dirt and sediment collects in the sludge compartment at the bottom of the tank, and should be drained off through cock (17) at frequent intervals. This may be done to advantage when the engine is running, the pressure in compartment (4) assuring thorough cleaning.

After passing the filter the fuel flows through hole (10) into the clean fuel compartment (7), and then to the high pressure fuel pump through pipe (13). This pipe is screwed into mounting bracket (12) which forms the bottom of the tank. Compartment (7) can be drained by removing plug (11). The excess fuel from the transfer pump passes through relief valve (16) and returns to the service tank through overflow pipe (9). The relief valve maintains a pressure of 6 lbs. per sq. in. in the filtered fuel compartment. When the high pressure system of the engine is being primed air is admitted to compartment (7) through tubes (14) and (15) allowing the fuel to flow to the priming pump. The check valve in tube (14) permits sucking air when priming and prevents escape of fuel oil when the engine is in operation. When the engine starts the air in compartment (7) escapes through tube (15). The pressure in filtered fuel compartment (7) assures a continual flow of fuel through tube (15) into the overflow pipe, with no possibilities of reverse flow of unfiltered fuel from the overflow pipe to compartment (7).

FUEL INJECTION SYSTEM

1. HIGH PRESSURE FUEL PUMP

The high pressure fuel pump is located on top of the centerframe on the operating side. The pump consists of one or two plungers actuated by cross heads and connecting rods from a crankshaft which is bolted to the end of the camshaft. One or two plungers are used depending on the engine bore and the number of cylinders. All engines with 6-1/2" bore have high pressure pumps equipped with one pump plunger which is also used on all 3-Cyl. models with bores up to and including 9 inches. 4 and 6-Cyl. models of engines with 7-1/2" or larger bores are equipped with two plunger pumps such as shown on Fig. O-1. The construction of the high pressure pumps with one and two plungers are however similar and the following description applies to either model. Both single and two plunger high pressure pump units are equipped with one hand operated plunger which is used for priming the fuel system and for building up fuel pressure when the spray valves are being timed or tested.

Referring to Fig. O-1 cast iron guides (4) are located in holes in the centerframe and are secured by capscrews. Cross heads (6) work in these guides and are actuated by the crankshaft and connecting rods (19). The bronze connecting rods have a clearance of .0015" to .003" on their crankpins and a side play of .005" to .009". The cross head pin bearing is formed directly in the upper end of the connecting rod and the pins have a clearance of .001" to .002" in the cross heads and in the connecting rods. Each cross head has a replaceable bronze sleeve (3), held in place by a shoulder on the lower end of the cross head and by oil guard (2) and plug (1) at the upper end. The clearance between the sleeve and the cross head guide is .002" to .004" and if it should become excessive new sleeves should be installed. Lubrication is by spray from the cranks.

Pump housing (31) and top cover (8) are both secured to the centerframe by means of through bolts (10). Top cover (8) carries the individual pump bodies (9) to which pump barrels (16) are secured. One of the pump bodies also carries the hand operated priming pump. Pump barrel (16) is threaded into the pump body and is seated at the upper end. A copper gasket (11) at this end provides a fuel tight seal. Spring

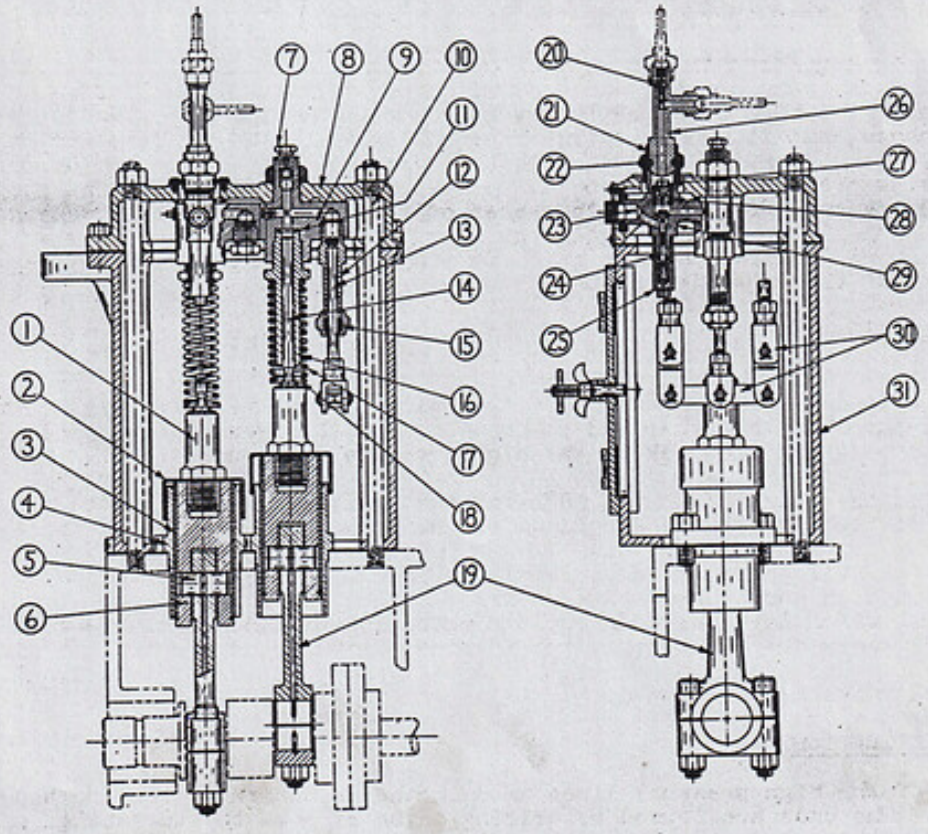


FIG. O-1

(17) is retained at the lower end of plunger (14) by washer (18) and forces the plunger downward on the suction stroke. The plungers and barrels are lapped together in matched pairs and are not interchangeable. In other words a plunger must always be used with the particular barrel to which it was lapped. If either piece becomes scored or damaged both must be replaced. Always wash parts thoroughly in clean solvent or fuel oil and lubricate with clean engine oil before replacing.

The suction and discharge valves are contained in housing (29) which in turn is screwed into pump body (9). Fuel under slight head from the filter and day tank unit is supplied through port (23). The fuel is discharged on top through discharge fitting (26) which is provided with two discharge connections, one being connected to the fuel rail and accumulator and the other to the fuel pressure regulating valve. In the case of high pressure pumps with two plungers the top outlet of one pump is connected to the side outlet of the second pump. On both single and two pump units a second discharge valve (20) is provided at the top discharge connection leading to the rail and accumulator. The seat and guide for suction valve (24) is formed in cage (29). The suction valve spring is enclosed by bonnet (25) which also prevents fuel leakage at that end. A flat is provided on the suction valve guide, connecting the bonnet space with the fuel supply. Discharge valve seat (28) is hardened and is pressed into cage (29). The discharge valve lift is limited by the lower end of fitting (26).

Both the suction and discharge valves may be removed and serviced by unscrewing nut (21) holding the discharge fitting to the valve cage by means of split collar (22). If the valves are leaky lapping the seats lightly with fine grinding compound is recommended but if this is not successful new valves and cage assembly should be installed. If the lower end of discharge fitting above the discharge valve shows signs of heavy hammering this is usually due to discharge valve seat (28) being loose in the cage. The cage and seat must then be replaced.

Priming pump barrel (12) is threaded into pump housing (9) and priming pump plunger (13) is actuated by linkage from the vertical priming lever on the pump housing top cover. Packing and nut (15) prevents leakage past the plunger. The upper end of the plunger is formed as a valve head which engages a seat in the barrel, preventing leakage when the priming pump is not in use. If the pump leaks while the engine is running the plunger valve head should be lapped in. If leakage takes place when the fuel system is being primed, packing (15) should be either tightened or replaced. When priming the fuel system loosen plug (7) which will allow air in the pump to escape. Tighten the plug when solid fuel appears.

Fuel leakage from the pumps and the priming pump collects on top of the centerframe inside the pump housing and is drained off through a hole in the end of the centerframe. The high pressure fuel pump has been designed to give long trouble-free performance, but it must be given reasonable care. Water, dirt and other impurities in the fuel will materially shorten the life of the plungers and barrels. The normal working pressure is 3000 to 4500 pounds per square inch but the pump is capable of building up pressures far in excess of these figures. It is consequently important that the fuel pressure regulating valve is functioning properly so that excessive pressures are not built up which may injure the pumps and may also damage other parts of the injection system.

2. FUEL RAIL

The fuel rail is located on the operating side of the engine level with the tops of the cylinder heads. One end of the rail is connected directly to the high pressure fuel pump and the other end is connected to the accumulator, pressure relief valve, pressure gauge and back to the high pressure fuel pump.

Isolating valves are built into the fuel rail at the outlets to the spray valves and an additional valve is provided for the purpose of testing the spray valves.

The fuel rail consists of a length of 3/4" O.D. x 3/8" I.D. seamless steel tubing inserted in and brazed to the bodies of the isolating valves. The isolating valve stems, which have hardened conical ends, are threaded into the valve bodies. The valve seats are replaceable tobin bronze washers and are held in place by plugs which are screwed into the valve bodies and to which the injection lines from the spray valve are connected.

3. INJECTION TUBING

All of the high pressure lines used in the injection system are seamless steel tubing. The ends are formed by brazing union sleeves to the tubing, and union nuts fasten these ends to the various fittings. 1/4" O.D. x .065" wall thickness tubing is used between the fuel rail and the spray valves and from the accumulator to the fuel pressure gauge. A high grade tubing is used, made especially for this service,

and standard seamless steel tubing should never be substituted.

The importance of keeping the injection lines clean cannot be overemphasized. When an injection line is removed from the engine the open ends should be covered with clean paper which should not be removed until the tubing is to be placed on the engine again. If there is any doubt as to the cleanliness of an injection line it should be thoroughly cleaned before installing. To clean a line it should be washed repeatedly in cleaning solvent or gasoline and should be blown out with an air hose between each washing. This cleaning process should be carried on until there is no uncertainty as to the cleanliness of the tubing.

4. ACCUMULATOR

To prevent large pressure fluctuations in the injection system each time a spray valve opens or a pump delivers fuel the volume of the system is increased by the addition of an accumulator. The fuel in the accumulator, due to its compressibility, tends to maintain a constant pressure in the fuel system without appreciable fluctuations. The accumulator is a welded steel bottle mounted on top of the centerframe and is connected to the fuel rail.

5. FUEL PRESSURE REGULATING VALVE

Injection pressure control is afforded by the adjustable pressure relief valve. This valve is of the by-pass type in which the opposing forces of a spring and the fuel pressure acting on the stem of a needle valve maintain constant fuel pressures. If the pressure starts to drop the spring closes the needle slightly reducing the amount of fuel by-passed with the result that the pressure is held constant.

Referring to Fig. O-2 the regulating valve is built around valve body (7). The hardened steel valve seat (8) is held between the body and adapter stud (9) which screws on the bottom of the body and through which passage (18) allows the by-passed fuel to escape. Fuel inlet elbow (16) is threaded into the side of the body, supplying fuel to the annular space around the reduced section of the valve stem (17). The top of the body is bored to receive stem packing (15) and packing gland (14). Screwed to the top of the body is relief valve spring cage (5). This cage is screwed down upon the drain cup holding the latter in place against a shoulder on the body.

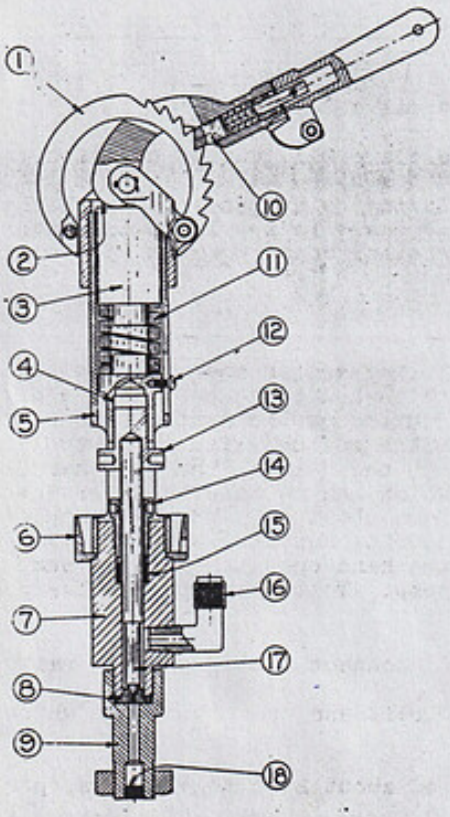


FIG. O-2

Cage (5) carries upper spring seat (3), Spring (11), and the lower spring seat. Valve spring adjusting screw (13) which is bored to receive the upper end of the valve is threaded into the bottom of the lower spring seat. A small machine screw in the lower spring seat engages a slot in the cage and prevents rotation of the seat when the adjusting screw is being turned. The bearing assembly which holds the control handle and sector (1) is threaded to the upper end of cage (5). The lower part of the control handle is shaped to form a cam which actuates the upper spring seat. A spring loaded pawl (10) in the handle engages teeth in sector (1) so that the handle will remain in position after it has been adjusted. A downward force on the end of the handle pulls the pawl away from the sector and allows the handle to be lowered.

The injection pressure is normally changed by moving the handle up or down. Moving the handle in an upward direction increases the pressure, downward movement lowers the pressure. The pressure increase or decrease per notch is approximately 600 to 800 lbs. However, the pressure in any notch may be changed by means of adjusting screw (13).

Packing (15) will need replacing when the fuel leakage around the valve stem (17) becomes excessive. Tighten the packing gland just enough to prevent leakage. Never attempt to stop leakage by tightening the gland severely when new packing is needed. A loss of fuel pressure can often be traced to dirt lodged between valve stem (17) and the seat (8). This condition can be remedied by removing adapter stud (9) and valve seat (8) from

the bottom of the relief valve and thoroughly cleaning the valve and its seat. Occasionally it may be necessary to lap the needle and its seat to prevent excessive by-passing and a low fuel pressure. After performing this operation all traces of grinding compound should be carefully washed off before the valve is reassembled.

6. SPRAY VALVES

The purpose of the spray valve (or fuel injection valve) is to meter the fuel accurately, to deliver it precisely at a definite moment, in a definite time into the combustion chamber in the form of a finely atomized spray. It might be stated that the successful operation of the engine depends upon the proper functioning of the spray valves more than on any other item. If the engine does not perform properly and the exhaust is smoky, the functioning of the fuel valves should be checked first of all. In the great majority of cases servicing the fuel valves and making them function properly corrects the trouble.

Fundamentally, the spray valve is a heavily spring loaded needle valve. Referring to Fig. O-3 the seat of the needle valve is incorporated in the tip or nozzle (1) just above the entrances to the spray orifices. The lower end of valve body (4) is counterbored to receive the end of the spray valve tip. A shoulder on the spray tip (1) which is centered in the counterbore, is held securely against the lower end of the body by nut (2). Valve assembly (3) is made up of two sections. The lower section has a conical end which is ground to the seat in the spray valve tip. This lower stem section is pressed into an extension (10) to which the spring loading is applied and by which the stem is lifted. A shoulder on the extension carries a small ball type thrust bearing (14) which acts as a lower spring retainer. Upper spring retainer (12) screws into the upper end of valve spring casing (13) which in turn is threaded to the upper end of valve body (4).

The flange used for clamping the valve is drilled and tapped to receive fuel elbow (6) which supports the small metal edge type filter (15). Fuel is carried from this point to the nozzle in the annular space surrounding stem (3). Leakage upward along the stem is prevented by packing (7) held between an upper and lower gland and secured by packing nut (8).

7. REMOVAL OF SPRAY VALVE FROM ENGINE (See Fig. O-3)

(a) Remove the cotter pin from one end of pin (37) at the fulcrum end of spray valve rocker (36). Drive the pin out with a brass drift.

(b) Remove horseshoe shaped collar (16) which forms the link between the rocker and the upper end of the spray valve and swing the rocker out of the way.

(c) Disconnect the injection line at the spray valve filter.

(d) Loosen the clamp nut and slide spray valve clamp (11) out of position.

(e) Remove the spray valve from the engine. It may be necessary to work the valve loose by rotating it back and forth and in some cases to pry it upward with a bar to remove it. As the valve is removed, note whether copper gasket (5) remains in the cylinder head or on the end of the valve.

8. TEST EQUIPMENT

All the parts for a spray valve test stand are included in the tool equipment supplied with the engine. The spray test clamp which holds the spray valve directly below the flanged section of the body can be mounted on the centerframe of the engine or at some other convenient location near the engine. The long stud supplied with this equipment screws into the outer end of the clamp. The test handle is supported on the upper end of the stud by a nut which can be screwed up or down on the stud until the desired height of fulcrum has been obtained. Fuel is supplied from the extra fuel rail valve through a length of tubing supplied with the tool equipment. Fuel pressure is obtained by means of the hand operated priming pump located at the forward end of the high pressure fuel pump. To test a spray valve proceed as follows:

(a) Clamp the spray valve in the test stand and connect it to the fuel rail.

(b) Close all the isolating valves on the fuel rail and open the valve which supplies the test stand.

(c) With the priming pump build up a pressure of about 2000 to 4000 lbs. per square inch.

(d) Open the valve quickly three or four times by hitting the end of the test handle

sharp blows with the fist, watching as the valve operates to see if a fine fuel spray comes out of <u>each</u> hole in the tip.

(e) Wipe off the tip carefully, pump up the pressure to about 4000 lbs. per square inch again and operate the spray valve as described in step 4 until the pressure has dropped to about 2000 lbs. per square inch. Then watch the bottom of the tip for a period of time to see if drops of fuel form, indicating tip leakage.

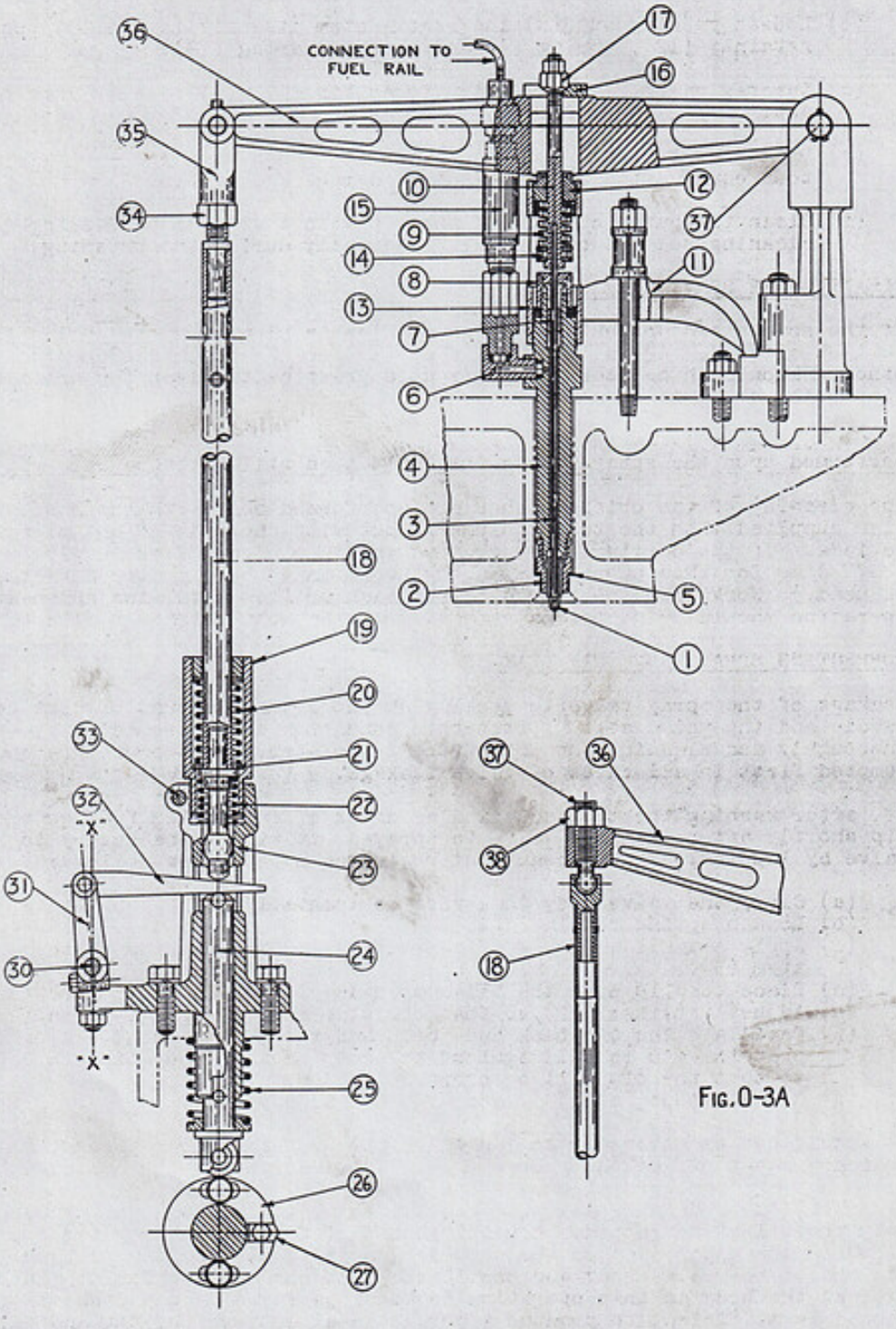


FIG. O-3A

FIG. O-3

9. DISASSEMBLY OF SPRAY VALVE (See Fig. 0-3)

If the sprays are not uniform, if one or more orifices are entirely plugged up, or if drops of fuel form on the end of the tip after testing as described in step (e) of the preceding section, the spray valve must be taken apart and serviced. Proceed as follows:

(a) Clamp the spray valve at the flanged section of the body in a vise.

(b) Unscrew upper spring retainer (12) with a suitable pin or drift.

(c) Loosen packing nut (8) and remove stem assembly (3 and 10) together with the retainer (12), spring (9) and thrust bearing (14).

(d) Unscrew valve seat nut (2). Spray tip (1) will usually come off with the nut.

(e) Drive the tip out of the nut with the punch supplied for this purpose in the tool equipment. Use care not to damage end of tip.

(f) Clean the outer surface of the tip with a wire brush dipping the tip into cleaning solvent or fuel oil frequently during the brushing.

10. CLEANING THE SPRAY ORIFICES

If the sprays are not uniform or an orifice is plugged up the holes in the spray tip must be cleaned. Again, if it is necessary to disassemble the spray valve for some other reason such as leakage, it is good practice to clean the orifices at the same time. It sometimes happens that all of the orifices become slightly clogged with the result that they deliver less fuel. Such a condition cannot be detected when the spray valve is tested but if the holes are cleaned every time service work is performed upon the spray valves this condition will be taken care of.

The cleaning of the orifices should be performed only with the music wire and pin vise supplied with the tool equipment, not with the ends of hat pins and other such devices. If the original wire is lost obtain a piece of music wire of not more than .007" dia. for this purpose. (On engines with 9" bore a wire diameter of .009" may be used.) Work the wire in and out of each orifice until the holes are clean. This operation should be performed carefully so that the orifice will not be deformed.

11. CORRECTING SPRAY VALVE TIP LEAKAGE

Leakage of the spray valve is usually due to a small amount of dirt between the needle and the valve seat. Often this condition can be remedied by washing the tip thoroughly and cleaning the end of the valve stem. This procedure should be attempted first in all cases of valve leakage.

If, after washing the tip and spindle, drops of fuel still form on the bottom of the tip shortly after the fuel valve is sprayed, it will be necessary to reseat the valve by lapping. The procedure of reseating a tip is as follows:

(a) Clamp the valve body in a vise horizontally.
(b) Loosen spring retainer (12).
(c) Apply a small amount of fine valve grinding compound to the end of valve stem (3).
(d) Place the tip over the valve stem and insert it fully into the valve body.
(e) Adjust retainer (12) so that the stem exerts a light pressure on the tip.
(f) Oscillate the tip back and forth and rotate the spindle slowly. Be sure that the tip is held against the body as this operation is being performed so that the tip will be properly guided.
(g) Repeat steps "c", "d", and "f" if necessary.

It should not be necessary to lap the tip more than two or three times to correct ordinary cases of leakage. However, if the seat in the tip has been badly damaged no amount of lapping will remedy the situation. In such instances a new tip should be installed. When installing a new tip the joint between the tip and the valve body must first be lapped. A small amount of fine valve grinding compound is applied to the upper face on the shoulder of tip (1). The tip is then installed in the end of the valve body and oscillated back and forth. The tip is held gently against the body as this operation is being performed. One light lapping process should be sufficient to produce a perfect seal between the tip and valve body. The tip is then lapped to the valve stem by the method described in this paragraph.

12. VALVE PACKING ADJUSTMENT

Packing nut (8) should never be appreciably more than finger-tight. A small amount

of fuel leakage past the packing is necessary for proper lubrication of the spindle. Too tightly adjusted packing will prevent this lubrication and will result in a scored spindle and sluggish valve action. If a spray valve leaks excessively along the spindle after the packing has been lightly tightened up the need for new packing or a new spindle or both is indicated.

13. ASSEMBLY OF THE SPRAY VALVE - SPRAY VALVE "LIFT"

Referring to Fig. O-3, spring (9) must be adjusted to a certain tension in order to assure proper functioning of the spray valve. It is further important that the adjustment of all the spray valve springs be the same or that the "lift" on all the spray valves be the same. With "lift" as used in the following instructions is understood the lift which spring (9) will allow before its coils touch each other and prevent further upward movement of the valve stem. (The actual lift when the spray valves are operating in the engine is of course determined by the position of fuel wedge (32), the adjustment on pushrod (18) and cam (27). This actual lift is less than the "lift" as defined in this paragraph.) Proceed as follows to assemble the valve and adjust for proper "Lift" (or opening tension):

(a) Wet spindle (3) with clean fuel oil and slip it into position in the valve body.
(b) Clean the spray valve tip and install it carefully on the valve body. Tighten valve seat nut (2) securely.
(c) Screw down on spring retainer (12) carefully until the coils of spring (9) just touch. Be careful not to screw down so hard that valve stem (3) bends, rendering it useless. It is best to have the valve in the test stand when performing this operation and determine when spring (9) becomes solid by means of the test handle. When it is not possible to lift the spray valve stem by means of the test handle the spring coils are touching. The "Lift" is then zero.
(d) Unscrew spring retainer (12) 3/4 to 7/8 turns which will make the "lift" 1/16". The "lift" on all the valves should be between 1/16" and 5/64".
(e) Screw down on packing nut (8) until it is just finger-tight.
(f) Test the functioning of the valve as described in paragraph 8.

14. ASSEMBLY OF SPRAY VALVE IN ENGINE

The spray valve is installed in the engine in the reverse order of its removal. Again referring to Fig. O-3, if copper gasket (5) is in the cylinder head merely lower the valve into position. If the copper gasket (5) was removed with the valve, the gasket can be held in position on the lower end of the valve by a thin coating of grease applied to the washer.

After installing the valve it will be necessary to reset the push rod as described in paragraph 18. After timing, in order to clear the cylinder of excess oil, always turn the engine over on air with the snifter valves open and with the fuel isolating valves closed.

15. SPRAY VALVE FUEL FILTERS

In addition to the fuel filter at the high pressure fuel pump an individual filter (15) is supplied at each spray valve. The spray valve filters are of the metal edge type and have a spacing of .0015". They are installed in housing (15) which screw into the fuel inlet elbows at the spray valves. The frequency at which these filters will need cleaning will depend upon the quality of the fuel and the condition of the filter located at the high pressure fuel pump. After disassembling the housings it will be possible to unscrew the filter unit. Wash each unit thoroughly in clean solvent or fuel and blow it clean with compressed air, being careful not to injure the windings when handling it.

16. SPRAY VALVE OPERATING MECHANISM (See Fig. O-3)

The spray valve is actuated by cam (27), lifter or cam follower (24), pushrod (18), and rocker arm (36). Lifter (24) and latch (29) are held against the cam by spring (25). Motion of the lifter is transmitted to the pushrod through wedge (32). As can readily be seen in Fig. O-3, moving the wedge inward will decrease the gap between the lifter and the pushrod. Consequently the spray valve will open sooner, will lift higher, and will close later. Moving the wedge outward produces the opposite results. The outer end of the wedge is pinned to lever (31) which is clamped to the wedge shaft, which in turn is connected to the governor. Accordingly the governor, by rotating the wedge shaft, completely controls the action of the spray valves.

When the engine was tested at the factory, wedge levers (31) were adjusted to be parallel to each other and in line on wedge shaft (30) and were then clamped and

pinned to the shaft. If new levers or a new wedge shaft are installed it is important that they be lined up in accordance with the above. The position of the fulcrum of wedges (32) for the full load full speed position (wedges fully in) should be about 1/4" inside the vertical line X-X through the center of the wedge shaft. The position of the wedge fulcrum for idling at low speed should be as shown in Fig. 11, that is, about 1/4" outside line X-X. In other words, line X-X should approximately divide the total movement of the wedge fulcrum in two equal parts.

Levers (36) should be approximately parallel for all the spray valves. This is accomplished by means of adjusting nut (17) which bears down on horseshoe collar (16) which in turn bears down on lever (36). With the lever disconnected from push rod fork (35) hold it up against collar (16) and nut (17) without opening the spray valve. Then adjust nut (17) for the proper lever position and lock by means of the lock nut on top.

Buffer spring assembly (19), positions the pushrod relative to the lifter and assists spray valve spring (9) in returning the valve mechaniam (rocker, pushrod, etc.) as the spray valve is being closed. The weak spring (22) below buffer spring (20) merely holds the pushrod against washer (21). As buffer spring assembly (19) is screwed down buffer spring (20) and washer (21) force the pushrod downward against the weaker spring and bring the end of the pushrod closer to the wedge and lifter. Proper adjustment of the buffer spring assembly is as follows:

(a) Bar the engine until the fuel cam follower is on the base circle of the cam.

(b) Set the wedge shaft and wedges in full load position (wedges "fully in" as determined by the governor weights being fully in) and unscrew cage (19) until there is clearance between the lower end of the pushrod and the upper face of the wedge.

(c) Slowly screw down cage (19) and at the same time move the wedge back and forth sideways with fingers.

(d) As soon as the wedge is felt to tighten unscrew the cage one-half turn and lock it in this position with the clamping screw.

NOTE: When timing the spray valves as described in the following the buffer spring assembly should always be unscrewed about one or two turns. When timing is completed adjust the buffer spring in accordance with instructions in this paragraph.

17. SPRAY VALVE TIMING (See Fig. O-3)

The timing procedure described in the following is for a spray valve opening of 8° B.T.C. (Before Top Center) and a spray valve closing of 18° A.T.C. (After Top Center). The proper spray valve timing to use is stamped in the engine name plate and should always be followed. If the timing in the name plate differs from 8° - 18° opening and closing the following instructions should be modified accordingly. Proceed as follows:

(a) Shift the camshaft to the AHEAD position and unscrew all Buffer Spring Cages one or two turns. Shut off all the isolating valves in the fuel rail except for Number 1 cylinder.

(b) Be sure that wedges are in the full load position ("fully in") as determined by the governor weights being against their inner stops. (Normally the wedges will be "fully in" when the engine is shut down but it is well to check this point.)

(c) Spot Number 1 cylinder at 5° A.T.C. on the power stroke. (Half way point between 8° B.T.C. opening point and 18° A.T.C. closing point.) Then unbolt and turn the fuel cam until the center of the toe is directly in line with the axis of the lifter. Clamp the fuel cam temporarily.

(d) Set the crankshaft 8° B.T.C. on the compression stroke. Bar the engine up to this point in the ahead direction of rotation.

(e) Pump up a fuel pressure of about 1500 lbs. per sq. inch with the hand pump.

(f) Slowly lengthen the spray valve pushrod until the needle of the pressure gauge drops indicating that the spray valve has opened. Check this adjustment by backing the engine up a few degrees, pumping the fuel pressure up again and barring the engine slowly in the ahead direction until the pressure again drops. If the flywheel pointer is not at 8° B.T.C. readjust the pushrod and check again.

To adjust the length of pushrod (18) loosen locknut (34) and turn the pushrod, using a pin or drift in the holes provided at its upper end. Then tighten the

locknut. On 6-1/2" bore engines the pushrod length is not changed. Referring to Fig. O-3A ball stud (37) in rocker (36) is screwed up or down instead. To adjust loosen locknut (38) and turn ball stud (37) with a screw driver. Tighten locknut (38) after the adjustment has been accomplished.

(g) Bar the engine over to 25° A.T.C. and again pump up the fuel pressure. Then bar the engine backwards slowly until the pressure drops. This point, which is the closing of the spray valve, should be 18° A.T.C.

(h) If this point is past 18° A.T.C. too long a spray period is at hand. It will be necessary to advance the fuel cam slightly and repeat steps "d", "e", "f", and "g". If on the other hand the spray valve closes before 18° A.T.C., retard the cam slightly and repeat steps "d", "e", "f", and "g".

(i) Repeat steps "c" to "g" on the remaining cylinders. Check and record the spray valve timings for ASTERN. The timing going Astern may be slightly different than the ahead timing. However, the ahead timing is the more important and no changes should be made to favor the astern timing.

(j) Adjust the buffer springs as per instructions in paragraph 16. Note that buffer spring cages should always be unscrewed when spray valves are timed.

18. BALANCING THE ENGINE FOR EQUAL LOAD ON ALL CYLINDERS

Theoretically, if the spray valves have been timed exactly and correctly (as outlined in the preceding paragraph) the amount of fuel injected in each cylinder should be the same. Consequently, the total engine load should also be equally divided between all the cylinders. Practically however, it is impossible to time all the spray valves exactly alike, and even if that could be accomplished manufacturing tolerances on such items as orifices in the spray valve tips, fuel cams, wedges, etc. are apt to affect the cylinder balance. The division of load between the various cylinders should consequently be checked after the engine is running, preferably at full load. Since the exhaust temperatures are proportional to the loads that the various cylinders are carrying the amount of fuel injected should be adjusted so that the exhaust temperatures for the various cylinders are alike, or nearly alike.

The amount of fuel injected and consequently the load carrying capacity of a cylinder may be changed by adjusting the length of pushrod (18), or in the case of 6-1/2" bore engines, by adjusting ball stud (37). (See Figures O-3 and O-3A respectively) It should be noted, however, that readjusting will affect the spray valve timing. Therefore, the adjustment should not be appreciable and should not exceed one-half turn of the pushrod or ball stud from the position obtained when timing the spray valve.

The proper procedure for balancing the engine can be summarized as follows:

(a) Assuming that all the spray valves have been correctly timed to open at 8° B.T.C. and close at 18° A.T.C. it should be possible to balance the engine by merely lengthening or shortening the pushrods by one-half turn or less. In the case of 6-1/2" bore engines the rocker adjusting screw should not be turned more than one-half turn. Lengthening a pushrod or screwing down on the rocker adjusting screw will increase the exhaust temperature of the cylinder and vice versa.

(b) If an adjustment of one-half turn is not sufficient the timing of all the spray valves should be checked and, if necessary, adjusted for an opening of 8° B.T.C. and a closing of 18° A.T.C. for full load wedge shaft position as described in Paragraph 16.

(c) If the valve timing is found to be satisfactory or if, after making any necessary correction in the spray valve timing, a correction of one-half turn of the pushrod is still insufficient, defective combustion is indicated. This may be due to one or more spray tip orifices being plugged or to any of the defects dealt with under the heading "Smoky Exhaust" in the "Maintenance and Inspection" section.

When the engine was tested at the factory spray valves were carefully timed and adjusted to equalize the exhaust temperatures in the various cylinders and while the operator should not continually change adjustments in an effort to improve an engine that is operating satisfactorily he should keep the balance of the various cylinders fairly even. The cylinder balance should be checked whenever a spray valve has been changed. If the exhaust temperatures are kept within a total range of 20° the balance will be excellent, while a range of 50° may not be considered excessive and will give fairly satisfactory operation. However, do not allow the cylinder unbalance to exceed the last mentioned value.

1. GOVERNOR

The flyball type governor is mounted on the forward end of the centerframe and is driven by the camshaft gear. It is illustrated in Fig. Q-1. Governor housing (21) which forms the governor bearing is bolted and doweled to the centerframe. It is located to allow .004" - .005" backlash between governor gear (22), which is keyed and pressed on governor body (20), and the camshaft gear. Lubricating oil from the pressure pump is piped to the bearing through a drilled hole in the housing. Governor weights (23) are mounted on fulcrum pins in governor body (20) and carry hardened steel rollers (24) on riveted pins. As the flyballs tend to move out due to centrifugal force, the rollers bear against thrust plate (12) and transmit the force developed by the weights through quill rod (11), thrust bearing (17) and spring block (14) to governor spring (3). The thrust reaction is taken by bearing (19), which is secured to the governor body by threaded retaining collar (18). Thrust clearance is adjusted to .010" and the collar is locked by a set screw, secured in place by a locking wire through the head.

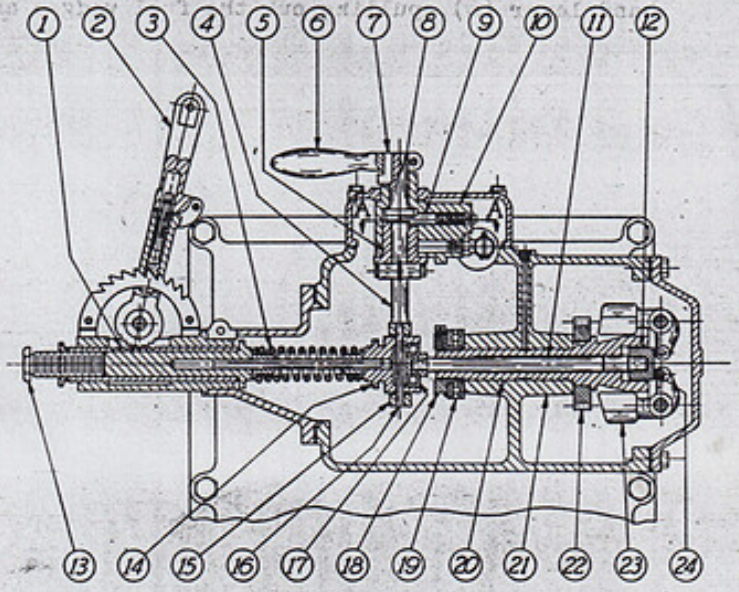


FIG. Q-1

Spring block (14) follows the motion of the weights resulting from variations in engine speed. This motion is further transmitted by means of pin (16) and fork (15) to vertical shaft (4), to which fork (15) is clamped. Additional linkage connects vertical shaft (4) to the fuel wedge shaft to which each of the wedges are linked, thus completing the connection from the governor weights to the fuel wedges. The engine speed is controlled by varying the tension of the governor spring through hand lever (2) and rack (1). The lever is held in place by a latch which engages a toothed quadrant. A break mechanism in the handle permits moving the lever to the left, which reduces the spring tension. This allows the governor weights to move out, withdrawing the fuel wedges and reducing the engine speed. Conversely moving the control lever to the right increases the engine speed. Adjusting screw (13) controls the engine speed and should be set to give the desired full load speed (see engine name plate) with the governor control lever in the last notch. The engine will then idle at the proper speed with the control handle in the first notch. The adjustment is secured by means of a lock nut.

2. STOPPING MECHANISM

The engine is stopped by rotating the hand lever on top of the governor housing. Lever (6) (See Fig. Q-1) is connected through a release mechanism to floating lever (10) on top of vertical shaft (4). Lever (10) is linked directly to the fuel wedge shaft. The release mechanism is shown in detail in Fig. Q-2 which is an enlarged section taken through A-A in Fig. Q-1. It serves to break the connection between Lever (10) and vertical shaft (4), releasing the wedge shaft from governor control. Referring to Fig. Q-2 it will be noted that set screw (25) and plunger (9), both of which are mounted in lever (10), form a rigid connection between levers (10) and (5). Lever

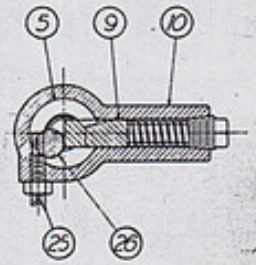


FIG. Q-2

(5) is clamped to vertical shaft (4) and appears in Fig. Q-2 as the annular segment, the opposite ends of which bear against the diagonally milled flat on the lower side of plunger (9) (shown dotted in Fig. Q-2) and the end of setscrew (25). This is the normal position of the mechanism when the engine is running, levers (10) and (5) operating as a single unit. When hand lever (6) is pulled to stop the engine, eccentric (26) on the lower end of shaft (8) engages the end of plunger (9) and forces it back against its spring, out of engagement with lever (5). Lever (10) is then free to rotate counterclockwise without interference with lever (5). As control lever (6) is moved further the projecting key (7) engages a boss extending from the top of lever (10) (not shown in Fig. Q-1) and thereafter lever (10) follows the motion of hand lever (6), pulling out the fuel wedges and stopping the engine.

against the latch shaft flange by spring (5) acting on rocker (6). The vent valve is open and the pilot valve is closed under the action of the spring. Connection (1), to which the device to be operated is connected is thus vented through the diagonal hole connecting the two valves.

When the latch shaft is rotated so that cam (8) contacts plunger (7) it raises rocker (6) closing the vent valve and opening the pilot valve, admitting air to the device to which the valve is connected. The adjusting screws in the rocker should be set to allow approximately 1/16" clearance between the ends of the screws and the ends of the valve stems when the valves are seated.

7. STARTING MECHANISM
ENGINES WITH 11½" OR SMALLER BORE

Referring to Section H the air starting valves in the cylinder heads on the smaller bore engines are actuated by rockers mounted eccentrically on the rocker shaft. Consequently turning the rocker shaft will raise or lower the air start lifter and latch. The individual rocker shafts are all interconnected by means of bell cranks and consequently turning the rocker shaft on No. 1 cylinder through an arc of approximately 110° will lower all the air start latches to a point where they contact the air start cams, throwing

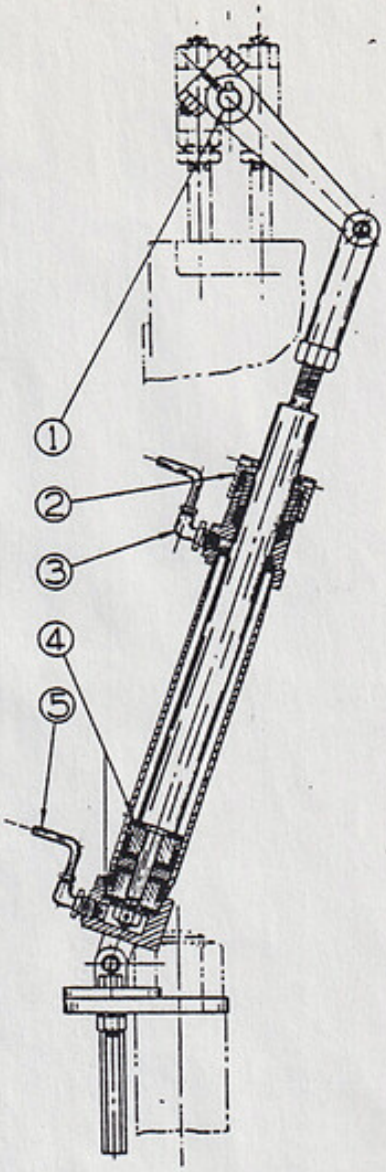


FIG. R-4

the starting air valves into operation.

The rocker shaft is shifted from one position to the other by means of a pneumatic cylinder mounted forward of cylinder No. 1 and illustrated in Fig. R-4. The pilot valve controlling this cylinder and the manner in which it is operated from the latch shaft are identical with the pilot valve, described in Paragraph 6. As shown in Fig. R-4, it is in the inoperative position, with the plunger down. Air pressure admitted above the piston through connection (3), which is permanently connected to the source of air supply normally holds it in this position. The pilot valve is piped to connection (5), and when in the RUN position vents the

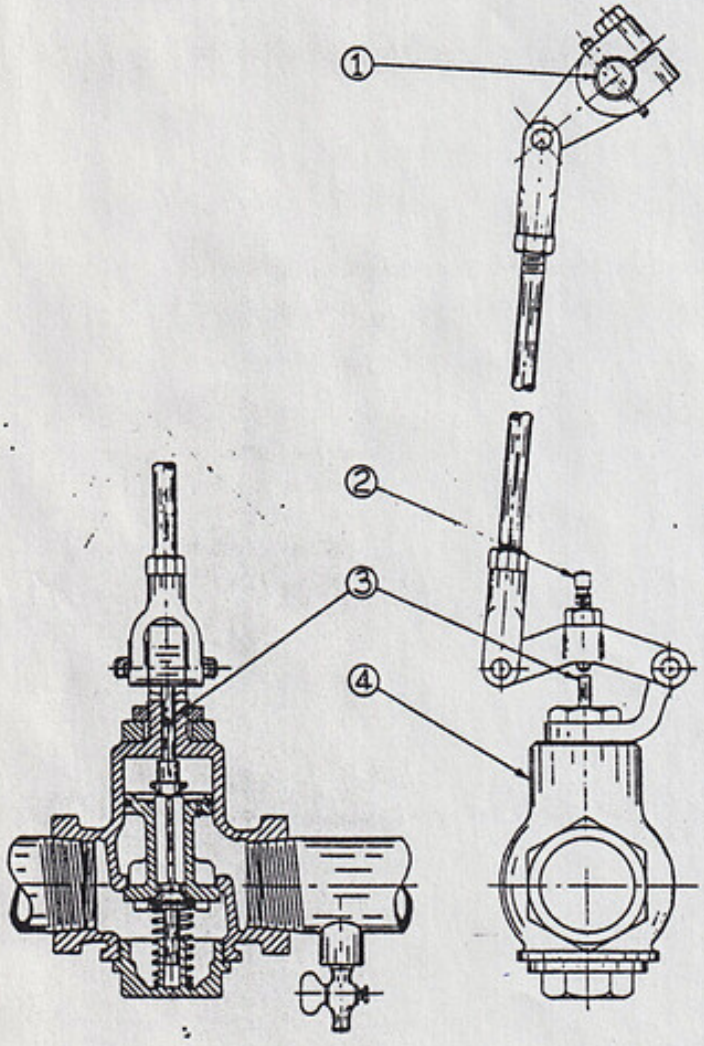


FIG. R-5

lower end of the cylinder. When the latch shaft is shifted to the START position the pilot valve opens, admitting air below the piston. Since the area below the piston is considerably larger than that above the piston it is forced up, shifting rocker shaft (1) to the START position. As soon as the pilot valve closes the space below the piston is vented and the air pressure above immediately returns the piston to the RUN position.

The travel of the piston is limited by contact of thrust washers (4) with the upper and lower heads of the cylinder and the stroke is 9-5/8" for the 11½" bore engine and 7⅞" for engines with 10" or 10¼" bore. Packing gland (2) should be kept sufficiently tight to prevent air leakage, but should not be tightened more than necessary.

The position of the rocker shaft relative to the air ram can be adjusted by means of the threaded end of the air ram piston, turning it in the clevis connecting to the rocker shaft lever. The rocker shaft position should be adjusted so that the bell cranks connecting the various rocker shafts point straight up when air ram piston is in the RUN position.

The master starting air manifold valve used on the smaller bore engines is illustrated in Fig. R-5. Valve (4) is essentially the same as that used on the 13" bore engines and described in Paragraph 5. It is mechanically operated however, by linkage connecting to the valve rocker shaft (1), this linkage replacing the pneumatic piston construction used on the 13" bore engines. When the rocker shaft shifts to the "START" position, adjusting screw (2) contacts pin (3) and opens the valve. Screw (2) should be set so that the valve is opened about ¼" when the rocker shaft is in the "START" position.

8. FUEL CUT-OUT MECHANISM

The fuel cut-out plunger is illustrated in Fig. R-6. As shown in Fig. R-6 the latch shaft is in or near the "STOP" position, with plunger (3) up on cam (4), which is mounted on one of the latch shaft webs. The upper end of the plunger has engaged the adjusting screw in lever (1), rotating the lever and the fuel wedge shaft (2) to pull out the fuel wedges and cut off fuel from the engine. The adjusting screw in lever (1) should be set to allow 1/8" clearance with the top of the plunger when the latter is down off the cam and the fuel wedges are in at the full load position.

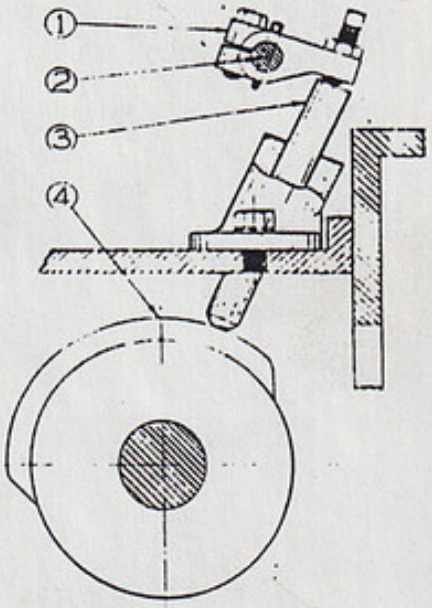


FIG. R-6

9. FLYWHEEL BRAKE

The flywheel brake assembly is shown in Fig. R-7. Brake shoe (1) which is faced with brake lining, is carried by the horizontal arm of crank shaped lever (2). This lever is mounted on shaft (3), and carries the brake cylinder (4) in trunnions on its vertical arm. Shaft (3) is supported by bracket (5) which is bolted to the after end of the centerframe. The projecting end of the piston rod (6) bears against the compressor cylinder and therefore the piston and rod remain stationary when air is admitted to the cylinder. When the pilot valve is opened and air is admitted to the brake, the cylinder moves relative to the piston. Lever (2) is rotated about its fulcrum, applying the brake to the flywheel and stopping the engine. When the air pressure is relieved the brake shoe is withdrawn from the flywheel by spring (7), which bears against a third arm on lever (2).

There are no adjustments necessary on the brake and the only service requirements are the replacement of the shoe lining and the piston cup leather when necessary.

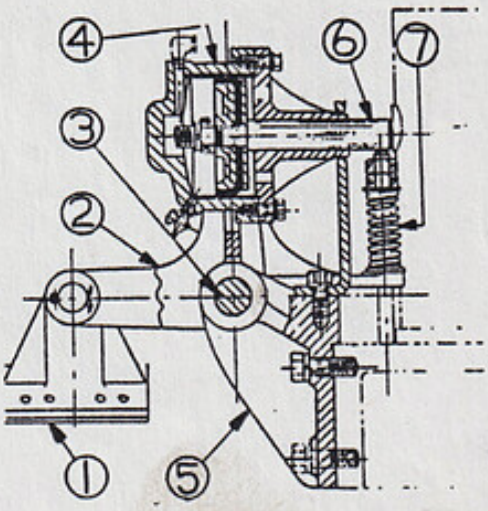


FIG. R-7

REVERSE GEAR AND THRUST BEARING

1. GENERAL

Five different size reverse gears are used on the various Atlas Reverse Gear Marine Engines, in accordance with the following table.

NO. OF CYLS.	BORE & STROKE	REVERSE GEAR SIZE	ILLUSTRATION
2-3-4	6½ x 8½	14"	Fig. S-1
3 & 4	7½ x 10½	19"	Fig. S-3
3 & 4	8 x 10½	19"	Fig. S-3
3	9 x 12	19"	Fig. S-3
4	9 x 12	21"	Fig. S-3
3	10 x 13	21"	Fig. S-3
4	10 x 13	24"	Fig. S-4
4	10½ x 13	24"	Fig. S-4
3 & 4	11½ x 15	28"	Fig. S-4
3 & 4	13 x 16	28"	Fig. S-4

The gear is made up of a planetary transmission, a disc clutch, and two brakes, operating on the drum of the transmission and on the propeller shaft. The resulting drive permits complete control of the propeller shaft by means of the clutch control mechanism. Its operation is described under Paragraph 6. The reverse gear is closely associated with the thrust bearing, and both units are shown in the illustrations and included in the following description. The different size gears are quite similar in design and the description applies to all of them with the exception of certain differences that are mentioned in the text. Fig. S-1 and Fig. S-2 show longitudinal and transverse sections through the 14" gear, Fig. S-3 illustrates the design of the 19" and 21" gears and Fig. S-4 the 24" and 28" gears. The

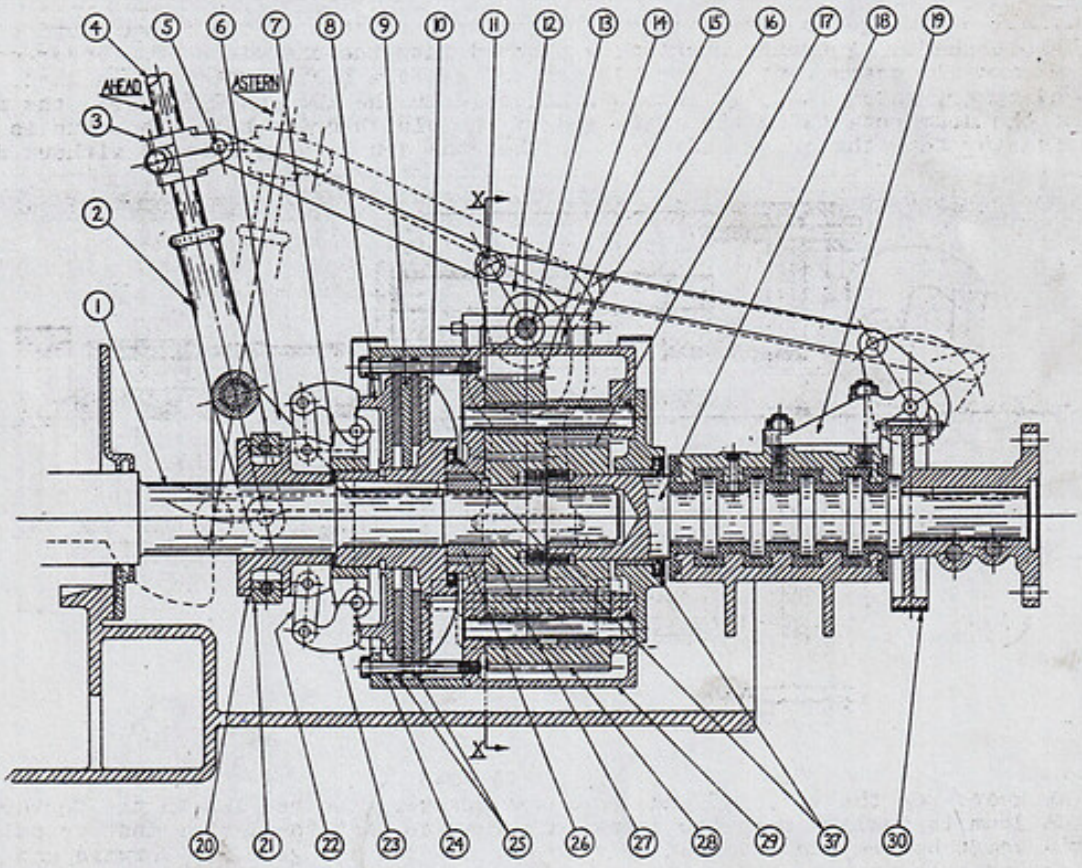


FIG. S-1

size designation of the gears is the diameter of the transmission drum in inches. Two different types of control mechanism are used, a single operating lever on the 14", 19", and 21" gears, and a rotating shaft, operated by a handwheel and geared to the clutch crowder collar on the 24" and 28" gears.

2. PLANETARY TRANSMISSION

Referring to Fig. S-1, the planetary transmission is housed in a rotating drum (29). It consists of two shaft gears (17) and (27), mounted side by side on adjacent ends of crankshaft (1) and thrust shaft (18), and interconnected by three pairs of "planet" gears, (14) and (28). These planet gears rotate on bronze bushings on pins mounted in drum (29). The long planet gears (28) extend across the faces of both of the shaft gears, meshing with the larger thrust shaft gear (17) and clearing the smaller crankshaft gear (27). The short planet gears (14) are in line with the crankshaft gear and the extension of the long planet gears, meshing with both of these gears and completing the gear train between the two shafts. Fig. S-2 shows a section taken through the planetary transmission at XX in Fig. S-1 and illustrates the planet gear mounting. The above general description applies to all of the different size gears, but there are a number of minor differences in design, the most important of which are as follows:

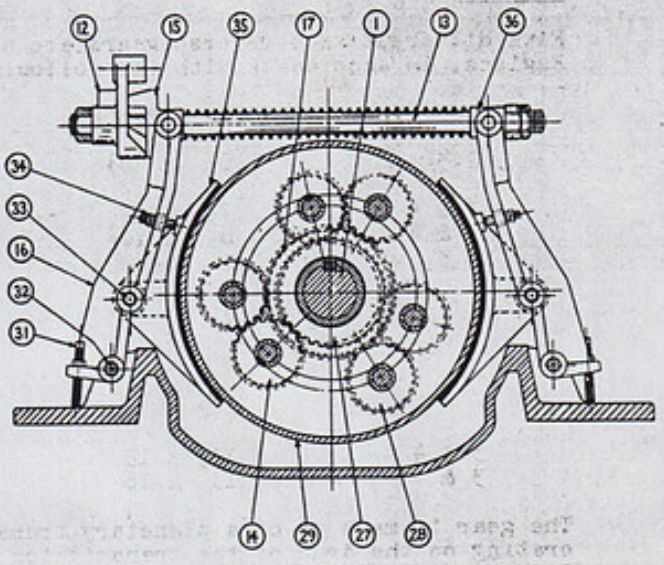


FIG. S-2

(a) Drum Mounting

In all of the gears the after end of the drum rotates on the forward end of the thrust shaft. A bronze bushing is pressed into the one piece drum cover on the 15", 19" and 21" gears, but on the 24" and 28" gears a babbitt bearing is used, poured in the cover, which is split into two halves. On the 19" and 21" gears, the forward end of the drum rotates on the after end of the clutch drive hub. This hub is larger in diameter than the crankshaft gear so that the drum may be removed without disturbing

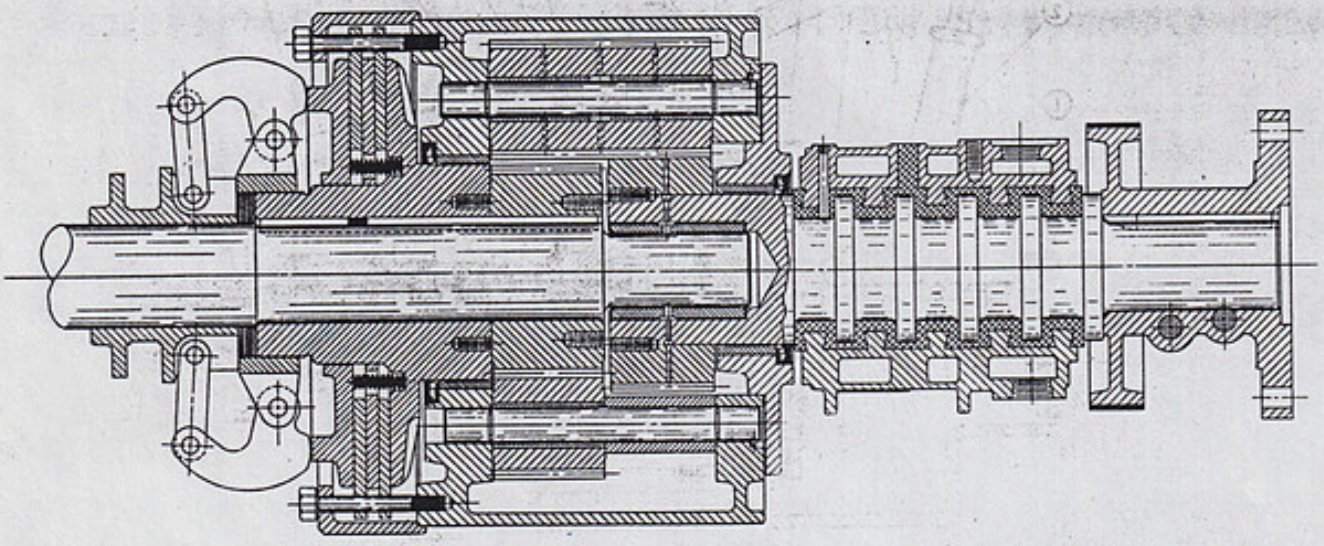


FIG. S-3

the gear. On the 14", 24" and 28" gears however, the bearing in the forward end of the drum is smaller than the crankshaft gear so that the latter must be pulled off the shaft before the drum can be removed. On the 14" gear the forward end of the drum rotates on a spacer on the crankshaft between the clutch driving hub and the crankshaft gear. On the 24" and 28" gears it rotates directly on the crankshaft. In all gears a bronze bushing pressed into the forward end of the drum provides the

bearing. The construction differences may be clearly seen by a comparison of Fig. S-1, Fig. S-3 and Fig. S-4.

(b) Oil Seals

On the 14", 19", and 21" gears oil seals (37) are incorporated into the drum bearings at each end, sealing the drum to the shaft and preventing leakage of oil along the shaft. On the 24" and 28" gears oil seals are not used however, and a heavier grade of lubricant must be used in these drums. Service instructions in regard to lubrication are given in paragraph 9 (a) under MAINTENANCE.

(c) Shaft Keys

The crankshaft drive gear and the clutch driving hub are pressed and keyed to the crankshaft or stub shaft (the 28" gear is mounted on a stub shaft bolted to the end of the crankshaft.) Taper keys are used on the 14" and 28" gears, and straight keys on the 19", 21", and 24" gears. Detailed instructions in regard to fitting the taper keys are given in Paragraph 8 under REASSEMBLY. The straight keys on the 19" and 21" gears are broken under the clutch hub and a felt packing inserted between the ends of the two keys to prevent oil leakage along the shaft.

(d) Thrust Ring

The 24" and 28" gears are provided with thrust rings, shown in Fig. S-4. Four springs acting on this ring push the drum forward when the clutch is disengaged, holding the clutch plates free so that they do not drag. In the 19" and 21" gears similar springs shown in Fig. S-3, work between the plates to hold them apart. No springs are used in the 14" gear. These springs should be replaced when overhauling if they are broken.

3. CLUTCH

The plate clutch acts between the crankshaft and the planetary transmission drum. Referring to Fig. S-1 the clutch driving hub (10) is keyed and pressed on the after end of the crankshaft, just forward of the crankshaft drive gear. Crowder collar (7) is screwed and clamped to the end of the clutch driving hub and a square hub on the latter engages the driving plates (8) and (9). The driven plates (25) are connected to transmission drum (29) by capscrews (24) which engage holes in the plates and also retain the clutch cover to the drum. Four floating clutch plates - two drive and two driven - are used on the 14", 19", and 21" gears, and five are used on the 24" and 28" gears. (On earlier engines only three floating plates were used on the large gears.)

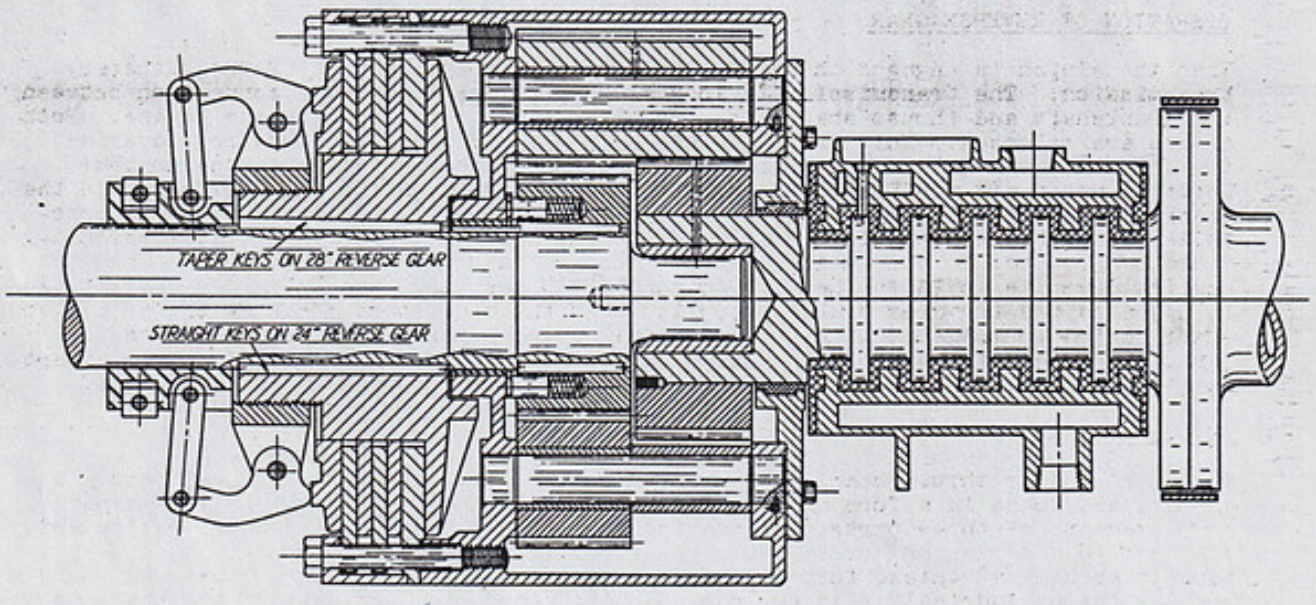


FIG. S-4

The clutch is engaged or disengaged by means of shifter cone (20) (See Fig. S-1) which slides fore and aft on the crankshaft and to which links operating the crowders (23) are pinned. When the clutch is engaged the cone is aft, bearing against crowder collar (7). In this position the center line of links (22) are inclined slightly forward. In other words the pins connecting the links to the cone have been moved in past center, so that the crowding force tends to hold the cone aft,

with the clutch engaged, rather than to push it forward, disengaging the clutch. The cone is moved by means of fingers extending down from cone shifter (2) and engaging pins projecting from each side of cone collar (21). The cone shifter is mounted on a shaft supported by brackets (6) on each side of engine base. On the 14", 19", and 21" gears the cone shifter is turned directly by clutch operating lever (4) which is inserted into a socket cast in the shifter. On the 24" gear which is equipped with the handwheel clutch control a pinion on the handwheel shaft engages an internal gear sector which is bolted to a flange on one end of the cone shifter casting. Both the shifter and handwheel shaft are mounted on bracket stands bolted to either side of the engine base. On the 28" gears a jack shaft is used between the shifter and handwheel shaft. A pinion on the handwheel shaft engages a gear on the jack shaft, and two pinions on the latter engage the shifter sectors. The two sectors rotate on a third shaft, and levers cast integrally with them extend down to engage the pins in the cone shifter collar.

Instructions covering the care and adjustment of the clutch are given in Paragraph 9 (b) under MAINTENANCE.

4. PLANETARY TRANSMISSION DRUM BRAKE

The brake controlling the planetary transmission drum consists of two shoes (35) (See Fig. S-2) which float on pins (33) on each side of the drum. The pins are carried by brake posts (16), which are supported at the bottom on fulcrum pins (32) extending through lugs on the engine base. Blocks, (15) & (36) swiveled in the tops of the posts are tied together by means of tie rod (13). Swivel block (15) is cam shaped and bears against a mating cam or crowder (12), which is rotated by means of a link connecting to the clutch operating lever. As the crowder is rotated it climbs up on the cam, shortening the tie rod and pressing the brake shoes in against the drum, applying the brake. The foregoing applies to all of the brakes except that on the 24" reverse gear, in which a sliding wedge mechanism is used for the crowder in place of the rotating cam. On the 28" gear two rotating crowder cams are used, one on each side, operated from levers on the handwheel jack shaft.

5. PROPELLER SHAFT BRAKE

A brake band (30) (See Fig. S-1) is used for the propeller shaft brake, wrapped around the drum on the shaft coupling. It is supported by a bracket (19) bolted to the top of the thrust bearing cap, and is operated by a link from the gear drum brake mechanism. A rotating crowder cam is used on most of the designs, but in some cases a sliding wedge is used. In either construction the cam or wedge design is such that the brake is applied and released at the desired points in the operating cycle. Instructions for adjusting and servicing the brakes are given in Paragraph 9 (c).

6. OPERATION OF REVERSE GEAR

When the clutch is engaged the crankshaft is coupled to the drum of the planetary transmission. The transmission is locked and provides a positive connection between the crankshaft and thrust shaft, the propeller shaft rotating with the engine. Both brakes are released. This is the AHEAD position, and the clutch control lever on the 14", 19", and 21" gears is slightly forward of the vertical. As the control lever is moved aft to NEUTRAL the clutch is released, breaking the drive between the crankshaft and thrust shaft. The same motion of the control lever applies the propeller shaft brake, stopping rotation of this shaft. The planetary transmission drum then rotates in the ahead direction somewhat slower than the engine. When the control lever is moved further aft to the ASTERN position, the propeller shaft brake is released and the drum brake is applied. As the drum stops rotating the propeller shaft begins to rotate astern, reaching full speed astern when the drum comes to rest. The operation of the 24" and 28" gears is the same as described above, except that the control is by means of the handwheel instead of by the operating lever.

7. THRUST BEARING

The multi collar thrust bearing is mounted on the after end of the engine base and carries all loads in a fore and aft direction resulting from the propeller thrust. It is made up of three parts, the bearing, the cap and the shaft. Both bearing and cap contain a series of dovetailed circumferential grooves, which when lined with babbitt about 1/4" thick, form grooves for the thrust shaft collars. Between the grooves the cylindrical areas are also babbitt lined and bear against the shaft so that sufficient journal area to carry a substantial radial load is incorporated in the bearing. Five different sizes of thrust bearing are used, corresponding to the five reverse gear sizes. All are very similar in design, with the exception of that in the 14" reverse gear, which is not water jacketed. The four larger sizes are jacketed both in the bearing and cap and a small amount of water is piped from the water pump to the bearing and is then discharged overboard. All of the bearings are lubricated from the engine lubricator. Instructions for the proper care of the thrust bearing are given in Paragraph 9 (d).

8. DISMANTLING AND REASSEMBLING THE REVERSE GEAR

When dismantling the reverse gear, proceed as follows:

(a) Remove all the clutch and brake control rigging.

(b) Break the propeller shaft coupling and slide the propeller shaft aft a sufficient distance to remove the thrust bearing. If an intermediate shaft is used it may be removed if desired, rather than shifting the propeller shaft.

(c) Remove the bolts and dowels holding the thrust bearing to the base.

(d) Remove the capscrews holding the after cover to the reverse gear drum.

(e) Remove the thrust bearing with the shaft and drum cover. Note that the bearing must be moved straight back until the pilot on the after end of the crankshaft clears the bore in the thrust shaft.

(f) Pull the crankshaft gear. Tapped holes in accordance with the following tabulation are provided in the gear and clutch hub and in the end of the crankshaft for use when dismantling and reassembling these parts.

Reverse Gear Size	Hole In Gear	Hole In Clutch Hub	Hole In Crankshaft
14"	5/8"-11 thds/in.	5/8"-11 thds/in.	1"-8 thds/in.
19"	5/8"-11 "	5/8"-11 "	1"-8 "
21"	3/4"-10 "	3/4"-10 "	1-1/4"-7 thds/in.
24"	1"-8 "	7/8"-9 "	1-1/2"-6 "
28"	1"-8 "	1"-8 "	1-1/2"-6 "

(g) Remove the capscrews holding the clutch cover to the drum and remove the drum. NOTE: On the 19" and 21" gears only, the drum can be removed without resorting to Step (f). (See Fig. S-3.) On the 14", 24" and 28" gears however, the crankshaft gear must be pulled before removing the drum.

(h) Press or drive the planet gear pins out of the drum. These pins are a press fit in the forward end of the drum and a sliding fit in the after end.

(i) Pull the clutch driving hub off the crankshaft.

(j) Loosen the crowder collar clamp bolts and unscrew the collar from the clutch hub. The clutch plates may then be removed from the hub.

Reassemble in the reverse order, noting particularly the following instructions in regard to fitting the keys:

On the 14" and 28" gear where the clutch hubs and crankshaft gears are held by taper keys (and also on some of the older designs where taper keys were formerly used), new keys must be fitted if the parts are replaced. The keys must be fitted individually, pressing each piece on the shaft in turn, fitting its key, removing it, and then proceeding with the next piece. On the 14" gear, clutch hub (10) (See Fig. S-1) must be pressed on the shaft without shifter cone (20) being in place. The taper key is driven in and marked at the end of the hub. The hub is then pulled and the key cut off where marked. The crankshaft gear is then pressed on to its final location, allowing exactly the correct space behind it for the clutch hub and spacer (26). The key is fitted and driven in and the end marked, leaving sufficient projection to engage the notch in the end of the spacer. The parts may then be finally assembled on the shaft, pressing the clutch hub and gear home on their respective keys. The end of the key for the clutch hub must be securely blocked to prevent its backing away as the hub is pressed against it. Substantially the same procedure is followed on the 28" gear, the difference being that spacer (26) is not used. (See Fig. S-4.) The key for the gear is allowed to extend along the shaft to the clutch hub, and the extension is filed down to the contour of the shaft. This is necessary to prevent oil leakage along the shaft. The keys must be fitted for each part individually prior to the final assembly, as described above for the 14" gear.

9. ADJUSTMENT AND MAINTENANCE

(a) Planetary Transmission

On engines with 14", 19", and 21" gears, in which oil seals are used, the drum should be kept from one third to one half full of a good grade of 600W cylinder oil. Pipe plugs for filling are provided in the after end of the drum and the level should be inspected frequently and oil added as necessary. The drum should be

drained and refilled with new oil every six months to a year, depending on the service. On the larger engines, with 24" and 28" gears the drum is not entirely oil tight and a heavier lubricant must be used. A mixture of half 600W and half cup grease is recommended. The bronze bushings in the drum and drum cover and in the planet gears are subject to wear and should be replaced when clearances become excessive. New bushings must be reamed after pressing in. Allow clearance of .001" per inch of journal diameter. The floating bronze bushing between the crankshaft pilot and the thrust shaft should be replaced when the clearance in either part exceeds .003" per inch of diameter. On the 24" and 28" gears it may be necessary to repour the babbitt bearing in the after drum cover. If this is done great care must be taken to keep the bore concentric with the finished outside diameter. The oil seals in the smaller gears should be replaced when worn. Whenever the clutch hub is pulled on the 19" and 21" gears the felt packing between the two keys should be replaced when reassembling.

(b) Clutch

On all of the different size gears the clutch adjustment is determined by the location of the crowder collar on the clutch hub. As the clutch plates wear, the collar must be screwed farther onto the hub to keep the clutch tight. It should be sufficiently tight to prevent slipping but should not be unduly tightened, causing excessive strain on the parts. Keep the clamp bolts tight to maintain the adjustment, but use care not to bend or break the clamp ears on the crowder collar.

The clutch plates should be oiled occasionally through holes provided in the clutch cover. If the plates become rough the clutch will tend to grab, and if this condition becomes troublesome it may be corrected by facing off the plates. When the plates have been worn or faced down about 1/16" to 1/8" the crowder collar adjustment will be all taken up and it will be impossible to keep the clutch from slipping. It will then be necessary to replace the clutch plates. Excessive wear in the driving pin holes in the plates may be corrected by drilling new holes or by fitting oversize pins. If new holes are drilled they must be very carefully located to line up with the pins.

The shifter cone collar should be kept well lubricated and should be replaced if excessively worn. Wear in the crowder pins and links will have the same effect as wear of the plates, that is it will reduce the effect of the crowder collar adjustment. It may therefore be possible to postpone replacement of the plates, necessitating a complete overhaul of the clutch, by replacing these minor items. The coil springs tying adjacent pins together take up lost motion and prevent rattling and should be kept in place. The thrust springs between the clutch plates should be replaced if broken.

(c) Brakes

If the drum brake is kept properly adjusted the lining will give long service, but if the adjustment is neglected it may be ruined very quickly. The adjustment is practically the same for all of the different size gears and is described below for the 14" gear. (See Fig. S-2.) Adjusting screws (31) should be set to allow clearance between the drum and the center of the brake shoes equal to approximately 1/32" on the 14" drum and up to 1/16" on the 28" drum. Adjusting nuts (34) should then be set to equalize the clearance at top and bottom of the shoe. If this adjustment is neglected the shoes will drag on the drum and wear the lining unevenly. The adjusting nuts on the tie rod determine the force that is applied to the brake shoe, and should not be set any tighter than is necessary to stop the drum when the gear is in reverse.

The brake shoe lining should be replaced before it wears down to the rivet heads, or the drum will be scored and must be turned down. Use "Raybestos" or other good grade of lining, 1/4" thick.

Referring to Fig. S-1 clamp (3) securing the brake operating link to the clutch control lever is adjustable on the lever, and should be set so that the brakes take up at the proper time in the control cycle. Use care however that this clamp is not raised so high on the lever that the linkage will buckle, that is so that pin (11) will drop down into line with pins (5) and (13) and will then be forced down rather than up when the clutch is thrown out. If this occurs the mechanism will jam and it will be impossible to release the clutch. This condition will be approached gradually as the plates wear, and if not watched for may occur when least expected.

The only adjustment for the propeller shaft brake is the band clearance, and it should be kept just sufficiently tight to stop the shaft when the reverse gear is in NEUTRAL. The instructions above, covering relining the shoes, apply equally well to both brakes.

(d) Thrust Bearing

In all of the reverse gear designs the forward end of the thrust shaft is piloted on the aft end of the crankshaft, with a floating bronze bushing between the two pieces. If the two shafts are out of line this bushing will wear rapidly and the crankshaft will be severely stressed. It is therefore most important that the thrust bearing be kept accurately aligned with the crankshaft. Dowels between the bearing and base provide means of maintaining the original transverse alignment, which was carefully determined in the factory when the engine was erected. The vertical alignment is determined by the shim thickness under the bearing however, and it is essential that the original thickness be maintained when reassembling. Note carefully the shim thickness under each side when dismantling and replace with exactly the same shims. If the thrust bearing is ever replaced or rebabbitted it must be very carefully aligned with the crankshaft and new dowel holes drilled.

In all of the bearing designs the thrust shaft gear is shrunk on the forward end of the shaft. If replaced the new gear should be heated to 600° F. and slipped over the end of the shaft, keeping the end of the gear flush with the end of the shaft. Drill and tap dowel holes down the joint, that is half in each piece and screw in studs for dowels. Cut off flush and prick punch to lock. Use the same number and size of dowels as in the old pieces, and drill oil holes through the gear and shaft corresponding to those in the old parts.

LUBRICATING OIL SYSTEM

1. The lubricating oil system on engines with 6½" bore consists of the day tank (not mounted on the engine), the lubricating oil pressure and sump pumps, the manifold in the base, with leads connecting to the main bearings, and the necessary piping to carry the oil through the system. Engines having 7½", 8", and 9" bore are also equipped with lubricating oil filters and coolers. In addition to the main lubricating oil system as outlined above there is also the Madison-Kipp lubricator, supplying a measured quantity of oil to each piston and cylinder liner. The normal oil flow is from the day tank to the pressure pump, then through the oil cooler (if used) to the manifold in the base supplying the main bearings. Drilled holes in the crankshaft carry oil to the crankpin bearings and the rifle drilled connecting rods feed the piston pins. The oil from the bearings drains down to a sump in the after end of the base, from which it is sucked up by the scavenge pump and discharged back to the day tank.

   On engines equipped with lubricating oil coolers, a four way cock interconnecting the piping to and from the cooler permits bypassing the oil flow around the cooler. The cock should always be thrown quickly from one position to the other and should never be left in an intermediate position.

   A relief valve, connected in the line leading to the base manifold, provides means for regulating the pressure on the system. The discharge should be piped by the customer to the lubricating oil day tank, and the valve should be adjusted for 35 to 40 lbs. per square inch, as indicated on the pressure gauge, with the oil hot. Note that low lubricating oil pressure may not necessarily be due to relief valve adjustment, but may result from one or more of the following causes, and their possibilities should be investigated before attempting to correct by readjusting the valve.

   (a) Low lubricating oil level in day tank.
   (b) Restriction in suction pipe to either of the lubricating oil pumps.
   (c) Broken pressure pipe or fitting.
   (d) Crankshaft bearing failure.
   (e) Excessive pump leakage.
   (f) Viscosity of oil too low, excessive temperature of oil, or thinning out with fuel oil.

2. LUBRICATING OIL DAY TANK

   The cylindrical lubricating oil day tank, has a capacity of about 12 gallons on engines with 6½" bore and about 17 gallons on engines with 7½" or larger bore. It should be mounted vertically, with the bottom at least three feet above the engine room floor, and should be piped by the customer to the discharge from the lubricating oil sump pump and the suction of the pressure pump. The connections should be of 1" pipe, the former leading to the pipe tap hole in the casting soldered to the top of the tank and the latter to the hole 6" above the bottom of the tank. A drain valve should be connected to the bottom connection.

   A gage glass near the top indicates the oil level, which should be maintained between the center and top of the glass when the engine is running. Under no circumstances should it be permitted to drop below the glass. The tank should be drained and flushed out at intervals to keep the sludge in the bottom from building up to the pump suction connection. New oil should be added to the system through the filler hole in the top of the tank, which is protected by a screen.

3. LUBRICATING OIL PUMPS.

   The rotary pump group, illustrated in Fig. T-1, is built into one of the center frame doors (3). It includes the lubricating oil pressure and sump pumps (14) and (17) and the fuel transfer pump (1), together with drive shaft (10) and gear (9), which meshes with a driving gear on the cam shaft. The door is positioned and doweled on the centerframe for .004" gear backlash. The door gasket should be 1/32" thick to maintain this adjustment.

   The gear is pressed on the drive shaft, which rotates on ball bearings (11) and (8). The bearings are retained in the housing by pressure pump body (13) and cover (5). The end clearance of the shaft is determined by the thickness of gaskets (12) and (6) under these two pieces, and should be maintained between .005" and .010". The gasket thickness should be 1/32". Never assemble without these gaskets, or the assembly will bind and the bearings will soon fail. The large bearing is mounted directly on the drive shaft, and the small one is mounted on sleeve (4), which is pressed over the fuel transfer pump end of the shaft and serves to align the two shafts. Flats on the mating ends of the shafts form the drive, and an oil seal pressed into cover (5) prevents oil leakage along the sleeve. When replacing the

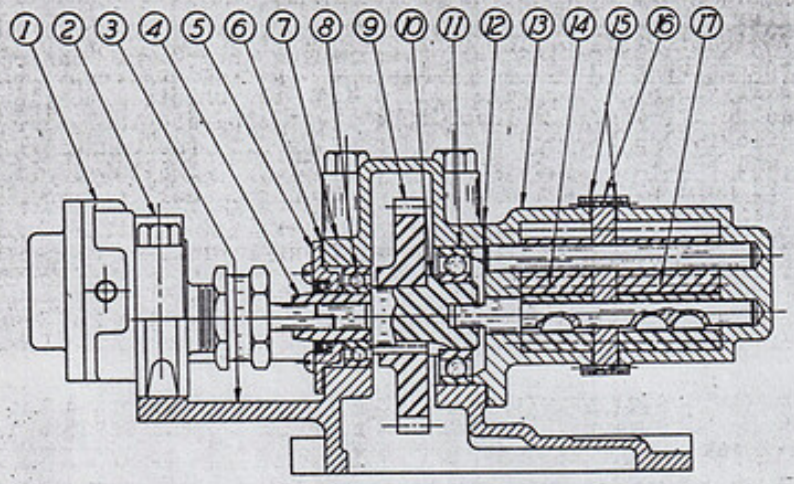


FIG. T-1

oil seal, assemble in the cover as shown in Fig. T-1.

Spacer (16) separates the lubricating oil sump and pressure pumps, and .004" thick paper gaskets (15) seal the spacers to the two pump housings and also determine the end clearances for the pump gears, which should be from .002" to .005". Never assemble the pumps without these gaskets or the gears will bind. Alignment between the two pumps is maintained by means of dowel pins between the pump housings and spacer (16).

The drive shaft assembly and the fuel transfer pumps are mounted in saddles bored in the centerframe door and are retained in place by caps (2) and (7) bolted to the door. The lubricating oil pressure pump is centered in the saddle bore by a spigot turned on the end of pump housing (13), so that alignment between the two pumps and the drive shaft is assured.

4. LUBRICATING OIL FILTER (Engines with 7½" or larger bore)

The lubricating oil filter is connected in a bypass line from the lubricating oil pump discharge. The filtered oil supplies the bearings on each end of the camshaft, the intermediate gear bearing, the governor and the water pump drive.

The filter is of the metal element type as shown on Fig. T-2. The elements are made up of flat metal ribbon wound around a central spool, adjacent layers being slightly separated from each other by raised ridges running across the ribbon. The successive layers of the ribbon are spaced .003" apart and it is these spaces that form the filtering medium. The oil flows from the outside toward the center and leaves the dirt on the outside of the spool. The filter may be cleaned by turning the cleaning handles on top, which rotates a knife bearing on the edge of the windings, scraping off the dirt and allowing it to settle to the bottom of the sump tank. The filter should preferably be cleaned when the engine is not running so that the dirt may settle to the bottom, although there is no objection to cleaning with the engine running. Cleaning should be at sufficiently frequent intervals to prevent stoppage of oil flow and the sump tanks should be drained before the dirt in the bottom builds up to the level of the elements. Experience will determine the correct in-

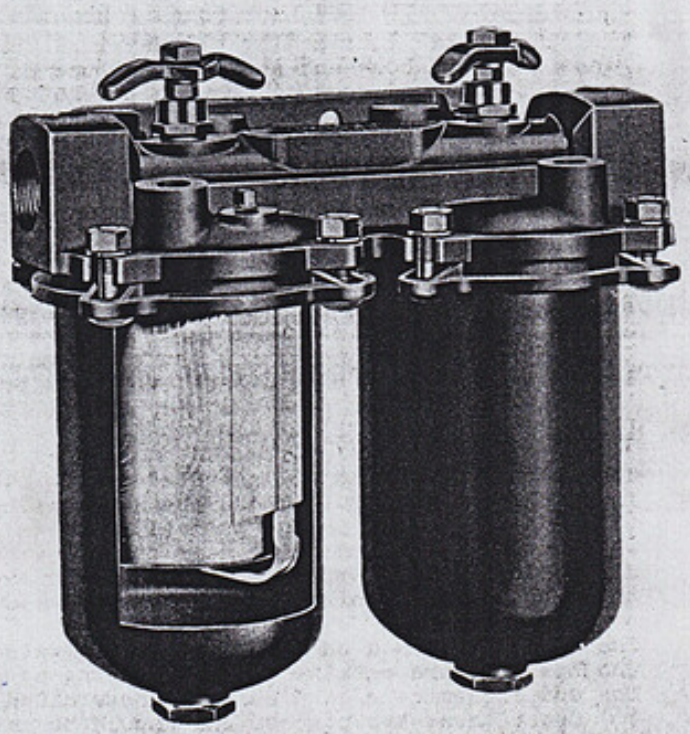


FIG. T-2

tervals.

5. LUBRICATING OIL COOLER (Engines with 7½" or larger bore)

The Ross tube type lubricating oil cooler is mounted vertically on the water inlet manifold. The tube sheets at each end are brazed to the seamless copper shell, and the ends of the admiralty bronze tubes are rolled into the sheets. Vertical baffles in the water inlet manifold flange and lower tube sheet separate the water inlet and discharge, the water flowing up through half of the tubes to the bonnet which covers the upper tube sheet and returning through the other half of the tubes. The flow of oil around the tubes is guided by bronze baffles inside the shell to produce the most efficient heat transfer.

The necessity for cleaning the cooler will depend upon the service and the nature of the cooling water and lubricating oil used, and will be indicated by decrease in cooling efficiency and increase in pressure drop through the unit. The cooler should be inspected after the first 500 hours of operation and should be regularly inspected, and cleaned whenever necessary.

There are many good scale solvents available on the market for removing the lime and iron rust scale from the water side of the cooler, but use care that the solution used does not attack the material of the cooler. Be sure that it is recommended by the manufacturer for the type of cooler on which it is to be used. A satisfactory solution may be made up of 10% muriatic acid (one pint of acid per gallon of water) with 1 lb. Grasselli No. 3 inhibitor to 50 gallons of solution. Plug the oil connections to the cooler, remove the top bonnet and immerse in the solution. The cleaning action of the solvent is evidenced by bubbling and foaming. When the bubbling stops inspect the tubes and if all scale has not been removed the process should be repeated with a fresh solution.

As soon as all scale is removed the cooler should be very thoroughly washed by flushing with fresh water and then dried with compressed air.

The oil side of the cooler can best be cleaned with carbon-tetra chloride, although gasoline or kerosene can be used. The carbon-tetra chloride will do the job better and quicker, and is non-inflammable. In any event the cleaning should be done in the open or in a well ventilated room. The cleaning solvent should be forced through the core with a hand pump until all of the sludge and dirt has been washed out. Never use wires or prods, as they can only reach a small area adjacent to the openings and may damage the tubes. Never allow the cooler to stand before cleaning after the oil has been drained, as the carbon deposit and sludge will soon harden and will be much more difficult to remove.

6. LUBRICATOR AND DRIVE

The Madison-Kipp lubricator supplies a measured quantity of lubricating oil to the pistons, introduced at the center of the liner on each side. Nipples screwed into the liners and projecting through the cylinders and sealed thereto by packing glands carry the oil through the water jackets. It also feeds oil to the air compressor cylinder and to the thrust bearing.

The lubricator is fully described in the Madison-Kipp bulletin attached at the end of the book. Oil feeds to the pistons should be adjusted to 20-25 drops per minute when the engine is new, but this may be reduced to approximately 15 to 20 drops per minute after the pistons and rings have been well worn in. KEEP THE LUBRICATOR WELL FILLED WITH CLEAN OIL. Use the same oil that is used in the engine. Do not under any circumstances allow it to run dry as serious damage to the pistons and liners may result. This should be made a regular part of the engine room routine and should never be neglected. The lubricator is mounted on a bracket on the forward end of the engine, and is driven from an eccentric on the end of the camshaft.

1. COOLING WATER SYSTEM (2 Cylinder engines with 6½" bore only)

The single acting plunger type cooling water pump is mounted on the forward end of the centerframe and is driven by a connecting rod from a crank on the end of the camshaft. The crank disc is secured to the shaft by a taper key. The bronze plunger is guided in the cylinder bore and is sealed to the cylinder by a packing gland. Do not tighten the gland more than necessary, allowing slight leakage for lubrication. The spring loaded rubber disc valves are mounted in bonnets on a grid which is bolted to the pump body. The construction of the pump is illustrated on the Parts Catalog Plate facing the water pump group list sheet. The cooling water inlet manifold carries the water from the pump to the cylinder water jackets, and pass-over pipes form the connections between the cylinders and the heads. The water outlet manifold collects the flow from each head and discharges into the forward end of the exhaust manifold water jacket. The overboard discharge is taken from the after end of this manifold.

A parallel flow, through the air compressor water jacket, is taken from the water inlet manifold and discharges into the water outlet pipe from the exhaust manifold.

The cooling system may be drained by loosening one of the cover plates on the water inlet manifold. If the engine is to stand in freezing weather the water pump must also be drained by removing the pipe plug in the suction valve bonnet.

2. COOLING WATER SYSTEM (3 & 4 Cylinder Engines with 6½" and larger bores)

All engines included under this listing are equipped with centrifugal circulating water pumps and plunger type bilge pumps, and engines with 7½" and larger bore also have lubricating oil coolers.

The cooling water enters the engine at the suction flange of the circulating water pump and is piped to the water inlet manifold extending along the cylinders. On engines equipped with lubricating oil coolers, the cooler is mounted on the water inlet manifold, cored passages in this casting conducting the water through the cooler tubes and then distributing it to the separate cylinder water jackets. The water is carried from the cylinder to the head by means of an external pass-over pipe, or by pipe nipples screwed into the top of the cylinders and projecting up into the cylinder head. These nipples are sealed with rubber grommets. Always use new grommets and do not coat with white lead or other sealing compound. The water outlet manifold carries the water from the cylinder heads to the forward end of the exhaust manifold water jacket, and the overboard discharge of the engine is from the after end of this manifold.

In addition to the main flow described above there are two minor parallel circuits as follows:

(a) The air compressor circuit, leading from the water inlet manifold to the air compressor cylinder, through a pass over pipe to the head and discharging into the exhaust manifold jacket outlet pipe.
(b) On engines with 7½" or larger bore, the thrust bearing circuit. Water is piped from the inlet manifold to the bottom of the thrust bearing jacket, up into the cap through a pass-over pipe and is discharged overboard. A cock in the inlet pipe just below the bearing provides means of draining the engine cooling system.

Be sure that all water is drained from the jackets before pulling a cylinder liner, or it will spill inside the engine. The circulating water pump and bilge pump are not emptied by this drain, and if the engine is allowed to stand in freezing weather these pumps must be drained. A plug is provided in the bottom of the circulating water pump casing, and the bilge pump can best be drained by loosening the capscrews holding the valve grid to the pump body.

3. CIRCULATING WATER PUMP (3 & 4 Cyl. Engines with 6½" and larger bores)

The centrifugal water pump is mounted on the manifold side of the engine and is chain driven from a sprocket on the crankshaft. All of the parts that come in contact with the water are brass or bronze. The impeller is screwed, riveted and doweled to the shaft, which rotates in a babbitt lined bushing pressed into the pump housing. A grease cup provides for lubrication and should be screwed down daily. The .010" paper gasket under the suction cover allows approximately .020" end clearance for the impeller. A packing gland forms the water seal for the shaft, and should not be tightened unnecessarily. Some leakage should be allowed for lubrication of the flax packing.

The drive end of the shaft is supported by a roller bearing, which is clamped in a bracket bolted to the pump housing. An oil cup provides lubrication. The pump body

is bolted to the engine base and should be carefully shimmed up into line with the drive shaft and the shafts aligned horizontally before tightening the mounting bolts.

4. CIRCULATING WATER PUMP DRIVE (3 & 4 Cyl. engines with 6½" bore)

The crankshaft sprocket for the water pump drive chain is pressed onto a hub on the compressor eccentric, and is locked in place by two 1/2" threaded dowels screwed into holes drilled and tapped down to the joint, that is half in each piece.

The pump drive shaft is mounted in a bracket bolted to the side of the engine base. The two ball bearings on which the shaft rotates are mounted in split adaptors which are clamped in saddles in the bracket. The adaptors are located in the saddles by dowels, and oil cups in the saddle cap provide for lubrication. The inner races of the bearings are locked in place on the shaft by clamp type adaptors, secured by lock nuts. The chain sprocket is pressed on the shaft between the two bearings. The bearings may be moved fore and aft in the adaptors before the saddle clamps are tightened, and the assembly should be adjusted to line up the sprocket with the crankshaft sprocket. Then the two halves of the coupling between the pump shaft and drive shaft should be bolted together after making sure that both shafts are in proper alignment.

The two keyed hubs of this coupling should be separated by 1/8". Keep coupling well lubricated, using SAE #70 or heavier oil (not grease). An oil hole is provided for this purpose. When full, oil will run out through space between hub and outer flange. If the Atlas clamp type of coupling is used, no lubrication is required, but extreme care must be exercised when assembling that both pump and drive shaft are in perfect alignment. An idler sprocket mounted on the end of the centerframe provides means of tightening the Whitney Silent type drive chain. The idler sprocket mounting bracket is clamped to the centerframe, and the chain adjustment is secured by means of a stud projecting from the bracket up through the top of the centerframe. As the nut on the stud is screwed down the bracket is raised, tightening the chain. A jam nut locks the stud adjustment. Slotted holes for the bracket mounting bolts allow the bracket to move, and of course the bolts must be loosened when making the adjustment. Keep the chain tight enough to prevent whipping, but do not tighten unduly.

The idler sprocket rotates on ball bearings which are clamped together against a spacer by the mounting shaft. The sprocket is held in place by a snap ring between the two bearings. Lubricating oil from the pressure pump is fed to the bearings through the hollow mounting shaft.

5. CIRCULATING WATER PUMP DRIVE (Engines with 7⅛" & larger bore)

The water pump drive for the larger engines is similar to that described in Paragraph 4, with the following exceptions:

(a) The drive sprocket on the crankshaft is split into two halves and is bolted to the air compressor eccentric.
(b) The mounting of the pump drive shaft bearings is slightly different, although the general arrangement is quite similar. The bearings are mounted directly in the drive housing and end cover thereto, without use of the clamping adapters. The driven sprocket is pressed on the shaft and secured by a taper key. It should be located to line up with the crankshaft sprocket. An oil seal in the housing cover seals the shaft against oil leakage. Oil cups are provided for lubrication.
(c) The idler sprocket for adjusting the chain tension is mounted on an eccentric shaft, so arranged that the position of the sprocket can be adjusted by rotating the shaft. The sprocket turns on a roller bearing on the eccentric part of the shaft. When dismantling, remove the adjusting flange from the projecting end of the shaft and then the two bearings on which the shaft is mounted. The shaft and sprocket can then be moved to place the eccentric part of the shaft in line with the hole in the housing and the shaft withdrawn from the bearing.

The assembly is locked in place, after securing the correct adjustment, by means of an indexing pin. Do not run chain tighter than necessary to prevent whipping. The idler housing is bolted to the top of the pump drive bracket on the side of the base, the entire pump drive assembly being contained within the one unit. An oil line from the pressure pump to the end of the eccentric shaft provides lubrication. The construction is illustrated in the Parts Catalog Plate facing the centrifugal water pump group drive sheet.

6. BILGE PUMPS (3 & 4 Cylinder engines with 6½" & larger bore)

The single acting plunger type bilge pump is mounted on the forward end of the cen-

terframe and is driven by means of a connecting rod from a crank pressed on the end of the camshaft. The crank disc is secured to the shaft by a taper key. The bronze plunger is guided in the cylinder bore and is sealed to the cylinder by a packing gland. Do not tighten the gland unnecessarily, allowing slight leakage to provide lubrication. The spring loaded disc valves are mounted in bonnets on a grid which is bolted to the pump body. The pump construction is illustrated on the Parts Catalog Plate facing the bilge pump group sheet. The bilge pump discharge is connected by means of a three way cock to the water inlet manifold, and in an emergency the engine may be run, AT SLOW SPEED ONLY, on this pump. Means should be provided for connecting the suction to a sea cock if this use is anticipated. The bilge pump is not drained by the main drain cock at the thrust bearing, and if the engine is to be exposed to freezing weather the drain plug in the suction valve bonnet should be removed.

AIR COMPRESSOR

1. SINGLE STAGE AIR COMPRESSOR

The single stage, single acting air compressor is located on the after end of the engine. A 3" bore compressor is used on 6½" bore engines and a 4" compressor on larger engines. The cast iron, water jacketed cylinder is bolted to the top of the centerframe directly behind the aftermost cylinder. The spring loaded poppet type suction and discharge valves are mounted in the cylinder head, the suction valve in a replaceable guide bushing pressed into the head and the discharge valve in a cage. Both valves seat directly in the head. A grid between the cylinder and head prevents possibility of the suction valve dropping down onto the piston in the event of breakage of the valve stem or of the spring retaining nut coming loose. The manual unloading handle is mounted on the discharge valve cage retaining cap. When the air pressure in the receiver has been built up to the desired value, usually about 225 lbs. per sq. inch, the compressor should be unloaded by turning the handle in line with the inlet valve, which it then holds open. If the compressor is not unloaded the safety valve will pop at 250 lbs. per sq. inch.

X2-EJ2(1)

The piston, which is driven from the crankshaft by a connecting rod, strap and eccentric, is fitted in the cylinder with a clearance of .002" to .004" on the 3" compressor and .003" to .005" on the 4" unit. Three 1/4" wide piston rings are used, all above the pin. The top two are compression rings and the bottom one is a ventilated oil control ring. Ring side clearance is .002 to .004" and the gap clearance should be .012" for the compression rings and .009" for the oil rings.

The wrist pin has a fit .0005" loose or .0005" tight in the piston bores and a clearance of .0005" to .0015" in the connecting rod bushing. If the bushing is replaced it should be reamed to size or .0005" oversize after pressing in. The pin is secured in the piston by a setscrew threaded into one of the pin bosses and engaging a recess in the pin. It is locked by a jam nut. Shims between the foot of the connecting rod and the strap allow adjustment of the piston height. The top of the piston should be set so that it just comes up to the bottom of the grid, which should be placed in position without any gasket between it and the cylinder. In final assembly when the gasket is in place between the grid and cylinder the gasket thickness will allow the proper clearance between the piston and grid. Be sure that the cylinder nuts are tight when making the adjustment. The strap is allowed a diametral clearance of .005" - .009" and a side clearance of .003" - .006".

MAINTENANCE & INSPECTION

1. GENERAL RULES

Observing the following general rules will go a long way toward insuring satisfactory and trouble-free operation. Refer to preceding sections for detail instructions.

KEEP YOUR ENGINE CLEAN

Inspect the engine regularly and keep it wiped clean. If oil is left standing it quickly hardens and must be washed or scraped off. It is much easier to keep the engine clean than to get it clean, and there is always less trouble with a clean engine than with one that is covered with oil and dirt.

LEAVE WELL ENOUGH ALONE

When the engine is running satisfactorily and smoothly, do not continually try to better the operation with minor adjustments.

NEVER ALLOW YOUR ENGINE TO SMOKE

When the exhaust from an engine is smoky it clearly indicates that combustion is not perfect and that residue, in the shape of smoke, is clinging to the oily surfaces of the cylinders, pistons, piston rings, valves, etc. When this happens you are creating trouble for yourself and doing an injustice to the engine. Therefore, the first thing in consideration of the operation of a Diesel engine is: DO NOT ALLOW YOUR ENGINE TO SMOKE.

KEEP A COMPLETE LOG OF ENGINE OPERATION

A complete log should always be kept of the engine operation, and back sheets should be consulted frequently and compared with present conditions. In this way gradual changes can be detected and investigated and insignificant troubles corrected before becoming real ones. Any unusual noises or other irregularities should be logged so that they will be investigated at the regular routine inspections.

INSPECTING REPAIRS

At completion of any adjustment or repair job, always make a thorough inspection to see that all parts have been correctly replaced, that bolts and nuts are tight, and that all cotter pins and locking wires are in place. If work involved rotating parts, bar engine around at least two full revolutions (so that camshaft is turned one revolution) to be sure that all parts are clear. Be sure that no tools or rags are left inside the engine.

2. SMOKY EXHAUST

Smoky exhaust indicates defective combustion which is usually due to one of the following causes:

(a) Excessive carbon on spray valve tips.

(b) Leaking spray valve.

(c) Leaky exhaust, inlet, or air starting valves.

(d) Buffer springs may be incorrectly adjusted.

(e) Fuel cam or roller may be worn.

(f) Leaky or stuck piston rings.

(g) Uneven cylinder load balance.

If exhaust smoke is not even but occurs in the form of puffs it is likely that the combustion is defective in one or two cylinders only. Where the trouble lies can usually be determined by cutting out spray valves one at a time. When this is done however, the engine should not carry more than about 3/4 load or the remaining cylinders will be overloaded.

3. INSPECTION AND MAINTENANCE ROUTINE

The following routine for regular inspection and maintenance work is suggested as a

guide for the operator, but experience with the engine over a period of time may indicate changes that should be made in the schedule.

It will be noted in the following schedules that spray valve cleaning has not been included. It is believed the spray valves should be cleaned only when necessary, rather than at definite intervals. The necessity for cleaning will be indicated by increased or uneven exhaust temperatures or smoky exhaust and at either of these indications the spray valves should be inspected and cleaned, if necessary.

In the following, work to be done under each routine should include work listed under preceding routines. For example, work under "Annual Routine" includes everything listed under all other routines.

4-HOUR ROUTINE

(a) Hand oil the following points:

1. The inlet and exhaust valve stems.
2. The rocker arms at their fulcrums and at their push rod ends.
3. Inlet and exhaust lifters, fuel wedges, lifter and buffers.
4. Wedge shaft bearings.
5. Tachometer drive (if engine is equipped with tachometer)
6. Circulating or Bilge pump connecting rod - both ends.
7. Mechanical lubricator strap.

For oiling the inlet and exhaust valve stems it is preferable to use penetrating oil. If this is not available a mixture of equal parts of engine lubricating oil and kerosene may be used. (A mixture of two-thirds engine fuel oil and one-third lubricating oil can be used in an emergency.) For all other points in above schedule use engine lubricating oil.

(b) Check the oil level in the mechanical lubricator. Fill the lubricator with clean engine oil of the grade used in the engine when necessary.

(c) Turn the handle of the lubricating oil filter (on engines equipped with lubricating oil filters)

(d) Turn the handle of the fuel oil filter.

Always turn filter handles immediately after stopping the engine.

DAILY OR 24-HOUR ROUTINE

(a) Clean out the sump tanks of the lubricating oil and fuel oil filters.

(b) Check the feeds on the mechanical lubricator.

(c) Hand oil reverse gear clutch plates if clutch is grabbing.

200 TO 300-HOUR ROUTINE

(a) Check intake and exhaust valve timing.

(b) Check spray valve timing. (After starting engine check cylinder load balance.) (See Section O)

(c) Clean out lubricating oil day tank if lubricating oil is dirty or dark in color.

(d) Remove crankcase doors and inspect connecting rods. Be sure that all connecting rod bolts are tight and that everything is in order. Inspect lower part of cylinder liner bore.

(e) Check level of lubricant in the reverse gear drum (See Section S, Paragraph 9 (a).

SEMI-ANNUAL ROUTINE

(a) Pull cylinder heads and pistons, remove rings and clean pistons and grooves thoroughly. Check rings for side and end clearance.

(b) Examine cylinder liner walls. Watch for shoulders due to ring travel.

(c) Grind intake and exhaust valves. Check valve springs for length and tension and for defects.

(d) Recondition spray valves. Inspect stem packing and repack if necessary. Inspect stem for wear and replace if worn. Inspect and clean spray valve tips. Grind stem to tip.

(e) Inspect main and connecting rod bearings. Check clearances and inspect bearing surfaces. Adjust clearances if necessary.

(f) Inspect gear train carefully, observing backlash, indications of wear on teeth, and clearance on intermediate gear bearings.

(g) Inspect camshaft. Watch for worn or loose cams, loose or worn rollers or pins on the lifters. Be sure all keys and lock bolts are in place and tight.

(h) Inspect water pump. Repack stuffing box if necessary.

(i) Drain reverse gear drum and refill with lubricant as recommended in Paragraph 9 (a) of Section S.

(j) Check propeller shaft coupling bolts and thrust bearing and flywheel clamp bolts.

(k) Check all hold-down bolts between engine and foundation. If they are loose check the engine alignment.

ANNUAL ROUTINE

(a) Check crankshaft and thrust shaft alignment. If shaft needs realignment it is recommended that the work be done by an experienced and careful mechanic.

(b) Examine cylinder jackets and exhaust manifold water jackets. If scale is over 1/16" thick it should be removed by scale remover solution. Then flush with water thoroughly.

(c) Remove and inspect lubricating oil and fuel oil transfer pumps. Note conditions of bearings, shafts, seals and stuffing box. Replace or repack if necessary.

(d) Inspect high pressure fuel pump. Note condition of pump plungers and barrels. Disassemble crossheads and connecting rods and inspect for wear. Inspect suction and discharge valves and grind seats.

(e) Disassemble governor and inspect carefully all moving parts for wear and signs of distress. Inspect entire linkage between governor and wedge shaft for lost motion and wear. Fuel wedges, links and pins should also be inspected for wear and replaced if necess

(f) Inspect Mechanical Lubricator and connections to cylinder liners. Inspect ratchet mechanism for wear and proper functioning. Hand crank lubricator and observe the feed to each liner. Watch for water leaks at the nipples going through the water jackets.

(g) Clean out crankcase thoroughly. Be sure that all cleaning solution is drained out after cleaning is completed.

FOREWORD

This Parts Catalog has been compiled to serve the dual purpose of providing a means for ordering parts and to furnish illustrations to aid in the dismantling and reassembling of the various units of the engine.

This Parts Catalog is made to conform to the original construction of the engine, and the Atlas Imperial Diesel Engine Co. does not assume the responsibility or obligate itself to maintain this catalog to conform to any subsequent changes made on the engine after it leaves the factory. Complete records of all changes and service orders for each engine are maintained at the factory in an effort to always supply correct parts, but due to occasional substitution of parts in the field, of which we have no knowledge, and the fact that we have no assurance that parts furnished from the factory are installed, we cannot guarantee the furnishing of correct parts.

The right is reserved to change the construction or material of any part or parts without incurring the obligation of installing such changes on engines already delivered.

INSTRUCTIONS FOR ORDERING PARTS

Always furnish Engine Number when ordering parts or when communicating with factory or agency. This number will be found on name plate located on operating side of engine. It is VERY NECESSARY THAT THE ENGINE NUMBER BE GIVEN as it helps to insure the furnishing of correct parts and is also the means whereby the factory service records of each engine are maintained.

Always give PART NUMBER, PART NAME AND QUANTITY. If part has no Part Number then give a COMPLETE DESCRIPTION AND SIZE OF PART.

Be particular to state POST OFFICE ADDRESS, TOWN, COUNTY and STATE to which parts are to be shipped.

Specify how merchandise is to be shipped--whether by FREIGHT, EXPRESS or PARCEL POST.

Confirm all Telephone and Telegraph orders in writing.

Claims for shortages or errors must be made within five days from the *receipt of goods or same will not be considered.*

Broken or damaged goods should be refused, or a complete description made of damage by the carrier agent on the freight bill. If this is done, full damage can generally be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company, from whom a receipt is received showing that shipment was in good condition when delivered to them; therefore, claims if any, should be made with the transportation company and not with the Atlas Imperial Diesel Engine Co.

Code Address: "ATGAS" - OAKLAND --- Codes: BENTLEY'S - PRIVATE

INSTRUCTIONS ON "HOW TO USE PARTS CATALOG"

In order TO LOCATE PART NUMBERS it is IMPERATIVE that the person concerned thoroughly understands the makeup of this book. He should CAREFULLY READ THE INSTRUCTIONS given on this and the following page, and thoroughly familiarize himself with the necessary steps involved. Particularly is this important when sub-assemblies are involved.

DO NOT ORDER PARTS BY REFERENCE NUMBERS as these numbers sometimes change and wrong parts might be supplied.

This catalog is made up of four basic sections, as follows:-

1. INDEX SHEET -- This sheet lists the various groups into which the engine is divided and must be used for obtaining the group sheet number.

2. GROUP LIST SHEET -- This sheet lists the parts which comprise the group, and are numbered with the prefix "L" or "2L".

3. PLATE (OR LINE DRAWING) -- Plates are arranged to face the group sheet to which they apply, and in most cases shows only the parts listed in the group. Occasionally a plate may include two or more groups making it necessary to always first obtain the group number from the index. If this is not done you may by chance turn to a plate showing the part wanted but will not find it listed on the group sheet facing this plate.
   NOTE:----- If no plate is found facing the group sheet, then the part wanted can be identified by the description. This will apply mainly to piping, and in this connection the actual pipe and fittings on the engine should always be measured and then ordered accordingly, due to unavoidable variations between engines.

4. SUB-ASSEMBLIES -- The term "Sub-assembly" (or the Word "Assembly" appearing in the part name) is used to indicate parts which are made up of two or more parts (or pieces) and yet must be considered as a unit part. For example, parts that are welded together, parts that have bushings pressed in, or parts that have to be machined together.
   A Sub-assembly list will be found immediately following the last group sheet, and itemizes the various parts used in each assembly. These assemblies are arranged in numerical sequence and always have the prefix "X", "G" or "GA" in the assembly number.
   NOTE:----- Certain parts of assemblies indicated by an "*" in place of a reference number, are not sold individually, and if wanted, the complete assembly must be ordered.

REFERENCE NUMBERS ON PLATES OR ASSEMBLY DRAWINGS

SINGLE NUMBERS or the TOP NUMBER (when more than one number appears in the circle) refers directly to a corresponding number on the group list sheet.

A circle with MORE THAN ONE NUMBER indicates part in question is a component part of a sub-assembly. The top number will refer to a corresponding number on the group list sheet, and the lower number will refer to a corresponding number in the sub-assembly.

TO FIND A PART WITH TWO REFERENCE NUMBERS IN THE CIRCLE PROCEED AS FOLLOWS:- (NOTE:- Select a part on any plate and follow step by step as explained.)

1st -- Using the top number in the circle locate corresponding reference number on the group list sheet, which will be an assembly ("X" or "G" number).

2nd -- Using the Part Number ("X" or "G" No.) of the assembly locate same in the numerical assembly list at rear of book.

3rd -- Refer back to the plate and obtain the second or lower number in the reference circle, then locate this number in the reference number column of the sub-assembly, and this will be the part desired.

If there are MORE THAN TWO NUMBERS in the reference number circle, proceed exactly as outlined above, only this time the part in the first assembly located will be another sub-assembly, so therefore it will be necessary to find the second assembly, and then referring back to the plate take the third number in the reference circle and match it with the corresponding number in the second assembly.

The following page will show a typical example and illustrate the above explanation step by step.

The following illustrated example will show the procedure as explained on opposite Page, for finding parts involved in sub-assemblies.

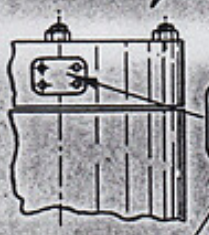
For this illustration assume that the part number for the Cylinder Head Cleanout Cover is wanted:-

We know that this cover would be listed with the "Cylinder Head" so we turn to the Index Sheet and locate the "Cylinder & Head Group" which gives us the sheet number.

PARTS CATALOG ---- INDEX — ENGINE NO. 11830
6 Cyl. 13 x 16 Marine Engine

	No. Req'd.	Group No.
BASE SECTION		
Base -- (Studs - Covers - Bearing Caps Etc.)	1	2L27
Base Oil Piping-(Main Manifold - Crank Brg.Oil Lines)	1	2L629
Crankshaft & Flywheel -- (Thrust Shaft & Bearing)	1	2L30
CYLINDER & VALVE MECHANISM SECTION		
Cylinder & Head	6	L-9776
Valve Rockers & Push-Rods	6	L-9777
Valve Lifters & Guide	6	L-6919
Piston & Connecting Rod	6	2L351

We find the sheet number for this group to be L-9776, and now we turn to this sheet and opposite we find a Plate or group drawing.



L-9776

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. K-1890

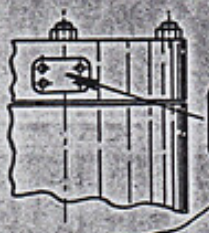
REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		X1283	1	CYLINDER ASSEMBLY	
2		753A-FB4	4	WASHER - Cyl. to Centerframe Stud	
3			4	NUT -- 1 3/4-5-NC-Hex. - - (Steel)	
4		X2810	1	HEAD ASSEMBLY - Cylinder	
5		C-3957	1	GASKET - Head to Cylinder	
6		610A-03	8	GROMMET - Cyl. to Head Water By-Pass Pipe	
7			8	NUT -- 1 1/2-6-NC-Hex. - - (Steel)	
8		785	1	FLANGE - Cyl. Head Water Outlet Hole (Blind)	

NAME CYLINDER & HEAD GROUP
ORIGINALLY ISSUED FOR 13 x 16 MAR. - STAT.
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST — ATLAS IMPERIAL DIESEL ENGINE CO. OAKLAND, CALIF. MATTOON, ILL.

L-9776

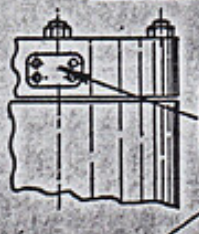
Looking at the Plate we locate the part we want and find the reference number to be 4-1-8. We now take the top number "4" and match this with the reference number "4" on the group list sheet. We find this to be X2810 Head Assembly, so that this assembly must next be found in the sub-assembly list at rear of book.



SUB-ASSEMBLY LIST

REF. NO.	PART NO.	NO. REQD.	NAME
X2810			HEAD ASSEM. - CYLINDER -- Includes
1	X2818	1	HEAD ASSEM.
2	X2811	1	VALVE & CAGE ASSEM.
3	X2812	1	VALVE & CAGE ASSEM.
4	C-2155L5	2	RING - Piston

After finding assembly X2810 in sub-assembly list, we now take the second of the reference numbers in the oval which is "1" and match this with the corresponding number of the sub-assembly. We find this to be X2818 Head Assembly so we now have to proceed to this assembly.



SUB-ASSEMBLY LIST

REF. NO.	PART NO.	NO. REQD.	NAME
X2818			HEAD ASSEM. - CYLINDER -- Includes
*		1	HEAD CYLINDER
*		6	PIPE PLUG -- 1 1/4 Std.
1	C-5520L5	4	STUD - In. & Exh. Cage
2	S-3060	2	STUD - Air Valve Cage
7	C-447	2	NOZZLE - Cooling
8	C-8214	2	COVER - Cleanout (Blind)

After this assembly X2818 is found we now take the bottom reference number in the oval which is "8" and match this with the corresponding reference number in X2818. We now have the unit part which we want.

PARTS CATALOG

ATLAS IMPERIAL DIESEL ENGINE CO.

INDEX

CATALOG APPLIES ONLY TO ENGINES INDICATED →

ENG. NO. 12719

ENG. SIZE 9 x 12 NO. CYL. 4 TYPE Marine - R.H. TO INCL.

SPEC. NO. 1489-2

ES NO.

DATE TYPED 4-2-47

ISSUE NO. 1

INSTR. 24 (M-S)

GROUP NAME	NO. USED	GROUP SHEET NUMBER
Base - (Studs - Covers - Brg. Caps - Lube Man.)	1	L-9877
Crankshaft & Flywheel - (Bear. Shells - Comp. Eccent.)	1	L-9879
Clutch - Reverse Gear	1	L-8867
Reverse Gear & Thrust Bearing	1	L-9880
Control - Reverse Gear	1	L-8436
Brakes - Rev. Gear Drum & Prop. Shaft	1	L-9883
Centerframe & Covers - (Covers - Breather - Pointers)	1	L-9887
Gear - Intermediate	1	L-8504
Camshaft & Fuel Pump Crank (Bearings)	1	L-8880
Cams	4	L-7001
Valve Lifters & Guides	4	L-6827
Cylinder & Head (Valves - Compression Relief Valves)	4	L-9889
Valve Rockers & Push-Rods	1	L-9892
Piston & Connecting Rod	4	L-8884
Spray Valve - (Clamps - Filter Etc.)	4	L-9483
Tip - Spray Valve .... ---- Part No. 5843 ----	4	
Manifold - Inlet & Exhaust -- (Air Suct. Silencer)	1	L-9895
Manifold - Air Starting	1	L-8823
Manifolds - Water Inlet & Outlet (& Cooler)	1	2L443
Fuel Pumps - (Priming & High Pressure)	1	2L455
Pumps - Lube Oil & Fuel Transfer	1	L-9906
Water Pump - Centrifugal	1	2L1381
Drive - Centrifugal Water Pump	1	2L1384
Pump - Bilge	1	L-9902
Governor (Housing - Covers Etc.)	1	2L865
Control - Governor Speed	1	L-8074
Spring - Governor	1	L-8076
Control - Fuel Wedge Shaft Hand	1	L-7123
Wedge Shaft - Fuel -- (& Linkage to Governor)	1	L-8904
Spring - Fuel Wedge Shaft	1	L-8205
Cylinder & Head - Air Compressor	1	L-8508
Piston, Connect. Rod & Eccentric Strap - Air Compressor	1	L-8889
Fuel System (Rail-Tubes-Accumulator-Regulat. Valve)	1	L-9909
Tank - Fuel -- (Filter)	1	L-8011
Bracket - Fuel Tank	1	L-4552
Piping - Fuel (Low Pressure)	1	L-8480
Lubricator (Drive - Piping Etc.)	1	L-8909
Piping - Lube Oil Pressure	1	L-9913
Piping - Lube Oil Pressure	1	2L446
Filter - Lube Oil	1	L-8468
Piping - Water	1	L-9915
Pressure Gages	1	L-6881

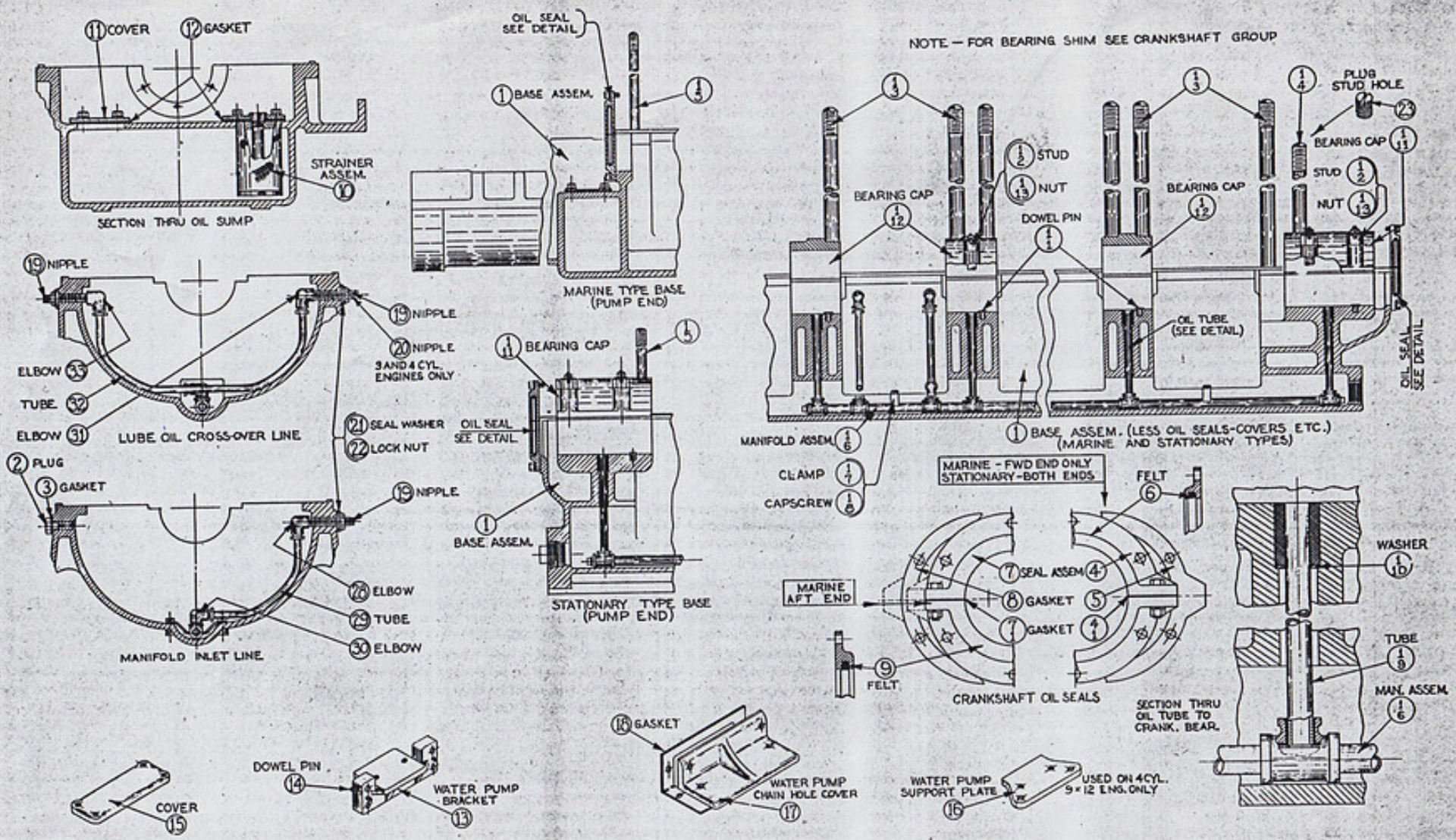
NOTE: When ordering parts substitute the following for those Listed:-

High Press. Fuel Line (To Press. Gage - 34" Lg.) -- X146
Gage Board & Bracket are special - order by description only

FORM 322 REV 350

PLATE No. K2307

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO: TYPED BY DLB DATE 4-17-45 CHKD MWH DATE 4-30-45 ISSUED BY JAR APRVD.

CHANGES #1 Retyped from 5-15-39 (no changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9877

PLATE NO. K-2307

ASSEM. DRWG. NO. K-1341

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1		1	X2854	1	BASE ASSEMBLY
2				1	PIPE PLUG -- 2 Std. - - (C.I.)
3				2	PIPE PLUG -- 3/4 Std. - - (C.I.)
4		2	C-8392	1	PLUG - Lube Oil Pipe Hole
5	C-211	3	1247-E	1	GASKET - Plug to Base
6	C-7958	4	X2081	1	SEAL ASSEM. - Crankshaft Oil - (Fwd. End)
7		5	S-2257	1	GASKET - Oil Seal to Base
8		6	C-1379	2	FELT - Oil Seal
9	C-8524	7	X1470	1	SEAL ASSEM. - Crankshaft Oil - (Aft. End)
10		8	S-2257	1	GASKET - Oil Seal to Base
11		9	C-8525	2	FELT - Oil Seal
12				12	CAPSCREW -- 3/8-16-NC x 7/8 Lg. - (St.)
13				12	LOCKWASHER -- 3/8 SAE Reg. - - (St.)
14	C-7871	10	X2059	1	STRAINER ASSEM. - Lube Oil - (Sump)
15		11	C-8391	1	COVER - Base Oil Sump Hole
16		12	C-7411	2	GASKET - Strainer & Cover to Base
17				8	CAPSCREW -- 3/8-16-NC x 3/4 Lg. - (St.)
18				8	LOCKWASHER -- 3/8 SAE Reg. - - (St.)
19		16	C-8380	1	PLATE - Centrifugal Water Pump Support
20				2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)
21				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
22		17	C-8389	1	COVER - Pump Drive Chain Hole - (Operat. Side)
23		18	C-8377	1	GASKET - Cover to Base
24				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)
25				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
26		19	C-8466	3	NIPPLE - Lube Oil Connect. - (Thru Base)
27		21	S-1974	3	WASHER - Lube Oil Nipple Seal
28	C-3278	22	367-01	3	LOCKNUT - Lube Oil Nipple
29		23	C-9558	2	PLUG - Centerframe & Cyl. Stud Hole
30					
31					
32					-- Base to Manifold Oil Line -(Man. Inlet)--
33	C-9805	28	C-9805-P 5/8	1	ELBOW - Tube Fitting - (Female)
34		29		1	TUBE--5/8 O.D. x .049 x 16 Lg.-(H.D. Copper)
35	C-9804	30	C-9804-P 5/8	1	ELBOW - Tube Fitting - (Male)
36					
37					-- Lube Oil Cross-over Line in Base --
38	C-9805	31	C-9805-P 5/8	1	ELBOW - Tube Fitting
39		32		1	TUBE--5/8 O.D. x .049 x 33½ Lg.-(H.D. Copper)
40	C-9805	33	C-9805-P 5/8	1	ELBOW - Tube Fitting
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME BASE GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

L-9877

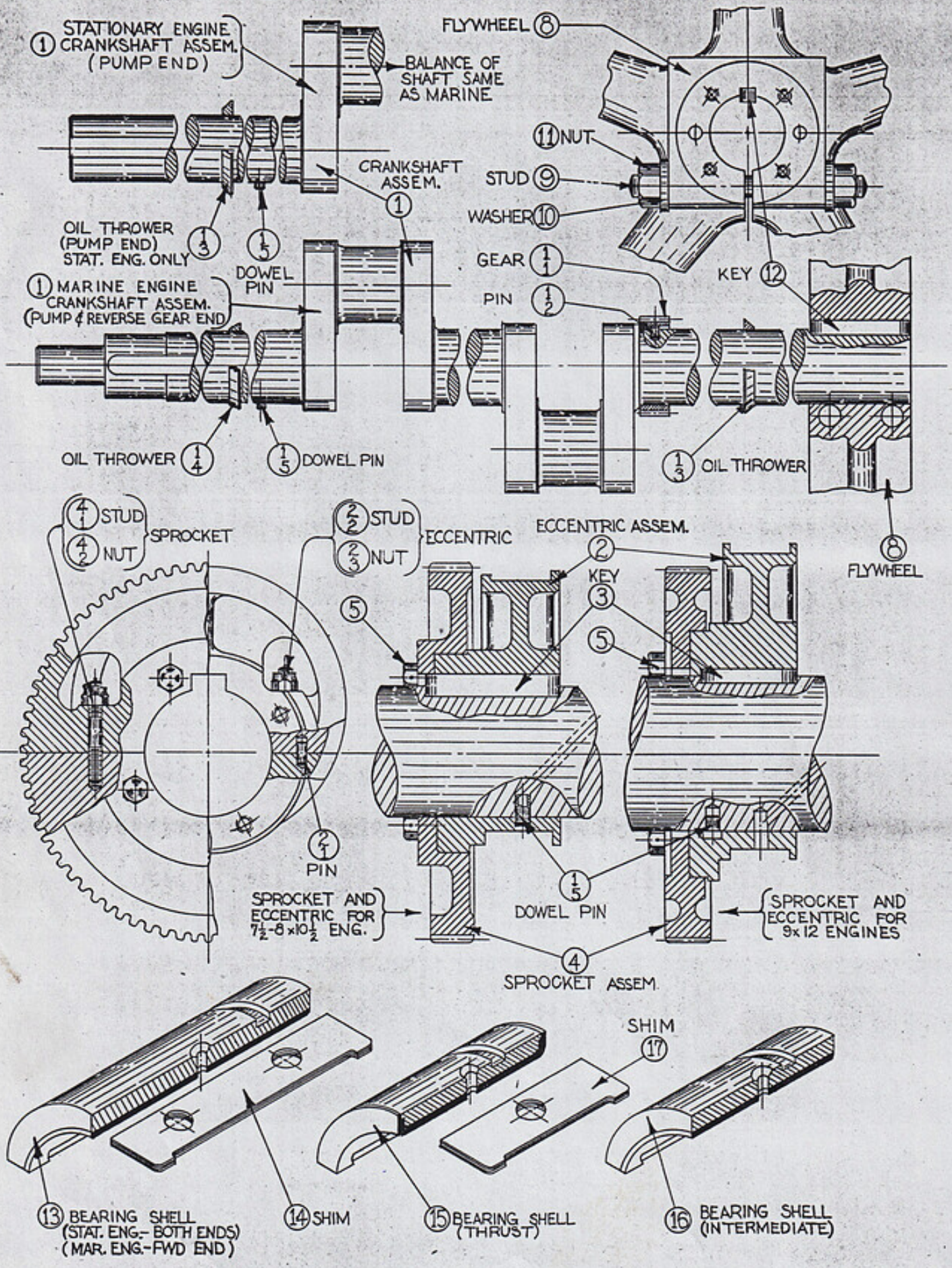


PLATE No.
W 2377

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO MATTOON TYPED BY MED DATE 5-15-39 ISSUED BY DATE CHKD. APRVD.

CHANGES

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9879

PLATE NO. W-2377

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME [ASSEM. DRWG. NO. (W-1157 Sprocket & Eccent
1		1		X2288	1	CRANKSHAFT ASSEMBLY
2	F-5286	2		X2113	1	ECCENTRIC ASSEM. - Air Compressor
3	C-8072	3		C-8072L3	1	KEY - Eccentric to Crankshaft
4	F-5517	4		X2270	1	SPROCKET ASSEM. - Centrif. Water Pump Drive
5	C-2408	5		C-2408L1 1/4	4	CAPSCREW - Sprocket to Eccentric
6					1	WIRE -- #16 Ga. x 23 Lg. - - (Steel)
7						
8		8		W-1150	1	FLYWHEEL
9		9		C-8512	2	STUD - Flywheel Clamp
10		10		S-2706	4	WASHER - Flywheel Clamp Stud
11		11			4	NUT -- 1 1/2-12-NF-Hex. - - (Steel)
12	C-2057	12		C-2057L9 3/4	1	KEY - Flywheel to Crankshaft
13						
14	F-5282	13		644-E32	2	SHELL - Crankshaft Bearing - (Fwd. End)
15	C-8506	14		719A-E32-A	2	SHIM - Crank. Fwd. Bearing - (1/16)
16	C-8506	14		719A-E32-B	4	SHIM - Crank. Fwd. Bearing - (1/32)
17	C-8506	14		719A-E32-D	10	SHIM - Crank. Fwd. Bearing - (.010)
18	C-8506	14		719A-E32-E	8	SHIM - Crank. Fwd. Bearing - (.003)
19						
20	C-598	15		648-E32	2	SHELL - Crankshaft Bearing - (Thrust)
21	C-597	16		646-E32	6	SHELL - Crankshaft Bearing
22	C-8505	17		720A-E32-A	8	SHIM - Crankshaft Bearing - (1/16)
23	C-8505	17		720A-E32-B	16	SHIM - Crankshaft Bearing - (1/32)
24	C-8505	17		720A-E32-D	40	SHIM - Crankshaft Bearing - (.010)
25	C-8505	17		720A-E32-E	32	SHIM - Crankshaft Bearing - (.003)
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

L-9879

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME CRANKSHAFT & FLYWHEEL GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

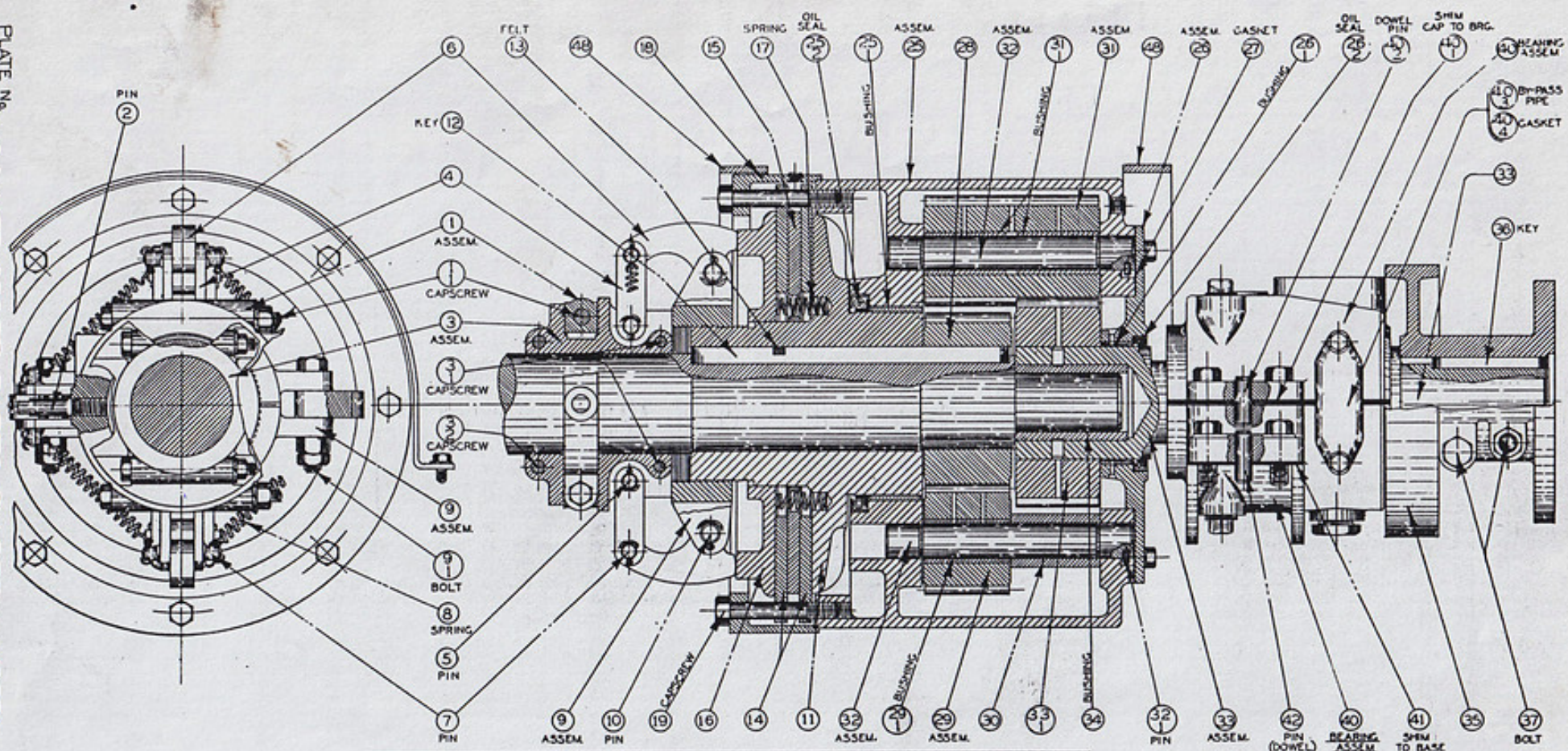
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

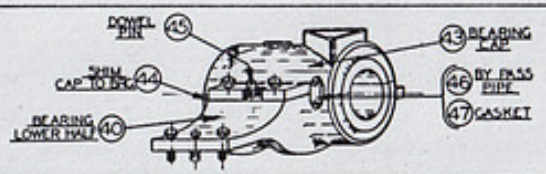
PLATE No. K2317(ED.2)

DO NOT ORDER PARTS BY REF. NUMBERS



NOTE

IF THRUST BEARING IS NOT LISTED AS AN ASSEMBLY ON THE GROUP SHEET, THE REFERENCE NUMBERS FOR THE PARTS ARE AS SHOWN



EXTRA COPIES TO | TYPED BY BW | DATE 1-8-45 | CHKD. | DATE | ISSUED BY | APRVD.

CHANGES #2 Retyped from 7-15-37 (No change)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8867

PLATE NO. K-2317

ASSEM. DRWG. NO. A-217

LINE NO.	DRWG. NO.	REF NO.	PART NO.	NO. REQD.	PART NAME
1	C-7840	1	G331-C3	1	COLLAR ASSEM. - Cone Shifter
2		2	C-7856	2	PIN - Cone Shifter Collar
3	F-5178	3	X2037	1	CONE ASSEM. - Clutch Shifter
4	C-8356	4	314-C4	8	LINK - Cone to Crowder
5	S-2040	5	313A-C3	4	PIN - Link to Cone
6				8	COTTER PIN -- 5/32 x 1 Lg. -- (St.)
7	C-8282	6	313-C6	4	CROWDER - Clutch Plate
8	S-2041	7	314A-C3	4	PIN - Link to Crowder
9				16	COTTER PIN -- 5/32 x 1 Lg. -- (St.)
10	S-2042	8	315-C3	4	SPRING - Crowder
11		9	G312-C3	1	COLLAR ASSEM. - Crowder Adjusting
12		10	C-7861	2	PIN - Crowder to Adjusting Collar
13				4	COTTER PIN -- 5/32 x 1 1/4 Lg. -- (St.)
14		11	W-1106	1	PLATE - Clutch Hub (Driver)
15		12	C-9546	1	KEY - Hub Plate & Drive Gear to Crankshaft
16		13	C-9547	1	FELT - Hub Plate to Crankshaft Key
17		14	W-1107	2	PLATE - Clutch Driven (Floating)
18	W-1108	15	320-C4	1	PLATE - Clutch Drive (Floating)
19		16	W-1109	1	PLATE - Clutch Pressure
20		17	C-7878	4	SPRING - Clutch Plate
21		18	W-1105	1	COVER - Clutch Plate
22	C-8521	19	C-8521L5 1/4	10	CAPSCREW - Cover to Reverse Gear Drum
23				2	PIPE PLUG -- 3/8 Std.--Countersunk Head--(C.I.)
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME REVERSE GEAR CLUTCH GROUP - - - - - (21")

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

FORM 840 REV. 12-44 IN TRANS.

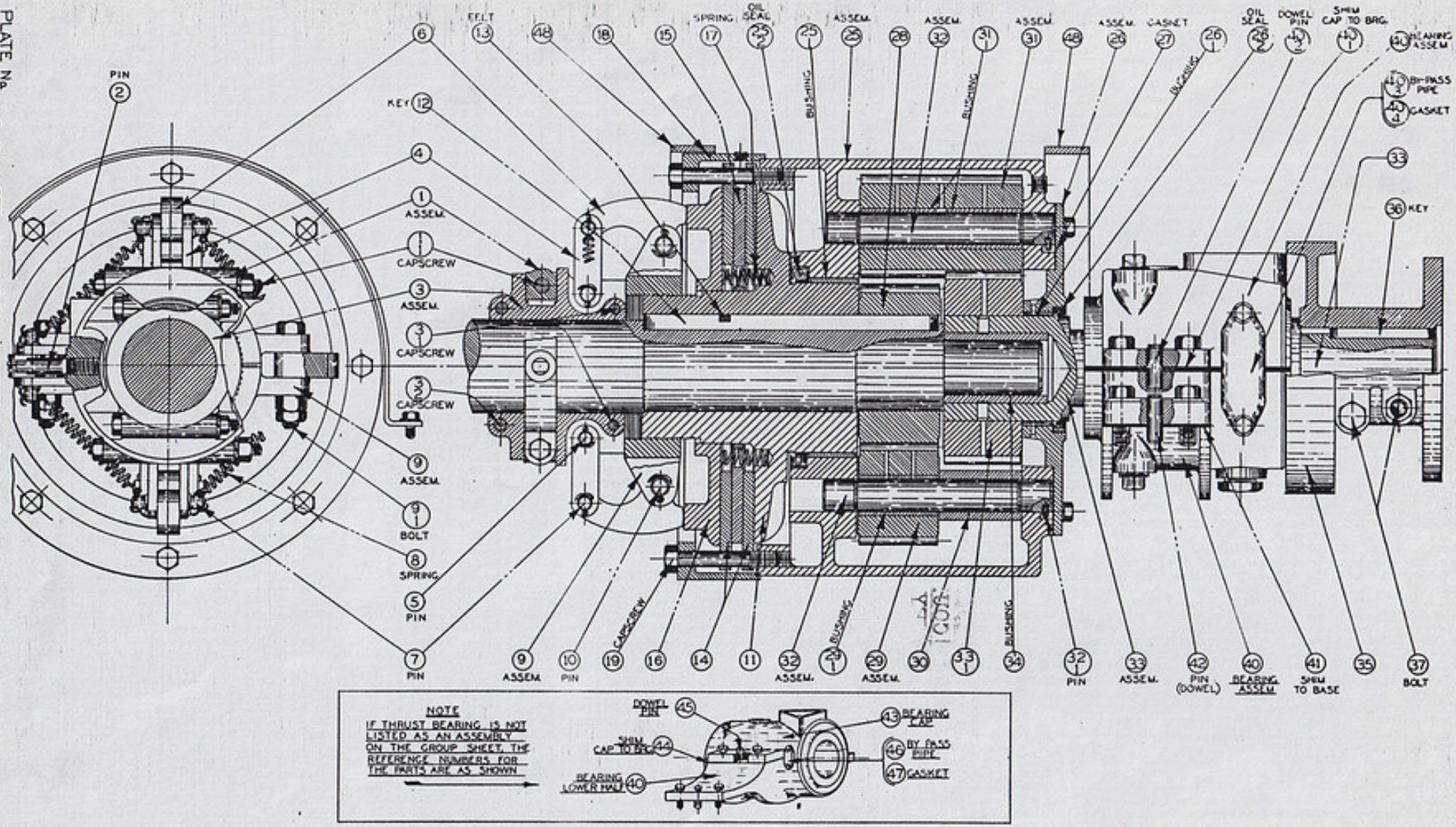
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-8867

PLATE No. K2317(ED.2)

DO NOT ORDER PARTS BY REF. NUMBERS



NOTE
IF THRUST BEARING IS NOT LISTED AS AN ASSEMBLY ON THE GROUP SHEET, THE REFERENCE NUMBERS FOR THE PARTS ARE AS SHOWN

EXTRA COPIES TO — TYPED BY BW DATE 1-8-45 CHKD — DATE — ISSUED BY — APPVD.

CHANGES #2 Retyped from 5-15-39 (No change)

CHANGES

L-9880

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. K-2317

ASSEM. DRWG. NO. A-217 -- K-1296

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1	W-1111	25	X2244	1	DRUM ASSEM. - Reverse Gear
2				2	PIPE PLUG -- 3/4 Std. - C't's'k. Head -- (C.I.)
3	F-5448	26	X2243	1	COVER ASSEM. - Reverse Gear Drum
4		27	C-8385	1	GASKET - Cover to Drum
5				6	CAPSCREW -- 5/8-11-NC x 1 1/2 Lg. -- (St.)
6				6	LOCKWASHER -- 5/8 SAE Reg. -- (St.)
7		28	F-5452	1	GEAR - Reverse Gear Drive - (on Crankshaft)
8	F-4997	29	G307-C4	3	PINION ASSEM. - Reverse Gear (Short)
9	C-8359	30	317-C4	3	SPACER - Rev. Gear Short Pinion
10	F-5000	31	G306-C4	3	PINION ASSEM. - Reverse Gear (Long)
11	C-8299	32	X2238	6	SHAFT ASSEM. - Reverse Gear Pinion
12	W-941	33	X2137	1	SHAFT ASSEM. - Thrust
13	C-8047	34	323-C6	1	BUSHING - Thrust Shaft (Floating)
14		35	W-942	1	COUPLING - Propeller Shaft(& Prop. Brake Drum)
15	C-6714	36	C-6714L6	1	KEY - Coupling to Thrust Shaft
16	C-2716	37	C-2716L7	2	BOLT - Coupling Clamp
17				2	NUT -- 1-8-NC-Hex. -- (St.)
18					
19		40	K-1256	1	BEARING - Thrust
20	C-5311	41	C-5311-B	2	SHIM - Thrust Bearing to Base - (1/32)
21	C-5311	41	C-5311-D	4	SHIM - Thrust Bearing to Base - (.010)
22	C-5311	41	C-5311-E	8	SHIM - Thrust Bearing to Base - (.003)
23	C-6271	42	C-6271L2 1/4	2	PIN - Bearing to Base Dowel
24				4	CAPSCREW -- 7/8-9-NC x 2 1/2 Lg. -- (St.)
25		43	W-939	1	CAP - Thrust Bearing
26	C-8401	44	C-8401-A	2	SHIM - Cap to Bearing - (1/16)
27	C-8401	44	C-8401-B	2	SHIM - Cap to Bearing - (1/32)
28	C-8401	44	C-8401-C	4	SHIM - Cap to Bearing - (1/64)
29	C-6271	45	C-6271L2 1/4	2	PIN - Cap to Bearing Dowel
30				4	CAPSCREW -- 7/8-9-NC x 2 1/4 Lg. -- (St.)
31		46	F-4396	2	PIPE - Water By-Pass
32		47	C-5287	2	GASKET - By-Pass Pipe to Thrust Brg. & Cap
33				4	CAPSCREW -- 1/2-13-NC x 2 Lg. -- (St.)
34				3	PIPE PLUG -- 1 1/2 Std. -- (C.I.)
35				1	PIPE PLUG -- 1 1/2 Std. - C't's'k. Hd. -- (C.I.
36				2	REDUCING BUSHING -- 1 1/2 x 1/4 Std. -- (C.I.)
37					BABBITT - SAE #11
38		48	F-5513	2	GUARD - Reverse Gear Drum
39				4	CAPSCREW -- 1/2-13-NC x 7/8 Lg. -- (St.)
40				4	LOCKWASHER -- 1/2 SAE Reg. -- (St.)
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE

FOR OPT. ROT. SEE

FROM 840 REV. 12:44 IN TRANS.

NAME REVERSE GEAR & THRUST BEARING GROUP -- (21" REV. GEAR)

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

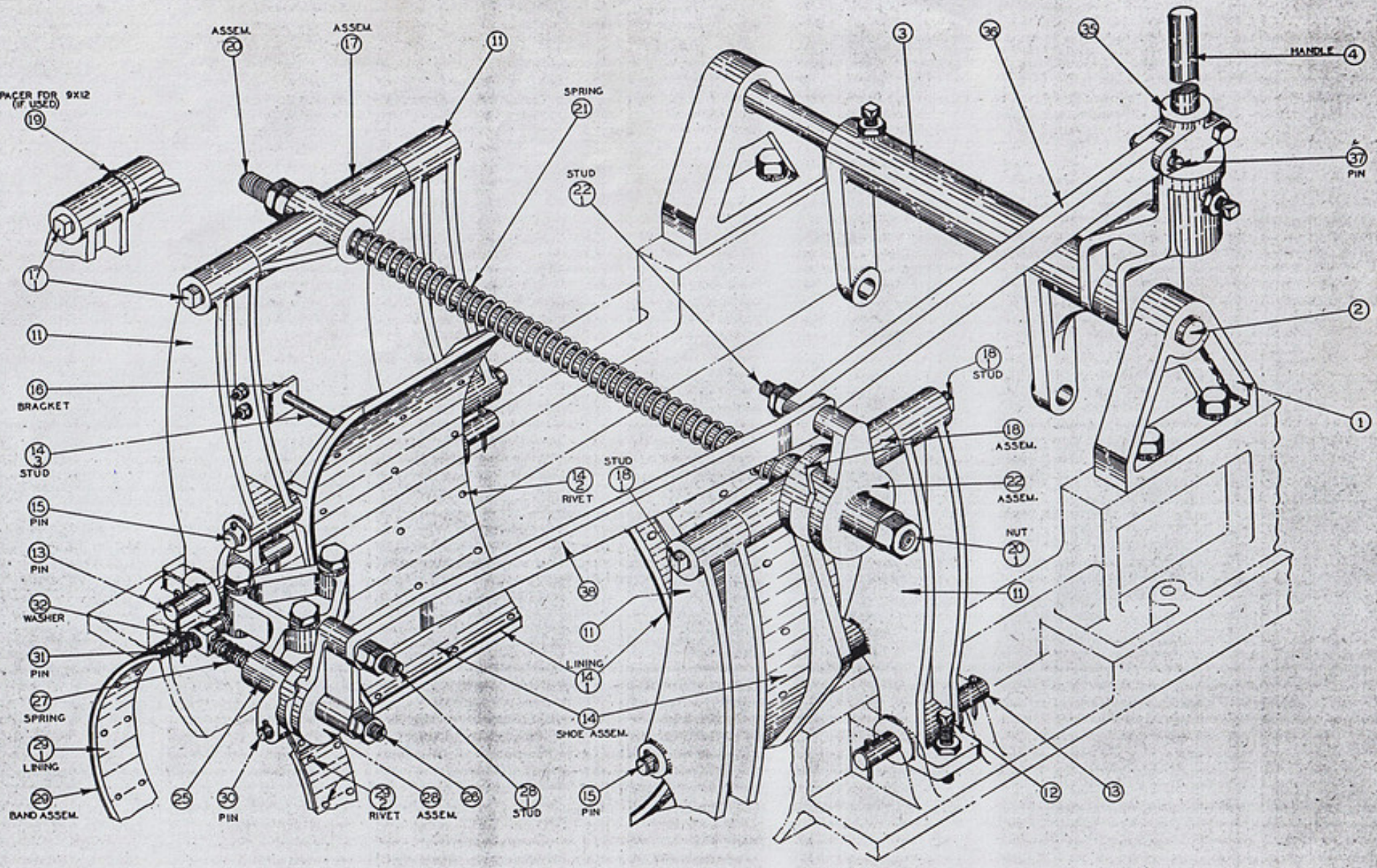
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

PLATE No. K2318

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO

TYPED BY BW DATE 1-6-45 CHKD MB DATE 1-8-45 ISSUED BY DM APRVD

CHANGES #1 Retyped from 12-4-36 (No change)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8436

PLATE NO. K-2318

ASSEM. DRWG. NO. A-198

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQ'D.	PART NAME
1		1	F-5162	2	STAND - Clutch Shifter
2				4	CAPSCREW -- 3/4-10-NC x 1 3/4 Lg. -- (St.)
3				4	LOCKWASHER -- 3/4 SAE Reg. -- (St.)
4		2	C-7862	1	SHAFT - Clutch Shifter
5		3	W-870	1	SHIFTER - Clutch
6		4	F-5186	1	HANDLE - Clutch Shifter
7				2	SETSCREW--1/2-13-NC x 1 1/4 Lg.-Sq. Head-Cup Point -- (St.)
8					
9				2	HALF NUT -- 1/2-13-NC-Hex. -- (St.)
10					
11					
12					
13					
14					
15					
15					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE

NAME REVERSE GEAR CONTROL GROUP - - - - (19")

ORIGINALLY ISSUED FOR 3-4 CYL. 7 1/2 x 10 1/2 MAR.

FOR OPP. HAND SEE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET.

FORM 540 REV. 12-43 IN TRIPLE
PRINTED IN U.S.A.

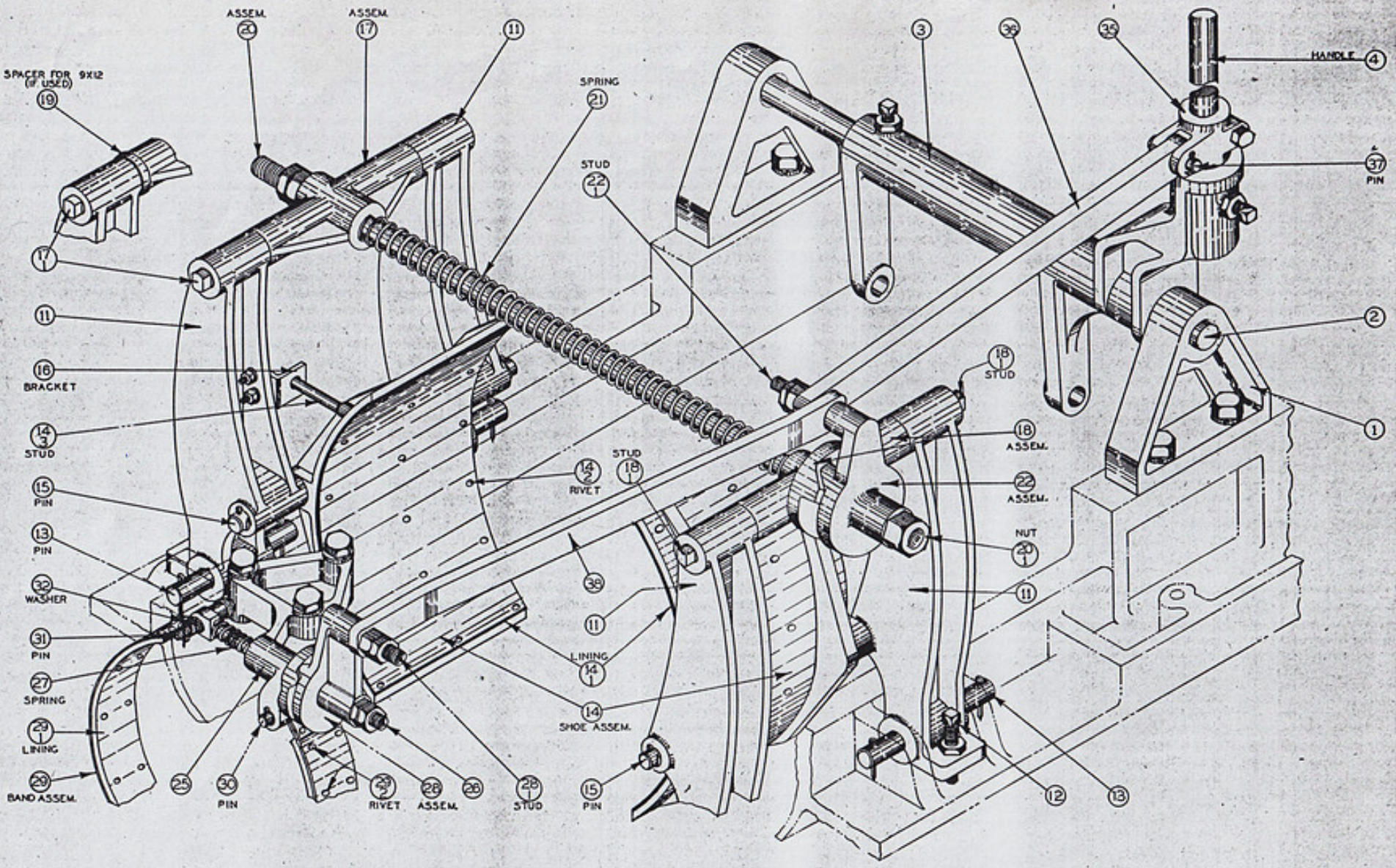
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-0436

PLATE No. K2318

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO MATTOON TYPED BY ABC DATE 3-7-47 CHKD ABC ISSUED BY ABC DATE 3-7-47

Retyped from 5-16-39 (no changes)

CHANGES #1

CHANGES

L-9883

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE No. K-2318

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-5498	11	343-10	4	POST - R.G. Drum Brake Shoe	
2		12		4	SETSCREW -- 1/2-13-NC x 3 Lg.-Sq.Hd.-Cup Pt.(S	
3				4	HALF NUT -- 1/2-13-NC-Hex. - - (St.)	
4		13	C-8434	4	PIN - Brake Post to Base	
5				8	COTTER PIN -- 3/16 x 1 1/2 Lg. - - (St.)	
6	C-8437	14	G342-C4	2	SHOE ASSEM. - R.G. Drum Brake	
7		15	C-8435	2	PIN - Brake Shoe to Post	
8				4	COTTER PIN -- 3/16 x 1 1/4 Lg. - - (St.)	
9		16	C-7863	2	BRACKET - Brake Shoe Centering	
10				4	CAPSCREW -- 1/4-20-NC x 5/8 Lg. - - (St.)	
11				4	LOCKWASHER -- 1/4 SAE Reg. - - (St.)	
12				4	HALF NUT (Centering Stud) -- 3/8-16-NC-Hex.-(S	
13		17	X2289	1	SWIVEL ASSEM. - Brake Post - (Plain)	
14		18	X2290	1	SWIVEL ASSEM. - Brake Post - (Crowder)	
15		19	C-8438	4	SPACER - Brake Post Swivel	
16	C-8433	20	X2266	1	ROD ASSEM. - Brake Post Tie	
17				1	NUT -- 7/8-9-NC-Hex. - - (St.)	
18				1	HALF NUT -- 7/8-9-NC-Hex. - - (St.)	
19	F-4410	21	345B-T3	1	SPRING - Brake Post Tie Rod	
20	C-7852	22	X2045	1	CROWDER ASSEM. - Brake Post Tie Rod	
21						
22		25	W-1307	1	BRACKET - Prop. Shaft Brake Band	
23				3	CAPSCREW -- 5/8-11-NC x 3 Lg. - - (St.)	
24				3	LOCKWASHER -- 5/8 SAE Reg. - - (St.)	
25		26	C-9930	1	EYE-BOLT - Prop. Shaft Brake Band	
26				2	HALF NUT -- 5/8-11-NC-Hex. - - (St.)	
27		27	C-7451	1	SPRING - Prop. Shaft Brake Band Eye-Bolt	
28	C-7855	28	X2047	1	CROWDER ASSEM. - Prop. Shaft Brake Band	
29	C-9550	29	X2612	1	BAND ASSEM. - Prop. Shaft Brake	
30		30	C-7857	1	PIN - Prop. Shaft Brake Band to Brake Bracket	
31				2	COTTER PIN -- 3/32 x 3/4 Lg. - - (St.)	
32		31	C-9554	1	PIN - Prop. Shaft Brake Band to Eye-Bolt	
33		32		2	PLAIN WASHER -- 1/2 SAE Std. - - (St.)	
34				2	COTTER PIN -- 1/8 x 3/4 Lg. - - (St.)	
35						
36		35	C-7810	1	CLEVIS - Brake Control Link (On Cont. Handle)	
37				1	CAPSCREW -- 1/2-13-NC x 2 Lg. - - (St.)	
38		36	C-8431	1	LINK - Rev. Gear Drum Brake Control	
39	S-184	37	1129A-HX	1	PIN - Drum Brake Control Link to Clevis	
40				2	COTTER PIN -- 1/8 x 3/4 Lg. - - (St.)	
41		38	C-8432	1	LINK - Prop. Shaft Brake Control	
42				2	NUT(Cont. Links to Crowders)--5/8-11-NC-Hex.-(	
43				2	HALF NUT(Cont. Links to Crowders) -- 5/8-11-NC-Hex. - - (St.)	
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE L-9884

FOR OPP. ROT. SEE

NAME REV. GEAR DRUM & PROP. SHAFT BRAKE GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MAR. - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

FORM 240 REV. 1/48 2M TRANS PRINTED IN U.S.A.

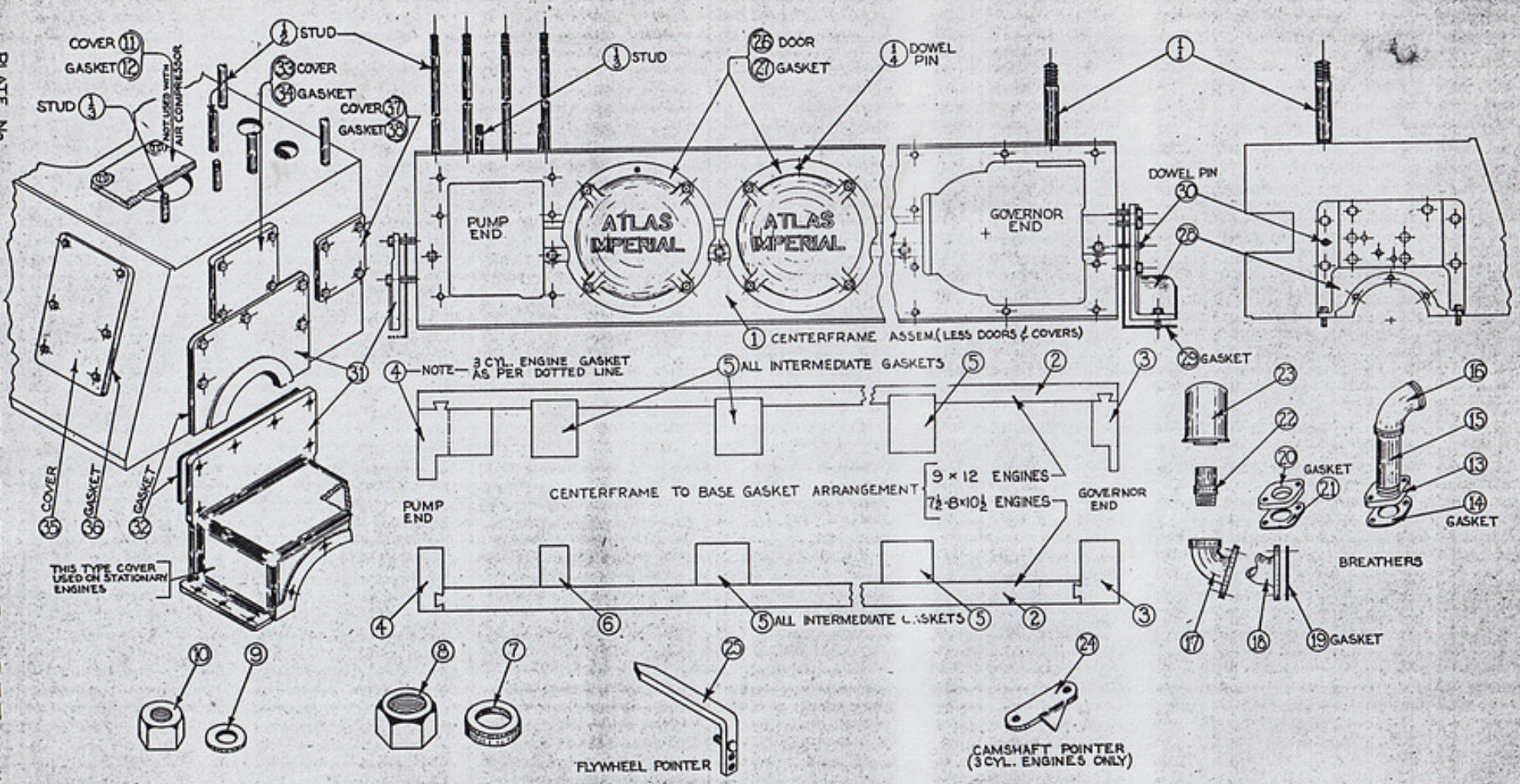
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIF. MATTOON, ILL.

PLATE No. K2305

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO MATTOON — TYPED BY MED — DATE 5-16-39 — ISSUED BY — DATE — CHKD. — APRVD.

CHANGES

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9887

PLATE NO. K-2305

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-5540	1		X2857	1	CENTERFRAME ASSEMBLY	
2		2		C-8510	2	GASKET - Centerframe to Base - (Side)	
3		3		C-8508	2	GASKET - Centerframe to Base - (Int. Gear End)	
4		4		C-8509	2	GASKET - Centerframe to Base - (Pump End)	
5		5		C-8507	8	GASKET - Centerframe to Base - (Inner Sect.)	
6	S-976	7		727A-KXH	1	WASHER - Base to Centerframe Stud	
7		8			1	NUT -- 1 3/8-6-NC-Hex. - - (Steel)	
8		9		C-3238	2	WASHER - Base to Centerframe Stud	
9		10			2	NUT -- 3/4-10-NC-Hex. - - (Steel)	
10	C-606	13		778	1	FLANGE - Breather Pipe	
11		14		C-3057	1	GASKET - Flange to Centerframe	
12					2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
13					2	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
14		15			1	NIPPLE -- 1 1/2 x 6 Lg. - (W.I.)	
15		16			1	ELBOW -- 1 1/2 Std. - - (M.I.)	
16		25		C-9539	1	POINTER - Flywheel	
17					2	CAPSCREW -- 3/8-16-NC x 1 Lg. - (Steel)	
18					2	LOCKWASHER -- 3/8 SAE Reg. - - (Steel)	
19	F-5189	26		692-E	7	DOOR - Centerframe - (Round)	
20	C-8430	27		692A-E3	7	GASKET - Door to Centerframe	
21					28	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (Steel)	
22					28	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
23		28		W-905	1	COVER - Centerframe End & Crank. Bearing (Gov.End	
24		29		F-5242	1	GASKET - Cover to Centerframe & Base	
25					10	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
26					10	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
27	C-7950	30		C-7950L1 1/2	1	PIN - Cover to Centerframe Dowel	
28					1	CASTLE NUT -- 3/8-24-NF-Hex. - - (Steel)	
29					1	COTTER PIN -- 3/32 x 3/4 Lg. - (Steel)	
30		31		F-5520	1	COVER - Centerframe Aft. End	
31		32		C-8489	1	GASKET - Cover to Centerframe	
32					6	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
33					6	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

L-9887

FOR OPP. HAND SEE L-9888

FOR OPP. ROT. SEE

NAME CENTERFRAME & COVERS GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE - R.H.

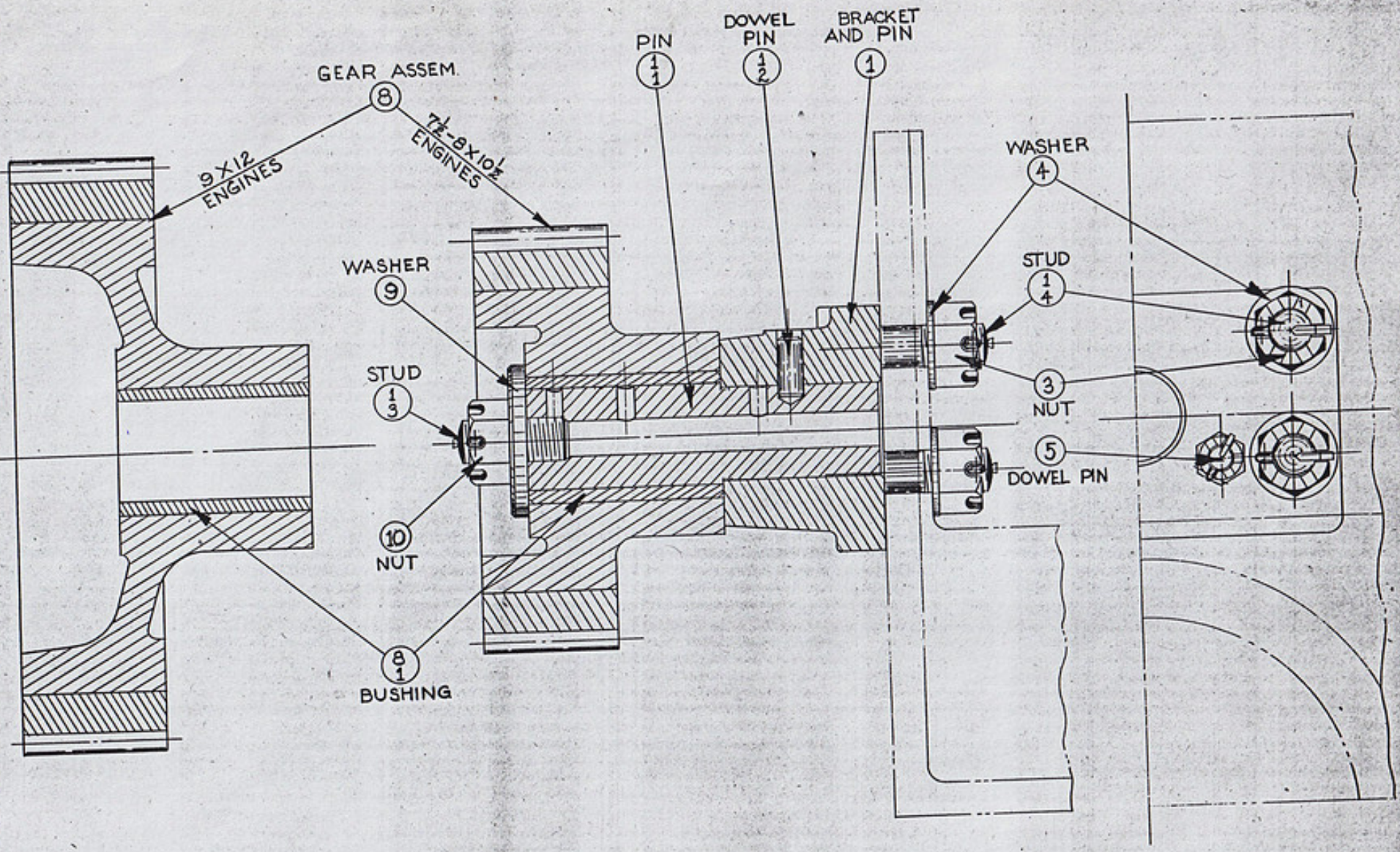
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. 240-3M-10-37

PLATE No. W2373 DO NOT ORDER PARTS BY REF NUMBERS



EXTRA COPIES TO

CHANGES

#3 Retyped from 12/9/36 (no changes)

TYPED BY DLB DATE 3-27-45 CHKD WEO DATE 5-2-45 ISSUED BY APRVD.

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8504

PLATE NO. W-2373

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	C-7891	1	X2068	1	BRACKET ASSEM. - Intermediate Gear (& Pin)	
2						
3		3		4	SLOTTED NUT -- 5/8-11-NC-Hex. -- (St.)	
4				4	COTTER PIN -- 1/8 x 1 1/4 Lg. -- (St.)	
5		4		4	PLAIN WASHER -- 5/8 SAE Std. -- (St.)	
6	C-7950	5	C-7950L1 3/4	2	PIN - Bracket to Bearing Cover Dowel	
7				2	CASTLE NUT -- 3/8-24-NF-Hex. -- (St.)	
8				2	COTTER PIN -- 3/32 x 3/4 Lg. -- (St.)	
9						
10	F-5237	8	X2078	1	GEAR ASSEM. - Intermediate	
11		9	C-7894	1	WASHER - Intermediate Gear Retainer	
12		10		1	SLOTTED NUT -- 5/8-11-NC-Hex. -- (St.)	
13				1	COTTER PIN -- 1/8 x 1 1/4 Lg. -- (St.)	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OFF-HAND SEE

FOR OFF. ROT. SEE

FORM 240 REV. 9-44 IN TRANS.
PRINTED IN U. S. A.

NAME INTERMEDIATE GEAR GROUP

ORIGINALLY ISSUED FOR 9 x 12 MARINE - STATIONARY

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

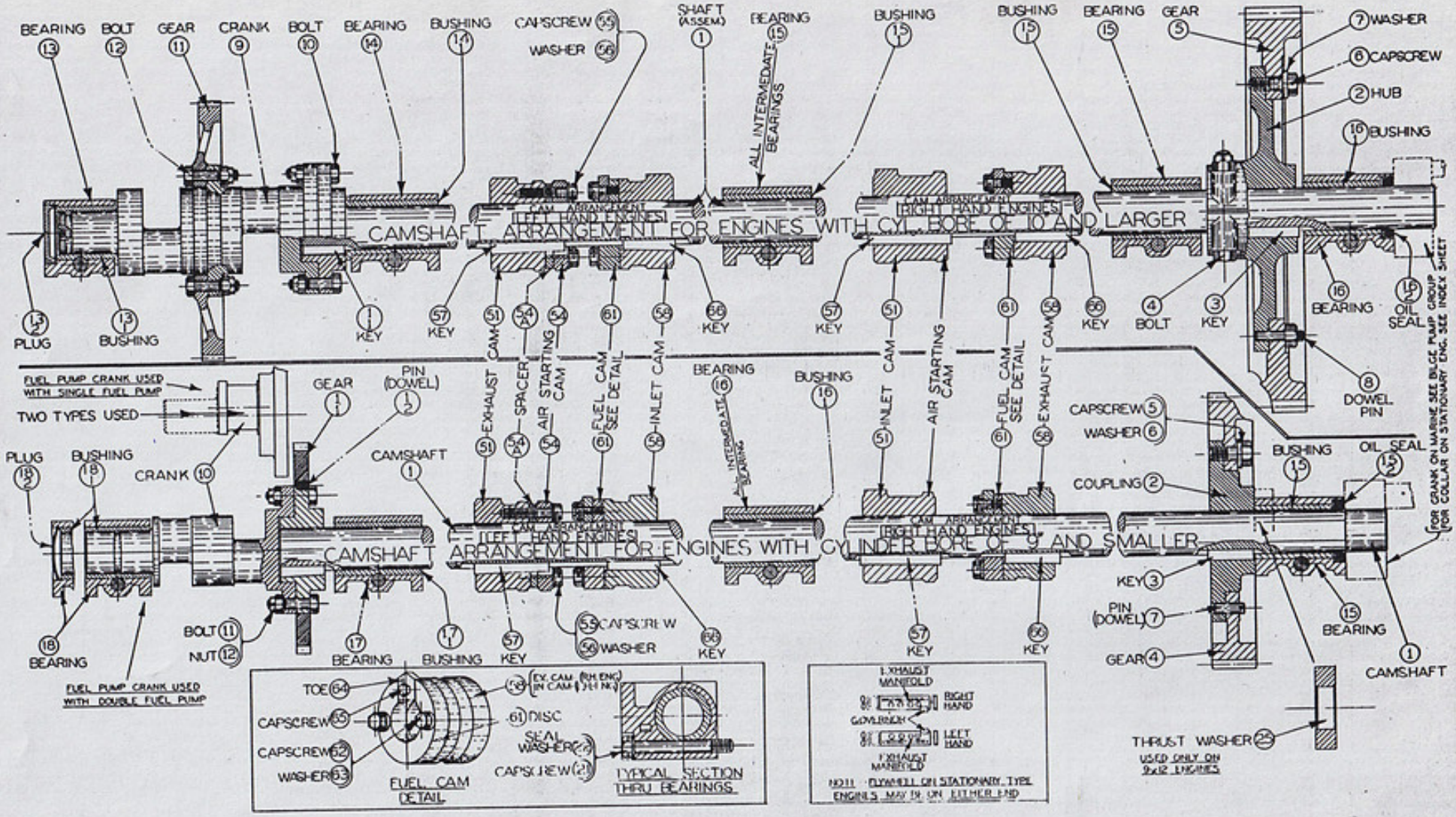
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-8504

PLATE NO. K-2356

DO NOT ODER PARTS BY REF NUMBERS



EXTRA COPIES TO

TYPED BY DLB DATE 6-9-45 CHKD. MSH DATE 6-13-45 ISSUED BY TBK APRVD.

CHANGES #2 Retyped from 3-26-45 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8880

PLATE NO. K-2356

ASSEM. DRWG. NO. W-1124

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1	F-5463	1	X2256	1	CAMSHAFT ASSEMBLY
2		2	F-3365	1	HUB - Camshaft Gear
3	S-3234	3	5357	1	KEY - Hub to Camshaft
4	F-3367	4	X248	1	GEAR ASSEMBLY - Camshaft Drive
5	C-2510	5	C-2510L1 1/2	4	CAPSCREW - Gear to Hub
6		6	S-2474	4	WASHER - Gear to Hub Capscrew
7				1	WIRE -- #16 Ga. x 28 Lg. - - (St.)
8		7	S-3350	1	PIN - Gear to Hub Dowel
9					
10		10	W-883	1	CRANK - Fuel Pump
11	C-2608	11	C-2608L2	4	BOLT - Crank to Coupling
12				4	CASTLE NUT -- 1/2-20-NF-Hex. - - (St.)
13				4	COTTER PIN -- 3/32 x 1 Lg. - - (St.)
14					
15	C-7919	15	X2074	1	BEARING ASSEMBLY - Camshaft End (Gov. End)
16	C-1342	16	G680-C	3	BEARING ASSEMBLY - Camshaft Center
17	C-1343	17	G683-C4	1	BEARING ASSEMBLY - Camshaft End (Pump End)
18	C-7940	18	X2076	1	BEARING ASSEMBLY - Fuel Pump Crank End
19		21	C-4921	6	WASHER - Bearing to Centerframe Capscrew
20		22		6	CAPSCREW -- 5/8-11-NC x 4 1/2 Lg. - (St.)
21		25	C-1754	1	WASHER - Camshaft Thrust
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OFF-HAND SEE L-9137

FOR OFF. ROT. SEE

NAME CAMSHAFT & FUEL PUMP CRANK GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9x12 MAR.-STAT.

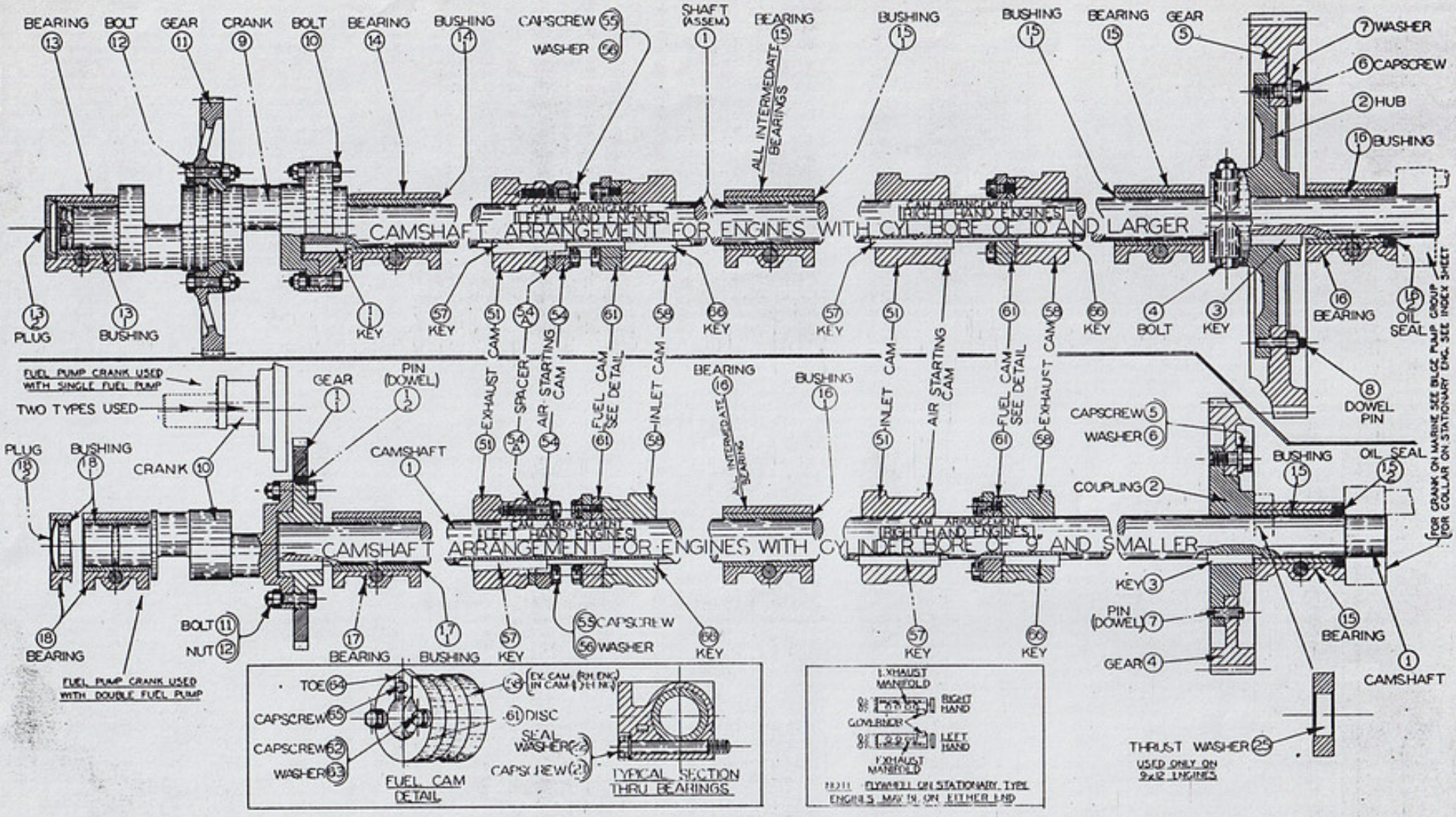
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

F-aaac

PLATE NO. K-2356

DO NOT ODER PARTS BY REF NUMBERS



EXTRA COPIES TO CHI-MAT-CAN TYPED BY ER DATE 9/11/46 CHKD ABC ISSUED BY DATE 9-12-46

Retyped from 6-9-45 (No Changes)

CHANGES #6

CHANGES

MASTER CARD

L-7001

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE No. K-2356 (See Note)

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		51	F-4246	1	CAM - Inlet & Air Starting	
2	2C1432	57	2C1432L5 1/2	1	KEY - Cam to Camshaft	
3		58	F-4248	1	CAM - Exhaust	
4	S-2978	61	881-E	1	DISC - Spray Valve Cam	
5	C-2408	62	C-2408L1 1/2	2	CAPSCREW - Disc To Ex. Cam	
6	S-2233	63	881A-E	2	WASHER - Disc to Cam Capscrew	
7	F-1656	64	880-E	1	TOE - Spray Valve Cam Disc	
8	C-2406	65	C-2406L 3/4	1	CAPSCREW - Toe to Cam Disc	
9				1	WIRE -- #16 Ga. x 12 Lg. - (St.)	
10	2C1432	66	2C1432L4 1/2	1	KEY - Cam to Camshaft	

---- NOTE ----

For L.H. 7 1/2-8 x 10 1/2 & 9 x 12 Engines See L-9132
For Larger Size Engines See 2L1005.
For corresponding Cam Group used with Gas Conversion See 2L1220.
For 9 x 10 1/2 Engines use Plate No. M-1833

FOR OPP. HAND SEE SEE NOTE

FOR OPP. ROT. SEE L-7002

NAME CAM GROUP - - - (INBOARD ROTATION)

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.

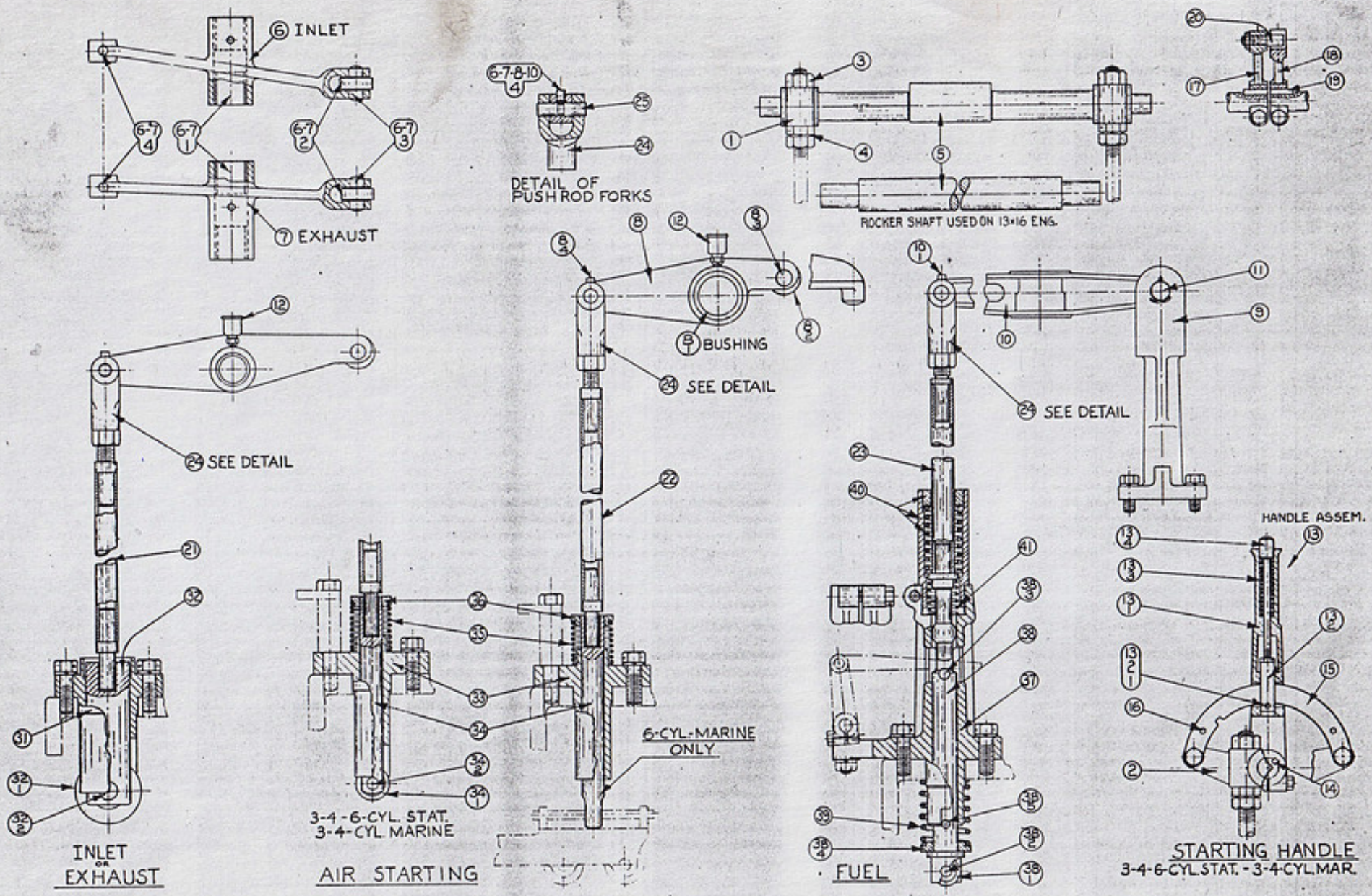
OAKLAND, CALIF. WATTSON, ILL.

FORM 1240 REV. 1/44 EH TRANS. PRINTED IN U.S.A.

L-7001

PLATE No. K-1926

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO

TYPED BY ABC DATE 2-12-46 CHKD BY DATE

Retyped from 12-23-43 (no change)

CHANGES

CHANGES #8

L-6827

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE NO. K-1926

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	C-7988	31	529-C	2	GUIDE - In. & Ex. Valve Lifter	
2				4	CAPSCREW -- 5/8-11-NC x 1 3/4 Lg. - - (St.)	
3				4	LOCKWASHER -- 5/8 SAE Reg. - - (St.)	
4	C-8465	32	X1211	2	LIFTER ASSEM. - In. & Ex. Valve	
5						
6	C-7989	33	599-C	1	GUIDE - Air Start. Valve Lifter	
7				1	CAPSCREW -- 5/8-11-NC x 1 3/4 Lg. - - (St.)	
8				1	LOCKWASHER -- 5/8 SAE Reg. - - (St.)	
9	C-7531	34	G594-E	1	LIFTER ASSEM. - Air Start. Valve	
10	C-7452	35	888-C3	1	SPRING - Air Start. Valve Lifter	
11	C-7987	36	594A-E	1	COLLAR - Valve Lifter Spring Retainer	
12						
13		37	W-140	1	GUIDE - Fuel Spray Valve Lifter	
14				2	CAPSCREW -- 5/8-11-NC x 1 3/4 Lg. - - (St.)	
15				2	LOCKWASHER -- 5/8 SAE Reg. - - (St.)	
16				1	CAPSCREW(Clamp) -- 1/2-13-NC x 2 Lg. - - (St.)	
17	F-3238	38	X469	1	LIFTER ASSEM. - Fuel Spray Valve	
18		39	C-3291	1	SPRING - Fuel Spray Valve Lifter	
19						
20	C-1932	40	X490	1	SPRING ASSEM. - Spray Valve Push-Rod Buffer	
21		41	C-1933	1	SPRING - Spray Valve Push-Rod	
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47			---- Cross-Reference Note ----			
48			For L.H. See L-7558			
49			For L.H. 6 Cyl. 10 x 13 with Wood. Gov. - See 2L1104			
50						

FOR OPP. HAND SEE SEE NOTE

FOR OPP. ROT. SEE

NAME VALVE LIFTER & GUIDE GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 7½x10½ to 13x16 R.H.

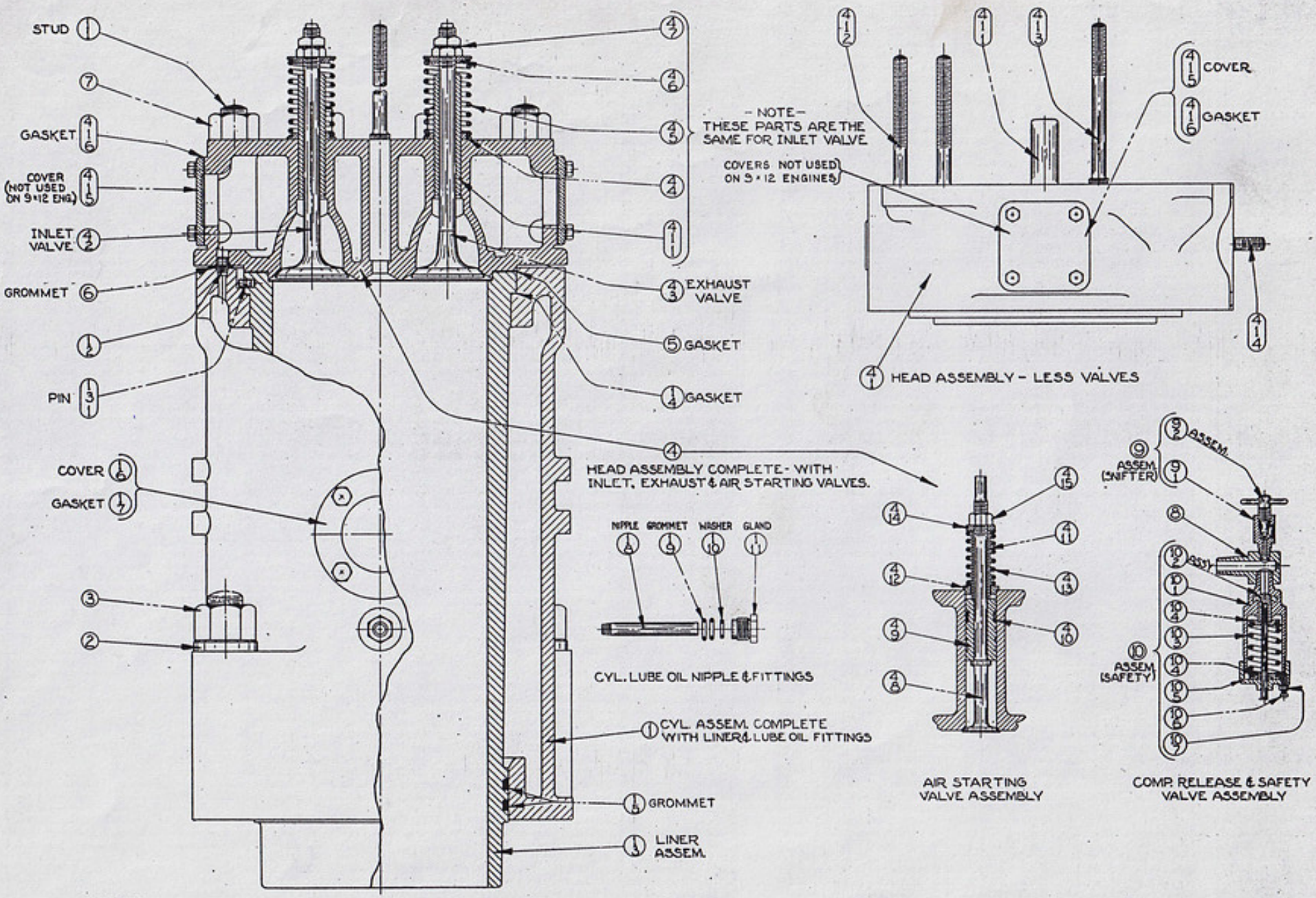
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM 240 REV. 1/46 GM TRANS. PRINTED IN U.S.A.

PLATE No. K-2077 (ED 2) DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO 12 TYPED BY DLB DATE 4-9-45 CHKD. MED DATE 4-30-45 ISSUED BY FK APRVD.

CHANGES #1 Retyped from 5-15-39 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9889

PLATE NO. K-2077 (Ed 2)

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	W-1140	1	G600-FB42	1	CYLINDER ASSEMBLY	
2	S-976	2	727A-KXH	4	WASHER - Cyl. to Centerframe Stud	
3		3		4	NUT -- 1 3/8-6-NC-Hex. - - (St.)	
4						
5		4	X2292	1	HEAD ASSEM. - Cylinder	
6		5	C-3831	1	GASKET - Head to Cylinder	
7	S-803	6	610A-RB3	6	GROMMET - Cyl. to Head Water By-Pass Pipe	
8		7		6	NUT -- 1 1/4-7-NC-Hex. - - (St.)	
9						
10		8	C-8417	1	PLUG-Compression Release & Safety Valve Adaptor	
11	C-354	9	G1197-E1	1	VALVE ASSEM. - Compression Release (Snifter)	
12	S-3340	10	X204	1	VALVE ASSEM. - Cyl. Pressure Relief Safety	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. HOT. SEE

NAME CYLINDER & HEAD GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12 MARINE

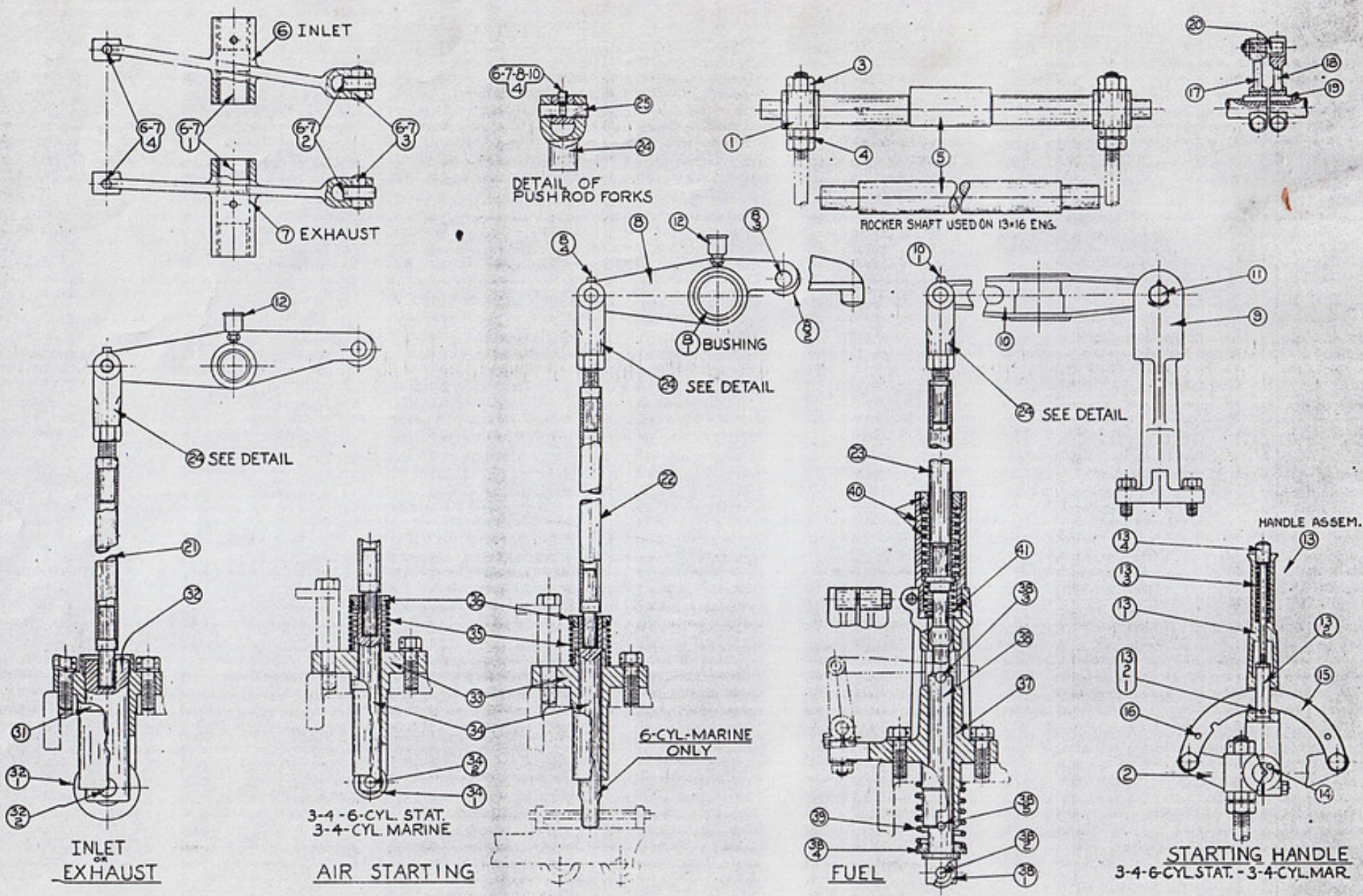
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

L-9889

PLATE No. K-1926

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO _____ TYPED BY DLB DATE 4-4-45 CHKD WED DATE 4-30-45 ISSUED BY JBR APRVD _____

CHANGES #3 Retyped from 5-15-39 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9892

PLATE NO. K-1926

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	S-2846	1	38-R8	7	BEARING - Valve Rocker Shaft	
2	F-3017	2	566-E3	1	BEARING - Valve Rocker Shaft	
3		3		16	NUT -- 5/8-11-NC-Hex. - - (St.)	
4		4		16	LOCKNUT -- Drake - 5/8-11-NC-Hex. - (St.)	
5	F-5480	5	565-E1	4	SHAFT - Valve Rocker	
6	F-5474	6	G520-E32	4	ROCKER ASSEM. - Inlet Valve	
7	F-5476	7	G550-E32	4	ROCKER ASSEM. - Exhaust Valve	
8	F-5478	8	G590-E32	4	ROCKER ASSEM. - Air Start. Valve	
9						
10	F-3089	9	872-E1	4	STAND - Fuel Spray Valve Rocker	
11				8	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
12				8	LOCKWASHER --- 1/2 SAE Reg. - - (St.)	
13		10	X1306	4	ROCKER ASSEM. - Fuel Spray Valve	
14	S-2448	11	873-R	4	PIN - Spray Valve Rocker to Stand	
15				8	COTTER PIN -- 3/32 x 1 1/2 Lg. - (St.)	
16						
17		12		12	OIL CUP--Bowen No. 5 - Hinged Lid - 1/8 P.T.(St	
18						
19		13	G570-C31	1	HANDLE ASSEM. - Air Starting	
20	S-3137	14	5123	1	KEY - Handle to Rocker Shaft	
21	S-2285	15	573-C3	1	SECTOR - Air Starting Handle	
22		16		2	TAPER PIN(Handle Stop)--No. 3 x 1 Lg.-(St.)	
23				2	CAPSCREW -- 1/2-13-NC x 7/8 Lg. - (St.)	
24				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
25	C-832	17	564A-E	3	CRANK - Rocker Shaft Connecting (Male)	
26	S-1415	18	564-E	3	CRANK - Rocker Shaft Connecting (Female)	
27	S-3137	19	5123	6	KEY - Crank to Rocker Shaft	
28				6	CAPSCREW -- 3/8-16-NC x 1 3/4 Lg. - (St.)	
29	S-2688	20	564B-E	3	PIN - Rocker Shaft Connect. Crank Drive	
30				3	HALF NUT -- 3/8-16-NC-Hex. - - (St.)	
31						
32	S-2749	21	525-E	8	PUSH-ROD - Inlet & Exhaust Valve	
33	S-2750	22	593-E	4	PUSH-ROD - Air Starting Valve	
34	F-4405	23	X1341	4	PUSH-ROD ASSEM. - Fuel Spray Valve	
35	C-281	24	526-R	16	FORK - Push-Rod to Valve Rocker Connecting	
36				16	NUT -- 3/4-16-NF-Hex. - - (St.)	
37	S-748	25	527-E1	16	PIN - Fork to Valve Rocker	
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OFF-HAND SEE L-9893

FOR OFF. ROT. SEE

NAME VALVE ROCKER & PUSH-ROD GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIF. MATTOON, ILL.

L-9892

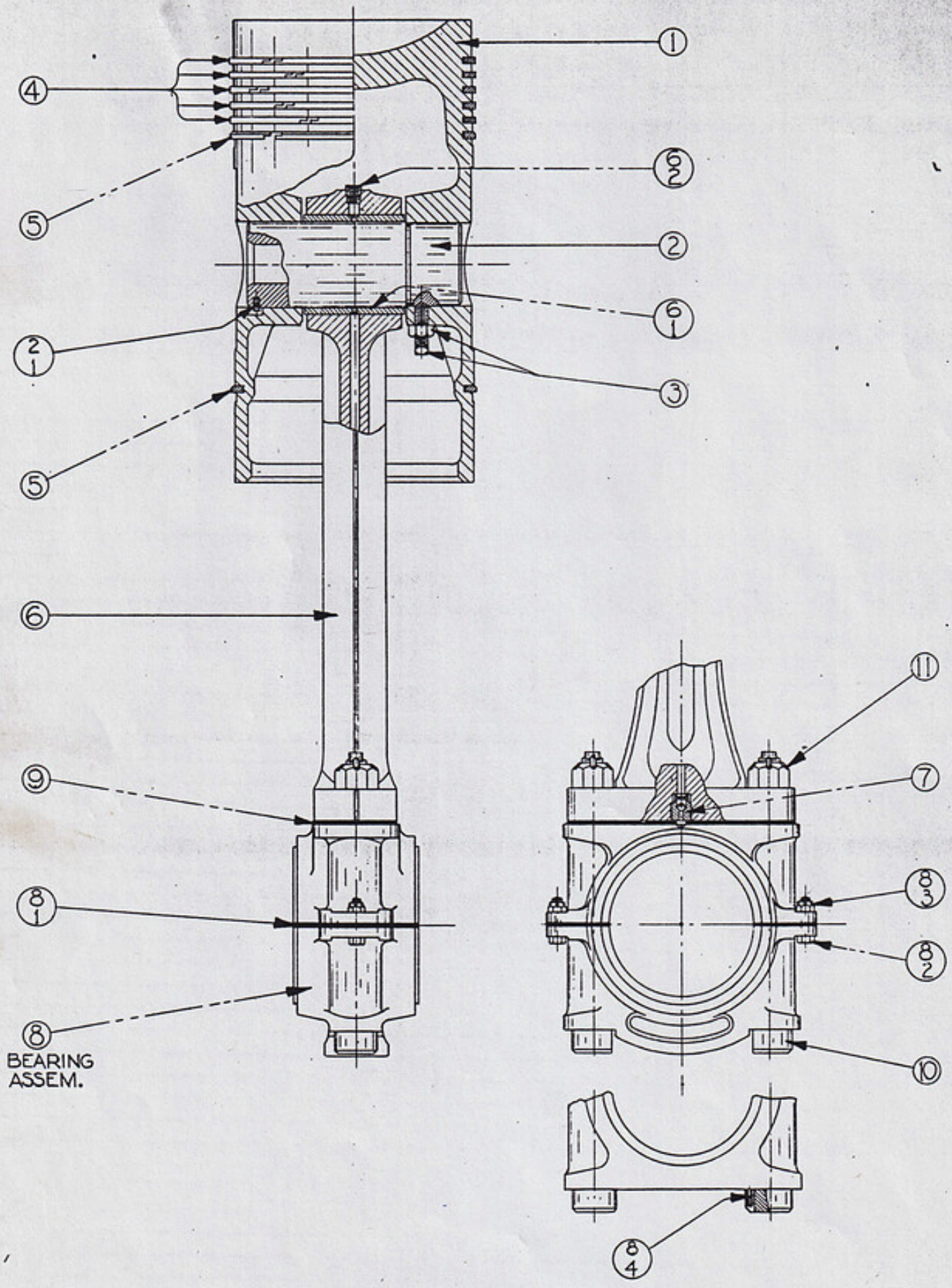


PLATE
No. W-1751

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO

TYPED BY DLB DATE 4-13-45 CHKD. MED DATE 5-2-45 ISSUED BY MC APRVD.

CHANGES #2 Retyped from 7-16-37 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8884

PLATE NO. W-1751

ASSEM. DRWG. NO. W-1156

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1	K-1347	1	620-F2	1	PISTON
2	C-8478	2	G621-F	1	PIN ASSEM. - Piston
3		3		1	SETSCREW--5/8-11-NC x 1 3/4 Lg.Sq.Hd.Cup Pt.(St)
4		3		1	NUT -- 5/8-11-NC-Hex. - - (St.)
5					
6	C-2155	4	C-2155L9	4	RING - Piston - (Compression)
7	C-2355	5	C-2355L9	2	RING - Piston - (Oil Control)
8					
9		6	GA630-FB4	1	ROD ASSEM. - Connecting
10	C-5307	7	G632-E	1	VALVE ASSEM. - Oil Check
11	W-931	8	GA636-E31	1	BEARING ASSEM. - Connecting Rod
12	C-8497	9	634-E31-A	1	SHIM - Bearing to Rod (1/16)
13	C-8497	9	634-E31-B	1	SHIM - Bearing to Rod (1/32)
14	C-8497	9	634-E31-C	2	SHIM - Bearing to Rod (1/64)
15		10	S-2722	2	BOLT - Connecting Rod
16		11	S-2715	2	NUT - Connecting Rod Bolt
17				2	COTTER PIN -- 3/16 x 2 Lg. - - (St.)
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					---- PARTS CATALOG NOTE ----
45					The Number of Compression Rings shown on Plate W-1751
46					may vary according to Engine Size.
47					
48					
49					
50					

L-0004

FOR OFF-HAND SEE

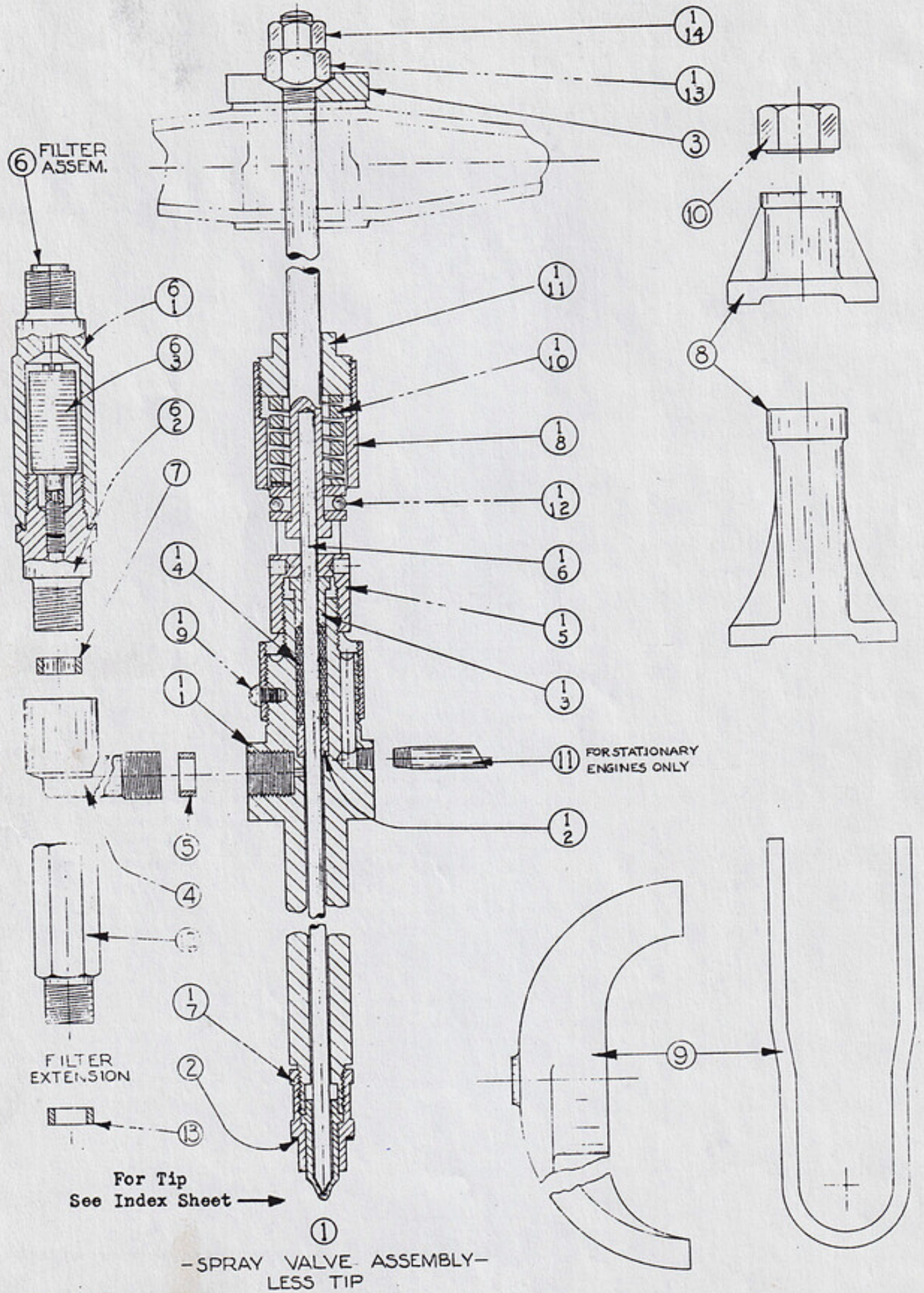
FOR OFF. BOT. SEE

NAME PISTON & CONNECTING ROD GROUP

ORIGINALLY ISSUED FOR 9 x 12 MARINE - STAT

FOR TOTAL REQUIREMENTS PER ENGINE, MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET.

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO. OAKLAND, CALIF. MATTOON, ILL.



-SPRAY VALVE ASSEMBLY-
LESS TIP

PLATE
No.-W-1596

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO MATTOON | TYPED BY GB DATE 9-22-43 | CHKD MCS DATE 12-4-43 | ISSUED BY [illegible] APRVD.

Retyped from 1/31/38 (no change)

CHANGE #1

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9483

PLATE NO. W-1596

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	W-182	1	X261	1	VALVE ASSEMBLY - Fuel Spray	
2	S-923	2	860-E	1	GASKET - Spray Valve to Cyl. Head	
3	C-179	3	877-E	1	COLLAR - Spray Valve to Rocker Retainer	
4		4	S-2231	1	CONNECTION - Spray Valve Fuel Filter	
5	S-928	5	861A-E	1	GASKET - Filter Connection to Spray Valve	
6	F-1981	6	X71	1	FILTER ASSEMBLY - Spray Valve Fuel	
7	S-928	7	861A-E	1	GASKET - Filter to Connection	
8	C-159	8	855-R	1	BRIDGE - Spray Valve Retainer	
9	S-2295	9	854-E	1	CLAMP - Spray Valve Bridge	
10	C-278	10	855A-FXC4	1	NUT - Spray Valve Bridge Clamp Retainer	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

FORM 240 REV. 5-43 IN TRANS IN BOND

NAME FUEL SPRAY VALVE GROUP

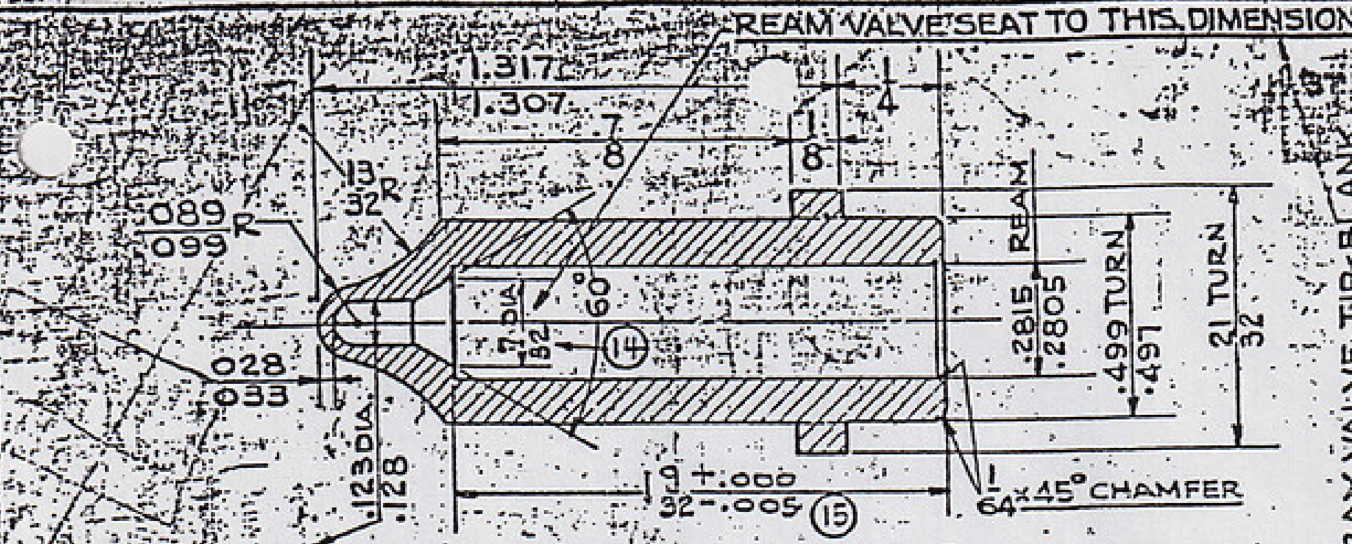
ORIGINALLY ISSUED FOR 3-4 CYL. 7 1/2 x 10 1/2 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-9483



NOTE– INSIDE DIA. MUST BE CONCENTRIC TO OUTSIDE DIA. WITHIN .005" AT FORMED END

SPRAY VALVE TIP-BLANK

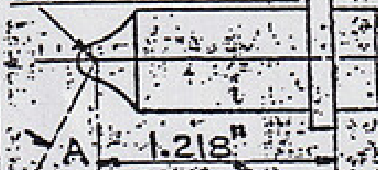
PART No. 864-E

MAT'L S.A.E. 1112

SEE TABULATION FOR DRILLING

PART No.	No. HOLES	A	SIZE HOLES	L-SHEET No.
5829	7	30°	.014	4342
5830	7	30°	.012	4343
5831	5	30°	.014	4344
5832	5	30°	.012	4345
5833	5	30°	.011	4346
5834	5	30°	.010	4347
5835	5	30°	.009	4348
5836	5	30°	.008	4349
5837	5	30°	.007	4350
5838	4	30°	.008	4351
5839	4	30°	.007	4352
5840	7	20°	.009	4353
5841	6	20°	.009	4354
5842	5	20°	[illegible]	4355
5843	5	20°	[illegible]	4356
5844	5	20°	.009	4357
5845	5	20°	.008	4358
5846	5	15°	.010	4359
5847	5	15°	.009	4360
5848	5	15°	.008	4361
5849	4	15°	.008	4362
5863	5	12°	.011	4588
5864	5	12°	.010	4606
5865	5	12°	.009	4607
5866	5	12°	.008	4608
5867	4	12°	.008	4609
5900	5	12°	.007	4994
6002	5	30°	.013	6164

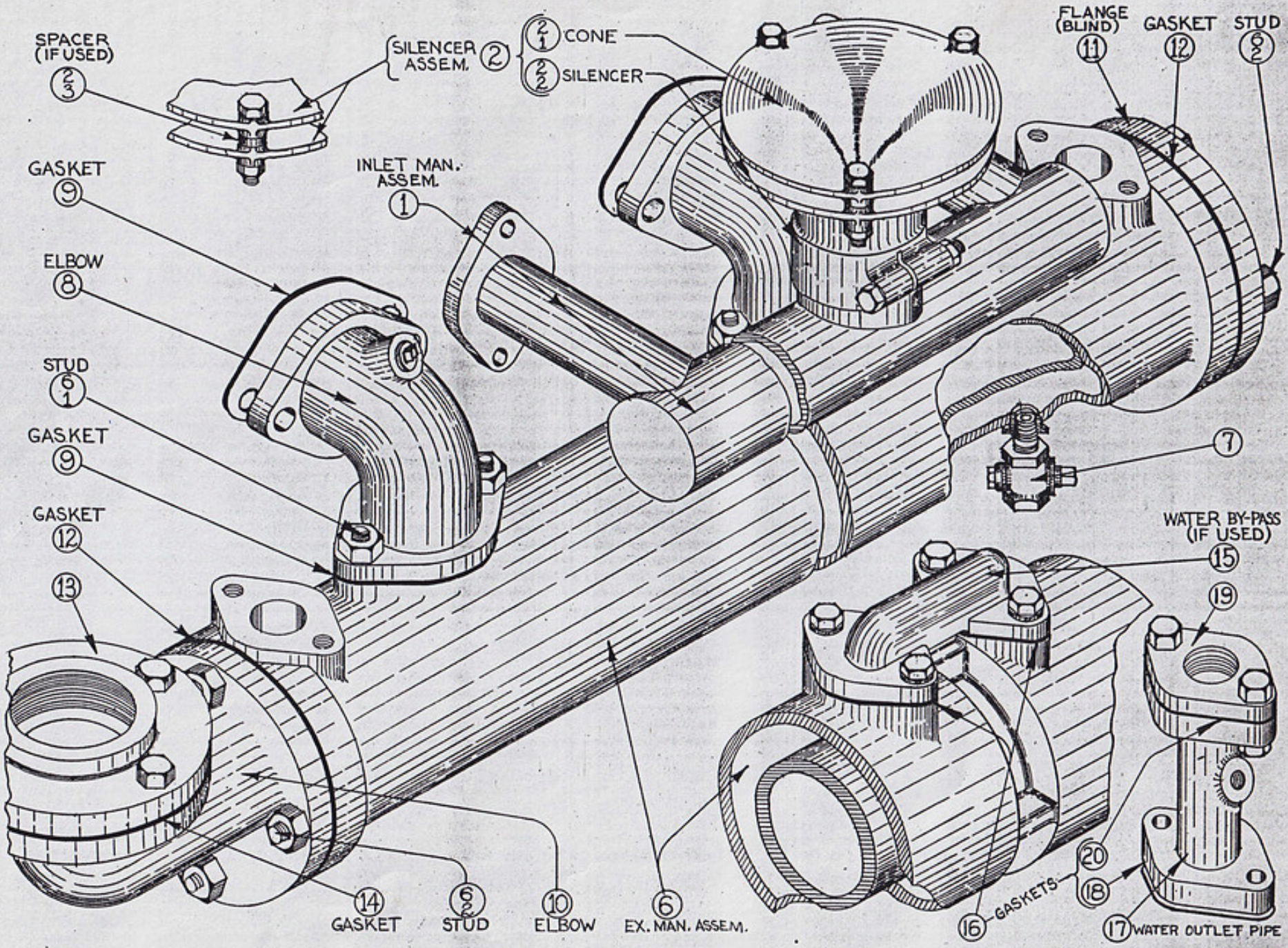
PART No.	No. HOLES	A	SIZE HOLES	L-SHEET No.
6134	7	30°	.013	8407
6168	6	30°	.008	9033
6169	6	30°	.011	9058
6172	8	30°	.014	9075
6178	7	25°	.016	9093
6184	7	25°	.013	2L237
6186	6	15°	.012	2L478
6200	6	15°	.011	2L1644
6201	5	25°	.011	
6202	7	20°	.010	
RA-8	8	15°	.016	AS 377
RA-11	6	25°	.011	AS 645
RA-30	6	20°	.011	AS 1133
RA-41	6	20°	.010	AS 2475
RA-117	6	30°	.013	ENG. NO. 50107
RA-190	8	25°	.016	AS 7167
RA-232	6	25°	.013	EXAS1064



CHG	WAS	DATE	BY
28	RA232 ADDED	3-10-54	[illegible]
27	RA-190 ADDED	11-13-53	[illegible]
26	WAS .010 DIA HOLE	[illegible]	[illegible]
25	WAS .011 DIA	9-4-53	[illegible]
24	RA117 ADDED	[illegible]	[illegible]
23	RA 41 ADDED	10-4-51	[illegible]
22	RA-30 ADDED ATH	3-9-51	[illegible]
21	RA-11 ADDED ATH	1-19-51	[illegible]
20	RA-8 ADDED ATH	12-12-50	[illegible]
19	ADDED 6202	3-24-48	GG
18	ADDED 6201	8-12-46	KCS
17	ADDED 6200	1-23-46	[illegible]
16	ADDED 6186	1-3-41	BR
15	15/64	12-16-40	MR
14	13/64 DIA	2-21-40	JR
13	ADDED 6184	[illegible]	[illegible]
12	REVISED & REDRAWN	1-11-39	MR
	FROM [illegible] DATED 1-1-43		
CHG	WAS	DATE	BY

PLATE No. W2384

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO MATTOON TYPED BY MED DATE 5-16-39 ISSUED BY [illegible] DATE [illegible] CHKD. [illegible] APRVD.

CHANGES #1 5-3-45 Lines 26 to 34 Incl. added

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9895

PLATE NO. W-2384

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-5509	1		X2269	1	MANIFOLD ASSEM. - Air Inlet	
2					8	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
3					8	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
4		2		X368	1	SILENCER ASSEM. - Air Suction	
5							
6							
7	W-1142	6		X2297	1	MANIFOLD ASSEM. - Exhaust	
8					2	CLOSE NIPPLE -- 1/2 Std. - - (Brass)	
9	C-9053	7		C-9053-P½	2	COCK - Exhaust Manifold Drain	
10	C-630	8		398-R6	4	ELBOW - Cyl. Head Exhaust Outlet	
11					4	PIPE PLUG -- 1/2 Std. - - (C.I.)	
12		9		S-3287	8	GASKET - Elbow to Manifold & Cyl. Head	
13					16	NUT -- 5/8-11-NC-Hex. - - (Steel)	
14		10		F-5527	1	ELBOW - Ex. Manifold Exhaust Outlet	
15	C-4023	11		763-C3	1	FLANGE - Exhaust Manifold End (Blind)	
16	S-919	12		760A-R10	2	GASKET - Elbow & Flange to Manifold	
17					8	NUT -- 5/8-11-NC-Hex. - - (Steel)	
18		13		C-1381	1	FLANGE - Exhaust Outlet Pipe	
19	S-919	14		760A-R10	1	GASKET - Flange to Elbow	
20					4	CAPSCREW -- 5/8-11-NC x 2 1/2 Lg. - (Steel)	
21					4	NUT -- 5/8-11-NC-Hex. - - (Steel)	
22	F-2819	15		792-BX6	1	PIPE - Water By-Pass	
23		16		S-2334	2	GASKET - By-Pass Pipe to Manifold	
24					4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
25					4	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
26	C-7946	17		791-C	1	PIPE - Ex. Man. Water Outlet	
27		18		S-1042	1	GASKET - Pipe to Ex. Manifold	
28					2	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (St.)	
29					2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
30	C-5351	19		786-B	1	FLANGE - Ex. Man. Water Outlet Pipe	
31		20		S-1042	1	GASKET - Flange to Pipe	
32					2	CAPSCREW -- 1/2-13-NC x 2 Lg. - (St.)	
33					2	NUT -- 1/2-13-NC-Hex. - - (St.)	
34					2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

FOR OPP. HAND SEE 2L1397

FOR OPP. HOT. SEE

NAME INLET & EXHAUST MANIFOLD GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MAR.-STAT. R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

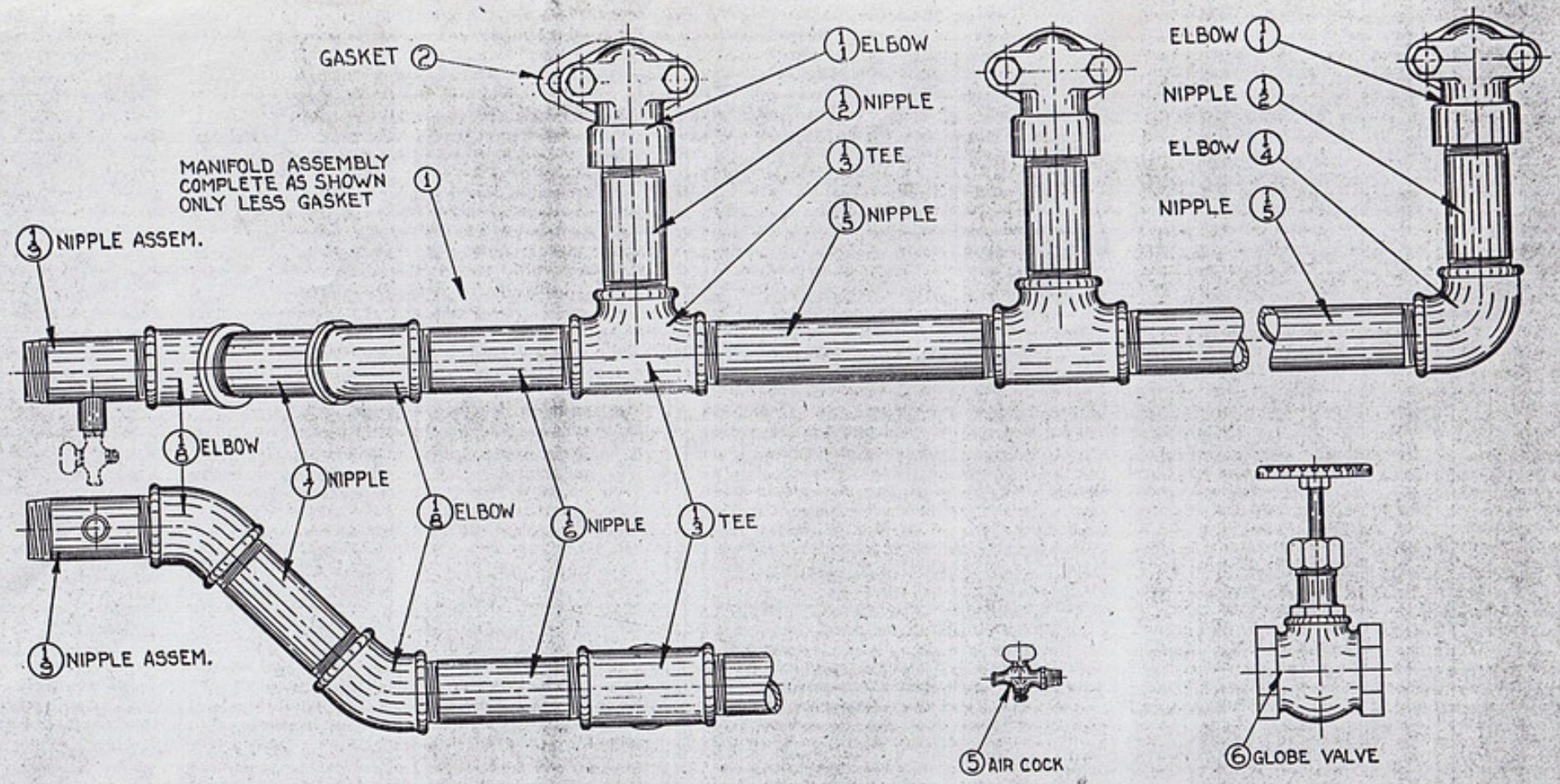
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. [illegible]

PLATE No. W-2438

DO NOT ORDER PARTS BY REFER. NUMBERS



EXTRA COPIES TO

TYPED BY DLB DATE 3-26-45 CHKD M. ED DATE 5-2-45 ISSUED BY TMK APRVD.

CHANGES #2 Retyped from 5/3/37 (no changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8823

PLATE NO. W-2438

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-5449	1	X2245	1	MANIFOLD ASSEM. - Air Starting	
2	S-1900	2	577A-C4	4	GASKET - Manifold to Cylinder Head	
3				8	CAPSCREW -- 1/2-13-NC x 2 1/2 Lg. -- (St.)	
4						
5	C-9045	5	C-9045-P 1/4	1	COCK - Air Bleeder	
6	C-9046	6	C-9046-P1 1/4	1	GLOBE VALVE	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

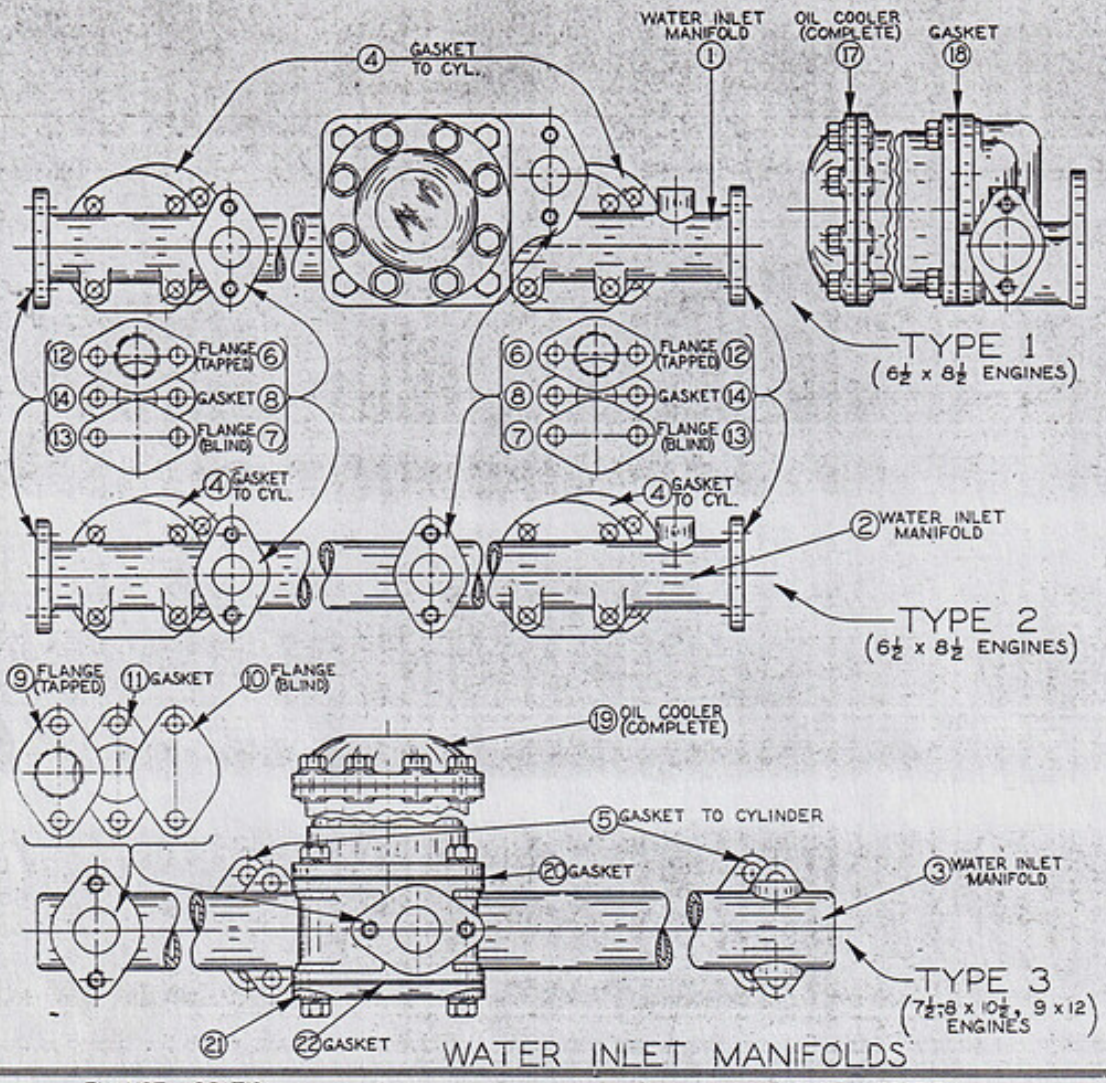
NAME AIR STARTING MANIFOLD GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MAR.- STAT.

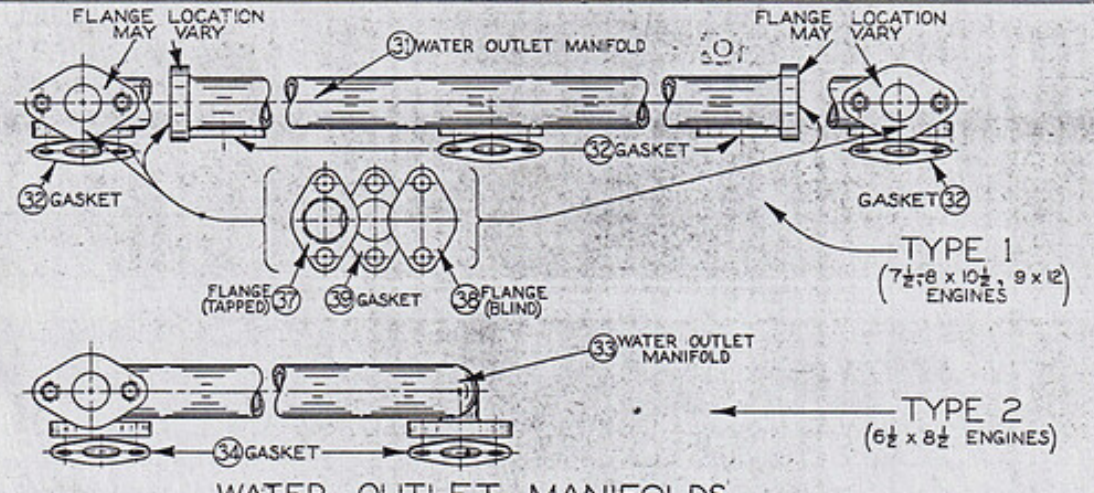
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

50075



WATER INLET MANIFOLDS



WATER OUTLET MANIFOLDS

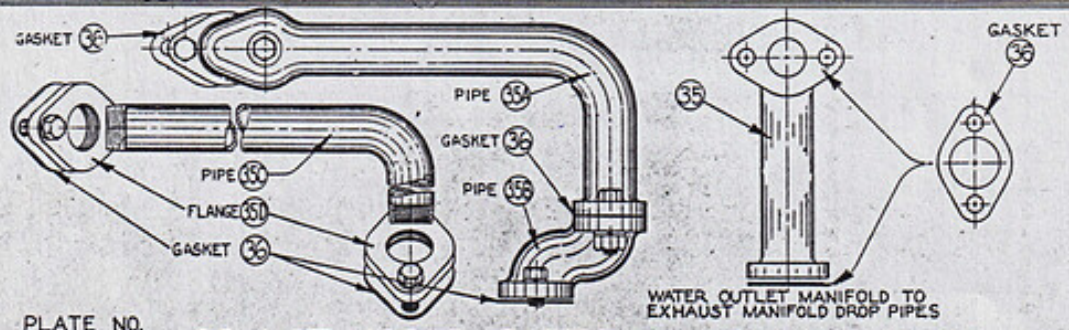


PLATE NO. K-2154 ED 2

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO

TYPED BY DLB DATE 3-29-45 CHKD. MCL DATE 5-3-45 ISSUED BY [illegible] APRVD.

CHANGES #1 Revised & Retyped from 12-17-40

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

2L443

PLATE NO. K-2154

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		3	K-1340	1	MANIFOLD - Water Inlet	
2				1	REDUCING BUSHING(Man. End)--3/4 x 3/8 Std.(C.I	
3				1	PIPE PLUG -- 3/4 Std. - - C't's'k Hd.-(C.I.)	
4				1	PIPE PLUG -- 3/8 Std. - - (C.I.)	
5		5	S-1042	4	GASKET - Manifold to Cyl.	
6				8	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
7				8	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
8		9	C-7491	2	FLANGE - Man. Water In.(Cent. & Bilge Pump)	
9		11	S-1042	2	GASKET - Flange to Manifold	
10				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
11				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
12	2C132	19	2C132-P	1	COOLER - Lube Oil	
13		20	C-5324	1	GASKET - Cooler to Manifold	
14				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg.-(St.)	
15				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
16		21	C-8383	1	COVER - Water Inlet Manifold (Bottom)	
17		22	C-8384	1	GASKET - Cover to Manifold	
18				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
19				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
20						
21		31	F-5512	1	MANIFOLD - Water Outlet	
22		32	S-2334	4	GASKET - Manifold to Cyl. Head	
23				8	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
24				8	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
25	C-8463	35	790-C3	1	PIPE - Water Man. to Ex. Man. Drop	
26		36	S-1042	2	GASKET - Drop Pipe to Manifolds	
27				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
28				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
29	C-3056	38	786	1	FLANGE - Water Outlet Manifold (Blind)	
30		39	S-1042	1	GASKET - Flange to Manifold	
31				2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
32				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OFF-HAND SEE 2L444

FOR OFF-ROT- SEE

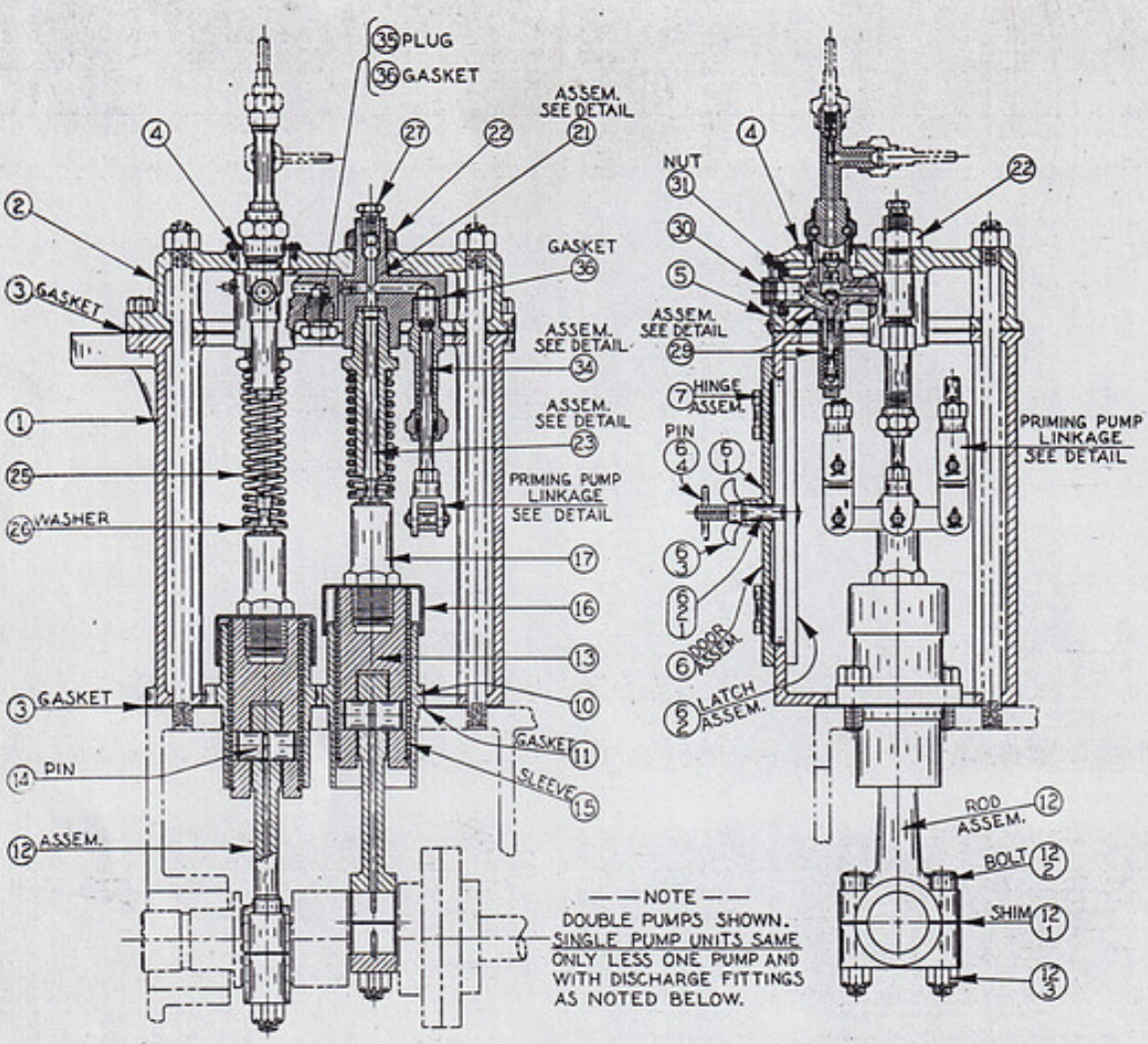
NAME WATER INLET & OUTLET MANIFOLD GROUP

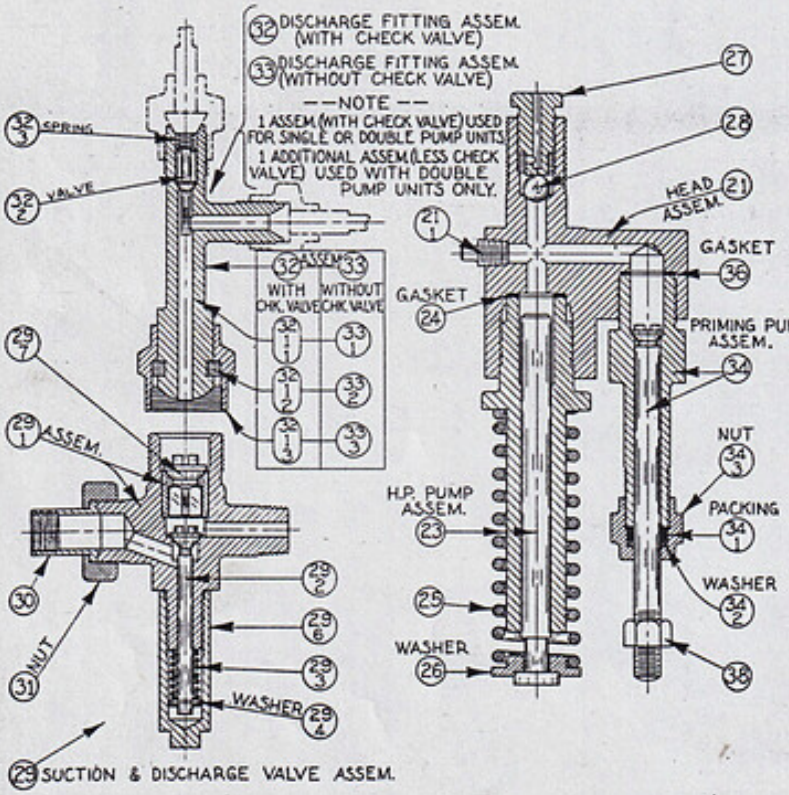
ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.





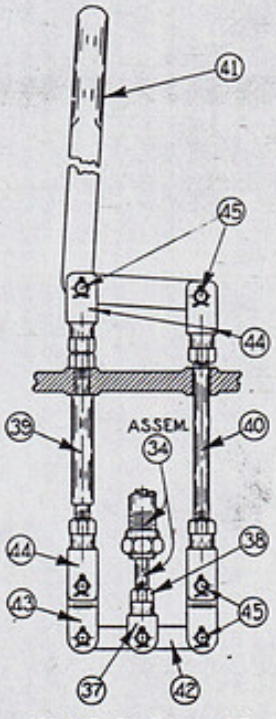


PLATE NO.
K-2149

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO MATTOON — TYPED BY MED DATE 6-2-41 — ISSUED BY [illegible] DATE [illegible] — CHKD. [illegible] APRVD. [illegible]

CHANGES
#1 Retyped From 12-19-40 - H.P.F. Pump Assem. Was X5352 - Added Part Nos. C-6222 & S-2936
#2 9-24-41 Added Part No. 2C2160 - For Part No. 2C2119 No. Req'd. Was 1
5-17-44 Lines 31 & 33 Added Drg. Nos.

CHANGES
#4 7-12-46 Line 15 Drwg. No. Added.

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

2L455
PLATE NO. K-2149

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	W-926	1		846-FB4	1	HOUSING - H.P. Fuel Pump	
2	W-925	2		817-FB42	1	PLATE - H.P. Fuel Pump Mounting	
3		3		C-7916	2	GASKET - Housing & Plate	
4					4	NUT -- 5/8-11-NC-Hex. - - (St.)	
5					2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
6		4		S-1255	2	COVER - Pump Mounting Plate (Top)	
7		5		S-679	2	COVER - Pump Mounting Plate (Side)	
8					10	MACHINE SCREW--#10-24 x 3/8 Lg.-Rnd.Hd. -(St.)	
9		6		G847-FB4	1	DOOR ASSEM. - H.P. Fuel Pump Housing	
10	C-6651	7		G847C-RB3	2	HINGE ASSEM. - Pump Housing Door	
11					12	MACHINE SCREW--#10-32 x 1/2 Lg.-Flat Hd.-(St.)	
12	C-554	10		829-RB31	2	GUIDE - H.P. Fuel Pump Crosshead	
13		11		C-3055	2	GASKET - Crosshead Guide	
14					4	CAPSCREW -- 5/8-11-NC x 1 1/2 Lg. - (St.)	
15	F-7718	12		G823-RB3	2	ROD ASSEM. - Fuel Pump Connect.	
16	C-552	13		831-RB3	2	CROSSHEAD - Fuel Pump Connect. Rod	
17	S-553	14		828C-RB3	2	PIN - Connect. Rod to Crosshead	
18	C-553	15		831C-RB3	2	SLEEVE - Crosshead	
19	S-878	16		831D-RB31	2	GUARD - Crosshead Oil	
20		17		C-7905	2	PLUG - Crosshead	
21							
22		21		X3225	2	HEAD ASSEM. - H.P. Fuel Pump	
23		22			2	NUT -- 1-14-NF-Hex. - - (St.)	
24		23		X5353	2	PUMP ASSEM. - H.P. Fuel	
25		24		S-2882	2	GASKET - Pump Body to Head	
26		25		C-6222	2	SPRING - Pump Plunger	
27		26		S-2936	2	WASHER - Spring Retainer	
28		27		C-8875	2	PLUG - Fuel Pump Bleeder	
29		28			2	STEEL BALL -- 7/16 Dia. - (St.)	
30	F-5832	29		X2605	2	CAGE ASSEM.-H.P. Fuel Pump Suction & Disch. Val	
31	2C3944	30		802B-E	2	UNION SLEEVE	
32							
33	2C3943	31		802A-E	2	UNION NUT	
34							
35		32		G796-EB32	1	FITTING ASSEM.-Pump Discharge(With Check Valve)	
36		33		G796-E	1	FITTING ASSEM. - Pump Discharge	
37		34		X3227	1	PUMP ASSEM. - Fuel Priming	
38		35		2C2160	1	PLUG - Pump Head (Priming Pump Hole)	
39		36		2C2119	2	GASKET - Priming Pump & Plug to Head	
40	S-2592	37		1279-RB3	1	EYE - Priming Pump Plunger	
41		38			1	NUT -- 7/16-20-NF-Hex. - (St.)	
42	S-3364	39		1284A-RB3	1	ROD - Handle & Link Fulcrum	
43	S-3365	40		1284-RB3	1	ROD - Link & Handle Connecting	
44	F-2274	41		1281-RB3	1	HANDLE - Priming Pump	
45	C-175	42		1280-RB3	1	LINK - Pump Plunger to Rod Connect.	
46	S-2603	43		1279A-RB3	2	LINK - Plunger Link to Rod Eye	
47	S-218	44		1279B-RB3	4	EYE - Connect. Rod & Fulcrum Rod	
48					4	NUT -- 1/2-13-NC-Hex. - (St.)	
49	S-2626	45		1280A-RB3	7	PIN - Eye to Links & Handle	
50					14	COTTER PIN -- 3/32 x 3/4 Lg. - (St.)	

2L456

NAME FUEL PUMP GROUP

ORIGINALLY ISSUED FOR 4 CYL. 7 1/2 x 10 1/2 -- 9 x 12 -R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET.

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

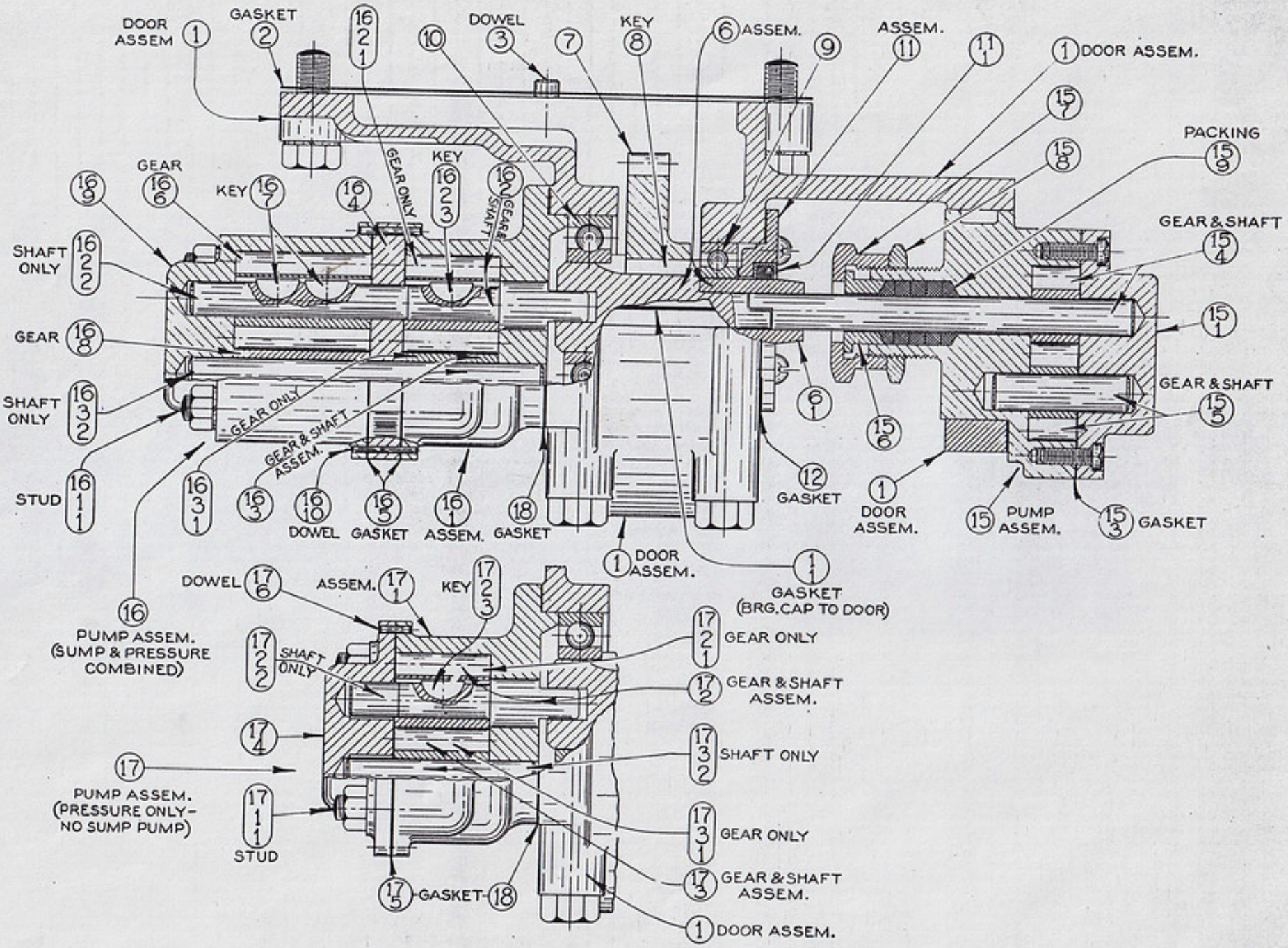
FOR OPP. HAND SEE 2L456
FOR OPP. ROT. SEE

FORM NO. 240 10-39

2L455

PLATE No. W-2112

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO MATTOON TYPED BY MED DATE 5-[illegible]-39 ISSUED BY [illegible] DATE 6-1-39 CHKD [illegible] APRVD.

CHANGES

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9906

PLATE NO. W-2112

ASSEM. DRWG. NO. K-1662

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD	PART NAME
1	F-5188	1		X2066	1	DOOR ASSEM. - Rotary Pump
2		2		C-8379	1	GASKET - Door to Centerframe
3					6	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (Steel)
4					6	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)
5		3		C-3190	2	PIN - Door to Centerframe Dowel
6						
7	C-7400	6		X1814	1	SHAFT ASSEM. - Pump Drive
8	F-938	7		1352-FB4	1	GEAR - Pump Drive
9		8		C-7415	1	KEY - Gear to Shaft
10	C-9034	9		5895	1	BALL BEARING - Drive Shaft (Small)
11	C-9037	10		4956	1	BALL BEARING - Drive Shaft (Large)
12		11		X1851	1	COVER ASSEM. - Pump Drive Shaft Bearing (End)
13		12		C-7401	1	GASKET - Cover to Pump Door
14					4	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd. Hd.(Steel)
15						
16	C-9039	15		G1338-RB31	1	PUMP ASSEM. - Fuel Transfer
17		16		X2825	1	PUMP ASSEM. - Lube Oil Sump & Pressure
18		18		C-6675	1	GASKET - Pump to Door
19					2	CAPSCREW -- 1/2-13-NC x 1 Lg. - (Steel)
20					2	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)
21						
22						
23						--- Fuel Transfer Pump Suction ---
24					1	NIPPLE -- 1/4 x 2 Lg. - (Brass)
25					1	TEE -- 1/2 x 1/4 x 1/2 Std. Reducing - (M.I.)
26					1	PIPE PLUG -- 1/2 Std. - - (C.I.)
27						
28						
29						--- Lube Oil Pressure Pump Suction ---
30					1	NIPPLE -- 1/2 x 2 Lg. - (Brass)
31					1	TEE -- 1/2 x 1 x 1 Std. Reducing - (M.I.)
32					1	PIPE PLUG -- 1 Std. - - (C.I.)
33						
34						
35						--- Sump Pump Suction Line (Base to Pump) ---
36					1	NIPPLE -- 3/4 x 2 Lg. - (Brass)
37					1	UNION -- 3/4 Std. (Crane #519 or Eq.)-(M.I.)
38					1	PIPE -- 3/4 x 25 Lg. - (Brass)
39					1	UNION TEE -- 3/4 Std.(Crane #598 or Eq.)-(M.I.)
40					1	PIPE PLUG -- 3/4 Std. - - (C.I.)
41					1	NIPPLE -- 3/4 x 2 Lg. - (Brass)
42						
43						--- Sump Pump Discharge ---
44					1	STREET ELL -- 3/4 Std. - - (M.I.)
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE L-9907

FOR OPP. HOT. SEE

NAME LUBE OIL & FUEL TRANSFER PUMP GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

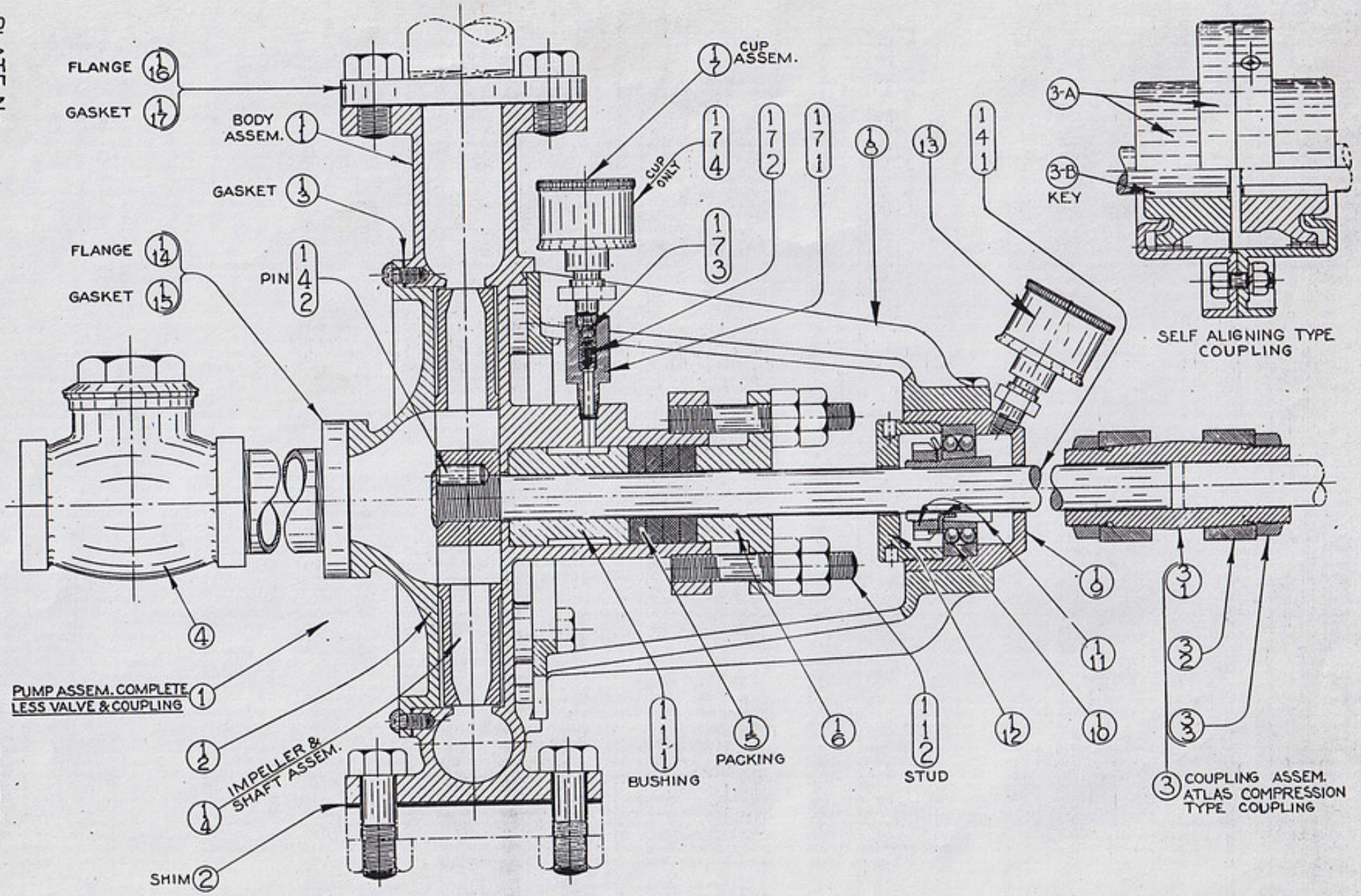
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. 560-3M-10-37

L-9906

PLATE No. W-2109 ED 2 DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO CHI-MAT-CAN — TYPED BY DLB DATE 3-9-45 — CHKD MEB DATE 3-12-45 — ISSUED BY — APRVD.

CHANGES

CHANGES

2L1381

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. W-2109 (Ed 2)

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		1	X3834	1	PUMP ASSEM. - Centrif. Water	
2	C-7953	2	C-7953-B	1	SHIM - Pump to Base (1/32)	
3	C-7953	2	C-7953-D	2	SHIM - Pump to Base (.010)	
4	C-7953	2	C-7953-E	4	SHIM - Pump to Base (.003)	
5				2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
6		3A	F-7401	1	COUPLING - Pump Shaft to Drive Shaft	
7	C-6803	3B	C-6803L1 1/4	2	KEY - Coupling to Pump & Drive Shaft	
8						
9						
10			---- Pump Suction Fittings ----			
11				1	NIPPLE -- 1 1/4 x 2 1/2 Lg. - (Brass)	
12	2C155	4	2C155-P1 1/4	1	SWING CHECK VALVE	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FL-10-

FOR OFF-HAND SEE

FOR OFF. ROT. SEE

NAME CENTRIFUGAL WATER PUMP GROUP - - - (1 1/4")

ORIGINALLY ISSUED FOR 3-4 CYL. 7½ - 8 x 10½ MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

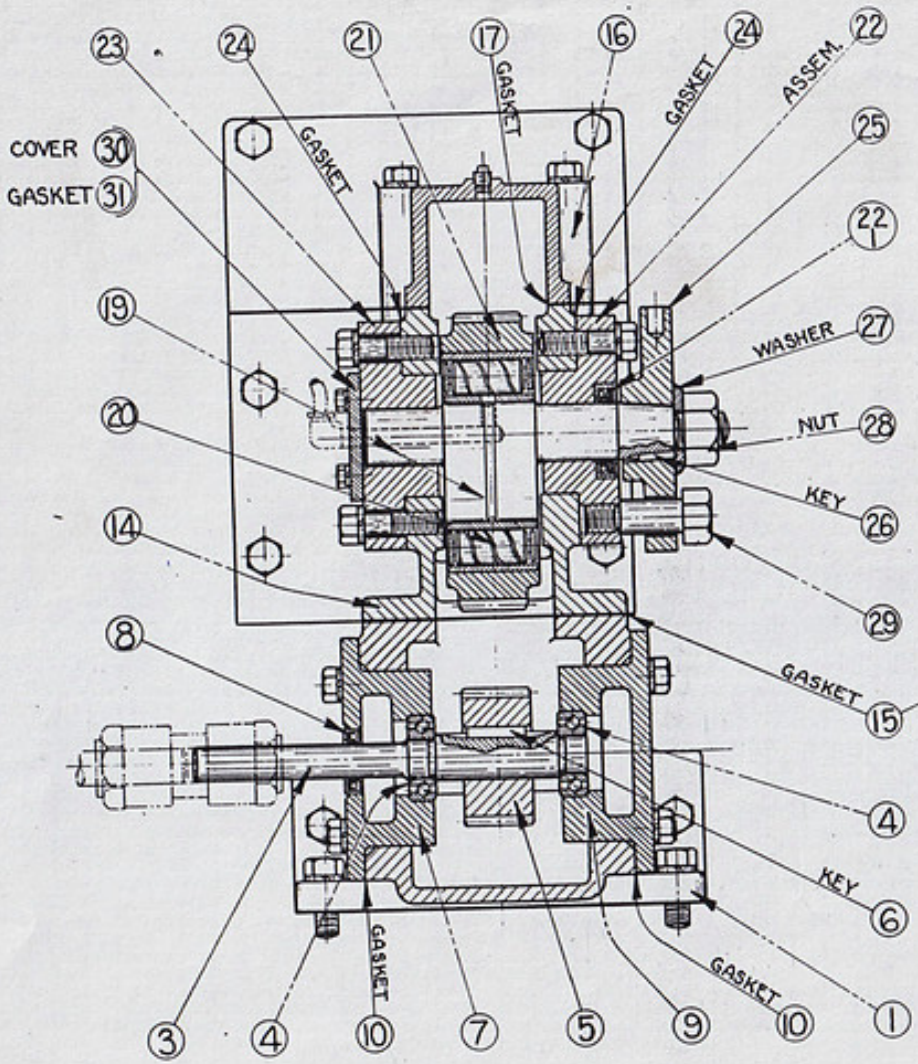
PRINTED IN U.S.A. FORM 240 REV. 8-44 1M. PRINT

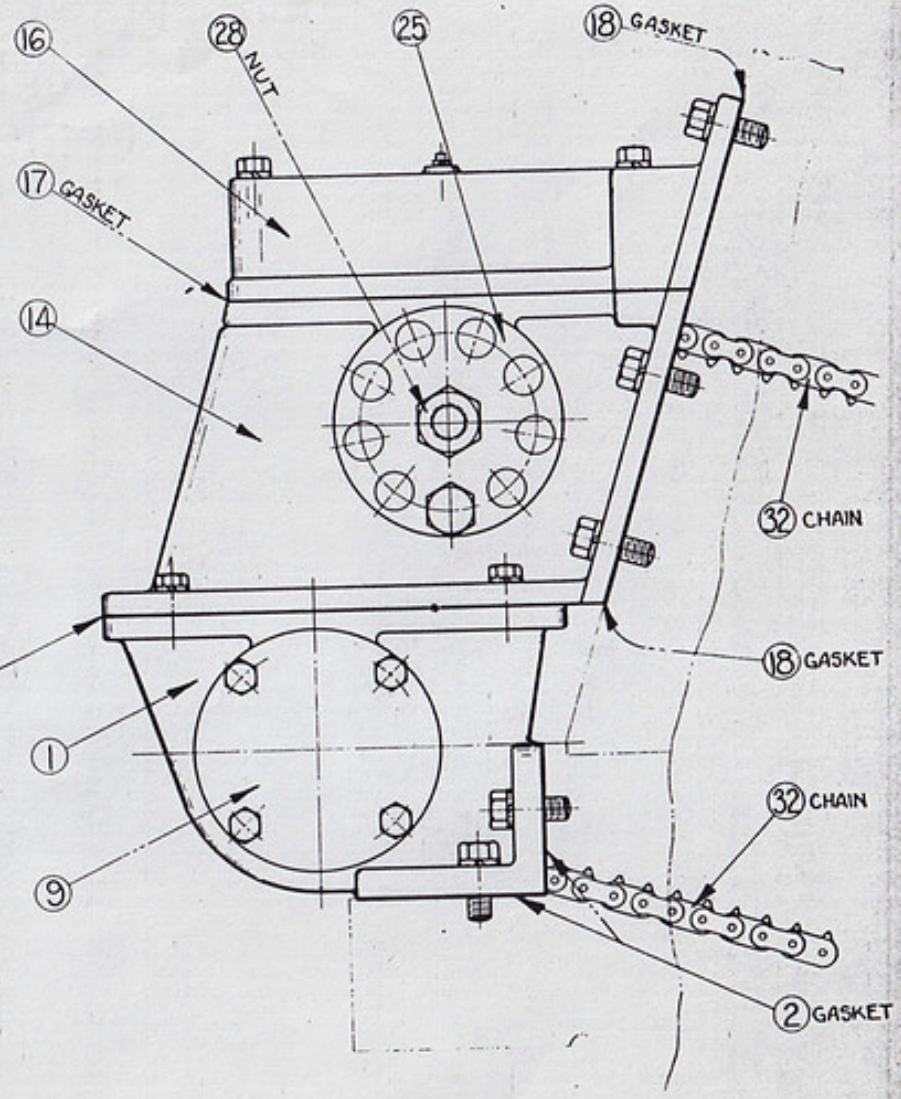
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

PLATE No.
W-2280

DO NOT ORDER PARTS BY REF. NUMBERS





EXTRA COPIES TO CHI — TYPED BY DLB DATE 3-9-45 — CHKD MED DATE 3-12-45 — ISSUED BY — APRVD.

CHANGES #1 4-1-47 Line 5 Part No. was 2C4155

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

2L1384

PLATE NO. W-2280

LINE NO.	DRWG. NO.	REF NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		1	F-5453	1	BEARING - Centrif. Pump Drive	
2		2	C-8377	1	GASKET - Bearing to Base	
3				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
4				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
5		3	~~2C5245~~	1	SHAFT - Centrif. Pump Drive	
6	C-9854	4	5988	2	BALL BEARING	
7	C-6639	5	1307-E	1	SPROCKET - Centrif. Pump Drive	
8	C-6704	6	C-6704L1 1/4	1	KEY - Centrif. Pump Drive Sprocket to Shaft	
9		7	F-5450	1	CAGE - Drive Shaft Brg.	
10		8		1	OIL SEAL -- National Motor Brg. Co. #50141	
11		9	F-5458	1	CAGE - Drive Shaft Brg. (Blind)	
12		10	S-2512	2	GASKET - Brg. Cage to Drive Brg.	
13				8	CAPSCREW -- 3/8-16-NC x 7/8 Lg. - (St.)	
14				8	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
15						
16						
17		14	F-5446	1	HOUSING - Cent. Pump Chain Idler	
18		15	S-2510	1	GASKET - Housing to Pump Drive Bearing	
19				4	CAPSCREW -- 3/8-16-NC x 1 Lg. - (St.)	
20				4	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
21		16	F-5447	1	COVER - Chain Idler Housing Top	
22		17	C-8361	1	GASKET - Cover to Housing	
23				4	CAPSCREW -- 3/8-16-NC x 3 1/4 Lg. - (St.)	
24				4	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
25		18	C-8362	1	GASKET - Idler Hous. & Cover to Centerframe	
26				6	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
27				6	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
28				1	PIPE PLUG -- 1/8 Std. - - (C.I.)	
29		19	F-2097	1	SHAFT - Chain Idler	
30		20	C-5288	1	BEARING - Chain Idler Sprocket (Hyatt W-213)	
31		21	F-909	1	SPROCKET - Chain Idler	
32		22	X2149	1	BEARING ASSEM. - Idler Shaft (Adjust. Side)	
33	F-2098	23	4098	1	BEARING - Idler Shaft	
34		24	C-5270	2	GASKET - Bearing to Idler Housing	
35				8	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (St.)	
36				8	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
37		25	F-3000	1	DISC - Idler Adjusting	
38	S-3137	26	5112	1	KEY - Adj. Disc to Idler Shaft	
39		27	S-3186	1	WASHER - Adj. Disc. Retainer	
40		28		1	NUT -- 3/4-10-NC-Hex. - - (St.)	
41		29	S-1857	1	PIN - Adj. Disc Lock	
42	F-398	30	846B-JX	1	COVER - Idler Shaft End	
43		31	S-1060	1	GASKET - Cover to Brg.	
44				4	CAPSCREW -- 1/4-20-NC x 5/8 Lg. - (St.)	
45				4	LOCKWASHER -- 1/4 SAE Reg. - - (St.)	
46		32		1	CHAIN -- Whitney #B-207 Silent Chain -	
47					1/2 Pitch - 138 Links Lg. - Chain to	
48					Include one Straight Connect. Link	
49					Complete	
50						

FOR OPP. HAND SEE 2L1385

FOR OPP. ROT. SEE

NAME CENTRIFUGAL WATER PUMP DRIVE GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.

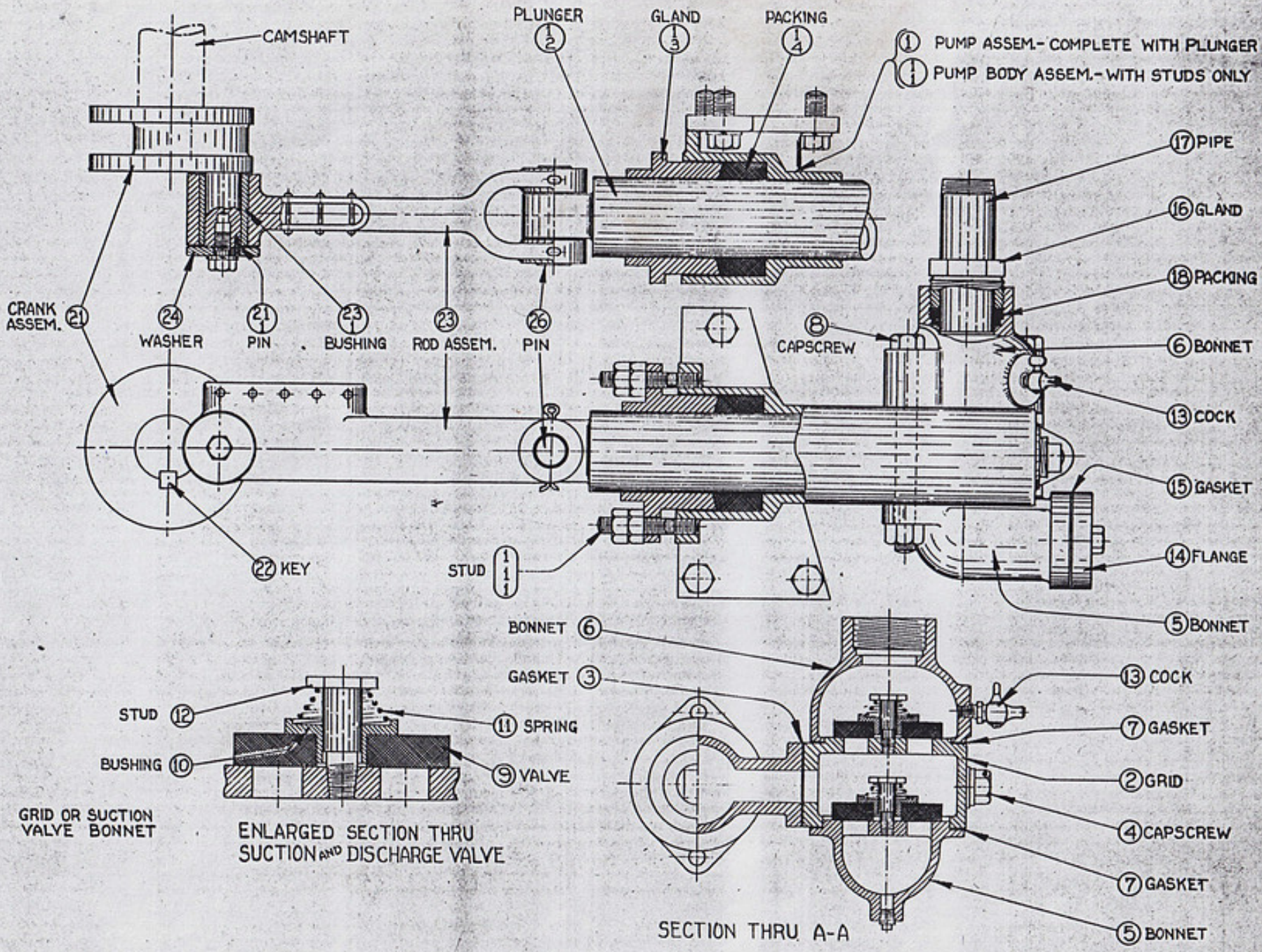
OAKLAND, CALIF. MATTOON, ILL.

FORM 840 REV. 9-44 (M TRANS.)

2L1384

PLATE NO. W-2434

DO NOT ORDER PARTS BY REFER. NUMBERS



EXTRA COPIES TO MATTOON TYPED BY MED DATE 5-15-39 ISSUED BY DATE CHKD. APRVD.

CHANGES #1 7-5-39 Line 11 Part No. Was C-487
Line 12 No. Req'd. Was 4

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-9902
PLATE NO. W-2434

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		1		X1229	1	PUMP ASSEM. - Bilge	
2					3	CAPSCREW -- 5/8-11-NC x 1 1/4 Lg. - (Steel)	
3					3	LOCKWASHER -- 5/8 SAE Reg. - - (Steel)	
4	W-23	2		214-E	1	GRID - Bilge Pump Valve	
5		3		C-1217	1	GASKET - Grid to Pump Body	
6	C-2410	4		C-2410L5 3/4	2	CAPSCREW - Grid to Pump Body	
7					2	LOCKWASHER -- 5/8 SAE Reg. - - (Steel)	
8	F-2892	5		215-29	1	BONNET - Bilge Pump Suction Valve	
9		6		C-9161	1	BONNET - Bilge Pump Discharge Valve	
10	S-2050	7		215A-E	2	GASKET - Bonnets to Grid	
11		8			2	CAPSCREW -- 5/8-11-NC x 6 Long -(Steel)	
12					2	NUT -- 5/8-11-NC-Hex. - - (Steel)	
13	S-1788	9		219-E1	2	VALVE - Bilge Pump Suction & Discharge	
14	S-2289	10		219A-6	2	BUSHING - Bilge Pump Valve	
15	C-461	11		218-E	2	SPRING - Bilge Pump Valve	
16	S-2046	12		217-7	2	STUD - Bilge Pump Valve	
17	C-9045	13		C-9045-P 1/4	1	COCK - Tee Handle Air (Discharge Bonnet)	
18					1	PIPE PLUG -- 1/4 Std. - - (Brass)	
19	C-5351	14		786-B	1	FLANGE - Bilge Pump Suction Pipe	
20		15		S-1042	1	GASKET - Flange to Pump Bonnet	
21					2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (Steel)	
22		16		C-8115	1	GLAND - Discharge Bonnet Packing	
23		17			1	PIPE--1½ x 5 3/4 Lg. (Thr'd. one End)-(Brass)	
24		18			1	PACKING -- 1/4 Sq. x 19 Lg. -(Flax)	
25							
26	C-7971	21		X2104	1	CRANK ASSEM. - Bilge Pump Drive	
27	S-3234	22		5354	1	KEY - Crank to Camshaft	
28	F-5491	23		G264-E	1	ROD ASSEM. - Bilge Pump Connecting	
29		24		C-8004	1	WASHER - Connect. Rod Retainer	
30					1	CAPSCREW -- 1/2-13-NC x 7/8 Lg. - (Steel)	
31					1	LOCKWASHER -- 1/2 SAE Reg. - - (Steel)	
32	S-2002	26		264B-E	1	PIN - Connect. Rod to Pump Plunger	
33					2	COTTER PIN -- 3/16 x 2 1/2 Lg. - (Steel)	
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

L-9902

FOR OPP. HAND SEE L-9903

FOR OPP. ROT. SEE

NAME BILGE PUMP GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

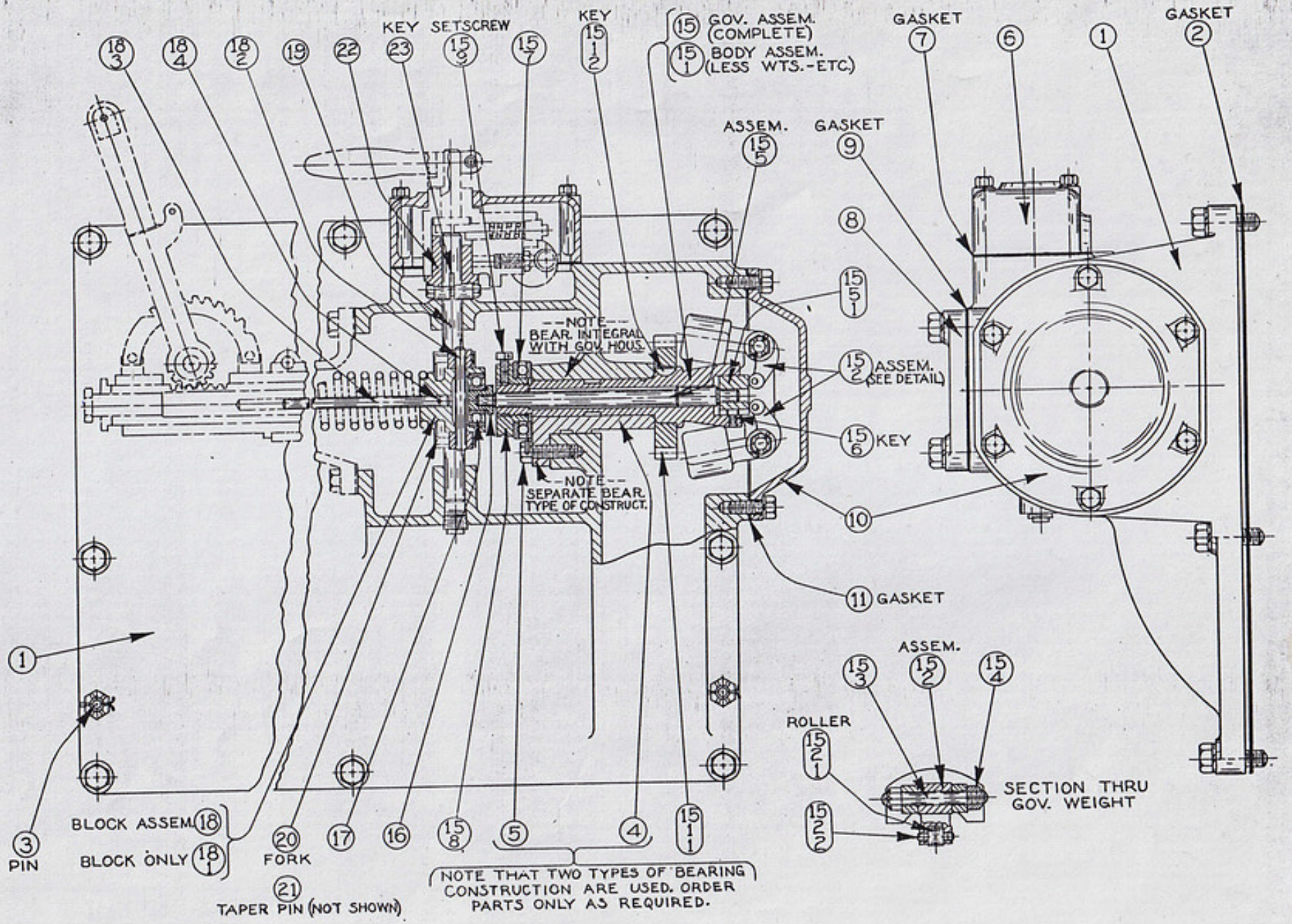
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. 341-TM-10-37

PLATE NO. W-2129

DO NOT ORDER PARTS BY REF. NUMBERS



COPIES TO

TYPED BY MED DATE 2-14-42 ISSUED BY BR DATE 2-16-42 CHKD. AK APRVD.

CHANGES

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

2L865

PLATE NO. W-2129

ASSEM. DRWG. NO. K-730

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME
1		1		K-1294	1	HOUSING - Governor
2		2		S-2363	1	GASKET - Housing to Centerframe
3					8	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (St.)
4					8	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
5	C-7950	3		C-7950L1 3/4	2	PIN - Housing to Centerframe Dowel
6					2	CASTLE NUT -- 3/8-24-NF-Hex. - - (St.)
7					2	COTTER PIN -- 3/32 x 3/4 Lg. - (St.)
8					1	PIPE PLUG -- 1/2 Std. - - (C.I.)
9		6		S-3206	1	COVER - Governor Housing Top
10		7		S-868	1	GASKET - Cover to Housing
11					4	CAPSCREW -- 1/4-20-NC x 2 1/2 Lg. - (St.)
12					4	LOCKWASHER -- 1/4 SAE Reg. - - (St.)
13		8		C-1477	1	DOOR - Governor Housing (Side)
14		9		C-1544	1	GASKET - Door to Housing
15					4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)
16					4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
17		10		W-130	1	COVER - Governor Housing End
18		11		C-3827	1	GASKET - Cover to Housing
19					6	CAPSCREW -- 3/8-16-NC x 1 Lg. - (St.)
20					6	LOCKWASHER -- 3/8 SAE Reg. - - (St.)
21		15		X3484	1	GOVERNOR ASSEMBLY
22		16		C-547	1	SOCKET - Thrust Quill
23	C-9858	17		5868	1	BALL BEARING
24	C-9799	18		X1810	1	BLOCK ASSEM. - Governor Spring
25		19		S-3199	1	SHAFT - Governor Verticle
26		20		F-3047	1	FORK - Governor
27					1	CAPSCREW -- 3/8-16-NC x 1 1/4 Lg. - (St.)
28		21			1	TAPER PIN -- #3 x 1 1/2 Lg. - (St.)
29		22		S-3208	1	BUSHING - Governor Lever Drive
30					1	CAPSCREW -- 3/8-24-NF x 1 1/2 Lg. - (St.)
31					1	NUT -- 3/8-24-NF-Hex. - - (St.)
32		23			1	WOODRUFF KEY -- 1/8 x 5/8 Std. - (St.)
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE 2L866

FOR OPP. ROT. SEE

NAME GOVERNOR GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

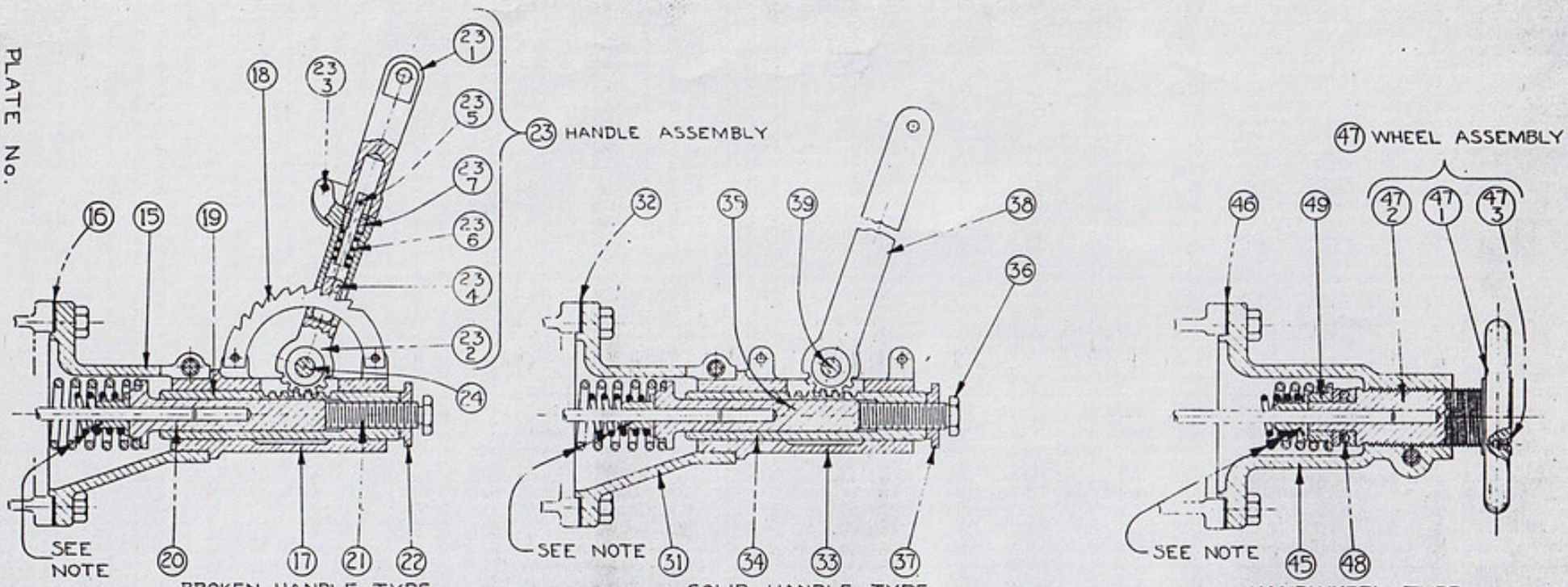
FORM NO. 240 10-41

PARTS LIST

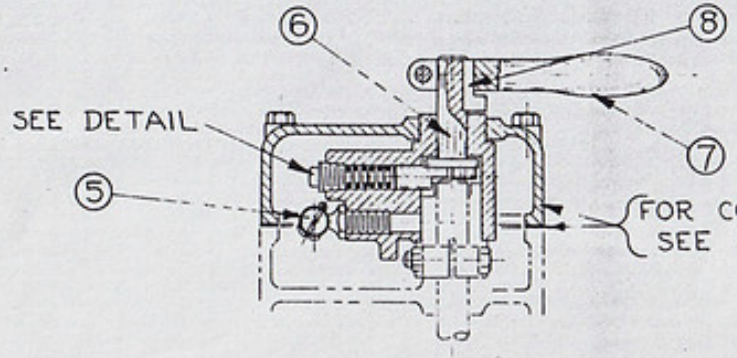
ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

PLATE No. W-1861

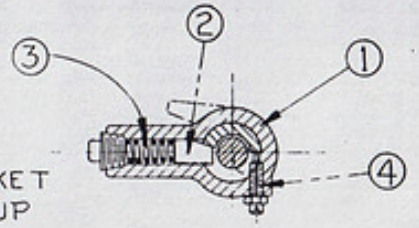
DO NOT ORDER PARTS BY REFERENCE NUMBERS



→NOTE - FOR GOV. SPRING SEE CATALOG INDEX SHEET←



FUEL WEDGE HAND CONTROL



DETAIL OF CONTROL LEVER

EXTRA COPIES TO

TYPED BY ABC DATE 2-13-46 CHKD DATE

ISSUED BY DATE 2-15-46

Retyped from 6-19-45 (no change)

CHANGES #4

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE L-8074

PLATE No. W-1861

ASSEM. DRWG. NO. F-5042

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQ'D.	PART NAME
1	F-6032	15	1123-DX04	1	BEARING - Spring Control Rack Guide
2		16	S-867	1	GASKET - Bearing to Gov. Housing
3				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - - (St.)
4				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
5				1	CAPSCREW(Clamp) -- 3/8-16-NC x 2 Lg. - - (St.)
6		17	F-2661	1	GUIDE - Spring Control Rack
7	S-1032	18	1122A-E1	1	SECTOR - Control Handle
8				2	CAPSCREW -- 1/4-20-NC x 1 Lg. - - (St.)
9				2	NUT -- 1/4-20-NC-Hex. - - (St.)
10				2	LOCKWASHER -- 1/4 SAE Reg. - - (St.)
11		19	S-2945	1	RACK - Spring Control
12		20	S-2907	1	GUIDE - Gov. Spring
13		21	C-8271	1	SCREW - Gov. Spring Adjust.
14		22	C-8272	1	NUT - Adjust. Screw Lock
15		23	X5227	1	HANDLE ASSEM. - Gov. Control
16		24		1	CAPSCREW -- 1/2-13-NC x 2 Lg. - - (St.)
17		24		2	HALF NUT -- 1/2-13-NC-Hex. - - (St.)
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OFF. HANDLING

FOR OFF. ROUTING

NAME GOVERNOR CONTROL GROUP - - - (BROKEN HANDLE)

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE, MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

FORM 340 REV. HAESN. TRANS. PRINTED IN U.S.A.

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-8074

EXTRA COPIES TO MATTOON GO TYPED BY MED DATE 5-22-41 ISSUED BY M.C. DATE 5-22-41 CHKD. M.C. APRVD.

CHANGES #1 Retyped From 5-13-36 (No Changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8076

PLATE NO. SEE GOV. CONTROL

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1				C-6234	1	SPRING - Governor Inner	
2				C-6283	2	GUIDE - Governor Spring	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME GOVERNOR SPRING - - (INNER)

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

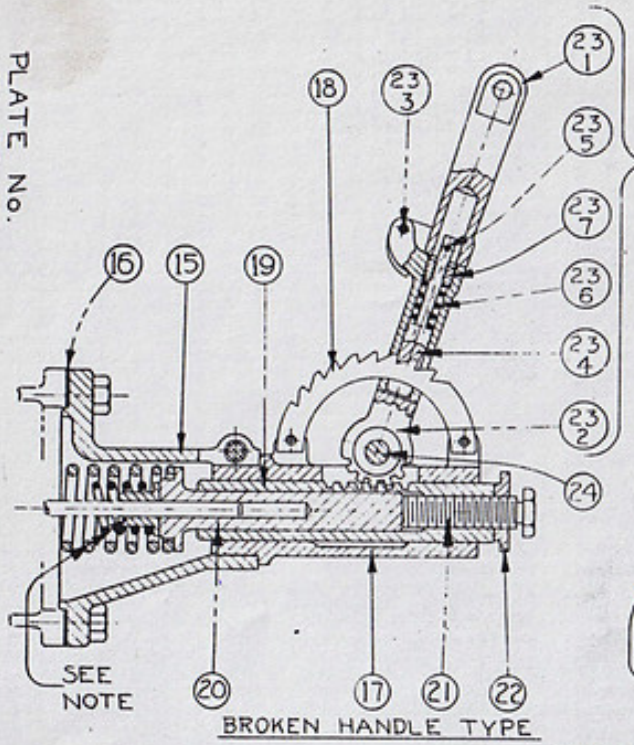
ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. 240 10-39

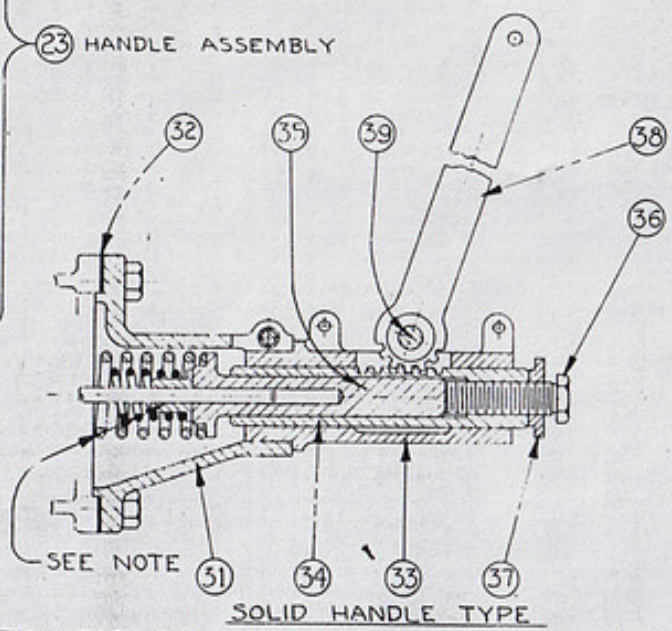
L-8076

PLATE No. W-1861

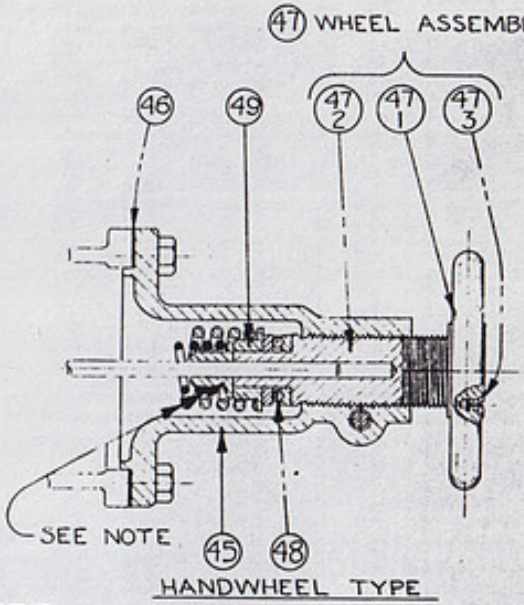
DO NOT ORDER PARTS BY REFERENCE NUMBERS



BROKEN HANDLE TYPE

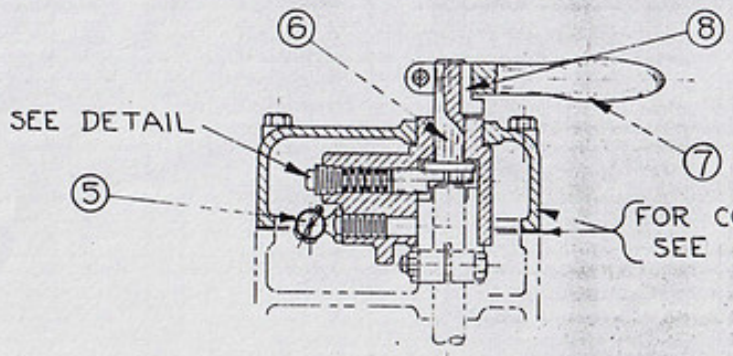


SOLID HANDLE TYPE

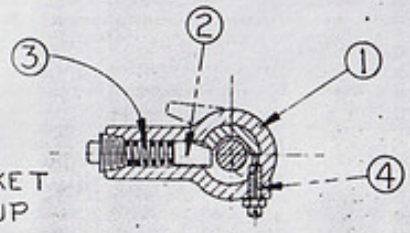


HANDWHEEL TYPE

→NOTE - FOR GOV. SPRING SEE CATALOG INDEX SHEET←



FUEL WEDGE HAND CONTROL



DETAIL OF CONTROL LEVER

EXTRA COPIES TO MATTOON — TYPED BY FR — DATE 10-17-46 — CHKD. — ISSUED BY — DATE 10-30-46

CHANGES #5

Retyped from 5-15-41 (No Changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

L-7123

PLATE NO. W-1861

ASSEN. DRWG. NO. S-3209

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1		1	S-3207	1	LEVER - Wedge Shaft Control
2		2	S-3334	1	PIN - Control Lever Drive
3		3	S-3202	1	SPRING - Drive Pin
4				1	PIPE PLUG -- 3/8 Std. -(Spring Retainer) - (St.
5		4	S-3193	1	SETSCREW - Governor Lever Stop
6				1	HALF NUT -- 1/4-20-NC-Hex. - (St.)
7		5	C-8410	1	JOINT - Ball & Socket
8		6	S-3288	1	SHAFT - Wedge Control Handle
9		7	S-819	1	HANDLE - Wedge Control
10		8	S-3194	1	KEY - Handle
11				1	CAPSCREW -- 5/16-18-NC x 1 1/4 Lg. - (St.)
12					
13				1	LOCKWASHER(Ball Joint)--3/8 Shakeproof Type 12
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE L-7139

FOR OPP. ROT. SEE

NAME FUEL WEDGE HAND CONTROL GROUP

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D PER GROUP GIVEN ON INDEX SHEET

FORM 240 REV. 1/46 3M TRANS. PRINTED IN U.S.A.

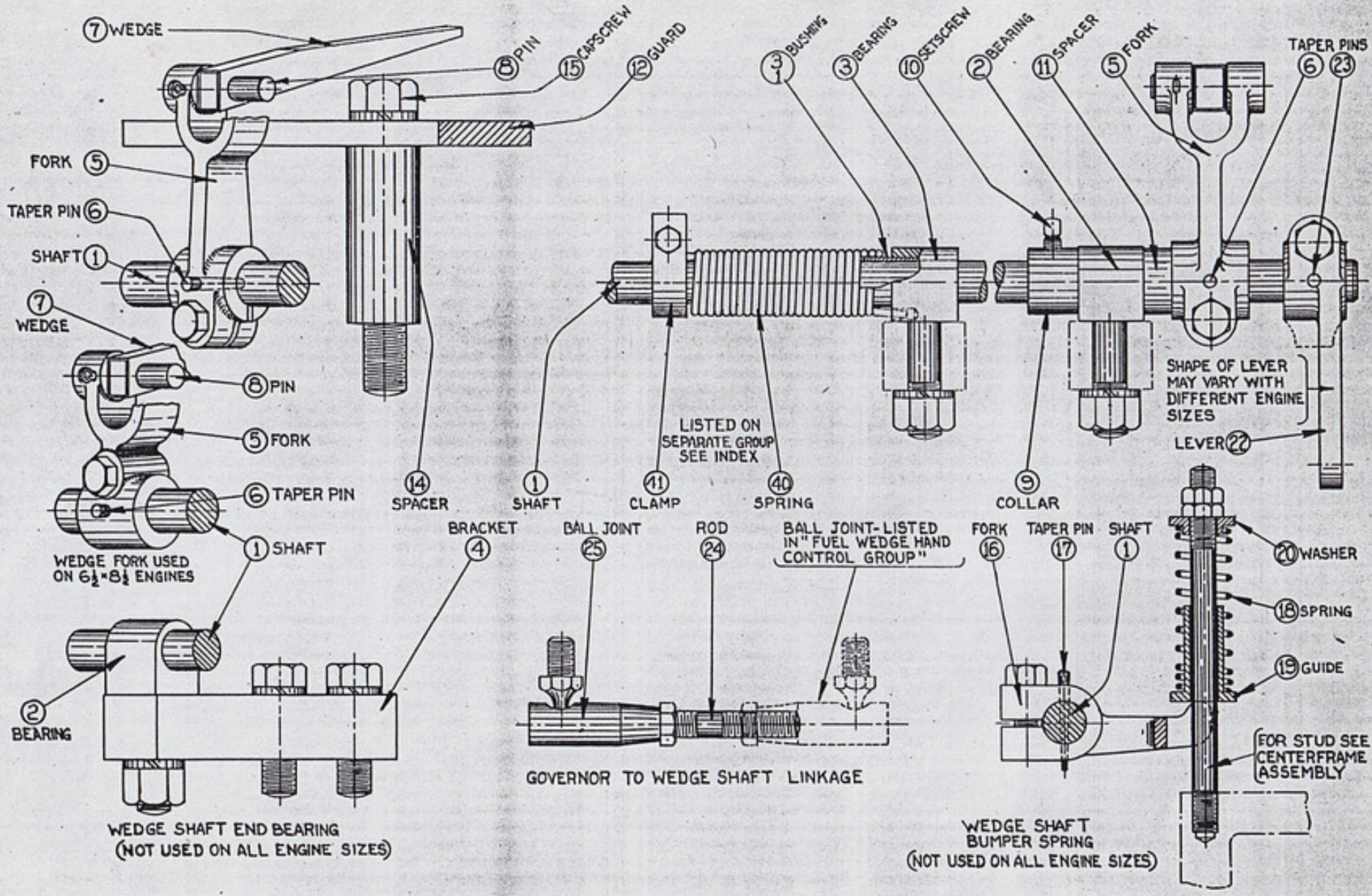
PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-7123

PLATE NO. W-2440

DO NOT ORDER PARTS BY REFER. NUMBERS



EXTRA COPIES TO

TYPED BY DLB DATE 3-26-45 CHKD WED DATE 5-16-45 ISSUED BY MK APRVD.

CHANGES #1 Retyped from 7/19/37 (no changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
★ INDICATES PART NOT SERVICED INDIVIDUALLY

L-8904

PLATE NO. W-2440

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	C-6623	1	C-6623L61	1	SHAFT - Fuel Wedge	
2	S-3292	2	1134-E	4	BEARING - Wedge Shaft	
3	C-4363	3	X929	1	BEARING ASSEM. - Wedge Shaft	
4				5	NUT -- 1/2-13-NC-Hex. -- (St.)	
5				5	LOCKWASHER -- 1/2 SAE Reg. -- (St.)	
6		4	C-3385	1	BRACKET - Wedge Shaft End Brg.	
7				2	CAPSCREW -- 1/2-13-NC x 1 3/4 Lg. -- (St.)	
8				2	LOCKWASHER -- 1/2 SAE Reg. -- (St.)	
9	C-3465	5	1131-C4	4	FORK - Fuel Wedge	
10				4	CAPSCREW -- 3/8-16-NC x 1 Lg. -- (St.)	
11		6		4	TAPER PIN -- #3 x 1 1/2 Lg. -- (St.)	
12	F-897	7	1132-E	4	WEDGE - Fuel	
13	S-752	8	1132A-E	4	PIN - Fuel Wedge to Fork	
14				4	COTTER PIN -- 1/8 x 1 Lg. -- (St.)	
15		9	S-862	1	COLLAR - Wedge Shaft Retainer	
16		10		1	SETSCREW--1/4-20-NC x 3/8 Lg.-Sq.Hd.Cup Pt. (St	
17		11	S-1582	1	SPACER - Wedge Shaft	
18						
19	F-3378	12	1139-E4	1	GUARD - Wedge Shaft	
20	S-2004	14	1141-E	4	SPACER - Wedge Shaft Guard	
21		15		4	CAPSCREW -- 5/8-11-NC x 4 3/4 Lg. -- (St.)	
22				4	LOCKWASHER -- 5/8 SAE Reg. -- (St.)	
23						
24						
25						
26						
27						
28						
29						
30						
31		22	C-6496	1	LEVER - Wedge Shaft Control	
32				1	CAPSCREW -- 3/8-16-NC x 1 Lg. -- (St.)	
33		23		1	TAPER PIN -- #3 x 1 1/4 Lg. -- (St.)	
34		24	C-8040	1	ROD - Wedge Shaft Control	
35				2	NUT -- 3/8-24-NF-Hex. -- (St.)	
36		25	C-8408	1	JOINT - Ball and Socket	
37				1	NUT -- 3/8-24-NF-Hex. -- (St.)	
38				1	LOCKWASHER -- 3/8 SAE Reg. -- (St.)	
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

5-1044

FOR OFF-HAND SEE

FOR OFF. RQT. SEE

NAME FUEL WEDGE SHAFT GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE - STAT.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

EXTRA COPIES TO

TYPED BY FR DATE 10-17-46 CHKD. [illegible] ISSUED BY [illegible] DATE 10-30-4

Retyped from 5-19-45 (No Changes)

#1

CHANGES

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

L-8205

PLATE No. SEE WEDGE SHAFT

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	C-43	40	1135-E-L.H.	1	SPRING - Fuel Wedge Shaft	
2	S-858	41	1136-E	1	CLAMP - Wedge Shaft Spring	
3				1	CAPSCREW -- 1/4-20-NC x 1 Lg. - (St.)	
4	"					
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE L-8204

FOR OPP. ROT. SEE

NAME FUEL WEDGE SHAFT SPRING GROUP

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

FORM 240 REV. 11-46 2M TRANS. PRINTED IN U.S.A.

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

Finance

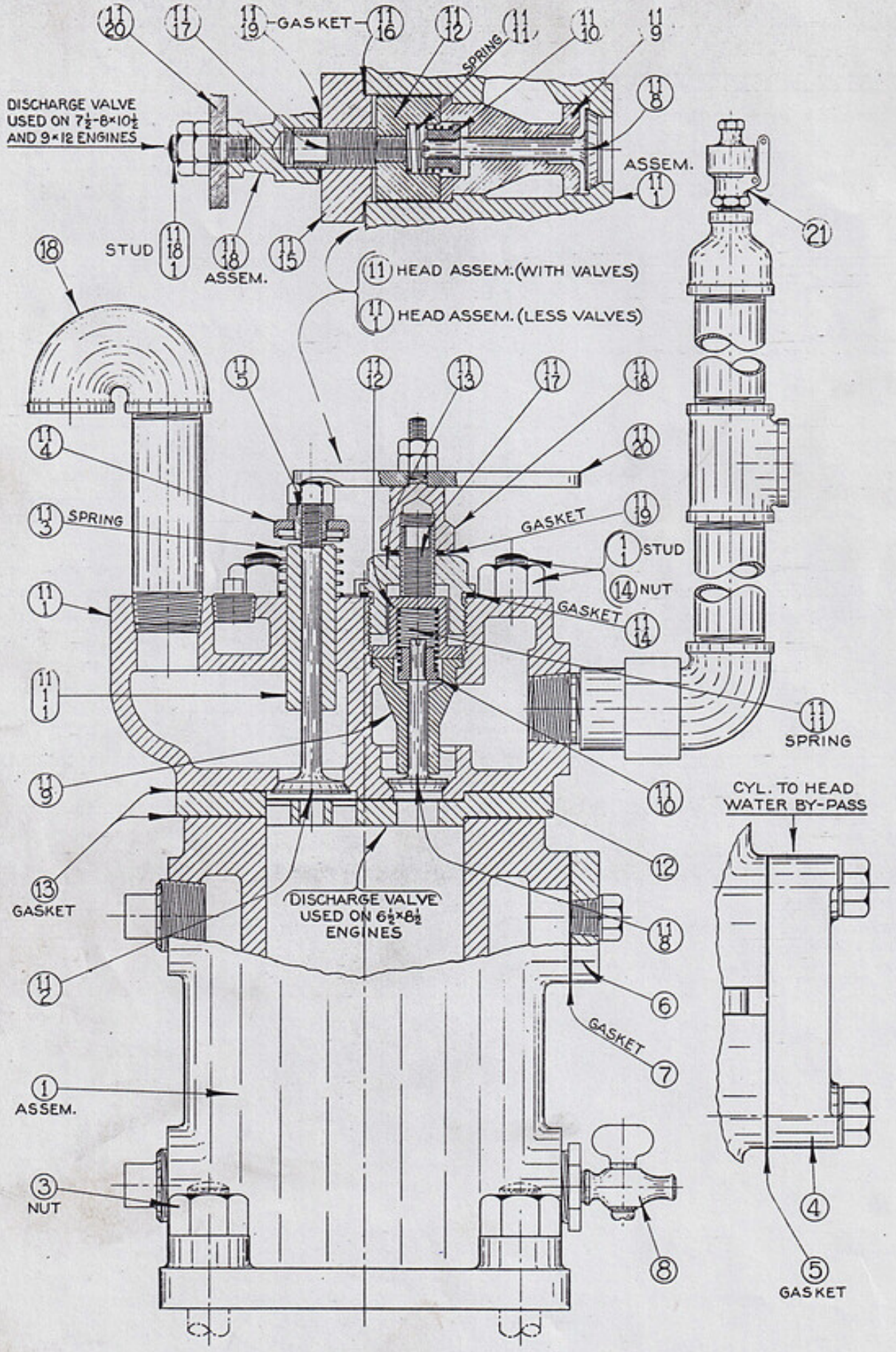


PLATE No.
W-2106 DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO | TYPED BY ABC DATE 2-25-46 | CHKD | ISSUED BY | DATE

#6 Retyped from 3-11-43 (no change)

CHANGES | CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE No. L-8508 W-2106

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEN. DRWG. NO.
1	C-7888	1	X2089	1	CYLINDER ASSEM. - Air Compressor	
2						
3		3		4	NUT -- 5/8-11-NC-Hex. - - (St.)	
4	S-1710	4	34-X	1	PIPE - Cyl. to Head Water By-Pass	
5	S-618	5	610A-X	1	GASKET - Pipe to Cyl. & Head	
6				2	CAPSCREW -- 1/2-13-NC x 2 Lg. - - (St.)	
7				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
8		6	C-517	1	FLANGE - Water Inlet	
9		7	S-2332	1	GASKET - Flange to Cylinder	
10				2	CAPSCREW -- 3/8-16-NC x 1 Lg. - - (St.)	
11				2	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
12	C-9045	8	C-9045-P 1/4	1	COCK - Drain	
13						
14						
15	F-3604	11	G901-C31	1	HEAD ASSEM. - Air Compressor Cylinder	
16	F-3603	12	906-C3	1	GRID - Air Compressor	
17	S-1195	13	901A-C3	2	GASKET - Grid to Head & Cylinder	
18		14		4	NUT -- 5/8-11-NC-Hex. - - (St.)	
19						
20						
21						
22			---- Air Suction ----			
23				1	NIPPLE -- 1 x 4 Lg. - (W.I.)	
24		18		1	RETURN BEND -- 1 Std. - (M.I.)	
25						
26			---- Discharge Piping ----			
27				1	CLOSE NIPPLE -- 1 Std. - (W.I.)	
28				1	UNION ELBOW -- 1 Std.(Crane #590 or Eq.) - (M.	
29				1	NIPPLE -- 1 x 10 Lg. - (W.I.)	
30				1	TEE -- 1 Std. - (M.I.)	
31				1	NIPPLE -- 1 x 4 Lg. - (W.I.)	
32				1	REDUCER (Bell) -- 1 x 1/2 Std. - (C.I.)	
33	C9974	21	C-9974-P 1/2	1	VALVE - Pop Safety	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

L-8508

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME 4" AIR COMPRESSOR GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 7½-8x10½ MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY No. REQ'D FOR GROUP GIVEN ON INDEX SHEET

FORM 240 REV. 1/44 5M TRANS. PRINTED IN U.S.A.

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

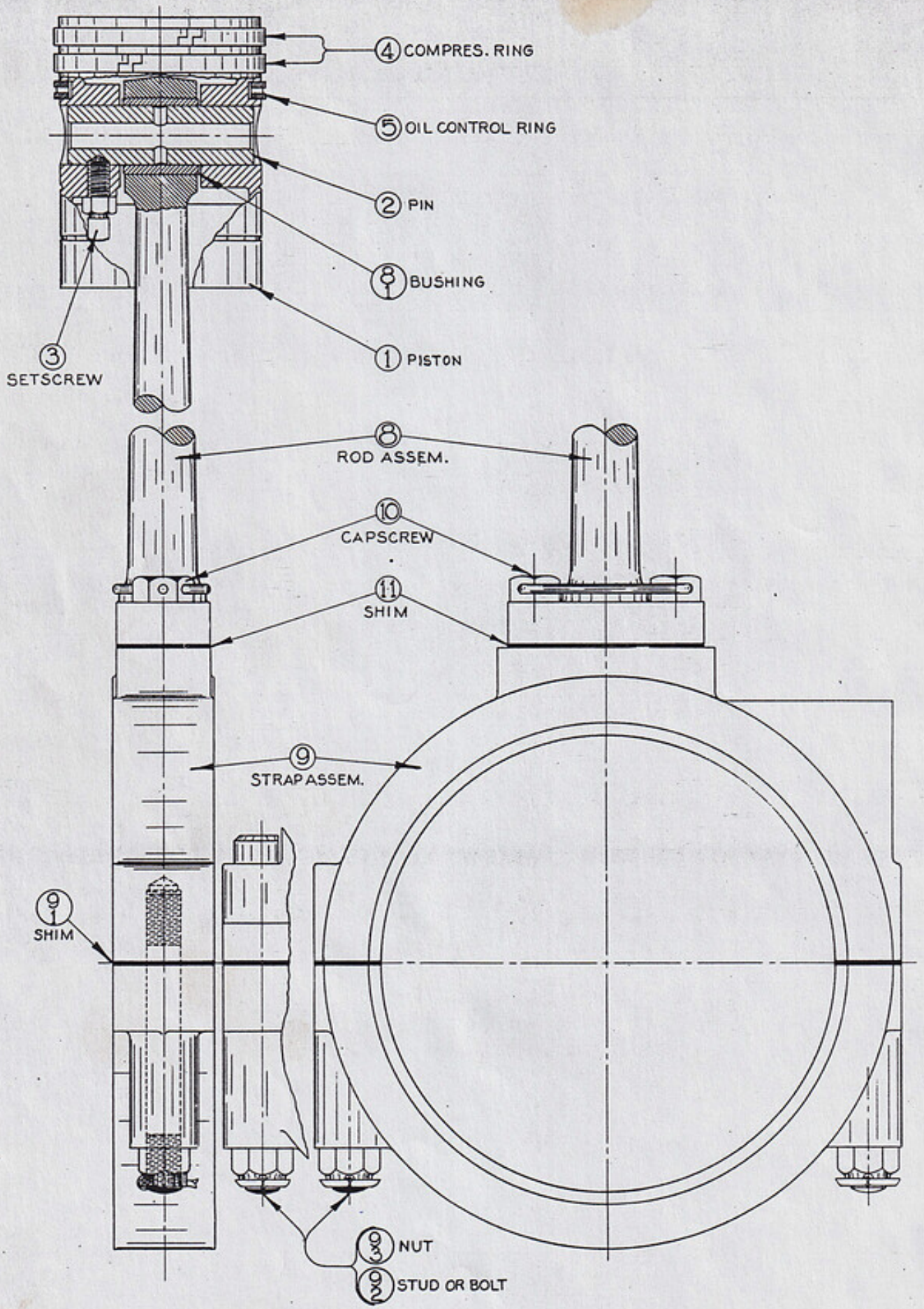


PLATE No.
W-2107

DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO

TYPED BY DLB DATE 3-27-45 CHKD MES DATE 5-2-45 ISSUED BY [illegible] APRVD.

CHANGES #1 Retyped from 7/16/37 (no changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
★ INDICATES PART NOT SERVICED INDIVIDUALLY

L-8889

PLATE NO. W-2107

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-3084	1	925-C4	1	PISTON - Air Compressor	
2	S-763	2	927-C3	1	PIN - Piston	
3		3		1	SETSCREW--5/16-18-NC x 1 Lg.Sq.Hd.Cup Point(St.	
4				1	NUT -- 5/16-18-NC-Hex. -- (St.)	
5	C-2153	4	C-2153L4	2	RING - Piston (Compression)	
6	C-2453	5	C-2453L4	1	RING - Piston (Oil Control)	
7						
8		8	G929-C3	1	ROD ASSEM. - Connecting	
9	F-5506	9	X2268	1	STRAP ASSEM. - Eccentric	
10	C-2412	10	C-2412L1 3/4	2	CAPSCREW - Rod to Strap	
11				1	WIRE -- #16 Ga. x 9 Lg. -- (St.)	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME PISTON, CONNECTING ROD & ECCENTRIC STRAP GROUP (4" AIR COMP)

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12 MARINE

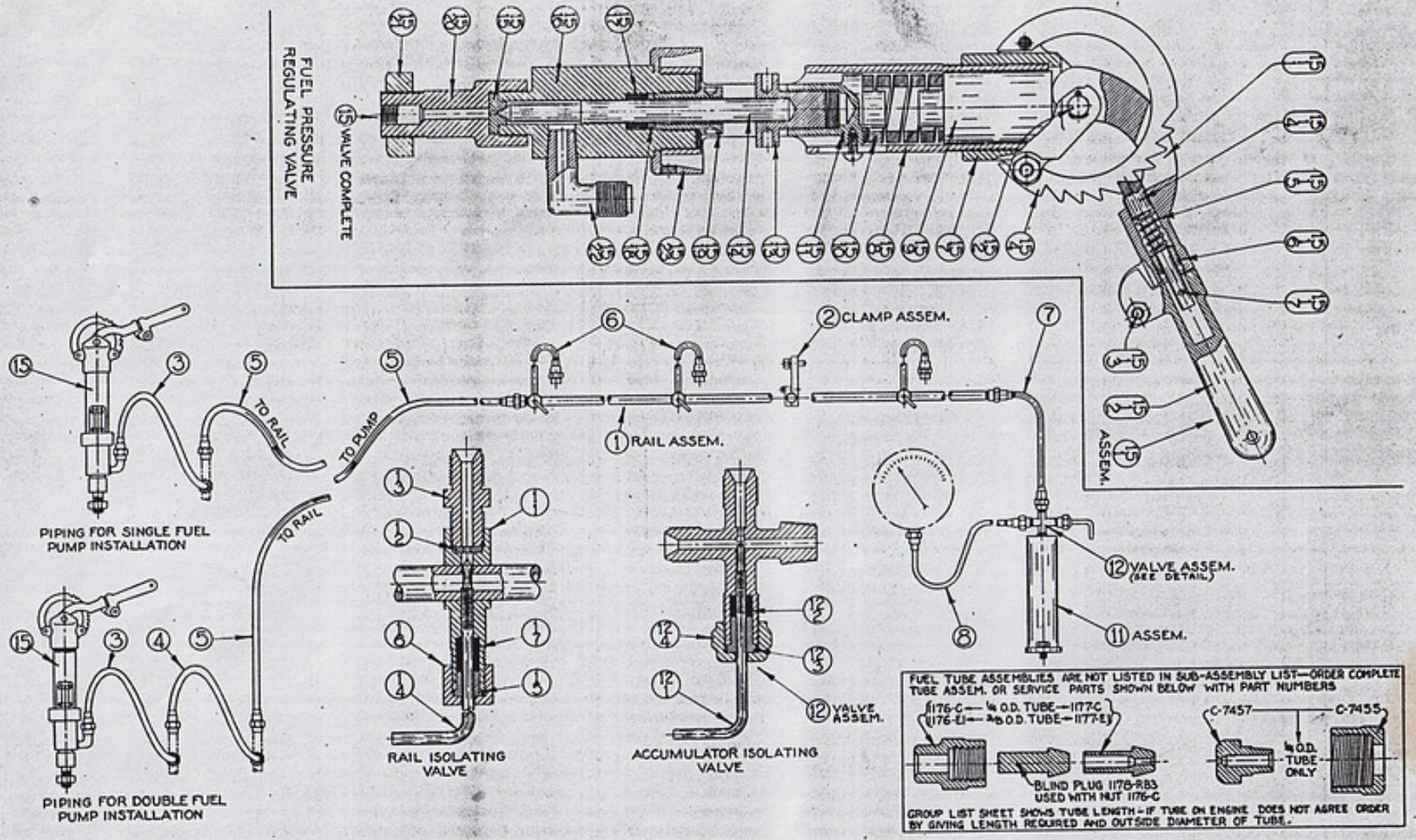
FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST ATLAS IMPERIAL DIESEL ENGINE CO.

L-8889

PLATE No. K-2162 (ED 2)

DO NOT ORDER PARTS BY REF. NUMBERS



EXTRA COPIES TO

TYPED BY DLB DATE 4-12-45 CHKD WED DATE 4-30-45 ISSUED BY [illegible] APRVD.

CHANGES #3 Retyped from 5-16-39 (No changes)

CHANGES

L-9909

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. K-2162

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	F-7124	1	X3726	1	RAIL ASSEM. - Fuel	
2	S-2238	2	G1203-AX3	4	CLAMP ASSEM. - Fuel Rail Support	
3				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
4				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
5						
6					--- High Press. Fuel Piping ---	
7	S-3178	3	X138	1	TUBE ASSEM. - Pump to Reg. Valve - (12")	
8	S-3178	4	X138	1	TUBE ASSEM. - Pump to Pump - (12")	
9	S-3178	5	X5013	1	TUBE ASSEM. - Pump to Rail - (20")	
10	S-3178	6	X5045	4	TUBE ASSEM. - Rail to Spray Valve - (24")	
11	S-3178	7	X5045	1	TUBE ASSEM. - Rail to Accumulator - (24")	
12	S-3178	8	X5013	1	TUBE ASSEM. - Accum. to Press. Gage - (20")	
13						
14	F-6456	11	X3233	1	ACCUMULATOR ASSEM. - Fuel Oil	
15				2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - (St.)	
16				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
17		12	G1215-E	1	VALVE ASSEM. - Accumulator	
18						
19	W-28	15	G1230-E1	1	VALVE ASSEM. - Fuel Press. Regulating	
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPT. MOT. SEE

NAME HIGH PRESSURE FUEL SYSTEM GROUP

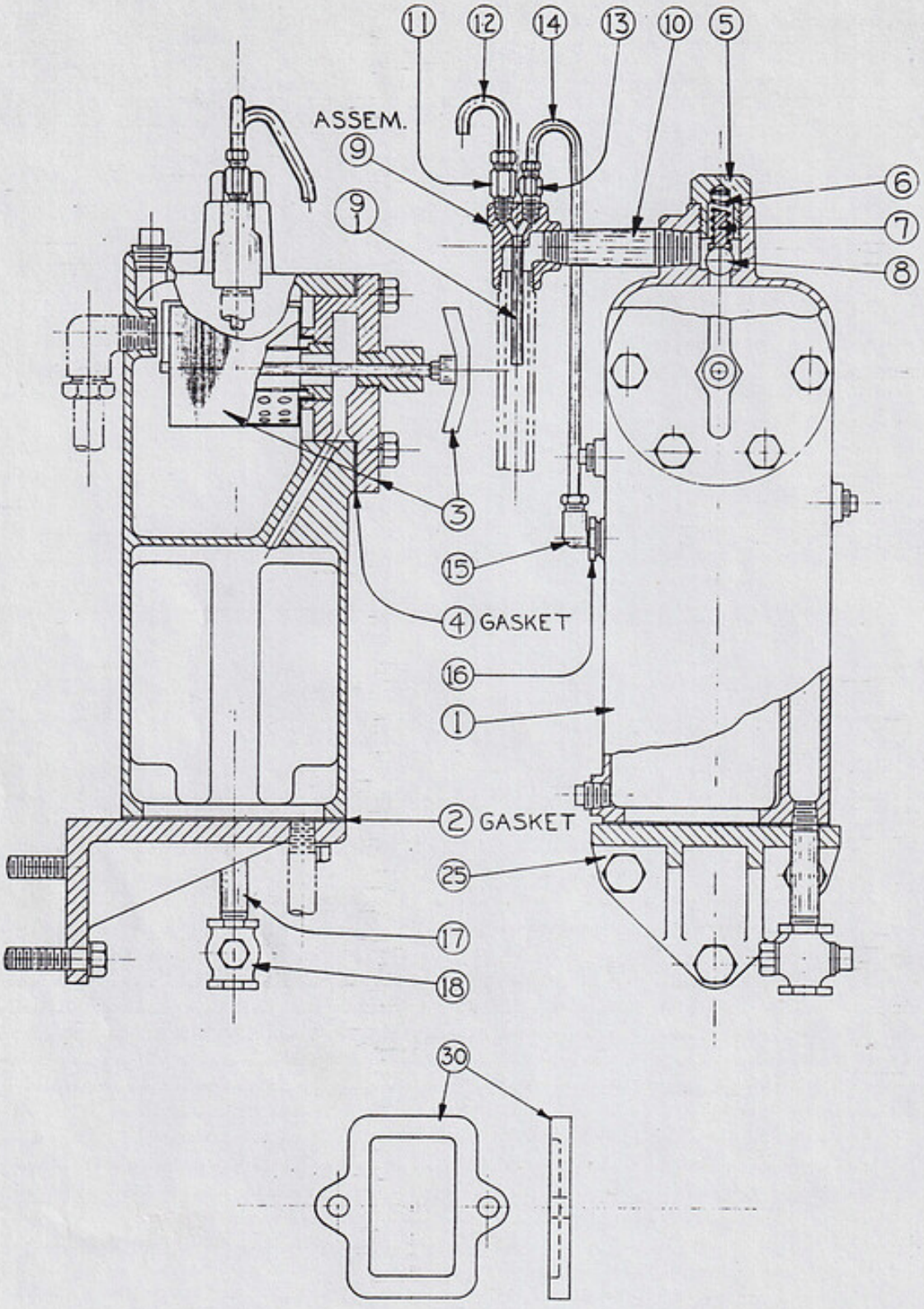
ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIF. MATTOON, ILL.



BRACKET TO CYLINDER BLOCK SPACER
7 × 8½ ENG. ONLY

PLATE No.
W-1842

DO NOT ORDER PARTS BY REFERENCE NUMBERS

EXTRA COPIES TO | TYPED BY ABC DATE 2-13-46 | CHKD WEO | ISSUED BY | DATE 2-15

Retyped from 5-26-41 (no change)

CHANGES #7

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

L-8011

PLATE NO. W-1842

ASSEM. DRWG. NO. 3774

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1		1	K-404	1	TANK - Fuel
2				3	PIPE PLUG -- 1/4 Std. - (C.I.)
3				1	PIPE PLUG -- 1/2 Std. - (C.I.)
4		2	S-2346	1	GASKET - Tank to Bracket
5				4	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - - (St.)
6				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
7		3	PG 78	1	ELEMENT - Filter
8		4	S-1009	1	GASKET - Element to Tank
9				6	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - - (St.)
10				6	LOCKWASHER -- 1/2 SAE Reg. - - (St.)
11		5	S-2220	1	PLUG - Relief Valve Spring Retainer
12		6	S-2345	1	SPRING - Relief Valve
13		7	S-2673	1	SEAT - Relief Valve Spring
14		8		1	STEEL BALL -- 5/8 Dia. Std. - - (St.)
15					
16		9	X511	1	VENT ASSEM. - Fuel Tank
17		10		1	NIPPLE -- 1/2 x 3 1/2 Lg. - - (St.)
18	C-9840	11	C-9840-P 1/4	1	CHECK VALVE - (Tube Fitting)
19		12		1	TUBE (Vent)--1/4 O.D. x .030 x 7 Lg. - (S.D.Co
20	C-9801	13	C-9801-P 1/4	1	CONNECTOR - Tube
21		14		1	TUBE -- 1/4 O.D. x .030 x 14 1/2 Lg. - (S.D.Co
22	C-9804	15	C-9804-P 1/4	1	ELBOW - Tube
23					
24					
25					
26					
27					--- Tank Drain ---
28		17		1	NIPPLE -- 3/8 x 2 Lg. - (Brass)
29	C-9053	18	C-9053-P 3/8	1	COCK - Drain
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR DMC HAND SEE

FOR DPP, ROT. SEE

NAME FUEL DAY TANK GROUP

ORIGINALLY ISSUED FOR

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D PER GROUP GIVEN ON INDEX SHEET.

FORM 540 REV. 3/45 SM TRANS. PRINTED IN U.S.A.

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L C C

EXTRA COPIES TO MATTOON TYPED BY FR DATE 10-17-46 CHKD. ABC ISSUED BY ABC DATE 10-30-46

Retyped from 12-15-42 (No Changes)

CHANGES #2

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE

PLATE No. L-4552

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1			F-3375	1	BRACKET - Fuel Oil Day Tank	
2				3	CAPSCREW -- 3/8-16-NC x 1 Lg. - (St.)	
3				3	LOCKWASHER -- 3/8 SAE Reg. - (St.)	
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE L-4553

FOR OPP. ROT. SEE

NAME FUEL OIL DAY TANK BRACKET GROUP

ORIGINALLY ISSUED FOR 6 1/2 x 8 1/2 - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY No. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM 240 REV. 1/46 2M TRANS. PRINTED IN U.S.A.

L-4552

EXTRA COPIES TO MATTOON TYPED BY MED DATE 11-4-42 CHKD DATE 11-5-42 ISSUED BY APRVD.

CHANGES #7 Revised & Retyped from 12-11-36
#8 5-19-43 Added Union Fitt. Part Nos.

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. L-8480

ASSEM. DRWG. NO. A-218

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME
1			---- L.P. Fuel Pump to Day Tank ----		
2				1	CLOSE NIPPLE -- 1/4 Std. - (W.I.)
3				1	COUPLING -- 1/4 Std. Pipe - - (M.I.)
4	C-9804		C-9804-P 3/8	1	ELBOW - Tube
5				1	TUBE -- 3/8 O.D. x .035 x 44 Lg. -(S.D. Cop.)
6	C-9804		C-9804-P 3/8	1	ELBOW - Tube
7				1	REDUCING BUSHING -- 3/8 x 1/4 Std. - (C.I.)
8			S-2810	1	CLAMP - Tube
9				1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd. Hd.-(St.)
10					
11					
12			---- Day Tank to H.P. Fuel Pump ----		
13				1	NIPPLE -- 3/8 x 2 1/2 Lg. - (W.I.)
14	C-9048		C-9048-P 3/8	1	GLOBE VALVE
15	C-9804		C-9804-P 1/2	1	ELBOW - Tube
16				1	TUBE -- 1/2 O.D. x .049 x 9 Lg.-(H.D. Cop.)
17	C-9801		C-9801-P 1/2	1	CONNECTOR - Tube
18	2C165		2C165-P 3/8	1	UNION TEE
19				1	NIPPLE -- 3/8 x 2 1/2 Lg. - (W.I.)
20	2C160		2C160-P 3/8	1	UNION ELBOW
21				2	CLOSE NIPPLE -- 3/8 Std. - (W.I.)
22					
23					
24			---- Fuel Press. Relief Valve to Day Tank By-Pass Line ----		
25	C-9801		C-9801-P 3/8	1	CONNECTOR - Tube
26				1	TUBE -- 3/8 O.D. x .035 x 32 Lg.-(S.D. Cop.)
27	C-9801		C-9801-P 3/8	1	CONNECTOR - Tube
28				1	TEE -- 1/2 x 1/2 x 1/4 Std. Reduc. -(M.I.)
29				1	NIPPLE -- 1/2 x 8 Lg. - (W.I.)
30					
31					
32			---- H.P. Fuel Pump Housing Drain ----		
33	C-9804		C-9804-P 3/8	1	ELBOW - Tube
34				1	TUBE -- 3/8 O.D. x .035 x 44 Lg.-(S.D. Cop.)
35			S-2810	1	CLAMP - Tube
36				1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd.Hd.-(St.)
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

FOR OPP. HAND SEE

FOR OPP. HOT. SEE

FORM 240 REV. 3-42 IM TRANS IM BOND

NAME L.P. FUEL PIPING GROUP

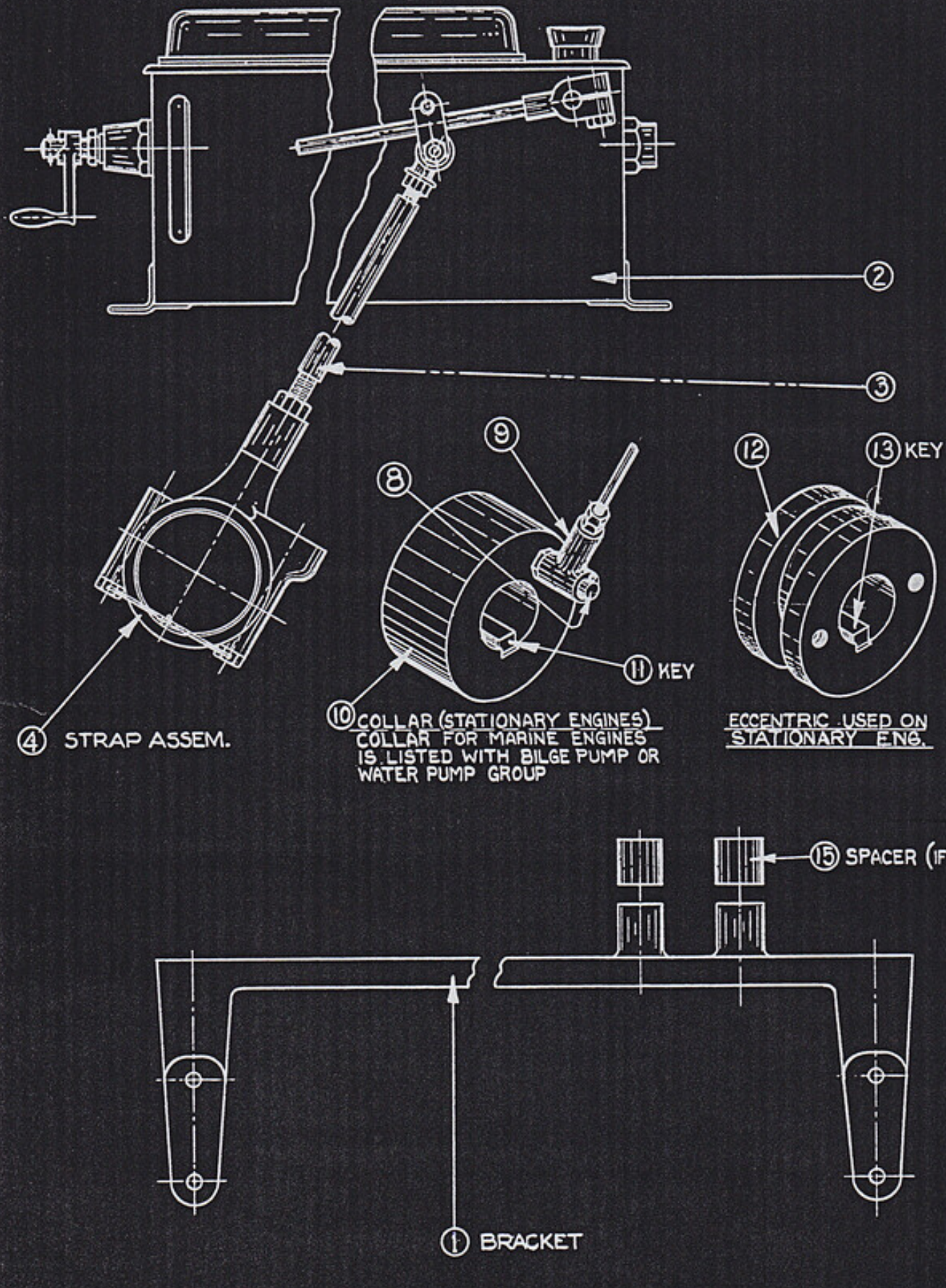
ORIGINALLY ISSUED FOR 4 CYL. 7½ x 10½ MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-8480



DO NOT ORDER PARTS BY REF. NUMBERS

EXTRA COPIES TO 3 | TYPED BY DLB DATE 4-11-45 | CHKD [illegible] DATE 4-30-45 | ISSUED BY [illegible] APRVD.

CHANGES #3 Retyped from 5-15-39 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

L-8909

PLATE NO. W-1746

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1		1	F-5249	1	BRACKET - Lubricator	
2			-	4	CAPSCREW -- 1/2-13-NC x 1 1/2 Lg. - (St.)	
3				4	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
4	F-7148	2	F-7148-P9	1	LUBRICATOR -- Madison-Kipp R.H. Side Drive -	
5					9 Feed	
6				4	CAPSCREW -- 3/8-16-NC x 1 1/4 Lg. - (St.)	
7				4	NUT -- 3/8-16-NC-Hex. - - (St.)	
8				4	PLAIN WASHER -- 3/8 SAE Std. - - (St.)	
9				4	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
10		3	C-8428	1	ROD - Lubricator Drive	
11				2	HALF NUT -- 3/8-16-NC-Hex. - - (St.)	
12		8	C-1223	1	PIN - Lubricator Drive	
13	C-500	9	253-X	1	EYE - Lubricator Drive Rod	
14				1	PLAIN WASHER -- 1/2 SAE Std. - (St.)	
15				1	COTTER PIN -- 1/8 x 1 Lg. - (St.)	
16						
17						
18						
19					--- Lubricator to Cylinder - Cam Side ---	
20				1	TUBE(Cyl. 1)--1/4 O.D. x .030 x 20 Lg.-(S.D. Cop.	
21				1	TUBE(Cyl. 2)--1/4 O.D. x .030 x 37 Lg.-(S.D. Cop.	
22				1	TUBE(Cyl. 3)--1/4 O.D. x .030 x 54 Lg.-(S.D. Cop.	
23				1	TUBE(Cyl. 4)--1/4 O.D. x .030 x 71 Lg.-(S.D. Cop.	
24	C-9832		C-9832-P 1/4	4	ELBOW - Tube Fitting	
25					--- Lubricator to Cylinder - Exhaust Side ---	
26				1	TUBE(Cyl. 1)--1/4 O.D. x .030 x 30 Lg.-(S.D. Cop.	
27				1	TUBE(Cyl. 2)--1/4 O.D. x .030 x 44 Lg.-(S.D. Cop.	
28				1	TUBE(Cyl. 3)--1/4 O.D. x .030 x 58 Lg.-(S.D. Cop.	
29				1	TUBE(Cyl. 4)--1/4 O.D. x .030 x 72 Lg.-(S.D. Cop.	
30	C-9832		C-9832-P 1/4	4	ELBOW - Tube Fitting	
31						
32					--- Lubricator to Thrust Bearing ---	
33				1	TUBE -- 1/4 O.D. x .030 x 142 Lg.-(S.D. Copper)	
34	C-9830		C-9830-P 1/4	1	CONNECTOR - Tube Fitting	
35				1	TEE -- 1/4 x 1/4 x 1/8 Std. Reducing - (M.I.)	
36				1	PIPE PLUG -- 1/4 Std. -- (Brass)	
37				1	NIPPLE -- 1/4 x 4 Lg. - (Brass)	
38	2C3		2C3-P	2	CLAMP - Oil Tube to Thrust Brg. Water Pipe	
39				2	MACHINE SCREW--3/8-16-NC x 3/4 Lg.-Rnd.Hd.-(St.)	
40				2	HALF NUT -- 3/8-16-NC-Hex. - - (St.)	
41	C-9831		C-9831-P 1/4	1	UNION - Tube Fitting	
42						
43			S-1492	4	CLAMP - Tube - (2 - 1/4 O.D. Tubes)	
44			S-1493	4	CLAMP - Tube - (3 - 1/4 O.D. Tubes)	
45			S-1494	4	CLAMP - Tube - (4 - 1/4 O.D. Tubes)	
46			S-1495	3	CLAMP - Tube - (5 - 1/4 O.D. Tubes)	
47				15	MACHINE SCREW--1/4-20 x 3/8 Lg.Rnd.Hd.-(St.)	
48				15	NUT -- 1/4-20-NC-Hex. - - (St.)	
49						
50						

L-8909

FOR OPP. HAND SEE L-8910

FOR OPP. ROT. SEE

NAME LUBRICATOR & PIPING GROUP

ORIGINALLY ISSUED FOR 4CYL. 9 x 12 MARINE - R.H.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM 240 REV. 9-44 IN TRANS.

EXTRA COPIES TO MATTOON TYPED BY MED DATE 5-16-39 ISSUED BY DATE CHKD. APRVD.

CHANGES #1 5-19-43 Added Union Fitt. Part No.

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. L-9913

ASSEM. DRWG. NO. A-219 -- A-218

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME
1						--- Pressure Pump to Base & Filter ---
2					1	NIPPLE -- 1/2 x 2 1/2 Lg. - (Brass)
3	2C167			2C167-P 1/2	1	UNION TEE
4					1	TUBE(to Filter)--5/8 ODx .049x 24 Lg.(H.D. Cop.
5	C-9804			C-9804-P 5/8	2	ELBOW - Tube Fitting
6					1	REDUCING BUSHING -- 1 x 1/2 Std. - (C.I.)
7					1	CLOSE NIPPLE -- 1/2 Std. - - (Brass)
8					1	TEE -- 1/2 Std. - - (M.I.)
9					1	NIPPLE -- 1/2 x 2 1/2 Lg. - (Brass)
10				PG 21L 1/2	1	VALVE - Pressure Relief
11					1	NIPPLE -- 1/2 x 9 Lg. - (Brass)
12	2C160			2C160-P 1/2	1	UNION ELBOW
13						
14						--- Filter to Camshaft Bearing ---
15					1	REDUCING BUSHING -- 1 x 3/8 Std. - (C.I.)
16					1	CLOSE NIPPLE -- 3/8 Std. - - (Brass)
17					1	TEE -- 1/4 x 1/4 x 3/8 Std. Reducing - (M.I.)
18					1	REDUCING BUSHING -- 1/4 x 1/8 Std. - (C.I.)
19					1	TUBE -- 1/4 O.D. x .030 x 12 Lg.-(S.D. Copper)
20	C-9801			C-9801-P 1/4	1	CONNECTOR - Tube Fitting
21	C-9804			C-9804-P 1/4	1	ELBOW - Tube Fitting
22						
23						--- Filter to Top of C't'rframe & Cent Pump Brg. ---
24					1	TUBE(Filter to top of Centerframe)--3/8 O.D. x
25						.035 x 20 Lg. - (S.D. Copper)
26	C-9801			C-9801-P 3/8	1	CONNECTOR - Tube Fitting
27	C-9805			C-9805-P 3/8	1	ELBOW - Tube Fitting
28					1	NIPPLE -- 1/4 x 5 1/2 Lg. - (Brass)
29					1	TEE -- 1/4 Std. - - (M.I.)
30					1	REDUCING BUSHING -- 1/4 x 1/8 Std. - (C.I.)
31					1	TUBE(Cent. Pump)--1/4 ODx .030x 38 Lg.-(S.D. Cop.
32	C-9804			C-9804-P 1/4	2	ELBOW - Tube Fitting
33					1	PIPE -- 1/4 x 63 1/2 Lg.(Thr'd. 2 Ends)-(Brass)
34					1	TEE -- 1/4 x 1/4 x 1/8 Std. Reducing - (M.I.)
35				S-2809	2	CLAMP - Pipe
36					2	MACHINE SCREW--1/4-20 x 1/2 Lg. - Rnd. Hd.-(Steel)
37						
38						---Tee on Top of C't'rframe to Gov.-Int Gear & Cam Brg
39					1	TUBE(Gov.)--1/4 ODx .030x 14 Lg.-(S.D. Copper)
40	C-9801			C-9801-P 1/4	2	CONNECTOR - Tube Fitting
41					1	TUBE(Int. Gear)--1/4 ODx .030x 18 Lg.-(S.D. Cop.)
42					1	TUBE(Cam. Brg.)--1/4 ODx .030x 15 Lg.-(S.D. Cop.)
43	C-9807			C-9807-P 1/4	1	TEE - Tube Fitting
44					1	REDUCING BUSHING -- 1/4 x 1/8 Std. -(C.I.)
45	C-9804			C-9804-P 1/4	2	ELBOW - Tube Fitting
46						
47						
48						
49						
50						

L-9913

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME LUBE OIL PRESSURE PIPING GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. [illegible]

EXTRA COPIES TO — TYPED BY MED DATE 12-18-40 — ISSUED BY — DATE — CHKD. — APRVD.

CHANGES #1 5-19-43 Added Union Fitt. Part Nos.

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. 2L446

ASSEM. DRWG. NO. A-218 -- A-219

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME
1						-- Base to Four Way Cock (Inlet & Outlet) --
2	2C160			2C160-P 1/2	2	UNION ELBOW
3					1	PIPE(Base Outlet)--1/2 x 22 Lg.(Thr'd. Both End
4						(Brass)
5					1	PIPE(Base Inlet)--1/2 x 22 Lg.(Thr'd. Both Ends
6						(Brass)
7	2C167			2C167-P 1/2	2	UNION TEE
8					2	CLOSE NIPPLE -- 1/2 Std. - (Brass)
9					1	PIPE PLUG -- 1/2 Std. - (Brass)
10	C-9055			C-9055-P 3/4	1	COCK - Four Way
11					4	REDUCING BUSHING -- 3/4 x 1/2 Std. - (Brass)
12						
13						
14						--- Four Way Cock to Cooler (Inlet) ---
15					1	CLOSE NIPPLE -- 1/2 Std. - (Brass)
16	2C160			2C160-P 1/2	1	UNION ELBOW
17					1	PIPE--1/2 x 15 Lg.(Thr'd. 2 Ends)-(Brass)
18	2C157			2C157-P 1/2	1	UNION
19					1	CLOSE NIPPLE -- 1/2 Std. - (Brass)
20						
21						
22						-- Cooler to Four Way Cock (Outlet) --
23					1	CLOSE NIPPLE -- 1/2 Std. - (Brass)
24					1	TEE -- 1/2 Std. - (M.I.)
25					1	PIPE PLUG -- 1/2 Std. - (C.I.)
26					1	NIPPLE -- 1/2 x 9 Lg. - (Brass)
27	2C160			2C160-P 1/2	1	UNION ELBOW
28					1	NIPPLE -- 1/2 x 5 Lg. - (Brass)
29					1	ELBOW -- 1/2 Std. 45° - (M.I.)
30					1	CLOSE NIPPLE -- 1/2 Std. - (Brass)
31					1	STREET ELL -- 1/2 Std. - (M.I.)
32						
33						
34						-- Base Inlet Pipe to Pressure Gage --
35	C-9801			C-9801-P 1/4	1	CONNECTOR - Tube Fitting
36					1	TUBE -- 1/4 O.D. x .030 x 48 Lg. -(S.D. Cop.)
37	C-9801			C-9801-P 1/4	1	CONNECTOR - Tube Fitting
38					1	REDUCER (Bell)--1/4 x 1/8 Std. - (M.I.)
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. ROT. SEE

NAME LUBE OIL PIPING GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 9 x 12

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. 242 — 10-39

2L446

EXTRA COPIES TO

TYPED BY DLB DATE 4-17-45 CHKD. MCS DATE 5-2-45 ISSUED BY FSL APRVD.

CHANGES #1 Retyped from 12-3-36 (no changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. L-8468

LINE NO.	DRWG. NO.	REF. NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1			W-888	1	BRACKET - Lube Oil Filter	
2			C-7915	1	GASKET - Bracket	
3				4	CAPSCREW -- 3/8-16-NC x 1 1/4 Lg. - - (St.)	
4				4	LOCKWASHER -- 3/8 SAE Reg. - - (St.)	
5						
6			PG 42	1	FILTER - Lube Oil	
7				2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg. - - (St.)	
8				2	LOCKWASHER -- 1/2 SAE Reg. - - (St.)	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OFF-HAND SEE

FOR OFF. RQT. SEE

NAME LUBE OIL FILTER GROUP

ORIGINALLY ISSUED FOR 4 CYL. 7 1/2 x 10 1/2 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

L-8400

EXTRA COPIES TO _____ TYPED BY MED DATE 1-17-41 ISSUED BY _____ DATE _____ CHKD. _____ APRVD. _____

CHANGES

#1 Retyped From Sheet Dated 5-31-39
#2 5-19-43 Added Union Fitt. Part Nos.

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
* INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. L-9915

ASSEM. DRWG. NO. A-218

LINE NO.	DRWG. NO.	REF. NO.	*	PART NO.	NO. REQD.	PART NAME
1						--- Bilge Pump Nipple to Water Inlet Man. ---
2	C-9054			C-9054-P1 1/4	1	COCK - Three Way
3					1	NIPPLE -- 1 1/4 x 7 Lg. - (Brass)
4					1	ELBOW -- 1 1/4 Std. - - (Brass)
5					1	NIPPLE -- 1 1/4 x 2 Lg. - (Brass)
6						
7						--- Cent. Water Pump to Water Inlet Man. ---
8					1	NIPPLE -- 1 1/4 x 12 Lg. - (Brass)
9					1	ELBOW -- 1 1/4 Std. - - (Brass)
10					1	NIPPLE -- 1 1/4 x 2 Lg. - (Brass)
11						
12						--- Water Inlet Man. to Thrust Bearing ---
13					1	STREET ELL -- 3/8 Std. - - (Brass)
14					1	REDUCING BUSHING -- 3/8 x 1/4 Std.-(Brass)
15					1	NIPPLE -- 1/4 x 5 1/2 Lg. - (Brass)
16	C-9053			C-9053-P 1/4	1	SERVICE COCK
17					1	NIPPLE -- 1/4 x 1 1/2 Lg. - (Brass)
18	2C162			2C162-P 1/4	1	UNION ELBOW
19						
20					1	PIPE -- 1/4 x 81 Lg.(Thr'd. 2 Ends)-(Brass)
21					1	ELBOW -- 1/4 Std. - - (Brass)
22					1	NIPPLE -- 1/4 x 8 Lg. - (Brass)
23	2C159			2C159-P 1/4	1	UNION
24					1	NIPPLE -- 1/4 x 1 1/2 Lg. - (Brass)
25					1	TEE -- 1/4 Std. - - (Brass)
26					2	NIPPLE -- 1/4 x 1 1/2 Lg. - (Brass)
27	C-9053			C-9053-P 1/4	1	DRAIN COCK
28				S-2809	1	CLAMP - Pipe to Centerframe
29					1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd.Hd.-(St.)
30						
31						
32						--- Water Inlet Man. to Air Comp. Cyl. ---
33					1	CLOSE NIPPLE -- 3/8 Std. - (Brass)
34	2C159			2C159-P 3/8	1	UNION
35					1	PIPE -- 3/8 x 18 Lg.(Thr'd. 2 Ends)-(Brass)
36						
37						--- Air Comp. to Ex. Man. Water Outlet ---
38					2	NIPPLE -- 3/8 x 3 Lg. - (Brass)
39	2C159			2C159-P 3/8	2	UNION
40					1	PIPE--3/8 x 16 3/4 Lg.(Thr'd. 2 Ends)-(Brass)
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

L-9915-C

FOR OPP. HAND SEE

FOR OPP. HOT. SEE

NAME WATER PIPING GROUP

ORIGINALLY ISSUED FOR 4 CYL. 9 x 12 MARINE

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR THIS GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM NO. P-01 10-39

EXTRA COPIES TO

TYPED BY DLB DATE 4-27-45 CHKD DATE 5-2-45 ISSUED BY APPV.

CHANGES #5 Retyped from 10-25-34 (No changes)

CHANGES

ALWAYS GIVE PART NUMBER—PART NAME—ENGINE NUMBER
FOR STD. HARDWARE WITHOUT PART NUMBER GIVE DESCRIPTION AND SIZE
★ INDICATES PART NOT SERVICED INDIVIDUALLY

PLATE NO. L-6881

LINE NO.	DRWG. NO.	REF NO.	PART NO.	NO. REQD.	PART NAME	ASSEM. DRWG. NO.
1	2C4040		1217-AX3	1	GAGE - Fuel Pressure	
2	2C46		5898	1	GAGE - Lube Oil Pressure	
3				6	MACHINE SCREW -- 1/4-20 x 3/8 Lg.Rnd.Hd.(St.	
4						
5			X2071	2	BRACKET ASSEM. - Pressure Gage	
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

FOR OPP. HAND SEE

FOR OPP. NOT. SEE

NAME PRESSURE GAGE GROUP

ORIGINALLY ISSUED FOR 3-4 CYL. 7½-8 x 10½ MAR.-STAT.

FOR TOTAL REQUIREMENTS PER ENGINE MULTIPLY NO. REQ'D GIVEN ABOVE BY NO. REQ'D FOR GROUP GIVEN ON INDEX SHEET

PARTS LIST

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIF. MATTOON, ILL.

FORM 840 REV 9-44 IM TRANS.

ASSEM. LIST NO. AL 171
ISSUE #2
ENGINE SIZE 7"x10½"-9x12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
X68			GREASE CUP ASSEM. - BALL CHECK — Includes
1	C-1259	1	BODY
2	C-1258	1	SPRING
3		1	BRONZE BALL -- 3/8" Dia.
4	C-1264	1	GREASE CUP
X71			FILTER ASSEM. - HIGH PRESS. FUEL — Includes
1	F-1982	1	BODY
2	S-1686	1	CAP - Filter Body
3	FG 25	1	ELEMENT - Filter
X204			VALVE ASSEM. - COMPRESSION RELIEF SAFETY - Includes
1	F-2798	1	BODY - Valve
2	X541	1	STEM ASSEM.
3	S-3339	1	SPRING
4	S-3337	2	WASHER
5	S-3338	1	CAP - Valve Body
6		1	SETSCREW--1/4-20 x 1 Lg.-Headless - Cup Pt.
7		1	HALF NUT -- 1/4-20-Hex.
X215			CLAMP ASSEM. - SPRAY VALVE TEST — Includes
			Test Clamp & Cap (No Service Parts)
X228			SPRING ASSEM-FUEL SPRAY VALVE PUSH-ROD BUFFER — Includes
			Cage, Spring & Sleeve (No Service Parts)
X237			PUSH-ROD ASSEM. - SPRAY VALVE — Includes
			Push-Rod Tube & Upper & Lower Plugs (No Service Parts)
X248			GEAR ASSEM. - CAMSHAFT — Includes
			Gear Hub & Ring (No Service Parts)
GA260-A			BODY ASSEM. - BILGE PUMP (2 1/2") — Includes
*		1	BODY
1	373A-J	2	STUD - Packing Gland
		1	PIPE PLUG -- 1 Std.
GA260-A-LH			BODY ASSEM. - BILGE PUMP (2 1/2") — Includes
*		1	BODY
1	373A-J	2	STUD - Packing Gland
		1	PIPE PLUG -- 1 Std.
GA260-E			BODY ASSEM. - BILGE PUMP (3") — Includes
*		1	BODY
1	373A-J	2	STUD - Packing Gland
		1	PIPE PLUG -- 1 Std.
GA260-E-LH			BODY ASSEM. - 3" BILGE PUMP — Includes
*		1	BODY
1	373A-J	2	STUD - Packing Gland
		1	PIPE PLUG -- 1 Std.
G261-A			PLUNGER ASSEM. - BILGE PUMP (2 1/2") — Includes
			Plunger & 1 1/4 Std. Pipe Plug (No Service Parts)
G261-E			PLUNGER ASSEM. - BILGE PUMP (3") — Includes
			Plunger & 1 1/4 Std. Pipe Plug (No Service Parts)
X261			VALVE ASSEM. - FUEL SPRAY — Includes
1	851-E	1	BODY
2	S-2757	1	GLAND - Packing (Lower)
3	866-E	1	GLAND - Packing (Upper)
4		6	PACKING RING -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. -- Garlock #333
5	865-E	1	NUT - Gland
6	6850-E	1	SPINDLE ASSEM.
7	856-E	1	NUT - Valve Seat
8	853-E	1	CASING - Valve Spring
9		1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd. Hd.
10	858-E	1	SPRING
11	857-AX3	1	RETAINER - Spring
12	5677	1	BALL BEARING -- Thrust
13	870-E	1	NUT - Spindle
14		1	NUT -- 1/2-13-Hex.
G264-A			ROD ASSEM. - BILGE PUMP CONNECTING — Includes
*		1	ROD
1	264A-E	1	BUSHING
		5	ESCUTCHEON PIN -- #10 x 1 1/4 Lg.

REF. No.	PART NUMBER	No. USED	DESCRIPTION
G264-A-LH			ROD ASSEM. - BILGE PUMP CONNECTING — Includes
*		1	ROD
1	264A-E	1	BUSHING
		5	ESCUTCHEON PIN -- #10 x 1 1/4 Lg.
G264-E			ROD ASSEM. - BILGE PUMP CONNECTING — Includes
*		1	ROD
1	264A-E	1	BUSHING
		5	ESCUTCHEON PIN -- #10 x 1 1/4 Lg.
G264-E-LH			ROD ASSEM. - BILGE PUMP CONNECTING — Includes
*		1	ROD
1	264A-E	1	BUSHING
		5	ESCUTCHEON PIN -- #10 x 1 1/4 Lg.
X265			WEIGHT ASSEM. - GOVERNOR — Includes
*		1	WEIGHT
1	C-544	1	ROLLER
2	S-2899	1	PIN - Roller
X266			QUILL ASSEM. - GOVERNOR THRUST — Includes
*		1	QUILL
1	C-545	1	PLATE - Thrust
X270			WEIGHT ASSEM. - GOVERNOR — Includes
*		1	WEIGHT
1	C-544	1	ROLLER
2	S-2899	1	PIN - Roller
X271			BODY ASSEM. - GOVERNOR — Includes
*		1	BODY
1	S-805	1	PINION
2		1	WOODRUFF KEY -- 1/8 x 5/8 Std.
3	1110-DXC4	1	COLLAR - Retainer
4		2	TAPER PIN -- #2 x 2 1/4 Lg.
G306-C3			GEAR ASSEM. - REVERSE GEAR (LONG) — Includes
*		1	GEAR
1		2	BUSHING -- Bunting #H1449
G306-C4			GEAR ASSEM. - REVERSE GEAR (LONG) — Includes
*		1	GEAR
1		2	BUSHING - Bunting #H1452
G307-C3			GEAR ASSEM. - REVERSE GEAR (SHORT) — Includes
*		1	GEAR
1	324-E3	1	BUSHING
G307-C4			GEAR ASSEM. - REVERSE GEAR (SHORT) — Includes
*		1	GEAR
1	324-C4	1	BUSHING
G312-C3			COLLAR ASSEM. - CROWDER ADJUSTING — Includes
*		2	COLLAR
1	C-9556L4 1/4	2	BOLT
		2	NUT -- 3/4-10-Hex.
		2	HALF NUT -- 3/4-10-Hex.
G331-C3			COLLAR ASSEM. - SHIFTER — Includes
*		2	COLLAR
1	C-7936	2	CAPSCREW
		2	NUT -- 5/8-11-Hex.
		2	LOCKWASHER -- 5/8 SAE Reg.
G342-C4			SHOE ASSEM.-REVERSE GEAR DRUM BRAKE(21") — Includes
*		1	SHOE
1	C-8439	1	LINING
2		24	RIVET -- 3/16 x 7/8 Lg.-(Tubular)
3	C-1737	1	STUD - Brake Shoe Centering

ASSEM'L LIST NO. AL 172 | ISSUE 1 | ENGINE SIZE 7½x10½-9x12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
G342-E3			SHOE ASSEM.-REVERSE GEAR DRUM BRAKE (19") Includes
*		1	SHOE
1	C-7846	1	LINING
2		20	RIVET -- 3/16 Dia. x 3/4 Lg.-(Tubular)
3	C-1737	1	STUD - Brake Shoe Centering
X368			SILENCER ASSEM. - AIR SUCTION Includes
1	F-2206	1	SILENCER
2	F-2207	1	CONE
3	C-3136	4	SPACER
		4	CAPSCREW -- 3/8-16-NC x 1 1/2 Lg.
		4	NUT -- 3/8-16-NC-Hex.
		1	CAPSCREW -- 1/2-13-NC x 3 3/4 Lg.
		1	NUT -- 1/2-13-NC-Hex.
G370-E1			PUMP ASSEM. - 1 1/4" CENTRIFUGAL Includes
1	GA370-E1	1	BODY ASSEM.
2	371-E	1	COVER - Suction
3	371C-E	1	GASKET - Cover
		12	MACHINE SCREW--1/4-20 x 3/8 Lg.-Rnd. Hd.
4	G372-E1	1	IMPELLER & SHAFT ASSEM.
5		1	PACKING -- 3/8 Sq. x 12 Lg. - (Flax)
6	373-E	1	GLAND - Packing-
		4	NUT -- 7/16-14-Hex.
7	X68	1	CUP ASSEM. - Grease
8	381-FB4	1	BEARING - Steady
		2	CAPSCREW -- 3/8-16 x 3/4 Lg.
		2	CAPSCREW -- 3/8-16 x 1 Lg.
		1	CAPSCREW -- 1/2-13 x 2 Lg.
9	386-FB41	1	HOUSING - Ball Bearing
10	C-9069-P	1	BALL BEARING
11	C-9070-P	1	ADAPTOR - Ball Bearing
12	386A-FB41	1	RETAINER - Ball Bearing
13		1	GREASE CUP -- 1/8 - Lunkenheimer -"Guard #00"
14	785-B	1	FLANGE - Suction Pipe
15	S-2334	1	GASKET - Flange
		2	CAPSCREW -- 1/2-13 x 1 Lg.
16	785-B	1	FLANGE - Pump Discharge
17	S-2334	1	GASKET - Flange
		2	CAPSCREW -- 1/2-13 x 1 Lg.
GA370-E1			BODY ASSEM. - 1 1/4" CENTRIFUGAL PUMP Includes
*		1	BODY
1	374-E	1	BUSHING
2	373A-E	2	STUD - Packing Gland
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/4 Std.
G372-E1			IMPELLER & SHAFT ASSEM.-CENTRIFUGAL PUMP -Includes
*		1	IMPELLER
1	379-E1	1	SHAFT
2	C-821	1	PIN - Impeller Lock
X378			CYLINDER ASSEM. - FLYWHEEL AIR BRAKE Includes
*		1	CYLINDER
1	5079	1	LINER
G384-28			COUPLING ASSEM. - COMPRESSION (3/4") Includes
1	384-28	1	SLEEVE
2	384A-28	2	COLLAR
3	384B-28	2	NUT
X489			LIFTER ASSEM. - FUEL SPRAY VALVE Includes
*		1	LIFTER
1	884-E	1	ROLLER
2	S-3032	1	PIN - Roller
3	S-2447	1	PIN - Fuel Wedge
4	C-3292	1	WASHER - Lifter Spring
5	S-2255	1	PIN - Lifter Guide
X490			SPRING ASSEM.-FUEL SPRAY VALVE BUFFER Includes
			Spring Cage, Spacer, Buffer Spring & Retainer Plug (No Service Parts)
GA500-R			HEAD ASSEM. - CYLINDER Includes
1	X822	1	HEAD ASSEM.
2	P-5275	1	VALVE - Inlet
3	P-5276	1	VALVE - Exhaust
4	513-R	2	SPRING - Valve
5	514A-FXC4	2	WASHER - Valve Spring (Bottom)
6	514-FXC4	2	WASHER - Valve Spring (Top)
7		4	HALF NUT -- 5/8-11-Hex.
8		2	LOCKWASHER -- Shakeproof - Type 11 - 5/8
9	580-R	1	VALVE - Air Starting
10	585-R	1	BUSHING - Air Start. Valve
11	C-2151L1 1/4	2	RING - Piston
12	579-R	1	BUSHING - Spring
13	582-E	1	SPRING - Air Start. Valve
14	588-R	1	WASHER - Spring (Bottom)
15	583-FXC4	1	WASHER - Spring (Top)
16		1	NUT -- 5/8-18-Hex.

REF. No.	PART NUMBER	No. USED	DESCRIPTION
X511			VENT ASSEM. - FUEL OIL DAY TANK Includes
*		1	BODY - Fuel Day Tank Vent
1		1	TUBE -- 1/4 O.D. x 3 Lg.-(Cop.)
G520-E32			ROCKER ASSEM. - VALVE Includes
*		1	ROCKER
1	550A-P2	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.,
G520-R3			ROCKER ASSEM. - VALVE Includes
*		1	ROCKER
1	520A-R3	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
G527A-E			BALL CHECK ASSEMBLY Includes
			Body, Spring & Ball (No Service Parts)
X541			STEM ASSEM.-COMPRESSION RELIEF SAFETY VALVE Includes
			Safety Valve & Valve Stem (No Service Parts)
G550-E32			ROCKER ASSEM. - VALVE Includes
*		1	ROCKER
1	550A-P2	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
G550-R3			ROCKER ASSEM. - VALVE Includes
*		1	ROCKER
1	520A-R3	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
G570-C31			HANDLE ASSEM. - AIR STARTING Includes
1	570-C31	1	HANDLE
		1	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
2	G571-C3	1	PAWL ASSEMBLY
3	572-GX8	1	SPRING
4	571A-C3	1	SCREW
		1	HALF NUT -- 5/16-18-Hex.
G571-C3			PAWL ASSEM. - AIR STARTING HANDLE Includes
*		1	PAWL
1	S-2892	1	PIN
G590-E32			ROCKER ASSEM. - AIR STARTING VALVE Includes
*		1	ROCKER
1	590A-E32	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
G590-R3			ROCKER ASSEM. - AIR STARTING VALVE Includes
*		1	ROCKER
1	590A-R3	2	BUSHING
2	523-E	1	ROLLER - Rocker
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
G594-E			LIFTER ASSEM. - AIR STARTING VALVE Includes
*		1	LIFTER
1	595-E	1	ROLLER
2	596-E	1	PIN

ASSEM'L LIST NO. AL 173
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
G600-FB42			CYLINDER ASSEMBLY - (LINER TYPE)	Includes
*		1	CYLINDER	
1	C-5219	6	STUD - Cyl. Head	
2	610-RB3	6	PIPE - Water Cyl. to Head Water	
3	G601-FB41	1	LINER ASSEM. - Cylinder	
4	C-3628	1	GASKET - Liner	
5	604-FB4	2	GROMMET - Liner	
6	605-N	2	COVER - Cylinder Clean-out	
7	605A-N	2	GASKET - Cyl. Clean-out Cover	
		8	CAPSCREW -- 1/2-13 x 1 1/4 Lg.	
8	C-264	2	NIPPLE - Cyl. Lube Oil	
9	610A-RB3	2	GROMMET - Oil Nipple	
10	S-2914	4	WASHER - Grommet	
11	612-R	2	GLAND - Packing	
G600-R			CYLINDER ASSEMBLY	Includes
*		1	CYLINDER	
		4	PIPE PLUG -- 1 1/4 Std.	
1	S-2263	6	STUD - Cyl. Head	
2	605-N	1	COVER - Clean-out	
3	605A-N	1	GASKET - Cover	
		4	CAPSCREW -- 1/2-13 x 1 1/4 Lg.	
4	C-264	2	NIPPLE - Lube Oil	
5	612-R	2	GLAND - Packing	
6	610A-RB3	2	GROMMET	
7	S-2914	4	WASHER	
G600-RB32			CYLINDER ASSEMBLY	Includes
*		1	CYLINDER	
		5	PIPE PLUG -- 1 1/4 Std.	
1	S-2263	6	STUD - Cylinder Head	
2	605-N	1	COVER - Clean-out	
3	605A-N	1	GASKET - Cover	
		4	CAPSCREW -- 1/2-13 x 1 1/4 Lg.	
4	C-264	2	NIPPLE - Lube Oil	
5	612-R	2	GLAND - Packing	
6	610A-RB3	2	GROMMET	
7	S-2914	4	WASHER	
8	610-RB3	5	PIPE - Water By-Pass	
G601-FB41			LINER ASSEM. - CYLINDER	Includes
*		1	LINER	
1	621A-F	1	PIN - Dowel	
G621-F			PIN ASSEM. - PISTON	Includes
*		1	PIN	
1	621A-F	1	PIN - Dowel	
G621-R1			PIN ASSEM. - PISTON	Includes
*		1	PIN	
1	621A-F	1	PIN - Dowel	
G621-RB32			PIN ASSEM. - PISTON	Includes
*		1	PIN	
1	621A-F	1	PIN - Dowel	
GA630-FB4			ROD ASSEM. - CONNECTING	Includes
*		1	ROD	
1	F-891	1	BUSHING	
2		1	PIPE PLUG -- 3/8 Std.	
GA630-R3			ROD ASSEM. - CONNECTING	Includes
*		1	ROD	
1	F-890	1	BUSHING	
2		1	PIPE PLUG -- 3/8 Std.	
G632-E			VALVE ASSEM. - BALL CHECK	Includes
			Valve Body, Steel Ball & Retainer Pin (No Service Parts)	
GA636-E31			BEARING ASSEM. - CONNECTING ROD	Includes
*		2	BEARING	
1	636A-E31-A	2	SHIM - (1/16)	
1	636A-E31-B	2	SHIM - (1/32)	
1	636A-E31-D	4	SHIM - (.010)	
1	636A-E31-E	8	SHIM - (.003)	
2	C-2506L1 1/2	2	CAPSCREW	
3		2	CASTLE NUT -- 3/8-24-Hex.	
		2	COTTER PIN -- 3/32 x 1 Lg.	
4	C-7972L 3/4	2	PIN - Bolt Retainer	

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
G680-C			BEARING ASSEM. - CAMSHAFT	Includes
*		1	BEARING	
1	685-C	1	BUSHING	
G683-C4			BEARING ASSEM. - CAMSHAFT	Includes
*		1	BEARING	
1	C-308	1	BUSHING	
X699			SILENCER ASSEM. - AIR SUCTION	Includes
1	P-2187	1	SILENCER	
2	P-2188	1	CONE	
		3	CAPSCREW -- 3/8-16 x 1 1/2 Lg.	
		3	NUT -- 3/8-16-Hex.	
		1	CAPSCREW (Clamp)--3/8-16 x 3 Lg.	
		1	NUT -- 3/8-16-Hex.	
X704			ROCKER ASSEM. - VALVE	Includes
*		1	ROCKER	
1	550A-F2	2	BUSHING	
2	523-E	1	ROLLER	
3	524-E	1	PIN - Roller	
4	G527A-E	1	BALL CHECK ASSEM.	
X706			ROCKER ASSEM. - VALVE	Includes
*		1	ROCKER	
1	550A-F2	2	BUSHING	
2	523-E	1	ROLLER	
3	524-E	1	PIN - Roller	
4	G527A-E	1	BALL CHECK ASSEM.	
X708			ROCKER ASSEM. - AIR STARTING	Includes
*		1	ROCKER	
1	590A-E32	2	BUSHING	
2	523-E	1	ROLLER	
3	524-E	1	PIN - Roller	
4	G527A-E	1	BALL CHECK ASSEM.	
X720			HEAD ASSEM. - H.P. FUEL PUMP	Includes
*		1	HEAD	
1	2C1833L 1/8	1	PIPE PLUG	
X731			HEAD ASSEM. - H.P. FUEL PUMP	Includes
*		1	HEAD	
1	2C1833L 1/8	1	PIPE PLUG	
X781			MANIFOLD ASSEM. - SPRAY VALVE DRAIN Pipe & Tees (No Service Parts)	Includes
X794			CONTROL ASSEM. - GOVERNOR SPEED	Includes
1	C-1986	1	HANDWHEEL	
2	C-3797	1	SLEEVE - Adjusting	
3		1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Flat Hd.	
G796-E			FITTING ASSEM.-H.P. FUEL PUMP DISCHARGE	Includes
1	796-EB32	1	FITTING	
2	796A-E	2	RING	
3	797-EB3	1	NUT	
G796-EB32			FITTING ASSEM.-H.P. FUEL PUMP DISCHARGE	Includes
1	G796-E	1	FITTING ASSEM.	
2	796C-E1	1	VALVE - Check	
3	796D-E1	1	SPRING - Check Valve	
X822			HEAD ASSEM. - CYLINDER	Includes
*		1	HEAD	
		6	PIPE PLUG -- 3/4 Std.	
		6	PIPE PLUG -- 1 Std.	
1	512-R51	2	GUIDE - In. & Exh. Valve	
2	854A-E	1	STUD - Spray Valve Clamp	
3	567-E	4	STUD - Rocker Shaft Bearing	
4	764-E	2	STUD - Exhaust Elbow	

ASSEMBLY LIST NO. AL 174 | ISSUE 1 | ENGINE SIZE 7½ x 10½ - 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
	G823-RB3		ROD ASSEM. - H.P. PUMP CONNECTING	Includes
*		1	ROD	
*		1	CAP	
1	C-227-D	4	SHIM - (.010)	
1	C-227-E	8	SHIM - (.003)	
2	C-222	2	BOLT	
3		2	CASTLE NUT -- 5/8-18-Hex.	
		2	COTTER PIN -- 1/8 x 1 Lg.	
	G847-FB4		DOOR ASSEM. - FUEL PUMP HOUSING	Includes
1	847-FB4	1	DOOR - Fuel Pump Housing	
2	G847A-FB4	1	LATCH ASSEM. - Door	
3		1	WING NUT -- 1/2-13 Std.	
4		1	TAPER PIN -- #2 x 1 3/4 Lg.	
	G847A-FB4		LATCH ASSEM. - FUEL PUMP HOUSING DOOR	Includes
*		1	LATCH	
1	S-2247	1	STUD	
	G847-RB3		DOOR ASSEM. - FUEL PUMP HOUSING	Includes
1	847-RB3	1	DOOR	
2	G847A-RB3	1	LATCH ASSEM.	
3		1	WING NUT -- 1/2-13 Std.	
4		1	TAPER PIN -- #2 x 1 3/4 Lg.	
	G847A-RB3		LATCH ASSEM. - FUEL PUMP HOUSING DOOR	Includes
*		1	LATCH	
1	S-2247	1	STUD	
	G847C-RB3		HINGE ASSEM. - FUEL PUMP HOUSING DOOR	Includes
			Door Hinges (No Service Parts)	
	G850-E		SPINDLE ASSEM. - SPRAY VALVE	Includes
			Spindle & Extension (No Service Parts)	
	G870-R31		ROCKER ASSEM. - SPRAY VALVE	Includes
*		1	ROCKER	
1	G527A-E	1	BALL CHECK ASSEM.	
	G870-RB3		ROCKER ASSEM. - SPRAY VALVE	Includes
*		1	ROCKER	
1	527-RB3	1	BALL	
	G901-C31		HEAD ASSEM.-4" AIR COMPRESSOR CYLINDER	Includes
1	GA901-C31	1	HEAD ASSEM.	
2	905-C3	1	VALVE - Inlet	
3	908-C3	1	SPRING - Valve	
4	908B-AX3	1	WASHER - Spring Retainer	
5	908A-C3	1	NUT - Inlet Valve	
		1	NUT -- 5/16-18-Hex.	
8	916-C4	1	VALVE - Discharge	
9	920-C4	1	GUIDE - Discharge Valve	
10	924-C4	1	COLLAR - Discharge Valve	
11	919-C4	1	SPRING - Discharge Valve	
12	923-C41	1	CAP - Discharge Valve Guide	
15	918-E3	1	FLANGE - Discharge Valve Retainer	
16	916D-E3	1	GASKET - Flange to Head	
		2	NUT -- 1/2-13-Hex.	
17	915A-C3	1	SCREW - Valve Guide Cap Retainer	
18	G922-C4	1	NUT ASSEM. - Valve Guide Retainer Screw	
19	922C-C3	1	GASKET - Nut to Flange	
20	922A-C3	1	HANDLE - Suct. Valve Unloader	
		2	HALF NUT -- 3/8-16-Hex.	
	GA901-C31		HEAD ASSEM. - 4" AIR COMPRESSOR CYLINDER	Includes
*		1	HEAD	
1	907-C3	1	GUIDE - Inlet Valve	
2	C-2008L2	2	STUD - Disch. Valve Retainer Flange	
		3	PIPE PLUG -- 1/2 Std.	
		2	PIPE PLUG -- 1/2 Std. - C't's'k. Hd.	
		1	PIPE PLUG -- 1 Std. - C't's'k. Hd.	
		1	REDUCING BUSHING -- 1/2 x 3/8 Std.	
	G922-C4		NUT ASSEM.-VALVE GUIDE RETAINER SCREW	Includes
*		1	NUT	
1	916B-C3	1	STUD	

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
	G929-C3		ROD ASSEM. - AIR COMPRESSOR CONNECTING	Includes
*		1	ROD	
1	232-456	1	BUSHING	
	X929		BEARING ASSEM. - FUEL WEDGE SHAFT	Includes
*		1	BEARING	
1	S-961	1	BUSHING	
	X1074		SEAL ASSEM. - CRANKSHAFT OIL	Includes
*		2	SEAL	
1	C-4537	2	GASKET	
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.	
		2	NUT -- 3/8-16-Hex.	
		2	LOCKWASHER -- 3/8 SAE Reg.	
	X1079		CORE ASSEM. - LUBE OIL COOLER	Includes
			Pipe, Pipe Plugs & Wire (No Service Parts)	
	X1080		COOLER ASSEM. - LUBE OIL	Includes
1	F-4260	1	PIPE (Outer)	
2	X1079	1	CORE ASSEM.	
3	C-3682	2	PLUG - Retainer	
		2	MACHINE SCREW--1/4-20 x 3/4 Lg.-Rnd. Hd.	
	X1105		MANIFOLD ASSEM. - EXHAUST	Includes
*		1	MANIFOLD - Exhaust	
		4	PIPE PLUG -- 1 1/4 Std.	
1	764-E	6	STUD	
1	C-2010L2 1/2	4	STUD (End)	
	X1110		PUMP ASSEM. - 2 1/2" BILGE	Includes
1	GA260-A	1	BODY ASSEM.	
2	G261-A	1	PLUNGER ASSEM.	
3	262-A	1	GLAND - Packing	
4		1	PACKING -- 1/2 Sq. x 43 Lg.-(Flax)	
		4	NUT -- 1/2-13-Hex.	
	X1111		PUMP ASSEM. - 2 1/2" BILGE	Includes
1	GA260-A-LH	1	PUMP ASSEM.	
2	G261-A	1	PLUNGER ASSEM.	
3	262-A	1	GLAND - Packing	
4		1	PACKING -- 1/2 Sq. x 43 Lg. - (Flax)	
		4	NUT -- 1/2-13-Hex.	
	G1197-E1		VALVE ASSEM.-COMPRESSION RELEASE(SNIFTER)	Includes
1	1197-E1	1	BODY	
2	G1198-E	1	STEM ASSEM.	
	G1198-E		STEM ASSEM.-COMPRESSION RELEASE VALVE(SNIFTER)	Includes
			Valve Stem & Handle (No Service Parts)	
	G1200-R3		RAIL ASSEM. - FUEL	Includes
*		1	TUBE - Fuel	
1	1205-E1	4	BODY - Isolating Valve	
2	1205C-E	4	SEAT - Isolating Valve	
3	1205D-E	4	PLUG - Isolating Valve	
4	1206-C31	4	STEM - Isolating Valve	
5	866-E	4	GLAND - Packing	
6	1208-C3	4	NUT - Gland	
7		12	RING - Packing -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. - Garlock #333	
	G1200-R4		RAIL ASSEM. - FUEL	Includes
*		1	TUBE - Fuel	
1	1205-E1	5	BODY - Isolating Valve	
2	1205C-E	5	SEAT - Isolating Valve	
3	1205D-E	5	PLUG - Isolating Valve	
4	1206-C31	5	STEM - Isolating Valve	
5	866-E	5	GLAND - Packing	
6	1208-C3	5	NUT - Gland	
7		15	PACKING RING -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. Garlock #333	

ASSEMBLY LIST NO. AL 175
ISSUE 1
ENGINE SIZE 7½x10½--9½12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS, ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
G1203-AX3			CLAMP ASSEM. - FUEL RAIL — Includes
			Clamp & Cap (No Service Parts)
G1203-E			CLAMP ASSEM. - FUEL RAIL — Includes
			Clamp & Cap (No Service Parts)
X1211			LIFTER ASSEM. - INLET OR EXHAUST VALVE — Includes
*		1	LIFTER
1	530-E	1	ROLLER
2	531-E	1	PIN
G1215-E			VALVE ASSEM. - FUEL OIL ACCUMULATOR — Includes
*		1	BODY
1	1206-C31	1	STEM - Valve
2		3	PACKING -- 1/2 O.D. x 1/4 I.D. x 1/4 Wide Garlock #333
3	866-E	1	GLAND - Packing
4	1208-C3	1	NUT - Packing Gland
X1229			PUMP ASSEM. - 3" BILGE — Includes
1	GA260-E	1	BODY ASSEM.
2	G261-E	1	PLUNGER ASSEM.
3	262-E	1	GLAND - Packing
4		1	PACKING -- 1/2 Sq. x 33 Lg.-(Flax)
		4	NUT -- 1/2-13-Hex.
G1230-E1			VALVE ASSEM. - FUEL PRESSURE REGULATING — Includes
1	G1243-E	1	HANDLE ASSEM.
2	1238A-E	1	PIN - Handle to Bearing
		2	COTTER PIN -- 3/32 x 3/4 Lg.
4	1244-E	1	SECTOR
		2	CAPSCREW -- 5/16-18 x 1 1/4 Lg.
		2	NUT -- 5/16-18-Hex.
7	1238-E	1	BEARING - Handle
8	1237-E1	1	CAGE - Spring
9	1245-E1	1	PLUG - (Upper)
10	1236-E	1	SPRING - Regulat. Valve
11	1240-E	1	NUT - Spring Adjust. Screw
		1	MACHINE SCREW--1/4-20 x 1/2 Lg.-Rnd. Hd.
13	1239-E	1	SCREW - Spring Adjusting
14	1233-E	1	STEM - Valve
15	1234-E	1	SEAT - Valve Stem
16	1230-E1	1	BODY - Regulat. Valve
17		3	PACKING RING--13/16 O.D. x 1/2 I.D. x 3/16 Wide - Garlock #333
18	1231A-E	1	RING - Packing Retainer
19	1231-E2	1	GLAND - Packing
20	1232-E1	1	STUD - Adaptor
21		1	HALF NUT -- 1-8-Hex.
22	1242-E	1	ELBOW - Fuel Inlet
23	1237A-E	1	CUP - Drain
X1233			ECCENTRIC ASSEM. - AIR COMPRESSOR — Includes
*		1	ECCENTRIC
*		1	CAP
1	C-8265L 3/4	2	PIN - Dowel
2	C-2108L3 1/4	4	STUD
3		4	CASTLE NUT -- 1/2-20-Hex.
		4	COTTER PIN -- 3/32 x 1 Lg.
X1235			SPROCKET ASSEM.-CENTRIFUGAL PUMP DRIVE — Includes
*		2	SPROCKET
1	C-2106L3	2	STUD
2		2	CASTLE NUT -- 1/2-20-Hex.
		2	COTTER PIN -- 3/32 x 1 Lg.
G1243-E			HANDLE ASSEM.-FUEL PRESS. REGULAT. VALVE — Includes
1	1243-E	1	CAM - Spring Control
2	1117-E	1	EXTENSION - Handle
3	1249-E	1	SCREW - Handle
4	1118-E1	1	PAWL
5	1124-E	1	SPRING - Pawl
6	1125-E	1	SCREW - Spring Adjust.
7		1	TAPER PIN -- #1 x 1 Lg.
		1	HALF NUT -- 1/4-20-Hex.
G1275-E832			PUMP ASSEM. - PRIMING — Includes
*		1	BODY
*		1	PLUNGER
1		1	PACKING -- 1/8 Rd. x 7 Lg.-(Pelro)
2	S-2065	1	WASHER - Packing
3	S-2064	1	NUT
		1	NUT -- 7/16-20-Hex.

REF. No.	PART NUMBER	No. USED	DESCRIPTION
X1306			ROCKER ASSEM. - SPRAY VALVE — Includes
*		1	ROCKER
1	0527A-E	1	BALL CHECK ASSEM.
G1338-RB3I			PUMP ASSEM. - FUEL TRANSFER — Includes
*		1	BODY
1	1340-RB3	1	COVER - Pump Body
2		2	PIN - Cover to Body Dowel
3	1339B-RB3	4	GASKET - Cover to Body
		6	MACHINE SCREW--1/4-28 x 3/4 Lg.-Fill. Hd.
4	G1341-RB3	1	GEAR & SHAFT ASSEM. (Drive)
5	G1342-RB3	1	GEAR & SHAFT ASSEM. (Driven)
6	1343-RB3	1	GLAND - Packing
7	1344-RB3	1	NUT - Packing Gland Retainer
8	1345-RB3	1	LOCK-NUT - Packing Gland
9		1	PACKING -- 3/16 Sq. x 13 Lg. - (Pelro)
G1341-RB3			GEAR & SHAFT ASSEM.-FUEL TRANSFER PUMP(DRIVE) — Includes
			Gear & Shaft (No Service Parts)
X1341			PUSH-ROD ASSEM. - SPRAY VALVE — Includes
			Tube & Sockets (No Service Parts)
G1342-RB3			GEAR & SHAFT ASSEM.-FUEL TRANSFER PUMP(DRIVEN) — Includes
			Gear & Shaft (No Service Parts)
X1470			SEAL ASSEM. - CRANKSHAFT OIL — Includes
*		2	OIL SEAL
1	C-6199	2	GASKET
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
		2	NUT -- 3/8-16-Hex.
		2	LOCKWASHER -- 3/8 SAE Reg.
X1583			PIPE ASSEM. - AIR STARTING VALVE TO GLOBE VALVE — Includes
			Nipple & Pipe Coupling (No Service Parts)
X1607			HEAD ASSEM. - CYLINDER — Includes
*		1	HEAD
		6	PIPE PLUG -- 3/4 Std.
		3	PIPE PLUG -- 1 Std.
1	512-R51	2	GUIDE - In. & Exh. Valve
2	854A-E	1	STUD - Spray Valve Clamp
3	567-E	4	STUD - Rocker Shaft Bearing
4	764-E	2	STUD - Exhaust Elbow
X1608			HEAD ASSEM. - CYLINDER — Includes
1	X1607	1	HEAD ASSEM.
2	P-5275	1	VALVE - Inlet
3	P-5276	1	VALVE - Exhaust
4	513-R	2	SPRING - Valve
5	514A-FXC4	2	WASHER - Valve Spring (Bottom)
6	514-FXC4	2	WASHER - Valve Spring (Top)
7		4	HALF NUT -- 5/8-11-Hex.
8		2	LOCKWASHER -- 5/8 Shakeproof -- Type 11
9	580-R	1	VALVE - Air Starting
10	585-R	1	BUSHING - Valve
11	C-2151L1 1/4	2	RING - Piston
12	579-R	1	BUSHING - Spring
13	582-E	1	SPRING - Air Starting Valve
14	588-R	1	WASHER - Spring (Bottom)
15	583-FXC4	1	WASHER - Spring (Top)
16		1	NUT -- 5/8-18-Hex.
X1748			VALVE ASSEM. - SPRAY (DRAIN TYPE) — Includes
1	P-4983	1	BODY
2	S-2757	1	GLAND - Packing (Lower)
3	866-E	1	GLAND - Packing (Upper)
4		6	PACKING RING -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. Garlock #333
5	865-E	1	NUT - Gland
6	G850-E	1	SPINDLE ASSEM.
7	856-E	1	NUT - Valve Seat
8	853-E	1	CASING - Valve Spring
		1	MACHINE SCREW--1/4-20 x 1/2 Lg. - Rnd. Hd.
10	858-E	1	SPRING
11	857-AX3	1	PLUG - Spring
12	5677	1	BALL BEARING - Thrust
13	878-E	1	NUT - Spindle
14		1	NUT -- 1/2-13-Hex.

ASSEM'L LIST NO. AL 176
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X1749		BODY ASSEM. - GOVERNOR — Includes
1	X271	1	BODY ASSEM.
2	X265	2	WEIGHT ASSEM.
3	2C1820	2	PIN - Weight
4		4	CASTLE NUT -- 3/8-24-Hex.
		4	COTTER PIN -- 3/32 x 3/4 Lg.
5	X266	1	QUILL ASSEM.
6	C-548	1	KEY - Thrust Quill
7	5720	1	BALL BEARING - Thrust
	X1759		CAMSHAFT ASSEMBLY — Includes
* 1	1353-FB4	1	CAMSHAFT & COUPLING
		1	GEAR - Rotary Pump Drive
2		3	CAPSCREW -- 3/8-16 x 3/4 Lg.
	X1791		PUMP ASSEM. - 3" BILGE — Includes
1	GA260-E-LH	1	BODY ASSEM.
2	0261-E	1	PLUNGER ASSEM.
3	262-E	1	GLAND - Packing
4		1	PACKING -- 1/2 Sq. x 33 Lg. - (Flax)
		4	NUT -- 1/2-13-Hex.
	X1809		DOOR ASSEM. - ROTARY PUMP — Includes
*		1	DOOR
*		1	CAP - Pump Gear & Bearing
1	C-6674	2	GASKET - Cap
		4	CAPSCREW -- 1/2-13 x 3 3/4 Lg.
*		1	CAP - Pump Clamp
		2	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
	X1810		BLOCK ASSEM. - GOVERNOR SPRING — Includes
1	P-5059	1	BLOCK
2	C-543	1	PIN - Fork
3	C-549	1	ROD - Spring
4	C-4351	1	PIN - Spring Rod
	X1814		SHAFT ASSEM. - PUMP DRIVE — Includes
* 1	1356-RB3	1	SHAFT
		1	SLEEVE
	X1851		COVER ASSEM. - PUMP DRIVE SHAFT BEARING END — Includes
*		1	COVER
1		1	OIL SEAL -- Perfect #1501
	X1855		DOOR ASSEM. - ROTARY PUMP — Includes
*		1	DOOR
*		1	CAP - Pump Gear
1	C-6674	2	GASKET - Cap
		4	CAPSCREW -- 1/2-13 x 3 3/4 Lg.
*		1	CAP - Pump Clamp
		2	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
	X1890		BEARING ASSEM. - CONNECTING ROD — Includes
*		1	BEARING (Cap)
*		1	BEARING (Foot)
1	C-7476-A	2	SHIM - (1/16)
1	C-7476-B	2	SHIM - (1/32)
1	C-7476-D	4	SHIM - (.010)
1	C-7476-E	8	SHIM - (.003)
2	C-2506L1 1/2	2	CAPSCREW
3		2	CASTLE NUT -- 3/8-24-Hex.
3		2	COTTER PIN -- 1/16 x 1 Lg.
	X1935		CAMSHAFT ASSEMBLY — Includes
* 1	1353-FB4	1	CAMSHAFT AND COUPLING
		1	GEAR - Rotary Pump Drive
2		3	CAPSCREW -- 3/8-16 x 3/4 Lg.
	X1957		COLUMN ASSEM. - JAHN'S GOVERNOR — Includes
* 1	S-1105	1	COLUMN
		2	STUD - Regulator Bracket

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X1958		DASH-POT ASSEM. - JAHN'S GOVERNOR — Includes
1	X1959	1	CYLINDER ASSEM.
2	S-562	1	PISTON
3	S-560	1	ROD-END
4		1	MACHINE SCREW -- 1/4-20 x 5/8 Lg.-Flat Hd.
5	S-626	1	ROD - Piston
6	S-561	1	PIN - Rod-End
7	S-646	1	COVER - Cylinder
8		4	CLOSE NIPPLE -- 1/8 Std.
9		1	ELBOW -- 1/8 Std.
10	C-9847-P 1/8	1	ANGLE VALVE - Needle Point
11		1	UNION -- 1/8 Std.
	X1959		CYLINDER ASSEM.-JAHN'S GOV. DASH-POT — Includes
*		1	CYLINDER
1	S-1106	1	STUD
	X1960		LOCK ASSEM.-JAHN'S GOV. REGULATOR DISC — Includes
			Lock & Lock Button (No Service Parts)
	X1967		COVER ASSEM.-JAHN'S GOV. COLUMN UPPER BEARING — Includes
*		1	COVER
1		1	OIL SEAL -- National Motor Brg. Co. #10151
	X1988		BODY ASSEM. - LUBE OIL PRESSURE PUMP — Includes
*		1	BODY
1	C-2106L1 1/2	4	STUD
	X1989		GEAR & SHAFT ASSEM.-PRESS. PUMP(DRIVE) — Includes
1	C-6695	1	GEAR
2	C-7588	1	SHAFT
3		1	WOODRUFF KEY -- 1/8 x 3/4 Std.
	X1990		GEAR & SHAFT ASSEM.-PRESS. PUMP (DRIVEN) — Includes
1	C-3024	1	GEAR
2	C-7589	1	SHAFT
	X1991		PUMP ASSEM. - LUBE OIL PRESSURE — Includes
1	X1988	1	BODY ASSEM.
2	X1989	1	GEAR & SHAFT ASSEM. - (Drive)
3	X1990	1	GEAR & SHAFT ASSEM. - (Driven)
4	F-5155	1	COVER - Pump Body
5	C-6693	1	GASKET - Cover to Body
		4	NUT -- 3/8-24-Hex.
6	C-7402	2	PIN - Pump Body Cover Dowel
	X1994		HOUSING ASSEM. - GOVERNOR DRIVE — Includes
*		1	HOUSING
1	C-2010L2 1/4	4	STUD
	X1995		HOUSING ASSEM. - JAHN'S GOV. DRIVE — Includes
*		1	HOUSING
1	C-2010L2 1/4	4	STUD
	X2037		CONE ASSEM. - CLUTCH SHIFTER — Includes
*		2	CONE
1	C-2708L4	2	CAPSCREW
2		2	CAPSCREW -- 1/2-13 x 5 Lg.
		4	NUT -- 1/2-13-Hex.
		4	LOCKWASHER -- 1/2 SAE Reg.
	X2038		DRUM ASSEM. - REVERSE GEAR — Includes
*		1	DRUM
1	C-7829	1	BUSHING
2		1	OIL SEAL -- National Motor Bearing Co. #55120
	X2039		COVER ASSEM. - REVERSE GEAR DRUM — Includes
*		1	COVER
1	C-7830	1	BUSHING
2		1	OIL SEAL -- National Motor Bearing Co. #55053
	X2040		SHAFT ASSEM. - REVERSE GEAR PINION — Includes
*		1	SHAFT
1	S-2391	1	PIN

ASSEM. LIST NO. AL 177
ISSUE #2
ENGINE SIZE 7½x10½-7x12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2041		SHAFT ASSEM. - THRUST — Includes
*		1	SHAFT
1	301A-C3	1	GEAR
		2	CAPSCREW -- 1/2-13 x 1 1/4 Lg.
	X2042		SWIVEL ASSEM. - BRAKE POST (PLAIN) — Includes
*		1	SWIVEL
1	C-7848	2	STUD - Fulcrum
	X2043		SWIVEL ASSEM. - BRAKE POST CROWDER — Includes
*		1	SWIVEL
1	C-7848	2	STUD - Fulcrum
	X2044		ROD ASSEM. - BRAKE POST TIE — Includes
*		1	ROD
1		1	NUT -- 7/8-9-Hex.
	X2045		CROWDER ASSEM. - BRAKE POST — Includes
*		1	CROWDER
1	C-7851	1	STUD - Control Link
	X2046		BOLT ASSEM. - PROPELLER BRAKE CROWDER — Includes
*		1	STUD
		1	NUT -- 5/8-11-Hex.
	X2047		CROWDER ASSEM. - PROPELLER BRAKE — Includes
*		1	CROWDER
1	C-7854	1	STUD - Control Link
	X2048		BAND ASSEM. - PROPELLER BRAKE — Includes
*		1	BAND
		4	RIVET -- 1/4 Dia. x 1/4 Lg. - Rnd. Hd.
*		1	CLIP
		4	RIVET -- 1/4 Dia. x 1/2 Lg. - Rnd. Hd.
1	C-7842	1	LINING
2		23	RIVET -- 3/16 Dia. x 5/16 Lg. - Tubular
	X2052		MANIFOLD ASSEM. - SPRAY VALVE DRAIN — Includes
			Pipe, End & Center Tees (No Service Parts)
	X2058		SEAL ASSEM.-CRANKSHAFT OIL (FWD. END) — Includes
*		2	SEAL
1	C-7865	2	GASKET
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
		2	NUT -- 3/8-16-Hex.
		2	LOCKWASHER -- 3/8 SAE Reg.
	X2059		STRAINER ASSEM. - LUBE OIL SUMP — Includes
			Collar, Screens & Suction Pipe (No Service Parts)
	X2060		MANIFOLD ASSEM. - LUBE OIL — Includes
			Pipe & Tees (No Service Parts)
	X2061		MANIFOLD ASSEM. - LUBE OIL — Includes
			Pipe & Tees (No Service Parts)
	X2062		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	C-7482	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	C-7487	1	RING - Oil Thrower (Fwd. End)
4	C-7867	1	RING - Oil Thrower (Aft End)
5	C-5209	1	PIN - Air Comp. Eccentric Dowel
	X2063		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	C-7482	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	C-7487	1	RING - Oil Thrower (Fwd. End)
4	C-7867	1	RING - Oil Thrower (Aft End)
5	C-5209	1	PIN - Air Comp. Eccentric Dowel
	X2066		DOOR ASSEM. - ROTARY PUMP — Includes
*		1	DOOR
*		1	CAP - Pump Gear
1	C-6674	2	GASKET - Cap
		4	CAPSCREW -- 1/2-13 x 3 3/4 Lg.
*		1	CAP - Pump Clamp
		2	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
	X2068		PIN ASSEM. - INTERMEDIATE GEAR — Includes
*		1	BRACKET
1	C-7889	1	PIN - Intermed. Gear
2	S-2760	1	PIN - Gear Pin to Bracket Dowel
3	S-2920	1	STUD - Gear Retainer
4	C-7942	4	STUD - Pin Bracket

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2069		GEAR ASSEM. - INTERMEDIATE — Includes
*		1	HUB
*		1	GEAR
1	664B-AX3	1	BUSHING
	X2071		BRACKET ASSEM. - PRESSURE GAGE — Includes
*		1	BRACKET
*		1	CAP
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
	X2072		MANIFOLD ASSEM. - AIR STARTING — Includes
1	577-C4	3	ELBOW - Manifold to Cyl. Head
2		3	NIPPLE -- 1 1/4 x 4 Lg.
3		2	TEE -- 1 1/4 Std.
4		1	ELBOW -- 1 1/4 Std.
5		2	NIPPLE -- 1 1/4 x 11 3/4 Lg.
6-7		2	NIPPLE -- 1 1/4 x 4 1/2 Lg.
8		2	ELBOW -- 1 1/4 - 45° Std.
9	X1583	1	NIPPLE ASSEM. - Manifold to Globe Valve
	X2073		MANIPOLD ASSEM. - AIR STARTING — Includes
1	577-C4	4	ELBOW - Manifold to Cyl. Head
2		4	NIPPLE -- 1 1/4 x 4 Lg.
3		3	TEE -- 1 1/4 Std.
4		1	ELBOW -- 1 1/4 Std.
5		3	NIPPLE -- 1 1/4 x 11 3/4 Lg.
6-7		2	NIPPLE -- 1 1/4 x 4 1/2 Lg.
8		2	ELBOW -- 1 1/4 - 45° Std.
9	X1583	1	NIPPLE ASSEM. - Manifold to Globe Valve
	X2074		BEARING ASSEM. - CAMSHAFT (FWD. END) — Includes
*		1	BEARING
1	2C3885	1	BUSHING
2		1	OIL SEAL -- National Motor Brg. Co. #50083
		2	PIPE PLUG -- 1/8 Std.
	X2075		BEARING ASSEM. - CAMSHAFT (APT END) — Includes
*		1	BEARING
1	685-C	1	BUSHING
	X2076		BEARING ASSEM. - CAMSHAFT (APT END) — Includes
*		1	BEARING
1	C-306	1	BUSHING
	X2078		GEAR ASSEM. - INTERMEDIATE — Includes
*		1	HUB
*		1	GEAR
1	664B-AX3	1	BUSHING
	X2081		SEAL ASSEM. - CRANKSHAFT OIL — Includes
*		2	SEAL
1	C-7885	2	GASKET
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
		2	NUT -- 3/8-16-Hex.
		2	LOCKWASHER -- 3/8 SAE Reg.
	X2089		CYLINDER ASSEM. - 4" COMPRESSOR — Includes
*		1	CYLINDER
1	C-5510L5 3/4	4	STUD - Cyl. Head
		1	REDUCING BUSHING -- 1 x 1/4 Std.
		1	PIPE PLUG -- 1/2 Std.
		2	PIPE PLUG -- 1 Std.
	X2090		MANIFOLD ASSEM. - EXHAUST — Includes
*		1	MANIFOLD
1	C-2010L2 1/4	6	STUD - Inlet Elbow
2	C-2010L2 1/2	8	STUD - Manifold End
		3	PIPE PLUG -- 1 1/4 Std.
		1	REDUCING BUSHING -- 1 1/4 x 1/2 Std.
	X2091		MANIFOLD ASSEM. - EXHAUST — Includes
*		1	MANIFOLD
1	C-2010L2 1/4	8	STUD - Inlet Elbow
2	C-2010L2 1/2	8	STUD - Manifold End
		5	PIPE PLUG -- 1/4 Std.
		1	REDUCING BUSHING -- 1 1/4 x 1/2 Std.

ENGINE SIZE 7½-10½--9x12 | ISSUE 1 | ASSEM. LIST NO. AL 178

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2102		MANIFOLD ASSEM. - AIR INLET Includes
			Manifold & Flanges (No Service Parts)
	X2103		MANIFOLD ASSEM. - AIR INLET Includes
			Manifold & Flanges (No Service Parts)
	X2104		CRANK ASSEM. - BILGE PUMP Includes
*		1	DISC
*		1	PIN - Pump Drive
1	C-8011L 3/8	1	PIN - Conn. Rod Retainer Washer Lock
	X2113		ECCENTRIC ASSEM. - AIR COMPRESSOR Includes
*		1	ECCENTRIC
*		1	CAP
1	S-2760	2	PIN - Dowel
2	C-2108L4	4	STUD - Cap
3		4	CASTLE NUT -- 1/2-20-Hex.
	X2137		SHAFT ASSEM. - THRUST Includes
*		1	SHAFT
1	301A-C4	1	GEAR
		2	CAPSCREW -- 1/2-13 x 1 1/2 Lg.
	X2149		BEARING ASSEM. - CHAIN IDLER SHAFT Includes
*		1	BEARING
1		1	OIL SEAL -- National Motor Brg. Co. #50049
	X2233		MANIFOLD ASSEM. - LUBE OIL Includes
			Pipe, Inlet & Outlet Tees (No Service Parts)
	X2234		MANIFOLD ASSEM. - LUBE OIL Includes
			Pipe, Inlet & Outlet Tees (No Service Parts)
	X2235		CRANKSHAFT ASSEMBLY Includes
*		1	CRANKSHAFT
1	C-7482	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	S-7487	2	RING - Oil Thrower
5	S-3135	1	PIN - Cent. Pump Drive Sprocket
		1	PIPE PLUG -- 1/4 Std. - C't'sk. Hi.
	X2236		CRANKSHAFT ASSEMBLY Includes
*		1	CRANKSHAFT
1	C-7482	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	C-7487	2	RING - Oil Thrower
5	S-3135	1	PIN - Cent. Pump Drive Sprocket
		1	PIPE PLUG -- 1/4 Std. - C't'sk. Hi.
	X2238		SHAFT ASSEM. - REVERSE GEAR PINION Includes
*		1	SHAFT
1	S-2391	1	PIN
	X2242		SPROCKET ASSEM.-CENTRIFUGAL PUMP DRIVE Includes
*		2	SPROCKET
1	C-8265L 3/4	2	PIN - Dowel
2	C-2110L3 1/4	2	STUD
3		2	CASTLE NUT -- 5/8-18-Hex.
		2	COTTER PIN -- 1/8 x 1 1/4 Lg.
	X2243		COVER ASSEM. - REVERSE GEAR DRUM Includes
*		1	COVER
1	C-8366	1	BUSHING
2		1	OIL SEAL -- National Motor Brg. Co. #55109
	X2244		DRUM ASSEM. - REVERSE GEAR Includes
*		1	DRUM
1	C-8368	1	BUSHING
2		1	OIL SEAL -- National Motor Brg. Co. #55129
	X2245		MANIFOLD ASSEM. - AIR STARTING Includes
1	577-C4	4	ELBOW - Air Start. Man.
2		4	NIPPLE -- 1 1/4 x 5 1/2 Lg.
3		3	TEE -- 1 1/4 Std.
4		1	ELBOW -- 1 1/4 Std.
5		3	NIPPLE -- 1 1/4 x 14 Lg.
6		1	NIPPLE -- 1 1/4 x 5 1/2 Lg.
7		1	NIPPLE -- 1 1/4 x 4 1/2 Lg.
8		2	ELBOW -- 1 1/4 - 45° Std.
9	X1563	1	NIPPLE ASSEM. - Manifold to Globe Valve

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2256		CAMSHAFT ASSEMBLY Includes
*		1	CAMSHAFT & COUPLING
1	1353-FB4	1	GEAR - Rotary Pump Drive
2		3	CAPSCREW -- 3/8-16 x 3/4 Lg.
	X2257		MANIFOLD ASSEM. - LUBE OIL Includes
			Pipe & Tees (No Service Parts)
	X2266		ROD ASSEM. - BRAKE POST TIE Includes
*		1	ROD
1		1	NUT -- 7/8-9-Hex.
	X2267		STRAP ASSEM.-AIR COMPRESSOR ECCENTRIC Includes
*		1	STRAP (Upper)
*		1	STRAP (Lower)
1	C-4554-A	2	SHIM - (1/16)
1	C-4554-B	2	SHIM - (1/32)
1	C-4554-D	4	SHIM - (.010)
1	C-4554-E	8	SHIM - (.003)
2	C-7996	2	BOLT
3		2	CASTLE NUT -- 3/4-16-Hex.
		2	COTTER PIN -- 1/8 x 1 1/4 Lg.
	X2268		STRAP ASSEM. - AIR COMPRESSOR ECCENTRIC Includes
*		1	STRAP (Upper)
*		1	STRAP (Lower)
1	C-6145-A	2	SHIM - (1/16)
1	C-6145-B	2	SHIM - (1/32)
1	C-6145-D	4	SHIM - (.010)
1	C-6145-E	8	SHIM - (.003)
2	C-7996	2	BOLT
3		2	CASTLE NUT -- 3/4-16-Hex.
		2	COTTER PIN -- 1/8 x 1 1/4 Lg.
	X2269		MANIFOLD ASSEM. - AIR INLET Includes
			Manifold & Flanges (No Service Parts)
	X2270		SPROCKET ASSEM. - CENTRIFUGAL PUMP DRIVE -Includes
*		1	SPROCKET
1	C-2108L2	2	STUD
2		2	CASTLE NUT -- 1/2-20-Hex.
		2	COTTER PIN -- 3/32 x 1 Lg.
	X2276		MANIFOLD ASSEM. - AIR INLET Includes
			Manifold & Flanges (No Service Parts)
	X2277		MANIFOLD ASSEM. - LUBE OIL Includes
			Pipe, Inlet & Outlet Tees (No Service Parts)
	X2278		MANIFOLD ASSEM. - LUBE OIL Includes
			Pipe, Inlet & Outlet Tees (No Service Parts)
	X2280		CAMSHAFT ASSEMBLY Includes
*		1	CAMSHAFT & COUPLING
1	1353-FB4	1	GEAR - Rotary Pump Drive
2		3	CAPSCREW(Dowel) -- 3/8-16 x 3/4 Lg.
	X2285		MANIFOLD ASSEM. - AIR STARTING Includes
1	577-C4	3	ELBOW - Manifold to Cyl. Head
2		3	NIPPLE -- 1 1/4 x 5 1/2 Lg.
3		2	TEE -- 1 1/4 Std.
4		1	ELBOW -- 1 1/4 Std.
5		2	PIPE -- 1 1/4 x 14 Lg.(Thr'd. Both Ends)
6		1	NIPPLE -- 1 1/4 x 5 1/2 Lg.
7		1	NIPPLE -- 1 1/4 x 4 1/2 Lg.
8		2	ELBOW -- 1 1/4 - 45° Std.
9	X1563	1	NIPPLE ASSEM. - Manifold to Globe Valve
	X2287		CRANKSHAFT ASSEMBLY Includes
*		1	CRANKSHAFT
1	660-E31	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	655-E31	1	RING - Oil Thrower (Fwd. End)
4	655-E	1	RING - Oil Thrower (Aft End)
5	S-2918	1	PIN - Air Comp. Eccentric Dowel

ASSEM. LIST NO. AL 179
ISSUE 1
ENGINE SIZE 7½ x 10½ - 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2288		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	660-E31	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	655-E31	1	RING - Oil Thrower (Fwd. End)
4	655-E	1	RING - Oil Thrower (Aft End)
5	S-2918	1	PIN - Air Comp. Eccentric Dowel
	X2289		SWIVEL ASSEM. - BRAKE POST (PLAIN) — Includes
*		1	SWIVEL
1	346A-C3	2	STUD
	X2290		SWIVEL ASSEM. - BRAKE POST CROWDER — Includes
*		1	SWIVEL
1	346A-C3	2	STUD - Fulcrum
	X2291		HEAD ASSEM. - CYLINDER — Includes
*		1	HEAD
		9	PIPE PLUG - 1 Std.
1	512-E1	2	GUIDE - Inlet & Exhaust Valve
2	854A-E	1	STUD - Spray Valve Clamp
3	567-E	4	STUD - Rocker Shaft Bearing
4	764-E	2	STUD - Exhaust Elbow
	X2292		HEAD ASSEM. - CYLINDER — Includes
1	X2291	1	HEAD ASSEM.
2	510-E1	1	VALVE - Inlet
3	F-3631	1	VALVE - Exhaust
4	514A-E	2	WASHER - In. & Ex. Valve Spring (Bottom)
5	513-E	2	SPRING - In. & Ex. Valve
6	514-E	2	WASHER - Spring Retainer (Top)
7		4	HALF NUT -- 3/4-10-Hex.
7		2	LOCKWASHER -- 3/4 Shakeproof - Type 11
8	580-KXB6	1	VALVE - Air Starting
9	585-E3	1	BUSHING - Air Start. Valve
10	C-2152L1 1/2	2	RING - Piston
11	579-FXC4	1	SLEEVE - Air Start. Valve Spring
12	588-KXB6	1	WASHER - Air Start. Valve Spring (Bottom)
13	582-E	1	SPRING - Air Start. Valve
14	583-FXC4	1	WASHER - Air Start. Valve Spring (Top)
15		1	NUT -- 5/8-18-Hex.
	X2295		MANIFOLD ASSEM. - LUBE OIL — Includes
			Pipe, Inlet & Outlet Tees (No Service Parts)
	X2296		MANIFOLD ASSEM. - EXHAUST — Includes
*		1	MANIFOLD
		4	PIPE PLUG -- 1 1/4 Std.
		1	REDUCING BUSHING -- 1 1/4 x 1/2 Std.
1	C-2010L2 1/4	6	STUD - Inlet Elbow
2	C-2010L2 1/2	8	STUD - (End)
	X2297		MANIFOLD ASSEM. - EXHAUST — Includes
*		1	MANIFOLD
		6	PIPE PLUG -- 1 1/4 Std.
		2	REDUCING BUSHING -- 1 1/4 x 1/2 Std.
1	C-2010L2 1/4	8	STUD - Inlet Elbow
2	C-2010L2 1/2	8	STUD - (End)
	X2298		SWIVEL ASSEM. - BRAKE POST CROWDER — Includes
*		1	SWIVEL
1	346A-C3	2	STUD - Fulcrum
	X2299		CROWDER ASSEM. - BRAKE POST — Includes
*		1	CROWDER
1	C-7851	1	STUD - Control Link
	X2301		ROCKER ASSEM. - INLET VALVE — Includes
*		1	ROCKER
1	520A-R3	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	0527A-E	1	BALL CHECK ASSEM.
	X2302		ROCKER ASSEM. - EXHAUST VALVE — Includes
*		1	ROCKER
1	520A-R3	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	0527A-E	1	BALL CHECK ASSEM.

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2303		ROCKER ASSEM. - AIR STARTING VALVE — Includes
*		1	ROCKER
1	590A-R3	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	0527A-E	1	BALL CHECK ASSEM.
	X2304		DOOR ASSEM. - ROTARY PUMP — Includes
*		1	DOOR
*		1	CAP - Pump Gear
1	C-6674	2	GASKET - Cap
		4	CAPSCREW -- 1/2-13 x 3 3/4 Lg.
*		1	CAP - Pump Clamp
		2	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
	X2305		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	660-E31	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	655-E31	2	RING - Oil Thrower
5	S-2918	1	PIN - Dowel (Air Comp. Eccentric or Pump Drive Sprocket)
		1	PIPE PLUG -- 1/4 Std. - C't's'k. Hd.
	X2306		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	660-E31	1	GEAR
2	S-3109	1	PIN - Gear Dowel
3	655-E31	2	RING - Oil Thrower
5	S-2918	1	PIN - Dowel (Air Comp. Eccentric or Pump Drive Sprocket
		1	PIPE PLUG -- 1/4 Std. - C't's'k. Hd.
	X2307		BODY ASSEM. - GOVERNOR — Includes
1	X271	1	BODY ASSEM.
2	X270	2	WEIGHT ASSEM.
3	2C1820	2	PIN - Gov. Weight
4		4	CASTLE NUT -- 3/8-24-Hex.
4		4	COTTER PIN -- 3/32 x 3/4 Lg.
5	X266	1	QUILL ASSEM. - Thrust
6	C-548	1	KEY - Thrust Quill
7	5720	1	BALL BEARING - Thrust
	X2310		MANIFOLD ASSEM. - SPRAY VALVE DRAIN — Includes
			Pipe & Tees (No Service Parts)
	X2311		MANIFOLD ASSEM. - SPRAY VALVE DRAIN — Includes
			Pipe & Tees (No Service Parts)
	X2314		PLATFORM ASSEMBLY — Includes
			Platform & Angle (No Service Parts)
	X2315		PLATFORM ASSEMBLY — Includes
			Platform & Angle (No Service Parts)
	X2426		BASE ASSEMBLY — Includes
*		1	BASE
		2	PIPE PLUG -- 1 1/2 Std.
1	S-2918	5	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	14	STUD - Crank. Brg. Cap
3	727-BB3	11	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2233	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
7	C-7865	4	CLAMP - Manifold to Base
8	C-2406L 1/2	8	CAPSCREW - Manifold Clamp to Base
9	2C2543	5	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	5	WASHER - Crank. Brg. Oil Tube
11	F-5194	2	CAP - Crankshaft Bearing (End)
12	713-R	3	CAP - Crankshaft Bearing
13	S-2713	14	NUT - Crankshaft Bearing Cap
		14	COTTER PIN -- 1/8 x 1 1/2 Lg.

ASSEM'L LIST NO. AL 180
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2427		BASE ASSEMBLY — Includes
*		1	BASE
		2	PIPE PLUG -- 1 1/2 Std.
1	S-2918	6	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	16	STUD - Crank. Brg. Cap
3	727-BB3	15	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2234	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
7	C-7865	5	CLAMP - Manifold to Base
8	C-2406L 1/2	10	CAPSCREW - Manifold Clamp to Base
9	2C2543	6	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	6	WASHER - Crank. Brg. Oil Tube
11	F-5194	2	CAP - Crankshaft Bearing (End)
12	713-R	4	CAP - Crankshaft Bearing
13	S-2713	16	NUT - Crankshaft Bearing Cap
		16	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X2428		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
4	S-1983	5	PIN - Centerframe Door Dowel
	X2429		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
		1	PIPE PLUG -- 1/2 Std. - C't's'k. Hd.
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
4	S-1983	7	PIN - Centerframe Door Dowel
	X2448		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 1 1/2 Std.
1	S-2918	4	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	10	STUD - Crank. Brg. Cap
3	727-BB3	11	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2060	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG-- 1/2 Std. - C't's'k. Hd.
7	C-7865	3	CLAMP - Manifold to Base
8	C-2406L 1/2	6	CAPSCREW - Manifold Clamp to Base
9	2C2543	4	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	4	WASHER - Crank. Brg. Oil Tube
11	F-5194	1	CAP - Crankshaft Bearing (End)
12	713-R	3	CAP - Crankshaft Bearing
13	S-2713	10	NUT - Crankshaft Bearing Cap
		10	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X2449		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 1 1/2 Std.
1	S-2918	5	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	12	STUD - Crank. Brg. Cap
3	727-BB3	15	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2061	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't's'k. Hd.
7	C-7865	4	CLAMP - Manifold to Base
8	C-2406L 1/2	8	CAPSCREW - Manifold Clamp to Base
9	2C2543	5	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	5	WASHER - Crank. Brg. Oil Tube
11	F-5194	1	CAP - Crankshaft Bearing (End)
12	713-R	4	CAP - Crankshaft Bearing
13	S-2713	12	NUT - Crankshaft Bearing Cap
		12	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X2450		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	5	PIN - Centerframe Door Dowel
	X2451		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	5	PIN - Centerframe Door Dowel

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2452		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
		1	PIPE PLUG -- 1/2 Std. -- C't's'k. Hd.
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	7	PIN - Centerframe Door Dowel
	X2453		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
		1	PIPE PLUG -- 1/2 Std. -- C't's'k. Hd.
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	7	PIN - Centerframe Door Dowel
	X2605		VALVE & CAGE ASSEM.-PUMP SUCTION & DISCHARGE — Includes
1	X2606	1	CAGE ASSEM.
2	S-579	1	VALVE - Suction
3	S-581	1	SPRING - Suction Valve
4	S-583	1	WASHER - Suction Valve Spring Retainer
		1	COTTER PIN -- 1/16 x 1/2 Lg.
6	C-9586	1	CAP - Suction Valve Stem
7	C-9534	1	VALVE - Discharge
	X2608		CAGE ASSEM.-FUEL PUMP SUCTION & DISCHARGE VALVE — Includes
			Cage & Discharge Valve Seat (No Service Parts)
	X2612		BAND ASSEM. - PROPELLER SHAFT BRAKE — Includes
*		1	BAND
		8	RIVET -- 1/4 Dia. x 1/4 Lg.-Rnd. Hd.
1	C-7842	1	LINING
2		24	RIVET -- 3/16 Dia. x 5/16 Lg. - Tubular
	X2721		BEARING ASSEM. - CAMSHAFT END — Includes
*		1	BEARING
1	2C3885	1	BUSHING
2		1	OIL SEAL -- National Motor Brg. Co. #50083
		2	PIPE PLUG -- 1/8 Std.
	X2791		ADAPTOR ASSEM. - LUBE PRESS. PUMP — Includes
*		1	ADAPTOR
1	5858	2	BUSHING - Pump Shaft
	X2792		ADAPTOR ASSEM. - LUBE PRESS. PUMP — Includes
*		1	ADAPTOR
1	5858	2	BUSHING - Pump Shaft
		1	PIPE PLUG -- 1/8 Std.
	X2825		PUMP ASSEM. - LUBE OIL SUMP & PRESSURE — Includes
1	X2826	1	BODY ASSEM. - Press. Pump
2	X2827	1	GEAR & SHAFT ASSEM. - Press. Pump (Drive)
3	X2828	1	GEAR & SHAFT ASSEM. - Press. Pump (Driven)
4	C-6698	1	SPACER - Pump Body
5	C-6693	2	GASKET - Spacer
6	C-9281	1	GEAR - Sump Pump (Drive)
7		2	WOODRUFF KEY -- 1/8 x 3/4 Std.
8	C-9280	1	GEAR - Sump Pump (Driven)
9	W-1274	1	BODY - Sump Pump
		4	NUT -- 3/8-24-Hex.
		4	LOCKWASHER -- 3/8 SAE Reg.
10	C-7402	2	PIN - Dowel
	X2826		BODY ASSEM. - LUBE OIL PRESSURE PUMP — Includes
*		1	BODY
1	C-2106L4	4	STUD
	X2827		GEAR & SHAFT ASSEM. - PRESSURE PUMP (DRIVE) — Includes
1	C-6695	1	GEAR
2	C-9916	1	SHAFT
3		1	WOODRUFF KEY -- 1/8 x 3/4 Std.
	X2828		GEAR & SHAFT ASSEM. - PRESSURE PUMP (DRIVEN) — Includes
1	C-3024	1	GEAR
2	C-9914	1	SHAFT

ASSEM'L LIST NO. AL-181
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9x12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X2853		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 2 Std.
1	S-2918	4	PIN - Crank. Bear. Shell Dowel
2	C-2112L6 1/4	10	STUD - Crank. Bearing Cap
3	C-5522L26 ½	11	STUD - Base, Centerframe & Cylinder
4	C-5522L21	1	STUD - Base & Centerframe
5	C-5512L19	2	STUD - Base & Centerframe (End)
6	X2277	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
7	C-9511	3	CLAMP - Manifold to Base
8	C-2406L 1/2	6	CAPSCREW - Clamp to Base
9	C-1352	4	TUBE - Man. to Crank. Bear. Oil
10	C-3662	4	WASHER - Crank. Bear. Oil Tube
11	F-5240	1	CAP - Crankshaft Bearing (End)
12	713-E32	3	CAP - Crankshaft Bearing
13	S-2713	10	NUT - Crankshaft Bearing Cap
		10	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X2854		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 2 Std.
1	S-2918	5	PIN - Crank. Bear. Shell Dowel
2	C-2112L6 1/4	12	STUD - Crank. Bearing Cap
3	C-5522L26 ½	15	STUD - Base, Centerframe & Cylinder
4	C-5522L21	1	STUD - Base & Centerframe
5	C-5512L19	2	STUD - Base & Centerframe (End)
6	X2257	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
7	C-9511	4	CLAMP - Manifold to Base
8	C-2406L 1/2	8	CAPSCREW - Clamp to Base
9	C-1352	5	TUBE - Man. to Crank. Bear. Oil
10	C-3662	5	WASHER - Crank. Bear. Oil Tube
11	F-5240	1	CAP - Crankshaft Bearing (End)
12	713-E32	4	CAP - Crankshaft Bearing
13	S-2713	12	NUT - Crankshaft Bearing Cap
		12	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X2855		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	5	PIN - Centerframe Door Dowel
	X2856		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	5	PIN - Centerframe Door Dowel
	X2857		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	7	PIN - Centerframe Door Dowel
	X2858		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	7	PIN - Centerframe Door Dowel
	X3068		BODY ASSEM. - GOVERNOR — Includes
*		1	BODY
1	S-805	1	PINION - Drive
2		1	WOODRUFF KEY -- 1/8 x 5/8 Std.
	X3178		MANIFOLD ASSEM. - AIR STARTING — Includes
1	577-C4	3	ELBOW - Manifold to Cyl. Head
2		3	NIPPLE -- 1 1/4 x 5 1/2 Lg.
3		2	TEE -- 1 1/4 Std.
4		1	ELBOW -- 1 1/4 Std.
5		2	PIPE -- 1 1/4 x 14 Lg.-(Thr'd, Both Ends)
6		1	NIPPLE -- 1 1/4 x 5 1/2 Lg.
7		1	NIPPLE -- 1 1/4 x 4 1/2 Lg.
8		2	ELBOW -- 1 1/4 - 45° Std.
9	X1583	1	NIPPLE ASSEM. - Manifold to Globe Valve
	X3184		ACCUMULATOR ASSEM. - FUEL — Includes Body, Upper & Lower Plugs & Flange (No Service Parts)
	X3225		HEAD ASSEM. - H.P. FUEL PUMP — Includes
*		1	HEAD
1	2C1833L 1/8	1	PIPE PLUG
	X3226		HEAD ASSEM. - H.P. FUEL PUMP — Includes
*		1	HEAD
1	2C1833L 1/8	1	PIPE PLUG
	X3227		PUMP ASSEM. - FUEL PRIMING — Includes
*		1	BODY
*		1	PLUNGER - Pump
1		1	PACKING -- 1/8 Rd. x 7 Lg. - (Pelro)
2	S-2065	1	WASHER - Packing
3	S-2064	1	NUT - Packing
	X3233		ACCUMULATOR ASSEM. - FUEL — Includes Body, Lower & Upper Plugs & Adaptor Flange (No Service Parts)
	X3236		CRANK ASSEM. - FUEL PUMP — Includes
*		1	CRANK
1	2C2139	1	SHAFT - Tachometer Drive
		1	SETSCREW--1/4-20 x 3/8 Lg. Headless Cup Pt.
	X3237		BEARING ASSEM. - CAMSHAFT — Includes
*		1	BEARING
1	C-308	1	BUSHING
	X3288		GOVERNOR ASSEMBLY — Includes
1	X3068	1	BODY ASSEM.
2	X265	2	WEIGHT ASSEM.
3	2C1820	2	PIN - Weight to Body
4		4	CASTLE NUT -- 3/8-24-Hex.
4		4	COTTER PIN -- 3/32 x 3/4 Lg.
5	X266	1	QUILL ASSEM.- Gov. Thrust
6	C-548	1	KEY - Thrust Quill
7	5721	1	THRUST BEARING - Bantam "OBLIGE"
8	2C1757	1	RETAINER - Bearing
9	2C2846L 7/8	1	SETSCREW
		1	WIRE -- #16 Ga. x 9 Lg.
	X3362		ADAPTOR ASSEM. - FUEL TRANSFER PUMP — Includes
*		1	ADAPTOR
1	2C2477	1	BUSHING
*		1	BEARING - Pump Shaft
2	C-9862	1	BUSHING - Bearing (Gear End)
3	2C2477	1	BUSHING - Bearing (Seal End)
		3	PIPE PLUG -- 1/8 Std.
4	C-8176	1	GASKET - Bearing to Adaptor
5	C-2406L 7/8	3	CAPSCREW - Bearing to Adaptor
		1	WIRE -- #16 Ga. x 9 Lg.
	X3376		MANIFOLD ASSEM. - AIR INLET — Includes Manifold & Flanges (No Service Parts)
	X3480		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	3	STUD - Fuel Pump Housing
4	S-1983	5	PIN - Centerframe Door Dowel
	X3481		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5522L9 1/2	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
4	S-1983	7	PIN - Centerframe Door Dowel
	X3482		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 2 Std.
1	S-2918	5	PIN - Crank. Bear. Shell Dowel
2	C-2112L6 1/4	14	STUD - Crank. Bearing Cap
3	C-5522L26 ½	11	STUD - Base, Centerframe & Cylinder
4	C-5522L21	1	STUD - Base & Centerframe
5	C-5512L19	2	STUD - Base & Centerframe (End)
6	X2295	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
7	C-9511	4	CLAMP - Manifold to Base
8	C-2406L 1/2	8	CAPSCREW - Clamp to Base
9	C-1352	5	TUBE - Man. to Crank. Bear. Oil
10	C-3662	5	WASHER - Crank. Bear. Oil Tube
11	F-5240	2	CAP - Crankshaft Bearing (End)
12	713-E32	3	CAP - Crankshaft Bearing
13	S-2713	14	NUT - Crankshaft Bearing Cap
		14	COTTER PIN -- 1/8 x 1 1/2 Lg.

ASSEM'L LIST NO. AL 182
ISSUE 1
ENGINE SIZE 7½ x 10½ - 3 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X3483		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 2 Std.
1	S-2918	6	PIN - Crank. Bear. Shell Dowel
2	C-2112L6 1/4	16	STUD - Crank. Bearing Cap
3	C-5522L26 1/2	15	STUD - Base, Centerframe & Cylinder
4	C-5522L21	1	STUD - Base & Centerframe
5	C-5512L19	2	STUD - Base & Centerframe (End)
6	X2276	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't's'k. Hd.
7	C-9511	5	CLAMP - Manifold to Base
8	C-2406L 1/2	10	CAPSCREW - Clamp to Base
9	C-1352	6	TUBE - Man. to Crank. Bear. Oil
10	C-3662	6	WASHER - Crank. Bear. Oil Tube
11	F-5240	2	CAP - Crankshaft Bearing (End)
12	713-E32	4	CAP - Crankshaft Bearing
13	S-2713	16	NUT - Crankshaft Bearing Cap
		16	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X3484		GOVERNOR ASSEMBLY — Includes
1	X3068	1	BODY ASSEM.
2	X265	2	WEIGHT ASSEM.
3	2C1820	2	PIN - Weight to Body
4		4	CASTLE NUT -- 3/8-24-Hex.
		4	COTTER PIN -- 3/32 x 3/4 Lg.
5	X266	1	QUILL ASSEM. - Gov. Thrust
6	C-548	1	KEY - Thrust Quill
7	5721	1	THRUST BEARING -- Bantam "OBLIGE"
8	2C1757	1	RETAINER - Bearing
9	2C2846L 7/8	1	SETSCREW
	X3485		GOVERNOR ASSEMBLY — Includes
1	X3068	1	BODY ASSEM.
2	X270	2	WEIGHT ASSEM.
3	2C1820	2	PIN - Weight to Body
4		4	CASTLE NUT -- 3/8-24-Hex.
		4	COTTER PIN -- 3/32 x 3/4 Lg.
5	X266	1	QUILL ASSEM. - Gov. Thrust
6	C-548	1	KEY - Thrust Quill
7	5721	1	THRUST BEARING -- Bantam "OBLIGE"
8	2C1757	1	RETAINER - Bearing
9	2C2846L 7/8	1	SETSCREW
	X3642		BASE ASSEMBLY — Includes
*		1	BASE
1	S-2918	8	PIN - Bear. Shell Dowel
2	C-9879	8	CONNECTOR - Oil Tube
3	C-2112L5 3/4	16	STUD - Bear. Cap
4	727-BB3	23	STUD - Base, Centerframe & Cylinder
5	729-BB3	1	STUD - Base & Centerframe(Fwd. End - Large)
6	C-2012L18 1/4	2	STUD - Base & Centerframe(Aft End - Small)
7	713-R	7	CAP - Bearing
8	2C3482	1	CAP - Bearing (Aft End)
9	S-2713	16	NUT - Bearing Cap
		16	COTTER PIN -- 1/8 x 1 1/2 Lg.
		2	PIPE PLUG -- 1 Std. - C't's'k. Hd.
		1	PIPE PLUG (Sump) -- 1/2 Std.
	X3643		SEAL ASSEM. - CRANKSHAFT OIL — Includes
*		2	SEAL
1	C-7885	2	GASKET
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
		2	NUT -- 3/8-16-Hex.
		2	LOCKWASHER -- 3/8 SAE Reg.
	X3644		CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	2C3453	1	GEAR
2	2C2259L1	2	PIN - Eccentric & Sprocket Drive
3	C-5209	1	PIN - Eccentric Dowel
	X3645		ECCENTRIC ASSEM. - AIR COMPRESSOR — Includes
*		1	ECCENTRIC
*		1	ECCENTRIC
1	C-6265L 7/8	2	PIN - Dowel
2	C-2108L3 1/2	4	STUD
		4	CASTLE NUT -- 1/2-20-Hex.
		4	COTTER PIN -- 3/32 x 1 Lg.
	X3646		SPROCKET ASSEM. - WATER PUMP DRIVE — Includes
*		2	SPROCKET - (Halves)
1	C-2106L3	2	STUD
		2	CASTLE NUT -- 1/2-20-Hex.
		2	COTTER PIN -- 3/32 x 1 Lg.
	X3647		STRAINER ASSEM. - LUBE OIL — Includes Strainer Body & Screen (No Service Parts)

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X3648		MANIFOLD ASSEM. - LUBE OIL — Includes Pipe & Inlet & Outlet Connections (No Service Parts)
	X3649		MANIFOLD ASSEM. - LUBE OIL — Includes Pipe & Inlet & Outlet Connections (No Service Parts)
	X3650		CYLINDER ASSEMBLY — Includes
*		1	CYLINDER
		4	PIPE PLUG -- 1 1/4 Std.
1	S-2263	4	STUD - Cyl. Head (Short)
2	2C3538	2	STUD - Cyl. Head (Long)
3	605-N	1	COVER - Clean-out
4	605A-N	1	GASKET - Cover
		4	CAPSCREW -- 1/2-13 x 1 1/4 Lg.
5	C-264	2	NIPPLE - Lube Oil
6	612-R	2	GLAND - Packing
7	610A-RB3	2	GROMMET
8	S-2914	4	WASHER
	X3651		HEAD ASSEM. - CYLINDER — Includes
*		1	HEAD
		6	PIPE PLUG -- 3/4 Std.
		6	PIPE PLUG -- 1 Std.
1	512-R51	2	GUIDE - In. & Exh. Valve
2	854A-E	1	STUD - Spray Valve Clamp
3	2C3539	4	STUD - Rocker Shaft Bearing
	X3652		HEAD ASSEM. - CYLINDER — Includes
1	X3651	1	HEAD ASSEM.
2	F-5275	1	VALVE - Inlet
3	F-5276	1	VALVE - Exhaust
4	513-R	2	SPRING - Valve
5	514A-FXC4	2	WASHER - Valve Spring (Bottom)
6	514-FXC4	2	WASHER - Valve Spring (Top)
7		4	HALF NUT -- 5/8-11-Hex.
8		2	LOCKWASHER -- Shakeproof - Type 11 - 5/8
9	2C3542	1	GUIDE - Air Start. Check Valve
		2	CAPSCREW -- 1/2-13 x 1 1/4 Lg.
		2	LOCKWASHER -- 1/2 SAE Reg.
10	2C3540	1	VALVE - Air Start. Check
11	2C3543	1	SPRING - Air Start. Check Valve
12	2C3541	1	RETAINER - Air Start. Check Valve Spring
		1	COTTER PIN - 3/32 x 7/8 Lg.
	X3653		CYLINDER ASSEMBLY — Includes
*		1	CYLINDER
		5	PIPE PLUG -- 1 1/4 Std.
1	S-2263	4	STUD - Cyl. Head (Short)
2	2C3538	2	STUD - Cyl. Head (Long)
3	605-N	1	COVER - Clean-out
4	605A-N	1	GASKET - Cover
		4	CAPSCREW -- 1/2-13 x 1 1/4 Lg.
5	C-264	2	NIPPLE - Lube Oil
6	612-R	2	GLAND - Packing
7	610A-RB3	2	GROMMET
8	S-2914	4	WASHER
9	610-RB3	5	NIPPLE - Water By-Pass
	X3654		HEAD ASSEM. - CYLINDER — Includes
*		1	HEAD - Cylinder
		6	PIPE PLUG -- 3/4 Std.
		3	PIPE PLUG -- 1 Std.
1	512-R51	2	GUIDE - In. & Exh. Valve
2	854A-E	1	STUD - Spray Valve Clamp
3	2C3539	4	STUD - Rocker Shaft Bearing
	X3655		HEAD ASSEM. - CYLINDER — Includes
1	X3654	1	HEAD ASSEM.
2	F-5275	1	VALVE - Inlet
3	F-5276	1	VALVE - Exhaust
4	513-R	2	SPRING - Valve
5	514A-FXC4	2	WASHER - Valve Spring (Bottom)
6	514-FXC4	2	WASHER - Valve Spring (Top)
7		4	HALF NUT -- 5/8-11-Hex.
8		2	LOCKWASHER -- 5/8 Shakeproof -- Type 11
9	2C3542	1	GUIDE - Air Start. Check Valve
		2	CAPSCREW -- 1/2-13-NC x 1 1/4 Lg.
		2	LOCKWASHER -- 1/2 SAE Reg.
10	2C3540	1	VALVE - Air Start. Check
11	2C3543	1	SPRING - Air Start. Check Valve
12	2C3541	1	RETAINER - Air Start. Check Valve Spring
		1	COTTER PIN -- 3/32 x 7/8 Lg.
	X3656		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
1	C-5520L9 1/4	1	STUD - Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Comp. Cylinder
4	S-1983	11	PIN - Centerframe Door Dowel

ASSEM. LIST NO. AL 183
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9 x 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
	X3657		CENTERFRAME ASSEMBLY	Includes
*		1	CENTERFRAME	
1	C-5520L9 1/4	1	STUD - Cylinder	
2	846A-RB3	4	STUD - Fuel Pump Housing	
3	C-5510L3	4	STUD - Air Compressor Cylinder	
4	S-1983	11	PIN - Centerframe Door Dowel	
	X3658		BRACKET ASSEM. - INTERMEDIATE GEAR	Includes
*		1	BRACKET	
1	C-7889	1	PIN - Gear	
2	S-2760	1	PIN - Dowel	
3	S-2920	1	STUD - Gear Pin End	
4	C-7942	4	STUD - Bracket	
5	2C3552	1	BUSHING - Tachometer Drive Shaft	
	X3659		BRACKET ASSEM. - INTERMEDIATE GEAR	Includes
*		1	BRACKET	
1	C-7889	1	PIN - Gear	
2	S-2760	1	PIN - Dowel	
3	S-2920	1	STUD - Gear Pin End	
4	C-7942	4	STUD - Bracket	
5	2C3552	1	BUSHING - Tachometer Drive Shaft	
	X3660		GEAR ASSEM. - INTERMEDIATE	Includes
*		1	HUB	
*		1	GEAR	
1	664B-AX3	1	BUSHING	
		2	CAPSCREW -- 1/2-13 x 1 Lg.	
	X3661		LIFTER ASSEM. - FUEL PUMP	Includes
*		1	LIFTER	
1	2C3522	1	ROLLER	
2	2C3523	1	PIN - Roller	
	X3662		PUMP ASSEM. - BILGE	Includes
1	W-2200	1	BODY	
		1	PIPE PLUG -- 1 Std.	
2	X3666	1	PLUNGER ASSEM.	
3		5	PACKING -- 3/8 Sq. x 8 Lg. - (Flax)	
4	X3710	1	GLAND ASSEM. - Packing	
		4	NUT -- 1/2-13-Hex.	
	X3663		PUMP ASSEM. - BILGE	Includes
1	W-2201	1	BODY	
		1	PIPE PLUG -- 1 Std.	
2	X3666	1	PLUNGER ASSEM.	
3		5	PACKING -- 3/8 Sq. x 8 Lg. - (Flax)	
4	X3710	1	GLAND ASSEM. - Packing	
		4	NUT -- 1/2-13-Hex.	
	X3666		PLUNGER ASSEM. - BILGE PUMP	Includes
*		1	PLUNGER	
*		1	PIPE PLUG -- 1 Std.	
	X3667		ROD ASSEM. - BILGE PUMP CONNECTING	Includes
*		1	ROD	
*		1	CAP	
1	C-2110L4 1/4	2	STUD	
2		2	CASTLE NUT -- 5/8-18-Hex.	
		2	COTTER PIN -- 1/8 x 1 1/4 Lg.	
		3	ESCUTCHEON PIN -- #10 x 1 1/8 Lg.	
3	C-8011L1 3/8	2	PIN - Stud Retainer	
	X3668		GOVERNOR ASSEMBLY	Includes
1	X3669	1	BODY ASSEM.	
2	X265	2	WEIGHT ASSEM.	
3	2C1820	2	PIN - Weight to Body	
4		4	CASTLE NUT -- 3/8-24-Hex.	
4		4	COTTER PIN -- 3/32 x 3/4 Lg.	
5	X266	1	QUILL ASSEM. - Thrust	
6	C-548	1	KEY - Thrust Quill	
7	5721	1	THRUST BEARING -- Bantam "OBLIGE"	
8	2C1757	1	RETAINER - Bearing	
9	2C2846L 7/8	1	SETSCREW	
		1	WIRE -- #16 Ga. x 9 Lg.	
	X3669		BODY ASSEM. - GOVERNOR	Includes
*		1	BODY	
1	2C3556	1	PINION	
2		1	WOODRUFF KEY -- 1/8 x 5/8 Std.	

REF. No.	PART NUMBER	No. USED	DESCRIPTION	
	X3670		CAMSHAFT ASSEMBLY	Includes
*		1	CAMSHAFT	
1	C-7972L 11/16	1	PIN - Shift. Collar Retainer Washer	
2	2C3550	1	ECCENTRIC - Fuel Pump	
3	C-6708L3 1/2	1	KEY - Eccentric & Lube Pump Gear	
4	2C3519	2	KEY - Bilge Pump Eccentric Sleeve	
		4	MACHINE SCREW--1/4-20 x 3/4 Lg.-Flat Hd.	
	X3671		BEARING ASSEM. - CAMSHAFT (FWD. END)	Includes
*		1	BEARING	
1	2C3615	1	BUSHING	
	X3672		BEARING ASSEM. - CAMSHAFT (FWD. END)	Includes
*		1	BEARING	
1	2C3615	1	BUSHING	
	X3673		BEARING ASSEM. - CAMSHAFT (INTERMED.)	Includes
*		1	BEARING	
1	2C3615	1	BUSHING	
	X3674		BEARING ASSEM.-CAMSHAFT(INTERM. - LARGE)	Includes
*		1	BEARING	
1	2C3637	1	BUSHING	
	X3675		BEARING ASSEM.-CAMSHAFT(INTERM. - LARGE)	Includes
*		1	BEARING	
1	2C3637	1	BUSHING	
	X3676		BEARING ASSEM.-CAMSHAFT(& BILGE PUMP ECCENT.)	Includes
1	X3678	1	BEARING ASSEM.	
2	2C3517	1	SLEEVE - Bilge Pump Eccentric	
3	F-7023	1	ECCENTRIC - Bilge Pump	
4	C-6908L2	1	KEY - Eccentric to Sleeve	
5		1	TAPER PIN -- #6 x 3 1/4 Lg.	
	X3677		BEARING ASSEM.-CAMSHAFT(& BILGE PUMP ECCENT.)	Includes
1	X3679	1	BEARING ASSEM.	
2	2C3517	1	SLEEVE - Bilge Pump Eccentric	
3	F-7023	1	ECCENTRIC - Bilge Pump	
4	C-6908L2	1	KEY - Eccentric to Sleeve	
5		1	TAPER PIN -- #6 x 3 1/4 Lg.	
	X3678		BEARING ASSEM. - CAMSHAFT (AFT END)	Includes
*		1	BEARING	
1	2C3518	1	BUSHING	
2		1	OIL SEAL -- National Motor Brg. #50365	
	X3679		BEARING ASSEM. - CAMSHAFT (AFT END)	Includes
*		1	BEARING	
1	2C3518	1	BUSHING	
2		1	OIL SEAL -- National Motor Brg. #50365	
	X3681		ADAPTOR ASSEM. - LUBE PRESS. PUMP.	Includes
*		1	ADAPTOR	
1	5858	2	BUSHING	
	X3682		ADAPTOR ASSEM. - LUBE PRESS. PUMP	Includes
*		1	ADAPTOR	
1	5858	2	BUSHING	
	X3683		LIFTER ASSEM. - INLET & EXHAUST VALVE	Includes
*		1	LIFTER	
1	2C3585	1	ROLLER	
2	2C3592	1	PIN - Roller	
	X3684		LIFTER ASSEM. - AIR START. VALVE	Includes
*		1	LIFTER	
1	595-E	1	ROLLER	
2	596-E	1	PIN - Roller	
	X3686		ROCKER ASSEM. - INLET VALVE	Includes
*		1	ROCKER	
1	2C3641	2	BUSHING	
2	523-E	1	ROLLER	
3	524-E	1	PIN - Roller	
4	0527A-E	1	BALL CHECK ASSEM.	

ASSEM. LIST NO. AL 184

ISSUE 1

ENGINE SIZE 7½ x 10½ - 9½/2

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER - PART NUMBER - NAME - OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X3687		ROCKER ASSEM. - EXHAUST VALVE — Includes
*		1	ROCKER
1	2C3641	2	BUSHING
2	523-E	1	ROLLER
3	524-E	1	PIN - Roller
4	G527A-E	1	BALL CHECK ASSEM.
	X3688		ROD ASSEM. - AIR COMPRESSOR CONNECTING — Includes
*		1	ROD
1	232-456	1	BUSHING
	X3689		STRAP ASSEM. - AIR COMPRESSOR ECCENTRIC — Includes
*		1	STRAP (Upper Half)
*		1	STRAP (Lower Half)
1	C-9209-B	4	SHIM (1/32)
1	C-9209-D	10	SHIM (.010)
1	C-9209-E	8	SHIM (.003)
2	C-2612L7 3/4	2	BOLT
3	S-2713	2	NUT
		2	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X3690		SHOE ASSEM. - FLYWHEEL AIR BRAKE — Includes
*		1	SHOE
1		1	LINING -- 4 Wide x 14 Lg. x 1/4 Thick - Double Stanley
2			RIVETS
	X3691		CYLINDER ASSEM. - FLYWHEEL AIR BRAKE — Includes
1	X378	1	CYLINDER ASSEM.
2	2C3576	1	ROD - Piston
3	5076	1	WASHER - Cup-Leather
4	5078	1	CUP-LEATHER
5	5077	1	FOLLOWER - Cup-Leather
6		1	CASTLE NUT -- 5/8-18-Hex.
		1	COTTER PIN -- 1/8 x 1 1/4 Lg.
7	3958	1	GUIDE - Piston Rod
		3	CAPSCREW -- 1/2-13 x 1 1/4 Lg.
		3	LOCKWASHER -- 1/2 SAE Reg.
	X3692		MANIFOLD ASSEM. - AIR STARTING — Includes
1	X3693	6	HOUSING ASSEM. - Pilot Valve
2	2C3569	6	VALVE - Pilot
3	X3694	6	COVER ASSEM. - Valve Housing
4	2C3571	6	GASKET - Cover to Housing
		18	CAPSCREW -- 1/2-13 x 1 1/2 Lg.
		18	LOCKWASHER -- 1/2 SAE Reg.
5		5	NIPPLE -- 1 x 10 3/8 Lg.
	X3693		HOUSING ASSEM. - PILOT VALVE — Includes
*		1	HOUSING
1	2C3566	1	BUSHING
	X3694		COVER ASSEM. - PILOT VALVE HOUSING — Includes
			Cover & Pin (No Service Parts)
	X3695		VALVE ASSEM. - AIR STARTING(AUTOMATIC) — Includes
1	X3696	1	HOUSING ASSEM.
2	2C3564	1	VALVE
3	2C170-P2 1/2	2	RING - Piston
4	2C3560	1	SPRING - Valve
5	2C3562	1	COVER - Valve Housing Top
6	2C3563	1	GASKET - Cover to Housing
		4	CAPSCREW -- 1/2-13 x 1 1/2 Lg.
		4	LOCKWASHER -- 1/2 SAE Reg.
	X3696		HOUSING ASSEM.-AIR STARTING VALVE(AUTOMATIC) — Includes
*		1	HOUSING
1	2C3560	1	SLEEVE
	X3698		CYLINDER ASSEM. - AIR STARTING — Includes
1	W-2219	1	CYLINDER
2	F-7064	1	BASE - Cylinder (End Cover)
3	2C3608	1	GASKET - Base to Cylinder
		3	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
		3	LOCKWASHER -- 1/2 SAE Reg.
4	2C3610	1	RING - Piston Rod Cup-Seal
5	2C172-P	1	CUP-SEAL - Piston Rod
6	F-7063	1	HEAD - Cyl. - (End Cover)
7	2C3609	1	GASKET - Head to Cyl.
		3	CAPSCREW -- 1/2-13 x 1 3/4 Lg.
		3	LOCKWASHER -- 1/2 SAE Reg.
8	F-7062	1	ROD - Piston
9	2C3612	1	PISTON
10	2C173-P	2	CUP-SEAL - Piston
11	2C3613	1	FOLLOWER - Upper Cup-Seal
12	2C3611	1	WASHER - Cup-Seal Spacer
13	4963	2	WASHER - Piston Bumper
14	4962	1	WASHER - Bumper Washer Adaptor
15		1	NUT -- 1/2-13-Hex.
16		1	TAPER PIN -- #0 x 1 Lg.
17	2C3675	1	PLUNGER - Piston Lock
18	2C3676	1	SPRING - Piston Lock Plunger
		1	PIPE PLUG -- 3/8 Std.
		2	PIPE PLUG -- 1/8 Std.

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X3699		BRACKET ASSEM. - ENGINE CONTROL — Includes
*		1	BRACKET
1	2C3684	1	PIN - Wedge Shaft Latch
2	2C3685	1	PIN - Latch Spring Anchor
	X3700		BRACKET ASSEM. - ENGINE CONTROL — Includes
*		1	BRACKET
1	2C3684	1	PIN - Wedge Shaft Latch
2	2C3685	1	PIN - Latch Spring Anchor
	X3701		SHAFT ASSEM. - ENGINE CONTROL LEVER — Includes
1	F-7055	1	SHAFT
2	F-7077	1	HUB - Control Lever
3	C-6704L2	1	KEY - Hub to Shaft
	X3702		CAM ASSEM. - AIR PILOT VALVE CONTROL — Includes
*		1	CAM
1	2C3633	1	PIN - Spring Guide
	X3703		FORK ASSEM. - CAMSHAFT SHIFTER — Includes
*		1	FORK
1	C-9219L 11/16	1	PIN - Shifter Collar Guide
	X3704		COLLAR ASSEM. - CAMSHAFT SHIFTER — Includes
*		1	COLLAR
1	2C3666	1	BUSHING
	X3705		LEVER ASSEM. - FUEL WEDGE THRO-OUT — Includes
*		1	LEVER
1	2C3621	1	BUTTON
	X3706		LEVER ASSEM. - FUEL WEDGE THRO-OUT — Includes
*		1	LEVER
1	2C3621	1	BUTTON
	X3708		RAIL ASSEM. - FUEL — Includes
*		1	RAIL - Fuel
1	1205-E1	7	BODY - Isolating Valve
2	1205C-E	7	SEAT - Isolating Valve
3	1205D-E	7	PLUG - Isolating Valve
4	1206-C31	7	STEM - Isolating Valve
5	866-E	7	GLAND - Packing
6	1208-C3	7	NUT - Gland
7		21	RING - Packing -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. -- Garlock #333
	X3710		GLAND ASSEM. - BILGE PUMP PACKING — Includes
*		1	GLAND
1	2C3605L7	2	STUD
	X3711		RAIL ASSEM. - FUEL — Includes
*		1	TUBE - Fuel
1	1205-E1	4	BODY - Isolating Valve
2	1205C-E	4	SEAT - Isolating Valve
3	1205D-E	4	PLUG - Isolating Valve
4	1206-C31	4	STEM - Isolating Valve
5	866-E	4	GLAND - Packing
6	1208-C3	4	NUT - Packing Gland
7		12	PACKING RING -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. Garlock #333
	X3713		CYLINDER ASSEM. - AIR STARTING — Includes
1	W-2232	1	CYLINDER
2	F-7090	1	BASE - Cylinder (End Cover)
3	2C3717	1	GASKET - Base to Cyl.
		3	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
		3	LOCKWASHER -- 1/2 SAE Reg.
4	2C3610	1	RING - Piston Rod Cup-Seal
5	2C172-P	1	CUP-SEAL - Piston Rod
6	F-7063	1	HEAD - Cyl. (End Cover)
7	2C3609	1	GASKET - Head to Cyl.
		3	CAPSCREW -- 1/2-13 x 1 3/4 Lg.
		3	LOCKWASHER -- 1/2 SAE Reg.
8	F-7062	1	ROD - Piston
9	2C3699	1	PISTON
10	2C177-P	2	CUP-SEAL - Piston
11	2C3698	1	FOLLOWER - Upper Cup-Seal
12	2C3700	1	WASHER - Cup-Seal Spacer
13	4963	2	WASHER - Piston Bumper
14	4962	1	WASHER - Bumper Washer Adaptor
15		1	NUT -- 1/2-13-Hex.
16		1	TAPER PIN -- #0 x 1 Lg.
17	2C3675	1	PLUNGER - Piston Lock
18	2C3676	1	SPRING - Piston Lock Plunger
		1	PIPE PLUG -- 3/8 Std.
		2	PIPE PLUG -- 1/8 Std.

ASSEM. LIST NO. AL 185
ISSUE 1
ENGINE SIZE 7½ x 10½ -- 9 n 12

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
X3714			GEAR ASSEM. - INTERMEDIATE — Includes
*		1	GEAR
1	664B-AX3	1	BUSHING
X3718			BEARING ASSEM. - THRUST — Includes
*		1	BEARING
*		1	CAP - Bearing
*		2	PIPE - Oil (Cast in place)
1	2C3737	2	GASKET (Cap to Brg.)
		6	CAPSCREW -- 3/4-10 x 3 3/4 Lg.
		6	LOCKWASHER -- 3/4 SAE Reg.
2	C-6699L3	2	PIN - Dowel (Cap to Brg.)
		2	PIPE PLUG -- 1/2 Std.
3	F-7101	1	COVER - Top
4	F-7100	1	GASKET - Cover to Bearing Cap
		6	CAPSCREW -- 1/2-13 x 1 1/2 Lg.
		6	LOCKWASHER -- 1/2 SAE Reg.
5	F-7102	1	COVER - Thrust Brg. Bottom
6	2C3738	1	GASKET - Cover to Bearing
		10	CAPSCREW -- 1/2-13 x 1 1/2 Lg.
		10	LOCKWASHER -- 1/2 SAE Reg.
		1	PIPE PLUG -- 1/2 Std.
7	2656	1	PIPE - Water (Lower Brg. to Cap)
8	C-3389	1	GASKET - Water Pipe to Bearing
		2	CAPSCREW -- 1/2-13 x 2 1/4 Lg.
		2	LOCKWASHER -- 1/2 SAE Reg.
9	2C2798L2	8	STUD - Packing Gland
10	2C3716	4	RING - Packing Gland Seal (Halves)
11		4	PACKING -- 3/8 Sq. x 15 Lg.-Green Tweed Co. "PALCO" Plated Packing
12	X3719	2	GLAND ASSEM. - Packing
		8	NUT -- 3/8-16-Hex.
		8	HALF NUT -- 3/8-16-Hex.
X3719			GLAND ASSEM. - THRUST BRG. PACKING — Includes Packing Gland (Halves) (No Service Parts)
X3720			BAND ASSEM. - PROPELLER BRAKE — Includes
*		1	BAND
*		2	RIVETS -- 1/4 Dia. x 1/4 Lg. - Rnd. Hd.
*		1	PLATE - Reinforcing
*		2	RIVETS -- 1/4 Dia. x 3/4 Lg. - Rnd. Hd.
1	2C3740	1	LINING - Brake Band
2		21	RIVETS -- 3/16 x 5/16 Lg. - Tubular
X3721			PLUNGER ASSEM. - PROPELLER BRAKE — Includes
*		1	PLUNGER
1	S-2388	1	ROLLER
2	S-2390	1	PIN - Roller
3	S-2389	1	STUD - Brake Band
X3722			ROD ASSEM. - PROPELLER BRAKE CONTROL — Includes Control Rod & Cam (No Service Parts)
X3723			BASE ASSEMBLY — Includes
*		1	BASE
1	S-2918	8	PIN - Crank. Bear. Shell Dowel
2	C-9879	8	CONNECTOR - Oil Tube
3	C-2112L5 3/4	16	STUD - Brg. Cap
4	727-BB3	23	STUD - Base, Centerframe & Cylinder
5	729-BB3	1	STUD - Base & Centerframe (Fwd. End - Large)
6	C-2012L16 1/4	2	STUD - Base & Centerframe (Aft End - Small)
7	713-R	7	CAP - Bearing
8	2C3482	1	CAP - Bearing (Aft End)
9	S-2713	16	NUT - Bearing Cap
		16	COTTER PIN -- 1/8 x 1 1/2 Lg.
		2	PIPE PLUG -- 1 Std. - C't'sk. Hd.
		2	PIPE PLUG -- 1/2 Std.
X3725			CRANKSHAFT ASSEMBLY — Includes
*		1	CRANKSHAFT
1	2C3453	1	GEAR
2	2C2259L1	2	PIN - Eccentric & Sprocket Drive
3	C-5209	1	PIN - Eccentric Dowel
4	2C3781	1	RING - Oil Thrower (Fwd. End)
X3726			RAIL ASSEM. - FUEL — Includes
*		1	TUBE - Fuel
1	1205-E1	5	BODY - Isolating Valve
2	1205C-E	5	SEAT - Isolating Valve
3	1205D-E	5	PLUG - Isolating Valve
4	1206-C31	5	STEM - Isolating Valve
5	866-E	5	GLAND - Packing
6	1208-C3	5	NUT - Packing Gland
7		15	PACKING RING -- 1/4 I.D. x 1/2 O.D. x 1/4 Th. Garlock #333
X3727			PUSH-ROD ASSEM. - SPRAY VALVE — Includes Tube, Upper & Lower Plug (No Service Parts)

REF. No.	PART NUMBER	No. USED	DESCRIPTION
X3735			VALVE ASSEM. - FUEL CUT-OUT CONTROL — Includes
*		1	BODY - Valve
		5	PIPE PLUG -- 1/8 Std.
*		1	PLUNGER - Valve
1	2C3845	1	SPRING - Plunger
2	2C3842	1	PLUNGER - Valve Body End (Spring End)
3	2C3841	1	PLUG - Valve Body End
4	2C3844	2	GASKET - Plug to Body
X3739			STUD ASSEM.-ENGINE CONTROL LEVER RETAINING — Includes
*		1	STUD
1	2C3834L 5/8	1	PIN
X3743			LATCH ASSEM. - WEDGE HOLD-OUT — Includes
*		1	LATCH
1	2C3850	1	PLUNGER
2	2C3852	1	PLUG
3	C-8116	1	GASKET - Plug to Latch
		1	PIPE PLUG -- 1/8 Std.
X3833			IMPELLER & SHAFT ASSEM.-1 1/2" CENTRIFUGAL PUMP — Includes
*		1	IMPELLER
1	2C4154	1	SHAFT
1	C-821	1	PIN - Impeller to Shaft Lock
X3834			PUMP ASSEM. - 1 1/4" CENTRIFUGAL — Includes
1	GA370-E1	1	BODY ASSEM.
2	371-E	1	COVER - Suction
3	371C-E	1	GASKET - Cover
		12	MACHINE SCREW--1/4-20 x 3/8 Lg.-Rnd. Hd.
4	X3833	1	IMPELLER & SHAFT ASSEM.
5		1	PACKING -- 3/8 Sq. x 12 Lg. - (Flax)
6	373-E	1	GLAND - Packing
		4	NUT -- 7/16-14-Hex.
7	X68	1	CUP ASSEM. - Grease
8	381-FB4	1	BEARING - Steady
		2	CAPSCREW -- 3/8-16 x 3/4 Lg.
		2	CAPSCREW -- 3/8-16 x 1 Lg.
		1	CAPSCREW -- 1/2-13 x 2 Lg.
9	386-FB41	1	HOUSING - Ball Bearing
10	C-9069-P	1	BALL BEARING
11	C-9070-P	1	ADAPTOR - Ball Bearing
12	386A-FB41	1	RETAINER - Ball Bearing
13		1	GREASE CUP -- 1/8 - Lunkenheimer - "Guard #00"
14	785-B	1	FLANGE - Suction Pipe
15	S-2334	1	GASKET - Flange
		2	CAPSCREW -- 1/2-13 x 1 Lg.
16	785-B	1	FLANGE - Pump Discharge
17	S-2334	1	GASKET - Flange
		2	CAPSCREW -- 1/2-13 x 1 Lg.
X3838			SEAL ASSEM. - CRANKSHAFT OIL — Includes
*		2	OIL SEAL
		2	CAPSCREW -- 3/8-16 x 1 1/2 Lg.
		2	NUT -- 3/8-16-Hex.
		2	LOCKWASHER -- 3/8 SAE Reg.
1	2C4167	2	GASKET
X3839			BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 1 1/2 Std.
1	S-2918	5	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	12	STUD - Crank. Brg. Cap
3	727-BB3	15	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2061	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
7	C-7865	4	CLAMP - Manifold to Base
8	C-2406L 1/2	8	CAPSCREW - Manifold Clamp to Base
9	2C2543	5	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	5	WASHER - Crank. Brg. Oil Tube
11	F-5194	1	CAP - Crankshaft Bearing (End)
12	713-R	4	CAP - Crankshaft Bearing
13	S-2713	12	NUT - Crankshaft Bearing Cap
		12	COTTER PIN -- 1/8 x 1 1/2 Lg.
X3842			CRANK ASSEM. - FUEL PUMP — Includes
*		1	CRANK - Fuel Pump
1	2C4132	1	SHAFT - Tachometer Drive
		1	SETSCREW -- 1/4-20 x 3/8 Lg.-Hd. Cup Pt.

ASSEM. LIST NO. AL 186
ISSUE #2
ENGINE SIZE 7 1/2 X 10 1/2

ATLAS IMPERIAL DIESEL ENGINE CO. SUB-ASSEMBLY LIST

WHEN ORDERING PARTS ALWAYS GIVE ENGINE NUMBER-PART NUMBER-NAME-OR COMPLETE DESCRIPTION AND SIZE.
DO NOT ORDER PARTS BY REFERENCE NUMBERS
*INDICATES PARTS NOT SOLD INDIVIDUALLY

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X3873		THRUST BEARING ASSEMBLY — Includes
*		1	BEARING
*		1	CAP
		3	PIPE PLUG -- 1 1/4 Std.
		1	PIPE PLUG -- 1 1/4 Std. - C't'sk. Hd.
		2	REDUCING BUSHING -- 1 1/4 x 1/4 Std.
1	C-7816-A	2	SHIM - (1/16)
1	C-7816-B	2	SHIM - (1/32)
1	C-7816-C	4	SHIM - (1/64)
		4	CAPSCREW -- 3/4-10-NC x 2 Lg.
2	C-6699L2	2	PIN - Cap to Bearing Dowel
3	P-4396	2	PIPE - Cap to Bearing Water By-Pass
4	C-5287	2	GASKET - Water By-Pass Pipe
		4	CAPSCREW -- 1/2-13-NC x 2 Lg.
	X3908		MANIFOLD ASSEM. - AIR INLET — Includes
			Manifold & Flanges (No Service Parts)
	X3913		BASE ASSEMBLY — Includes
*		1	BASE
		4	PIPE PLUG -- 1 1/2 Std.
1	S-2918	4	PIN - Crank. Brg. Shell Dowel
2	C-2112L5 3/4	10	STUD - Crank. Brg. Cap
3	727-BB3	11	STUD - Base, Centerframe & Cylinder
4	729-BB3	1	STUD - Base & Centerframe
5	731-BB3	2	STUD - Base & Centerframe (End)
6	X2060	1	MANIFOLD ASSEM. - Lube Oil
		2	PIPE PLUG -- 3/8 Std.
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
7	C-7865	3	CLAMP - Manifold to Base
8	C-2406L 1/2	6	CAPSCREW - Manifold Clamp to Base
9	2C2543	4	TUBE - Manifold to Crank. Brg. Oil
10	C-3662	4	WASHER - Crank. Brg. Oil Tube
11	P-5194	1	CAP - Crankshaft Bearing (End)
12	713-R	3	CAP - Crankshaft Bearing
13	S-2713	10	NUT - Crankshaft Bearing Cap
		10	COTTER PIN -- 1/8 x 1 1/2 Lg.
	X3920		ADAPTOR ASSEM. - LUBE PRESS. PUMP — Includes
*		1	ADAPTOR
1	5858	2	BUSHING
	X3921		ADAPTOR ASSEM. - LUBE PRESS. PUMP — Includes
*		1	ADAPTOR
1	5858	2	BUSHING
	X3950		PUSH-ROD ASSEM. - SPRAY VALVE — Includes
			Push-Rod Tube, Socket & Button (No Service Parts)
	X3951		CENTERFRAME ASSEMBLY — Includes
*		1	CENTERFRAME
		1	PIPE PLUG -- 1/2 Std. - C't'sk. Hd.
1	C-5520L9 1/4	1	STUD - Centerframe to Cylinder
2	846A-RB3	4	STUD - Fuel Pump Housing
3	C-5510L3	4	STUD - Air Compressor Cylinder
4	S-1983	7	PIN - Centerframe Door Dowel

REF. No.	PART NUMBER	No. USED	DESCRIPTION
	X5087		VALVE & CAGE ASSEM.-PUMP SUCTION & DISCHARGE — Includes
1	S-577	1	CAGE
2	S-579	1	VALVE - Suction
3	S-561	1	SPRING - Suction Valve
4	S-563	1	WASHER - Suction Valve Spring Retainer
		1	COTTER PIN -- 1/16 x 1/2 Lg.
6	S-580	1	CAP - Suction Valve
7	811-E	1	VALVE - Discharge
	X5227		HANDLE ASSEM. - GOVERNOR SPEED CONTROL — Includes
1	1117-E	1	HANDLE (Upper Sect.)
2	S-2910	1	HANDLE (Lower Sect.)
3	1249-E	1	SCREW - Handle
		1	HALF NUT -- 1/4-20-Hex.
4	1118-E1	1	PAWL
5		1	TAPER PIN (Pawl Retain.)--#1 x 1 Lg.
6	1124-E	1	SPRING - Pawl
7	1125-E	1	PLUG - Spring Retainer
	X5353		BODY ASSEM. - H.P. FUEL PUMP — Includes
			Pump Body & Plunger (No Service Parts)

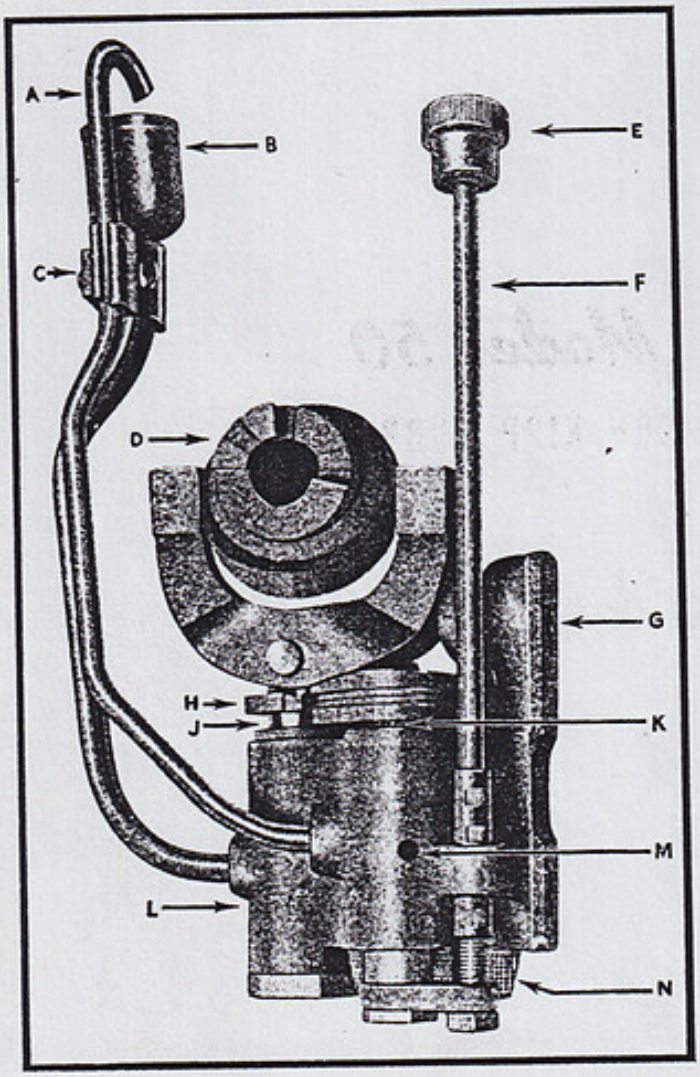
INSTRUCTION BOOK
and
REPAIR PARTS LIST

Model 50

MADISON-KIPP LUBRICATOR

MADISON-KIPP CORPORATION
Madison, Wisconsin, U. S. A.

The **MODEL 50** pumping unit illustrated in Figure 1 embodies a mechanical motion so ingenious as to deserve your special attention. The driving eccentric imparts to both forcing and metering plungers a reciprocating movement for pumping and an oscillating movement for valving. The angle of the eccentric ring groove is 27°. When the eccentric makes a complete revolution, the plungers make a total swing of 54°. The reciprocating movement or lift is .212". Oil intake and outlet ports register with grooves in the plungers as they travel their cycle.



A Sight Feed Tube which shows the amount of oil in drops according to the oil delivery adjustment setting.

B Sight Feed Oil Cup.

C Tube Clamps tying the tubes "A" and "B" together.

D Eccentric to impart the reciprocating and oscillating movement to the plungers *(See first paragraph above)*.

E Adjusting Button to regulate the amount of oil to be delivered per feed impulse.

F Adjusting Spindle.

G Oil Outlet from pumping unit.

H Gear for oscillating and lifting metering plunger in unison with forcing plunger.

J Plunger which forces the measured quantities of oil to the feed outlet.

K Metering Plunger which delivers oil to the sight feed cup.

L Body of pumping unit.

M By-Pass Opening—oil not delivered to the sight feed cup is by-passed back to the reservoir.

N Fine Strainer located at oil inlet of pumping unit.

Figure 1

INSTRUCTIONS FOR ATTACHING, OPERATING AND CARE OF MADISON-KIPP LUBRICATORS.

Madison-Kipp Model 50 Lubricators are built on one standard design, of any required size and number of feed outlets, and are applied universally to all types of steam, oil, and gas engines, steam pumps, air compressors, steam hammers, shovels, dredges and cranes, marine engines, steering engines, drilling engines, agricultural tractors, grain separators, machine tools, and special types of machinery.

The Sight Feed type is built with a visible feed and an individual fine adjustment for each pumping unit. The Blind Feed type is designed for service where fine adjustment and visible feed are not necessary. It can be adjusted, however, by means of employing different lengths on the ratchet arm.

Madison-Kipp Lubricators are built on the Kipp Valveless principle, which permits the pumping and forcing of oil without the use of ball and spring valves.

ATTACHING

The lubricator should be bolted down, using lock washers to prevent bolts from working loose. Try to avoid offset bends in the driving rod.

The driving arm should be clamped on the lubricator shaft so as to place the driving pawl located inside the lubricator in the center of the space available for the stroke. If possible, turn machine over by hand to check stroke and clearance.

The standard lubricator is provided with a 44-tooth ratchet wheel and would require 44 strokes to complete one revolution of the lubricator if connected to engage with one tooth of the ratchet per stroke. The recommended speed varies from four to twenty revolutions per minute, depending on the type and size of machine to be lubricated.

Oil Leads

Lubricators can be furnished with connections for either ¼" O.D. copper or brass tubing, or for ⅛" or ¼" iron pipe. Where many turns and bends are necessary, the copper or brass tubing is preferable. The tubing or pipe should be clean, ends free from burrs and cut to a length which will allow the connections between the lubricator and point to be lubricated to be as direct as possible. Care should be taken when bending tubing to avoid flattening, which would restrict the flow of oil. All joints should be tight, and tubing or pipe should be anchored securely to machine to avoid vibration. Where possible, arrange tubing to prevent exposure to the extreme cold. In making the joint, let the tubing extend through the ferrule into the connection at least ⅛".

OPERATION AND ADJUSTMENT

Fill the lubricator with *clean* oil and turn hand crank until each of the oil leads are filled with oil. At this time make an inspection of all the connections to see that no leaks occur.

Adjustment or regulation of the quantity of oil to be delivered for each revolution of the unit is accomplished by turning the adjusting button, located on the cover (Part C-880-A). Turning to the right (clockwise) decreases, and to the left (counter-clockwise) increases the amount of oil being forced to the point to be lubricated. Observation can be made through the transparent hood to see the amount delivered by each feed. A very close adjustment may be had. Turning the lubricator by means of the hand crank when making adjustment is recommended. When lubricator is first applied, it is recommended as a safe practice to leave lubricator set for maximum delivery of oil, cutting it down gradually with care if an oversupply is noted at the points to be lubricated.

CARE OF LUBRICATOR

The Madison-Kipp pumping unit is made of very accurately machined parts which function coördinately, contains no troublesome check valves and springs and for this reason requires no attention after final feed adjustments have been made, other than the care necessary to keep dirt out of the lubricator.

Field operators, while perhaps not intentionally careless, often make no provision for keeping oil containers, funnels, etc., free from dust and dirt. As foreign matter so collected is likely to find its way into the lubricator tank, it is recommended as standard practice to drain the oil out of the lubricator and clean out the reservoir with kerosene every thirty to ninety days, depending on usage. The following are our suggestions for attention at regular intervals:

Use only clean oil.

Keep the lubricator full of oil.

See that all connections are tight.

See that the oil pipes are supported where excessive vibration is developed.

See that the lubricator is securely bolted down.

Inspect lubricator to see that filler cup strainer has not been removed. This part should be taken out for cleaning purposes only.

Keep the sight feed hood clean.

Cleaning

1. To clean out reservoir or repair lubricator, it is necessary to remove lubricator from the engine by unscrewing the oil tube connections, loosening the driving arm and unscrewing the bolts at the bolting brackets.

2. Remove cover by first unscrewing all cover screws and then lifting the cover off with the aid of a screw driver used as a pry.

3. Remove drain plug and drain oil from lubricator reservoir.

The lubricator can then be thoroughly washed out with kerosene. Do not operate the lubricator any more than necessary while washing and see that all kerosene is removed before filling with fresh oil.

DISASSEMBLING AND ASSEMBLING

If it is desired to disassemble the lubricator for any reason, proceed as follows after removing cover:

1. Drive out the split end taper pin which is driven through the shaft next to the ratchet wheel.
2. You can now remove the shaft as far as desired by pulling the hand crank.
3. Loosen bearings at each end of the reservoir by unscrewing the check nut on the inside of the reservoir.
4. To remove the pumping unit, remove the connector to which the oil pipe was attached and the cap screw below this connector, both of which are located on the outside of the reservoir. With these screws removed and the shaft pulled out beyond the unit to be removed, the pumping unit can be lifted out.

If the plunger is removed from pumping unit, be sure it is replaced in the same barrel from which it was taken, as these parts are ground to an individual selective fit and are not interchangeable.

To assemble, reverse the above operation, and put together, being sure that all screws are tight and check nuts in place.

The eccentric clutch jaws are so designed that they can be assembled only the correct way.

Assemble eccentric and strap so that the part marked "R" is to the right when facing the flat surface of the unit which is applied to the side of the reservoir.

When putting on the cover, it is necessary to see that the flats of the adjusting spindle are all in the same position as the flat depressions in the adjusting buttons. The cover can then be pressed on very readily. Do not drive or force cover in place.

Before reattaching lubricator to machine, it would be well to fill the lubricator and check the quantity of oil being delivered, for during the cleaning and repairing operation it is possible that the adjustment was changed. Do this by noting the quantity of oil delivered through the sight feed tubes at one turn of the hand crank.

SHAFT BEARINGS

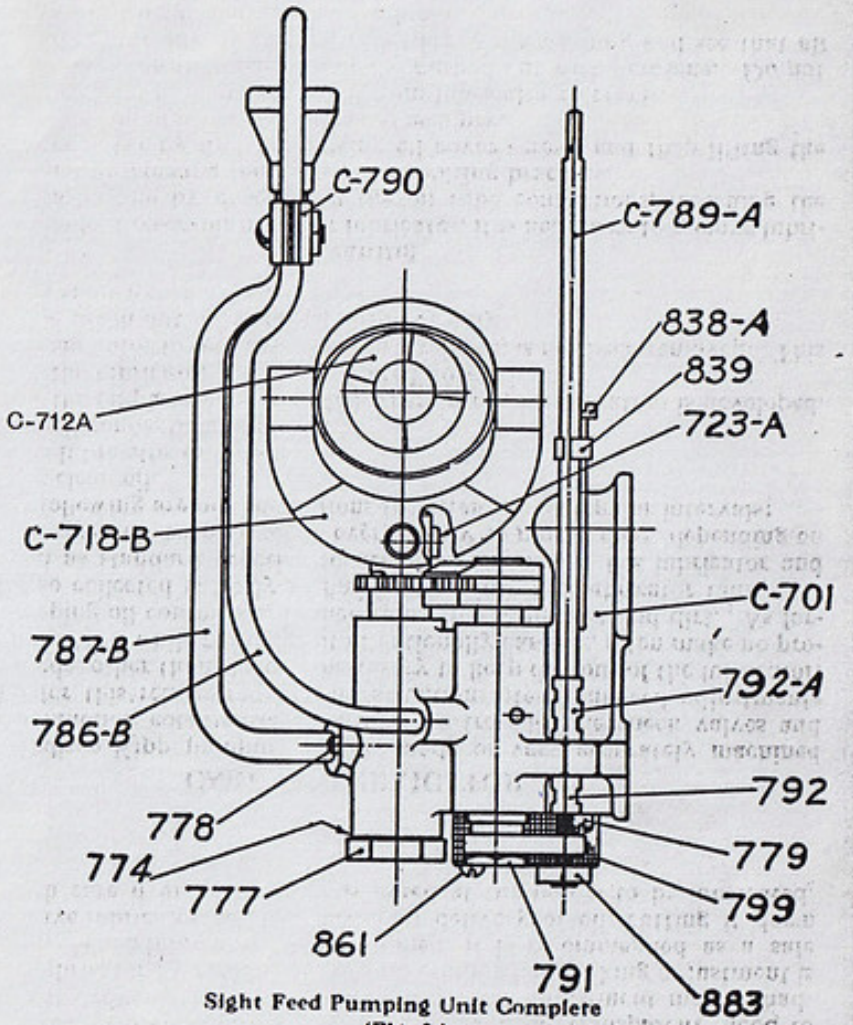
The shaft bearings are each provided with an adjustable stuffing box gland and check nut. Should a leakage develop at these points, unscrew the gland, put in a length of string packing, and replace gland, being careful to have check nut drawn up tight.

The pumping unit itself requires no packing.

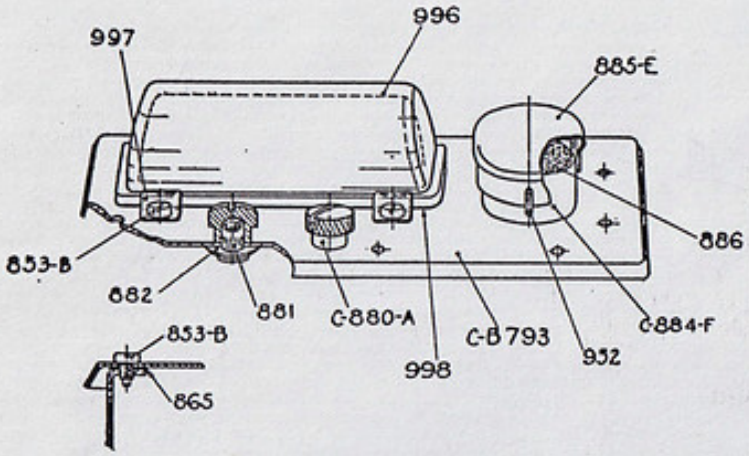
REPLACING GAUGE GLASS

To replace tubular gauge glass, after removing cover as instructed above, unscrew gauge glass plug screw, remove old gauge glass, and replace with new glass and new washers.

The bull's-eye design of gauge glass can be readily replaced from the outside without removing cover.

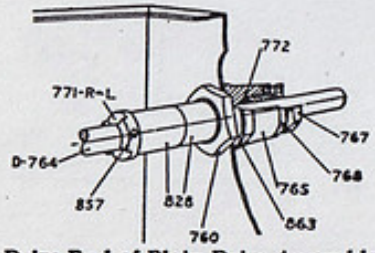


Sight Feed Pumping Unit Complete
(Fig. 3.)



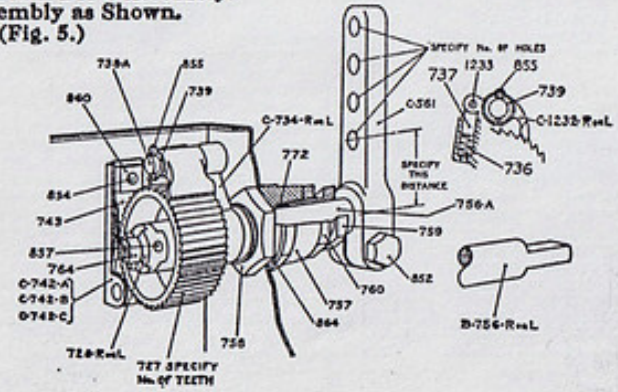
Sight Feed Lubricator Cover. Symbol C—B793. Having Glass Hood L. H. as illustrated

(Fig. 7.)



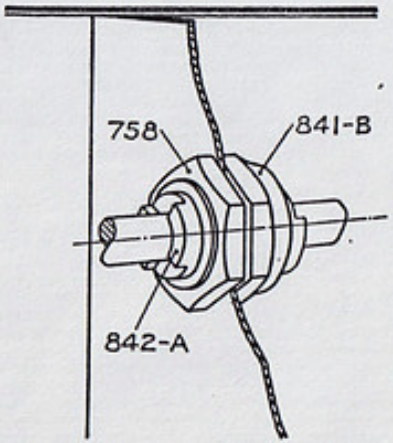
Drive End of Plain Drive Assembly. R. H. Assembly as Shown.

(Fig. 5.)



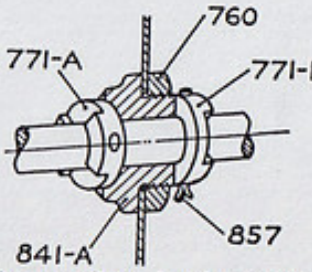
End ratchet drive assembly. Right hand assembly is shown, left hand would be on opposite end of reservoir.

(Fig. 10.)



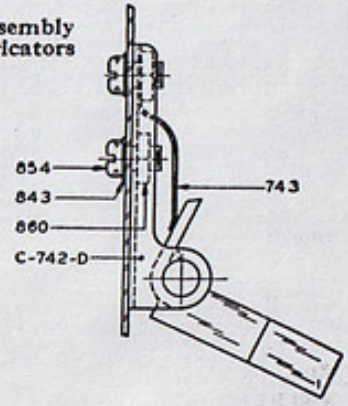
Intermediate bearing assembly for *single compartment* lubricators (New Style).

(Fig. 16.)



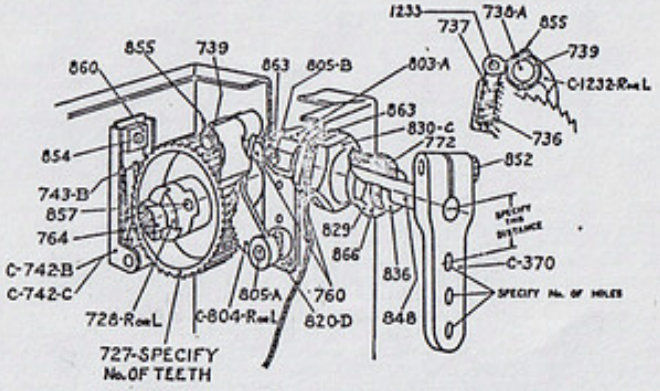
Intermediate bearing assembly for *single compartment* lubricators (Old Style).

(Fig. 17.)



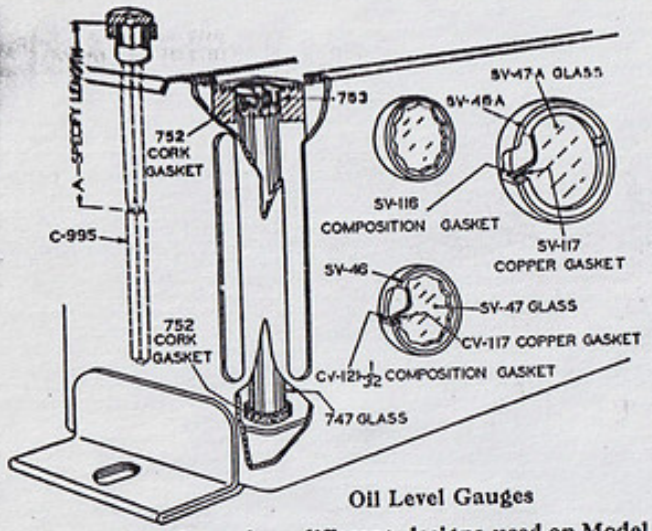
Weighted Retainer Pawl Assembly.

(Fig. 18.)



Front side ratchet drive assembly. Right hand assembly is shown, left hand would be on same side at opposite end of reservoir.

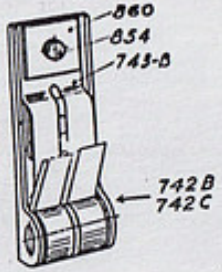
(Fig. 9.)



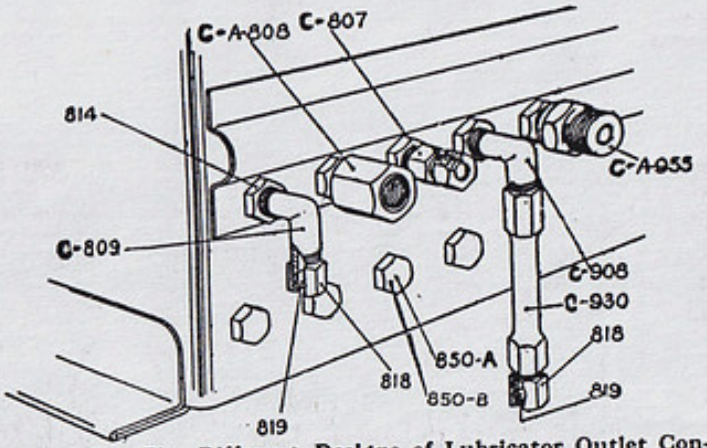
Oil Level Gauges

Illustration shows four different designs used on Model 50 Lubricator. When ordering specify symbol numbers of parts required.

(Fig. 19.)

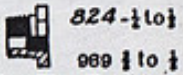


Retainer Pawl Assembly for Double Pawl (Fig. 20.)



Illustrating Five Different Designs of Lubricator Outlet Connections. When Ordering Specify Symbol Number of Part Required.

(Fig. 38.)

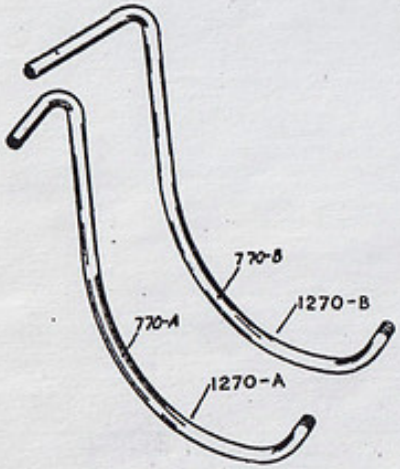


Pipe Size Bushing (Fig. 39.)

Compression Nut (Fig. 40.)

Single Cone Ferrule (Fig. 41.)

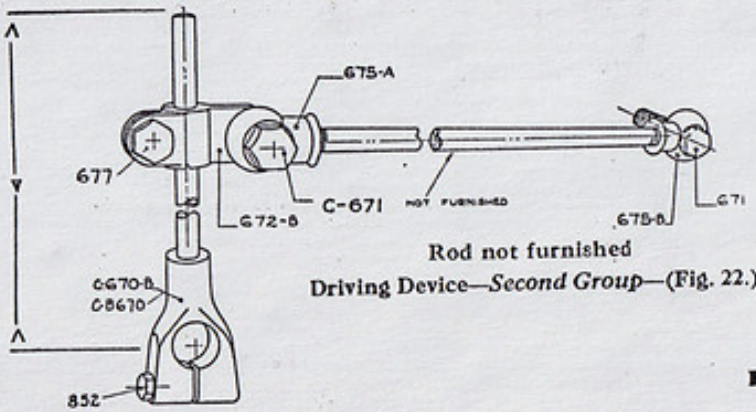
Double Cone Ferrule (Fig. 42.)



Side Ratchet and Rotary Drive Bearing Oiling Tubes

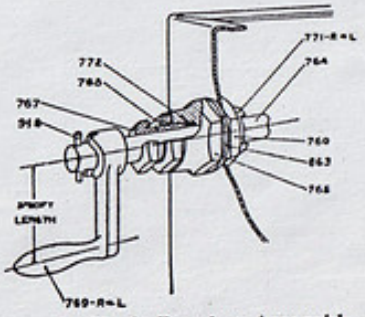
Tubes 770 A & B are for right hand drive lubricators. Tubes 1270 A & B are for left hand drive lubricators—see parts description for tube necessary for different types of drives.

(Fig. 26.)



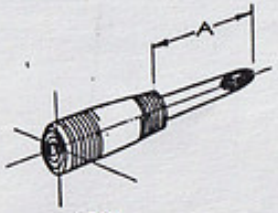
Rod not furnished

Driving Device—*Second Group*—(Fig. 22.)



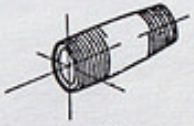
Eccentric Shaft Bearing Assembly. Left hand as illustrated

(Fig. 45.)



801

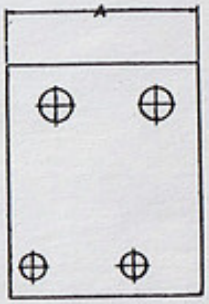
Standard Quill (Fig. 36.)



817

Nipple (Fig. 37.)

Hand Crank Shield (Fig. 47.)



720

Unit Gasket (Fig. 46.)

Directions for Ordering Repair Parts

All parts of the Model 50 Lubricator are clearly illustrated and numbered on the preceding pages.

Locate the part wanted in the illustrations to obtain the part number. Names and prices are given on the pages following illustrations.

BE SURE TO GIVE PART NUMBER, NAME AND OTHER INFORMATION ASKED FOR UNDER THE NUMBER OF THE PART WANTED

Parts are furnished only as listed. Pumping unit and plungers are never sold separately.

Prices are subject to change without notice.

Sales, use, or other taxes imposed on these products shall be borne by purchaser.

Symbol	Name	Price
CV- 16	Union Nut	$ .30
SV- 46	Glass Clamp Screw for SV-47	.25
SV- 46A	Glass Clamp Screw for SV-47-A	.40
SV- 47	Gauge Glass Disc 1 1/16" Diameter	.20
SV- 47-A	Gauge Glass Disc 1 3/16" Diameter	.25
SV-116	Composition Gasket for SV-47-A	.10
SV-117	Copper Gasket for SV-47-A	.15
CV-117	Copper Gasket for SV-47	.10
CV-121 1/2	Composition Gasket for SV-47	.05
CV-233	Terminal Check valve plug	$ .20
C-370	Drive Arm complete with 852 screw. Specify distance indicated on cut and number of holes	1.20
C-561	Drive Arm complete with 852 screw. Specify distance as indicated on cut and number of holes	1.00
C-561-D	Drive Arm weight, complete with set screw	.75
C-575-A	Blind Feed Pumping Unit complete as illustrated. Plunger and barrel never furnished separately	6.00
580-B	Unit Test Tube	.25
581	Unit Test Tube Spout	.15
582-A	Unit Test Tube Spout Screw	.10
C-B-670	Adjustable Drive Arm with 852 screw for 1/2" Dia. shaft. Specify Dimension "A"	2.00
C-670-B	Adjustable Drive Arm with 852 screw for 3/4" Shaft. Specify Dimension "A"	2.25
671	Adjustable Drive Arm Bolt	.20
C-671	Adjustable Drive Arm Bolt with nut and washer	.30
672-B	Sliding Head	1.10
675-A	Adjustable Drive Arm Swivel	.50
675-B	Adjustable Drive Arm Swivel	.50
677	3/8" x 3/4" Hex Head Cap Screw for 672-B	.10
C-678	Connecting Rod Clamp complete with set screw	1.50
700	Sight and Blind Feed Lubricator Tanks (Not illustrated) See footnote before ordering:	
	1 and 2 feed sizes	$8.00
	3 and 4 feed sizes	9.00
	5 and 6 feed sizes	10.00
	7 and 8 feed sizes	12.00
	9 and 10 feed sizes	14.00
	11 and 12 feed sizes	16.00
	Prices of larger sizes on application.	
C-701	Pumping Unit for Sight Feed. Complete as illustrated	7.50
C-A-701-R	Pumping Unit same as C-701 except has 770 Drive bearing oiling tube. For right hand drive lubricators	7.75
C-A-701-L	Pumping Unit same as C-701 except has 1270 Drive bearing oiling tube. For left hand drive lubricators	7.75
C-712-A	Eccentric for pumping unit (Consisting of 2 pieces)	.75
C-718-B	Eccentric Strap Yoke Assembly less C-712 eccentric	$ 1.00
720	Gasket. Specify Dimension "A"	.10
723-A	Eccentric Yoke Knuckle Pin	.05
724	Hand Crank Pin Shield	.20
725	Hand Crank Pin for use with 724	.05
726	1/4" Lock washer for 724	.05
727	Ratchet wheel. Specify number of teeth	1.50
728-R. or L.	Drive Collar. Specify whether lubricator has right or left hand drive. Right hand is illustrated	.50
C-734-R. or L.	Paul Carrier Arm complete with 756-A and 738-A stud. Right hand is illustrated	1.00
736	Pawl Plunger Spring	.10
737	Pawl Plunger	.10
738-A	Stud. Furnished only with C-734 R. or L. and C-804 R. or L. Pawl carrier arms	
738-B	Stud. Furnished only with C-806 R. or L. Pawl Carrier Arm	
739	Pawl Stud Washer	.05
C-742-A	Retainer pawl assembly complete with stud and single pawl	1.00
C-742-B	Retainer Pawl Assembly complete with stud and two pawls for 44 and 88 tooth ratchet wheel	1.00
C-742-C	Retainer Pawl Assembly complete with stud and two pawls for 66 tooth ratchet wheel	1.00
C-742-D	Retainer Pawl Assembly with weighted pawl	1.50
743	Spring for single pawl retainer	.10

Symbol	Name	Price
743-B	Spring for double pawl retainer	.20
747	Tubular Gauge Glass	.30
752	Gasket upper and lower for 747 gauge glass	.05
753	Plug screw for 747 gauge glass	.05
756-A	Drive Shaft, Furnished only with C-734 R. or L.	
B-756	Drive Shaft with milled end furnished only with C-734 R. or L. (Specify milled end shaft if required)	
757	Drive Shaft Bearing	.85
758	Bearing lock nut	.20
759	Bearing Gland	.25
760	Bearing and Gland Lock Nut	.20
761	Washer for 762 and C-981	.05
C-762	Stud for 763 with nut, washers and cotter key	.30
763	Strap and connection complete. Specify Dimension "A"	.85
764	Eccentric Shaft. Specify length and if for hand crank shield	1.00
D-764	Eccentric Shaft for plain drive lubricator. Specify length and if for hand crank shield. Illustrated Figure 5	1.00
765	Hand Crank Bearing	.70
766	Spacing Washer ¾" O.D. x ⅜" I.D. x 1/16" to ⅛" thick (Not illustrated)	.05
767	Eccentric Shaft Bearing Gland	.20
768	Eccentric Shaft bearing gland lock nut	.10
769–R. or L.	Hand Crank. Specify length of crank and whether for right or left hand drive lubricators	$ .40
770-A	Drive Bearing Oiling Tube for side ratchet and side rotary drive lubricators. For right hand drive only	.25
770-B	Drive bearing oiling tube for end rotary drive lubricators. For right hand drive only	.25
771–R. or L.	Spacing Collar. Specify whether lubricator has right or left hand drive	.30
771-A	Spacing collar for drive side of partition. Specify whether for right or left hand drive lubricators	.30
771-B	Spacing collar for crank side of partition. Specify whether for right or left hand drive lubricators	.30
772	Stuffing box packing	.05
774	Copper gasket for 777	.05
777	Plug for plunger hole	.10
778	No. 8 x 32 Brass Plug	.05
779	¼" x 32 Brass Plug	.05
786-B	Sight Feed Tube	.20
787-B	Oil Receiving tube complete with cup	.40

Symbol	Name	Price
C-789-A	Adjusting Spindle with 792, 792-A and 883	.20
C-790	Tube Clamp for single unit, complete with bolt and nut	.10
C-790-A	Tube clamp for binding together more than one unit. Specify how many. Complete with nuts and bolts	.40
791	Plug for adjusting sleeve	.10
792	Adjusting spindle collar (Lower)	.05
792-A	Adjusting spindle collar (Upper)	.05
C-A-793–R. or L. C-B-793–R. or L.	Sight Feed lubricator covers complete as illustrated. Specify whether for right or left hand drive lubricator, length of lubricator tank, if for single or double compartment specify the number of feeds in each compartment. If single compartment of over six feeds specify number of intermediate bearings or number of sight feed hoods and also number of screw holes in cover.	
	NOTE: The covers as illustrated show both old (C-A-793) and new (C-B-793) Covers. These covers are not interchangeable and therefore be sure to specify correct number of cover wanted as well as all information requested.	
	1 and 2 feed sizes	3.50
	3 and 4 feed sizes	4.00
	5 and 6 feed sizes	5.00
	7 and 8 feed sizes	6.50
	9 and 10 feed sizes	8.00
	11 and 12 feed sizes	10.00
	Prices of larger sizes on application	
799	Oil Strainer for pumping unit	.20
801	Nipple complete with quill. Specify dimension "A".	1.00
803-A	Blind Bearing	.70
C-804–R. or L.	Pawl carrier arm for front side ratchet drive complete with parts 738-A, 805-A, 805-B, 820-D and 848 shaft. Specify whether right or left hand drive. See illustration Fig. 9	2.50
805-B	Furnished only with C-804 R. or L. and C-A-804 R. or L.	
C-806–R. or L.	Pawl carrier arm for end belt drive complete with 738-B Stud. Specify if for right or left hand drive	1.10
C-807—¼"	Straight tube connector WITHOUT CHECK complete with 814, 818 and 819 for ¼" O.D. Tube	.50
C-A-807¼	Straight tube connector WITH CHECK complete with 814, 818 and 819 for ¼" O. D. Tube	.70

Symbol	Name	Price
C-809–¼	Angular barrel clamp connector WITHOUT CHECK. Complete with 814, 818 and 819 for ¼" O.D. Tubing	.80
C-A-809–¼	Angular barrel clamp connector WITH CHECK. Complete with 814, 818 and 819 for ¼" O.D. Tubing	1.10
814	Connector check nut	.10
817	Nipple for 900 check valve	.10
818	Cinch nut for single cone ferrule. Specify outside diameter of tubing	.05
A-818	Double cone cinch nut	.05
819	Single cone ferrule. Specify diameter of tubing	.05
A-819	Double cone ferrule. Specify diameter of tubing	.05
828	Spacing collar ⅛" O.D. x ½" I.D. Specify length	.20
829	Stuffing box	.45
836	Set collar	.10
838-A	Minimum adjusting spindle	.10
839	Minimum adjusting spindle spring	.05
840	Spring for A-810 and A-811 (Not illustrated)	.05
841-A	Intermediate bearing ½" bore	.60
841-B	Intermediate bearing ⅝" bore	.65
841-C	Partition bearing	.60
842-A	Spacing collar for 841-B intermediate bearing	.70
842-B	Spacing collar for two compartment partition bearing	.70
843	Gasket for 854	.05
846	Nut for 841-C	.70
847	Packing ring	.20
848	Eccentric driving shaft. Furnished only with 804 R. or L. for side ratchet drive	.05
849	Bearing packing	.05
850-A	5/16"-18 x ⅜" Hex head cap screw	.05
850-B	5/16"-18 x 5/16" Hex head cap screw	.05
852	⅜ x 1⅜" Hex head cap screw	.10
853	Cover screw ¼" Diameter	.05
853-B	Cover screw 5/16" Diameter	.05
854	¼ x ⅜ Round head cap screw	.05
855	5/32 x ½" Spring cotter	.05
857	No. 1 x 1¼" Split end taper pin	.05
858	No. 1 x ¾ taper pin (Not illustrated)	.05
859	5/16" Steel ball for A-807, A-809 and C-900	.05
860	¼-20 Standard square nut	.05
861	Screw for 799	.05
863	1-5/16 I.D. Composition gasket	.05
864	1-5/16" I. D. Composition gasket	.05
865	Cover gasket. Specify length wanted.	

Symbol	Name	Price
879	¼-20 Hollow head set screw	.15
C-880-A	Adjusting spindle head, complete with 881 and 882.	.20
883	5/16"-32 nut for 789	.05
884	Oval filler cup	.25
C-884-F	Oval filler cup complete with 885-E and 952	.50
884-H	Round filler cup (Not illustrated)	.50
C-885-A	Filler cup cover complete with chain	.30
885-E	Oval filler cup cover	.20
885-F	Round filler cup plug (Not illustrated)	.75
886	Oval filler cup strainer	.10
C-890	Swivel complete with washer, cotter and set screw	.45
891	Attachment arm. Specify dimension "A"	1.00
C-892	U Bolt with nuts	.20
C-A-900	Check valve complete ⅛" I.P.S. both ends	1.75
C-B-900	Check valve complete ¼" I.P. both ends	1.75
C-908	Angle barrel clamp connection complete with 814. Having ⅛" male pipe thread both ends	.50
914	⅛" I.P. Plug	.05
918	No. 1 x 1" Taper pin	.05
927	Hinge Link	1.80
928	Hinge Link (Upper half)	1.90
C-929	Hinge Link Pin, complete with spring cotters	1.00
C-930	Extension adapter complete with 818 and 819	1.00
952	Filler cup hinge ring	.05
C-995	Oil Dagger gauge. Specify dimension "A"	.80
996	Glass Hood. Specify length overall, also, number of tubes covered by each glass required 1, 2 and 3 feed sizes 4 and 5 feed sizes 6 and 7 feed sizes 8 feed	.50 .75 .80 1.00
997	Glass hood clamp	.10
998	Glass hood gasket. Specify length overall	.10
C-1232-R. or L.	Drive pawl with stud for right or left hand drive. Specify which	.90
1233	Pawl wing stud. Furnished only with C-1232 R. or L.	
1270-A	Drive bearing oiling tube for side ratchet and side rotary drive lubricators. For left hand drive only	.25
1270-B	Drive bearing oiling tube for end rotary drive lubricators. For left hand drive only	.25

ATLAS ⇒ WHITE ⇒ COOPER (DeLAVAL) ENTROPY
SUPERIOR

COOPER ATLAS/IMPERIAL® REPLACEMENT PARTS CATALOG

DIESEL PARTS CO OF CALIFORNIA
1900 E. 12TH STREET
OAKLAND, CALIFORNIA 94606

1/20/95


DIESEL PARTS CO. OF CALIFORNIA
1900 EAST 12th ST.
OAKLAND, CA 94606
JEAN GERARDS
(510) 534-9716
FAX (510) 534-9347

ATLAS PARTS 1/20/95
4 PAGES

QTY	PART NUMBER	DESCRIPTION
14	1117-E	HANDLE
3	1118-E1	PAWL
94	1124-E	SPRING
1	1125-E	SCREW
3	1131-DXC4	CABLE
1	1132-JX	WEDGE
1	1217-AX3	GAGE PRESSURE
2	1217-E	GAGE PRESSURE 6 INCH
4	1230-E1	BODY
7	1231-AE	RING
2	1232-E1	STUD
10	1233-E	STEM
4	1234-E	SEAT SPRING
10	1236-E	SPRING
6	1237-E1	CAGE
1	1238-E	BEARING HANDLE CAP
4	1239-E	SCREW
3	1242-E	ELBOW
1	1243-E	CAM
1	1244-E	SECTOR
2	18628	FILTER CAP
53	2C-1312	SPINDLE
2	2C-136P	ROTOR
7	5-007-30	TIP INJECTOR
60	502-LX	GASKET
126	505-FKX	GASKET
3	513-E	SPRING
33	580-KXH6	VALVE
92	5843	TIP 5 HOLE .010-20
2	646-03	BEARING HALF
15	680-C	BEARING CAM W/BRUSH
15	683-BB3	BEARING CAM W/BRUSH
14	851-H	BODY
12	853-E	CASING
25	856-E	TIP NUT
97	858-E	SPRING
3	859-E	BEARING
373	860-E	GASKET
11	861-GX8	ELBOW TUBE
26	865-E	NUT
125	866-E	BUSHING
70	880-E	VALVE TOE SPRAY
9	880-R	CAM TOE
205	884-E	ROLLER
6	888-C3	SPRING

QTY	PART NUMBER	DESCRIPTION
220	C-2152L-1-1/2	PISTON RING
104	C-2155L-9	RING
242	C-2293	GASKET
85	C-2333	GASKET
9	C-2355L-13	RING
1	C-3231	CONNECTION
23	C-3258	ZINC BLOCK
10	C-4026	GASKET
10	C-6460	SPRING
3	C-6463	BUSHING
1	C-7533	WEDGE
1	C-7561-E	SHIM
11	C-7562-A	SHIM SET
10	C-7567	BOLT CON ROD
2	C-7574	GASKET
23	C-8193	GASKET
24	C-8252	ROD SOCKET
148	C-8410	BALL JOINT
1	C-9290-P6	IDLER
7	C-9290-P7	ROTOR & SHAFT ASSY
25	C-9534	VALVE
7	C-9596	NUT ADJUSTING
2	C-9882	BEARING SLEEVE
49	C-9924	GASKET
7	C-9988	SEAL OIL
1	CB-227	BEARING ASSEMBLY
1	F-1095	GASKET
350	F-1099	GASKET
99	F-1537	GASKET
5	F-2798	BODY
7	F-2835	CAM EXHAUST
7	F-2841	CAM INLET & AIR STAR
1	F5729	VALVE
1	F-5729	VALVE POPPET
1	F-6039	GEAR ASSY
1	F-6154	GEAR
1	F-6155	GEAR
22	F-6771	ELEMENT FILTER
11	F-6796-P8	VALVE
18	F-680	BEARING VALVE
17	F6814P7	SPLIT PACKING
3	F-812	CABLE
1	F-891-R	BUSHING
2	G-1197-KXH	VALVE
3	G-1230-E1	VALVE ASSY

QTY	PART NUMBER	DESCRIPTION
186	G-5083	PIN
28	G-527A-E	BALL CHECK ASSY
62	G-632-E	VALVE
3	G-6332-E	NUT
53	G-850-KXH	SPINDLE
53	H-1529	SPRING RELIEF VALVE
1	J-3820-4	CON ROD
3	P-211387	PUMP FUEL
87	P-8B	SEAT
37	PG-25	FILTER
1	R-891	BUSHING
52	S-1005	GASKET
17	S-2334	GASKET
126	S-2337	GASKET
1	S-2574	GASKET
154	S-2632	SPRING
13	S-2645	GASKET
70	S-2714	NUT
98	S-2757	BUSHING
18	S-3197	FITTING
78	S-3286	GASKET
24	S-3337	SEAT
5	S-3338	CAP
3	S-3339	SPRING
17	S-3352	SEAL
6	S-579	VALVE
1	S-581	SPRING
101	S-800	GASKET
179	S-810	SEAL RING
36	S-814	GASKET
7	S-962	COLLAR SHAFT SPACER
41	W-2310P-2	WEAR RING
7	W-2310P-9	SLEEVE
5	W-751	CRANKSHAFT
28	X-142	FUEL LINE INJECTOR
22	X-1512	VALVE
28	X152	TUBE ASSY
32	X-204	VALVE
7	X-214	BRACKET ARM
1	X-216	INJECTOR ASSEMBLY
5	X-2164	PLUNGER & BARREL
9	X-2223	CAMSHAFT
27	X-260	GUIDE
34	X-2605	VALVE ASSY
13	X-2608	VALVE BODY

QTY	PART NUMBER	DESCRIPTION
23	X-260-C	CAP STEEL
33	X-260-S	SPACER
19	X-260-T	TIP PROTECTOR
7	X-2760	SEAL OIL
1	X-2832	GEAR ASSY
32	X-3225	FUEL PUMP HEAD
10	X-3227	FUEL PUMP PRIMER
30	X-3227-B	BODY
130	X-3227-P	GASKET
1	X-3361	ADAPTER
1	X-490	SPRING ASSY
26	X-5100	TUBE ASSY
12	X-5100-A	NUT CONE
13	X-5100-B	NUT
1	X-522	ROCKER ARM ST
171	X-5343	ROCKER ASSY
3	X-5353	BODY & PLUNGER ASSY
14	X-71	FILTER
2	X-946	ROD ASSEMBLY

ATLAS / WHITE SUPERIOR / COOPER PARTS
(mixed listing)

1/20/95
23 PAGES

QTY	PART NUMBER	DESCRIPTION
136	000-755	GASKET
3	000-756	GASKET
44	001-307	FUEL LINE
2	001-310	HOSE
1	001-317	HOSE ASSY
9	001-331	HOSE
4	001-649	VALVE INT & EXH
5	001-720	GASKET
1	001-750	SEAT
14	001-790	GASKET
3	001-792	O-RING
28	001-867	SEAL
49	001-912	GASKET
280	001-953	BUSHING ROCKER
12	002-106	SHAFT
10	003-031	VALVE
1	003-664	HOSE
1	004-034	GEAR
96	004-243	SEAL RING
14	004-524	RETAINER GEAR
7	005-429	FILTER KIT
349	005-477	VALVE GUIDE
1	005-544-INC	GASKET KIT - INC.
1	005-548	COUPLING
110	005-832	TIP 5 HOLE .012-30
8	005-835	TIP 5 HOLE .009-30
14	005-842	TIP 5 HOLE .011-20
92	005-843	TIP 5 HOLE .010-20
27	006-002	TIP 5 HOLE .013-30
5	006-291	TAPPET
63	006-368	GASKET
27	006-627	GASKET
19	006-680	GASKET
1	007-976	INSERT INT VALVE
1	008-735	CONNECTOR
12	009-411ID1	HOSE NON-METALLIC
722	009-520	HOSE
1	009-534	FITTING CONNECTOR
1	009-707	GAUGE
200	00X	CAP PLUG
2	010-468	PUMP FUEL
14	010-770	PUMP FUEL
4	010-790	BUSHING
417	011-223	SEAL
1	011-225	INSERT EXH VALVE

QTY	PART NUMBER	DESCRIPTION
1	012-224	INSERT VALVE
1	012-313	PUSH ROD
368	012-935	BEARING SHELL UPPER
1	013-502	CYLINDER HEAD
1	014-208	INSERT VALVE
3	016-160	THERMOMETER
2	018-684	PILOT LIGHT
5	019-306	PIPE JOINT
21	020-272	BEARING
21	020-417	HOSE
64	020-472	GASKET SET
1	020-473	GASKET & PACKING KIT
21	021-234	BEARING
2	021-736	STUD
1	022-203	INSERT
4	022-207	LEVER
3	022-421	STUD
1	022-457	INSERT INT VALVE
2	024-750	GAUGE
1	026-056	PUMP FUEL
243	026-580	GASKET
3	026-889	ROLLER ASSEMBLY
2	027-921	VALVE
6	029-325	GASKET
119	060-092	VALVE ASSY
4	060-180	FITTING
1	061-136	FITTING
1	077-977	INSERT EXH VALVE
50	101-075	SCREW
9	101-514	GASKET
10	101-515	BEARING
2	101-595	THERMOCOUPLE
1	101-625	PUMP FUEL
4	101-655	PUMP FUEL INJECTOR
10	101-695	HOLDER
16	103-555	THERMOMETER
1	103-670	SEAL RUBBER
21	104-000	HOSE
71	104-460	HOSE
3	104-745	HOSE
1	105-030	PUMP FUEL
4	105-975	PUSH BUTTON CONTACT
811	106-420	O RING B-46 N-70
2	107-900	PILOT LIGHT
2	108-425	ELEMENT

QTY	PART NUMBER	DESCRIPTION
1618	108-750	CLAMP HOSE
5	108-875	THERMOSTAT
1	109-500	SEAL
263	109-595	O RING B-46 N-70
2	109-730	THERMOCOUPLE
2	109-820	PUMP FUEL
1	110-275	SWITCH PRESSURE
5	111-100	CHAIN CAM DRIVE
12	111-295	O RING S-59 RED SILI
14	1117-E	HANDLE
3	1118-E1	PAWL
702	112-455	O RING B-46 N-70
94	1124-E	SPRING
1	1125-E	SCREW
3	1131-DXC4	CABLE
1	1132-JX	WEDGE
317	113-815	O RING B-46 N-70
722	113-956	HOSE
1	113-958	HOSE
1	113-964	HOSE
1	113-966	HOSE
1	113-968	HOSE
1	11481	GUARD DRIVE
12	115-005	LIGHT
1	115-680	PUMP FUEL
125	115-720	O RING B-46 N-70
4	116-815	CYLINDER AIR
34	1179	GEAR
3	118-530	ELEMENT FILTER
6	119-663	HOSE TURBO INTERCOOL
1	1217-AX3	GAGE PRESSURE
2	1217-E	GAGE PRESSURE 6 INCH
4	1230-E1	BODY
7	1231-AE	RING
2	1232-E1	STUD
10	1233-E	STEM
4	1234-E	SEAT SPRING
10	1236-E	SPRING
6	1237-E1	CAGE
1	1238-E	BEARING HANDLE CAP
4	1239-E	SCREW
3	1242-E	ELBOW
1	1243-E	CAM
1	1244-E	SECTOR
2	18628	FILTER CAP

QTY	PART NUMBER	DESCRIPTION
1	19330	BEARING
129	223-481	GASKET
43	2727	SHAFT
53	2C-1312	SPINDLE
18	2C-1325	PIN
2	2C-136P	ROTOR
1	2C-1757	RETAINER BEARING
1	2C-1995	NUT
16	2C-2224	SPRING
45	2C-2763	GASKET
48	2C-2765	GASKET
74	2C-3047	GASKET
70	2C-4260	GASKET
3	333-1/2	PACKING
17	333-1/4	SPLIT PACKING
9	382-275	SHAFT
2	3A-2028	BEARING
1	3A-2051-X	GEAR CRANKSHAFT
2	3A-2054	VALVE
80	3A-2055	BEARING HALF SLEEVE
19	3A-2055	BEARING HALF SLEEVE
4	3A-2069	LIFTER
1	3A-2090	GEAR
4	3A-2092	GEAR HELICAL
9	3A-2092	GEAR
10	3A-2107	COUPLING
4	3A-2128	VALVE AIR STARTING
48	3A-2146	O-RING
10	3A-2148	PUMP
5	3A-2159	COVER
215	3A-2166	RING
65	3A-2169	PISTON RING
80	3A-2189	STUD
75	3A-2197	GASKET
11	3A-2198	GASKET
74	3A-2208	GASKET
75	3A-2212	GASKET
73	3A-2213	GASKET
73	3A-2214	GASKET
73	3A-2217	GASKET
69	3A-2219	GASKET
73	3A-2220	GASKET
76	3A-2221	GASKET
46	3A-2222	GASKET
3	3A-2223	GASKET

QTY	PART NUMBER	DESCRIPTION
75	3A-2228	GASKET
71	3A-2229	GASKET
47	3A-2230	GASKET
35	3A-2240	GASKET
48	3A-2245	SHIM
7	3A-2246	GASKET
24	3A-2253	SHIM
43	3A-2254	GASKET
15	3A-2257	SPRING
6	3A-2258	GASKET
341	3A-2259	GASKET
75	3A-2273	GASKET
72	3A-2274	GASKET
71	3A-2282	GASKET
73	3A-2340	GASKET
48	3A-2348-X	PISTON AIR CYLINDER
499	3A-2351	GASKET COPPER
73	3A-2387	GASKET
74	3A-2398	GASKET
77	3A-2426	GASKET
72	3A-2435	GASKET
74	3A-2436	GASKET
38	3A-2440	GASKET
24	3A-2441	GASKET
72	3A-2461	GASKET
75	3A-2466	GASKET
46	3A-2511	GASKET
22	3A-2538	SPRING
73	3A-2572	GASKET
15	3A-2717	GASKET
41	3A-2746	GASKET
74	3A-2972	GASKET
73	3A-3007	GASKET
68	3A-3069	GASKET
97	3A-3071	GASKET
29	3A-3072	GASKET
17	3A-3073	GASKET
1	3A-3076	GASKET
2	4020400	PIN VISE
13	442-E-17-K	VALVE BRASS
10	4741-8	FITTING
49	4A-1105	GASKET
47	4A-1142	GASKET
74	4A-1160	GASKET
100	4A-1180	BUSHING

QTY	PART NUMBER	DESCRIPTION
4	4A-1184	GASKET
73	4A-1185	GASKET
74	4A-1188	GASKET
76	4A-1189	GASKET
72	4A-1190	GASKET
93	4A-1195-P-7	SPRING
48	4A-1199	GASKET
26	4A-1201	GASKET
72	4A-1202	GASKET PAPER
146	4A-1203	GASKET PAPER
35	4A-1204	GASKET
74	4A-1207-A	GASKET
175	4A-1231	RING SEAL
8	4A-1236	HOSE ASSY
81	4A-1383-A	RING
26	4A-1388	PACKING
28	4A-1413-A	GASKET
15	4A-1555	SPRING
17	4A-1566-A	GASKET
349	4A-1574	VALVE GUIDE
15	4A-1574-A	VALVE GUIDE
11	4A-1576-H	SPRING
146	4A-1579	SLEEVE INJ HOLDER
1	4A-1583-B	GASKET
20	4A-1621-A	PUSH ROD
507	4A-1630-A	GASKET
98	4A-1648	GASKET
25	4A-1655-A	GASKET
2	4A-1667-A	GASKET
141	4A-1668-A	GASKET
186	4A-1674	RING STEEL
24	4A-1685	SPRING
33	4A-1715	GASKET CORK
1	4A-1721	STUD
197	4A-1726	GASKET
1	4A-1783	INSERT SEAL
1	4A-1901	BUSHING
30	4A-1921	SHAFT
47	4A-2043	GASKET
10	4A-2044	BUSHING
94	4A-2047	SPRING VALVE
3	4A-2074-A	GASKET
16	4A-2077	GASKET
29	4A-2082	GASKET
31	4A-2098-A	GASKET

QTY	PART NUMBER	DESCRIPTION
59	4A-2116	PISTON RING
22	4A-2129-A	GASKET
3	4A-2130	GASKET
2	4A-2143-A	GASKET
91	4A-2144-A	GASKET
18	4A-2145	GASKET
32	4A-2170-A	GASKET
46	4A-2181-A	GASKET
86	4A-2182-A	GASKET
24	4A-2199	GASKET
83	4A-2384	GASKET
1	4A-2447	SPRING
31	4A-2483	SHAFT
141	4A-2483-A	COUPLING LONG
100	4A-2491	GASKET
2	4A-2493	RETAINER
52	4A-2670	GASKET
73	4A-2845	GASKET OLD STYLE
27	4A-2846	GASKET
7	4A-2873	GASKET
3	4A-5074-A	GASKET
5	4B-1076	GEAR HELICAL
70	4B-1078	GASKET
1	4B-1084	SHAFT
74	4B-1090	GASKET
4	4B-1283-1	VALVE EXHAUST
4	4B-1283-A	VALVE EXHAUST
51	4B-1288	SHAFT SHOULDER
33	4B-1289	SHAFT ROCKER
81	4B-1316-A	GASKET
1	4B-1348	GASKET
27	4B-1467	BUSHING VALVE
2	4B-1581-R	BEARING SLEEVE
4	4B-1611	HOUSING
24	4C-1189	CASTING ROCKER ARM
3	4C-1324	PULLEY GROOVE
11	4C-1480	CYLINDER
416	4C-1486-8	GASKET
66	4C-1486-9	SPRING
7	4D-1006-D-18	ELEMENT KIT
71	4D-1006-D-8	GASKET
583	4D-1006-D-9	GASKET
1	4Y-1058	COUPLING ASSY
39	4Y-1183	VALVE ASSY INCOMPLTE
1	4Y-1471	ROCKER ARM

QTY	PART NUMBER	DESCRIPTION
13	4Y-2073	FUEL LINE
4	4Y-2188	CYLINDER HEAD
7	5-007-30	TIP INJECTOR
60	502-LX	GASKET
126	505-FKX	GASKET
6	5-13-30	TIP SPRAY
3	513-E	SPRING
19	526FB4	SOCKET PUSH ROD
4	5367225	TUBE
6	5367515	PLUG
2	5367670	GAGE OIL
1	5381456-5	BRUSH HOLDER
23	5774-AC-4	GASKET
33	580-KXH6	VALVE
1	582-E	SPRING
92	5843	TIP 5 HOLE .010-20
82	585-E-3	BUSHING
310	610-A-RB-3	SEAL RING
310	610-RB-3	SEAL RING
72	641-H-1	GASKET
2	646-03	BEARING HALF
15	680-C	BEARING CAM W/BRUSH
6	6-8-11483	BUSHING
15	683-BB3	BEARING CAM W/BRUSH
109	7/16-20	NUT
53	721A-LXH-A	SHIM
12	754-171	GASKET
23	754-416	VALVE ASSY
2	754-473	SPRING F.P. INJECTOR
1	754-764	SEAL
1	754-982	GASKET
17	755-126	WASHER LOCK
18	756-360	SHAFT IDLER PINION
1	756-366	GUIDE
14	756-442	ELEMENT KIT FILTER
2	756-661	PACKING
115	756-829	DISCHARGE
1	757-184	HANDLE ASSEMBLY
49	82008	NUT HEXAGON
4	848506	RING
14	851-H	BODY
12	853-E	CASING
25	856-E	TIP NUT
10	857-684	BOLT
97	858-E	SPRING

QTY	PART NUMBER	DESCRIPTION
3	859-E	BEARING
373	860-E	GASKET
11	861-GX8	ELBOW TUBE
26	865-E	NUT
125	866-E	BUSHING
70	880-E	VALVE TOE SPRAY
9	880-R	CAM TOE
205	884-E	ROLLER
6	888-C3	SPRING
702	900-835-024	O RING B-46 N-70
1	9594-AS	RELAY
4	A000-124	LEVER
2	A000-186	LINK
17	A001-090	LIGHT BULB
1	A001-175	GASKET
4	A001-649	VALVE INT & EXH
416	A001-717	GASKET
66	A001-718	SPRING
5	A001-720	GASKET
166	A001-725	SPRING
31	A001-743	NOZZLE NUT
3	A001-751	SPRING
608	A001-753	SEAT
1809	A001-755	GASKET
3	A001-792	O-RING
63	A001-804	PACKING
28	A001-867	SEAL
280	A001-953	BUSHING ROCKER
3	A002-166	GASKET
3	A002-174	PACKING
1	A003-032	VALVE RELIEF
2	A003-487	GAUGE
10	A003-514	SPACER
2	A003-747	GAGE PRESSURE
2	A004-033	GEAR
1	A004-544	COUPLING
1	A004-914	SCREW
349	A005-477	VALVE GUIDE
1	A005-533	MOTOR STARTER
5	A006-291	TAPPET
1	A006-664	WASHER
1	A006-669	SEAL
35	A006-678	SEAL
2	A006-679	SEAL STRIP
6	A007-144	GASKET

QTY	PART NUMBER	DESCRIPTION
7 FT	A007-244	HOSE NONMETALLIC
1	A007-417	ASSEMBLY
2	A007-432	PIPE JOINT
1	A007-631	HOSE
1	A008-253	WIRE
12	A009-411	HOSE NON-METALLIC
3	A010-396	GASKET
2	A010-468	PUMP FUEL
4	A010-790	BUSHING
2	A011-496	BEARING ROD END
1	A011-498	LINK ROD END
2	A011-499	BEARING ROD END
45	A012-313	PUSH ROD
1	A012-314	NUT
1	A013-026	VALVE
2	A016-822	ELEMENT KIT
2	A016-908	VALVE
4	A017-084	OVERSPEED TRIP
1	A019-878	SEAL
2	A020-060	VALVE RELIEF
21	A020-417	HOSE
1	A022-066	ELEMENT
3	A022-421	STUD
1	A024-473	V BELT SET
1	A026-367	WIRE
186	A029-327	RING STEEL
119	A060-092	VALVE ASSY
30	A060-175	HOSE FITTING
4	A060-180	FITTING
6	A060-190	FITTING
1	A060-254	FITTING
1	A060-257	FITTING
1	A060-274	FITTING
4	A060-290	FITTING ELBOW
2	A060-291	FITTING
1	A060-300	FITTING
4	A060-340	FITTING
32	A060-433	FITTING
1	A060-447	FITTING
1	A060-456	FITTING
1	A060-639	FITTING
1	A061-016	FITTING
1	A061-152	FITTING
10	A101-515	BEARING
2	A101-595	THERMOCOUPLE

QTY	PART NUMBER	DESCRIPTION
1	A101-625	PUMP FUEL
4	A101-655	PUMP FUEL INJECTOR
10	A101-695	HOLDER
21	A104-000	HOSE
1	A105-030	PUMP FUEL
2	A105-820	TERMINAL
4	A105-975	PUSH BUTTON CONTACT
811	A106-420	O RING B-46 N-70
2	A107-545	GAGE PRESSURE F.O.
2	A107-900	PILOT LIGHT
1618	A108-750	CLAMP HOSE
5	A108-875	THERMOSTAT
1	A109-500	SEAL
2	A109-730	THERMOCOUPLE
2	A109-820	PUMP FUEL
12	A111-295	O RING S-59 RED SILI
702	A112-455	O RING B-46 N-70
7	A112-875	STRIP
317	A113-815	O RING B-46 N-70
1	A113-964	HOSE
1	A113-968	HOSE
12	A115-005	LIGHT
69	A115-300	PIN
1	A115-680	PUMP FUEL
125	A115-720	O RING B-46 N-70
4	A116-815	CYLINDER AIR
3	A118-530	ELEMENT FILTER
3	A119-075	CUP SEAL
1	A119-516	GASKET
6	A119-663	HOSE TURBO INTERCOOL
60	A1205	GASKET
1	A48153	CYLINDER HEAD
23	A754-416	VALVE ASSY
2	A754-473	SPRING F.P. INJECTOR
1	A754-578	GASKET
1	A754-764	SEAL
18	A756-360	SHAFT IDLER PINION
71	A756-660	O-RING
1	A756-927	ELEMENT
1	B000-126	LEVER
136	B000-755	GASKET
10	B003-031	VALVE
1	B004-034	GEAR
63	B006-368	GASKET
27	B006-627	GASKET

QTY	PART NUMBER	DESCRIPTION
9	B010-514	GASKET
21	B020-272	BEARING
21	B021-234	BEARING
243	B026-580	GASKET
507	B029-326	GASKET
12	BM1342	PACKING
3	BM2139	METAL ELEMENT
15	BM2167	TACHOMETER
1	BM2177-1	STARTER
2	BM2187	SWITCH MAGNETIC
1	BM2198	PUMP FUEL
8	BM2246	HOSE CONN
1	BM2307	SEAL RUBBER
21	BM2990B	HOSE
2	BM3000	GAGE
71	BM3424-B	HOSE
7	BM3537	SPRING
5	BM3538	SPRING
3	BM3547	BUSHING
4	BM3622	SPRING
12	BM3624	FUEL COMM
1	BM3720	SPRING
2	BM3728	GASKET
12	BM3729	SPRING
9	BM3730	SPRING
2	BM3810-B	VALVE
31	BM4015	BUSHING
39	BM4016	BUSHING
9	BM4020	SEAL
5	BM4023	OIL SEAL
9	BM4043	SPRING
1	BM4047	BUSHING
1	BM4048	ARMATURE
5	BM4319	BUSHING
2	BM4324	BUSHING
2	BM4519	BUSHING
740	BM5352-B	PACKING PREFORMED
1618	BM6062-A	CLAMP HOSE
2	BM6334	THERMOCOUPLE
1809	BM6371-1	GASKET
166	BM6371-28	SPRING
18	BM6387-16	SHAFT IDLER PINION
10	BM664-A	BEARING
811	BM6711-D	O RING B-46 N-70
5	BM6834-B	CHAIN CAM DRIVE

QTY	PART NUMBER	DESCRIPTION
1	BM7324-A	HOSE
2	BM733	THERMOCOUPLE
702	BM7485-A	O RING B-46 N-70
722	BM7866-12	HOSE
1	BM7866-20	HOSE
1	BM7867	HOSE
1	BM7867-4	HOSE
12	BM8129	LIGHT
3	BM8832-1	ELEMENT FILTER
1	BM885	PUMP FUEL
2	BM890	PUMP FUEL INJECTOR
51	BM9033-5	GASKET COVER NUT
49	BM9033-8	GASKET SHELL
19	C-006-680	GASKET
14	C010-770	PUMP FUEL
3	C016-864	GOVERNOR
1	C019-494	SHAFT
220	C-2152L-1-1/2	PISTON RING
104	C-2155L-9	RING
242	C-2293	GASKET
85	C-2333	GASKET
9	C-2355L-13	RING
1	C-3231	CONNECTION
23	C-3258	ZINC BLOCK
10	C-4026	GASKET
10	C-6460	SPRING
3	C-6463	BUSHING
1	C-7533	WEDGE
1	C-7561-E	SHIM
11	C-7562-A	SHIM SET
10	C-7567	BOLT CON ROD
2	C-7574	GASKET
23	C-8193	GASKET
24	C-8252	ROD SOCKET
148	C-8410	BALL JOINT
1	C-9290-P6	IDLER
7	C-9290-P7	ROTOR & SHAFT ASSY
25	C-9534	VALVE
7	C-9596	NUT ADJUSTING
2	C-9882	BEARING SLEEVE
49	C-9924	GASKET
7	C-9988	SEAL OIL
1	CB-227	BEARING ASSEMBLY
1	F-1095	GASKET
350	F-1099	GASKET

QTY	PART NUMBER	DESCRIPTION
99	F-1537	GASKET
5	F-2798	BODY
7	F-2835	CAM EXHAUST
7	F-2841	CAM INLET & AIR STAR
18	F-4962	SHAFT ROCKER ARM
1	F5729	VALVE
1	F-5729	VALVE POPPET
1	F-6039	GEAR ASSY
1	F-6154	GEAR
1	F-6155	GEAR
22	F-6771	ELEMENT FILTER
11	F-6796-P8	VALVE
18	F-680	BEARING VALVE
17	F6814P7	SPLIT PACKING
3	F-812	CABLE
1	F-891-R	BUSHING
2	G-1197-KXH	VALVE
3	G-1230-E1	VALVE ASSY
186	G-5083	PIN
28	G-527A-E	BALL CHECK ASSY
62	G-632-E	VALVE
3	G-6332-E	NUT
53	G-850-KXH	SPINDLE
4	GDB8	PACKING RING
13	H-12076	BEARING SHELL MAIN
1	H-12079	BEARING
69	H-12160-A	GASKET
6	H-12163	PISTON RING
6	H-12222	GASKET
32	H-12343-A	GASKET
79	H-12395-R	PISTON RING
10	H-13038	RING EXHAUST
70	H-14303-A	GASKET
294	H-14303-B	GASKET
66	H-14308-A	GASKET
36	H-14393	SPRING
361	H-14396-A	GASKET
4	H-14421	COLLAR ROCKER SHAFT
1	H-14438-1	CLAMP
1	H-14458-B	GASKET
12	H-14458-C	GASKET
3	H-14461-A	FLANGE
1	H-14487-A	STUD ADJUSTING
54	H-14547-A	GASKET
280	H-14548-A	GASKET

QTY	PART NUMBER	DESCRIPTION
33	H-14551-A	GASKET
25	H-14665	BALL SEAT
84	H-14667	GASKET
19	H-14678	GASKET
2	H-15085	FULCRUM
53	H-1529	SPRING RELIEF VALVE
14	H-2807-B-1	BUSHING CRANKPIN
7	H-2874	STUD
27	H-3040-H	RING
47	H-3147-C	VALVE
1	H-3154	INJECTOR W/NOZZLE
2	H-3168-A	CAP VALVE
3	H-3522	GASKET COPPER
296	H-3751-A	SPRING
1	H-4086-A	COLLAR
4	H-4524	STUD
1	H-4649-A-10	KEY
1	H-5233-1	SLEEVE
75	H-5389	WASHER
1	H-5445	BEARING
3	H-5569-D	LINER RING
6	H-6001	GASKET
4	H-6054-F	VALVE INT & EXH
4	H-6612-A	GASKET
11	H-6798-A	SHAFT DRIVE
159	H-6837-E	GASKET
1	H-7171-A	CAM
32	H-7415-A	O-RING
1	H-7825	O-RING
64	H-7827-A	GASKET COPPER
32	H-7852-C	SEAL
60	H-8264	BUSHING
40	H-8329-A	GASKET
3	H-8372-A	SPROCKET DRIVE
1	H-8379-AW	LEVER
11	H-8762-A1	GASKET
6	H-8763-A1	GASKET
54	H-8765	GASKET
1	H-8773	GASKET
11	H-8778-B	GASKET
2	H-8831-ATR	BUSHING
18	H-8978-1	GASKET
43	H-9000-A	GASKET
23	H-9002	GASKET
97	H-9009-A	GASKET

QTY	PART NUMBER	DESCRIPTION
10	H-9009-B	GASKET
81	H-9015	GASKET
50	H-9035-A	BEARING SLEEVE
75	H-9042-A	RETAINER
48	H-90430-D	COLLAR
289	H-9043-C	COLLAR SET
1	H-9043-D	VALVE KEEPER
1	H-9044	GUIDE
4	H-9044-D	VALVE GUIDE
2	H-9046	SPRING
117	H-9060	BEARING SLEEVE
4	H-9070-A	LEVER
24	H-9088-BR	BUSHING
6	H-9110-E	COVER
39	H-9150-B	GASKET
1	H-9151-A	GASKET
1	H-9152-E	SEAL RING CYL LINER
2523	H-9153-C	GASKET NEOPRENE
163	H-9156-B	GASKET
22	H-9157-C	GASKET
28	H-9174	STUD
2	H9194	BOLT LINK
262	H-9195	PIN
22	H-9202	STUD
6	H-9286-B	PLUG
46	H-9286-C	PLUG F.O. & L.O.
5	H-9303-2	BOLT
3	H-9346-D1	GEAR DRIVE OIL PUMP
1427	H-9426-2	GASKET
76	H-9516-C	GASKET
1	H-9546	SHAFT CONTROL
13	H-9547-D	LEVER
4	H-9596	GASKET
2	H-9596-A	GASKET
63	H-9597-B	GASKET
26	H-9598	GASKET
4	H-9599-A	GASKET
1	H-9602-B	GASKET
96	H-9603	GASKET
1	H-9604-E	GASKET
24	H-9605-A	GASKET
52	H-9608-B	GASKET
63	H-9609	GASKET
47	H-9610-B	GASKET
129	H-9612-A	GASKET

QTY	PART NUMBER	DESCRIPTION
3	H-9613-C	GASKET
19	H-9618-C	GASKET
117	H-9622-B	GASKET
117	H-9622-C	GASKET
45	H-9623-C	GASKET FRT END COVER
15	H-96304-E	GASKET
28	H-9640	GASKET
243	H-9689-C	GASKET
1	H-9743-D	BEARING
21	H-9745-C	BEARING
250	H-9745-C	BEARING
15	H-9753	GASKET
3	H-9769-B	GASKET
2	H-9770	GASKET WATER PUMP
2	H9770-1	GASKET WATER PUMP
13	H-9776-A	GASKET
5	H-9782-A	GASKET
1	H-9836-D	GASKET
84	H-9842	GASKET
356	H-9843	GASKET
356	H-9843-A	GASKET
2	H-9864-F	SHAFT
1	H-9908-K-1	VALVE EXHAUST
46	H-9927	INSERT
3	HR-2296	HANDLE
1	J-3820-4	CON ROD
1	K-005-544	GASKET KIT - INC.
1	K008-144	ELEMENT
1	K018-623	GASKET & PACKING KIT
3	LB-291	PISTON
1	P-10100F	PULLEY
1	P-101DO-F	PULLEY DRIVE
26	P-10200	VALVE EXHAUST OUTLET
7	P-10218	COVER
4	P-10219	CONNECTION TEE
2	P-10445	ELBOW PIPE
5	P-11017-B	VALVE
3	P-11041	TACHOMETER
1	P-11221	FLANGE
4	P-11312	SHAFT
110	P-11372	SPRING
30	P-11388	GASKET
11	P-11391	PLATE THRUST
71	P-11459	SEAT
3	P-1147	BUSHING

QTY	PART NUMBER	DESCRIPTION
9	P-11481	GUARD DRIVE
14	P-11483	BUSHING
3	P-11484	BUSHING
4	P-11594	BUSHING
3	P-11600	BUSHING
22	P-11603	GEAR OIL PUMP
94	P-116-A	GASKET
138	P-117	ELEMENT FILTER
10	P-119	DRIVE SHAFT FP
1	P-12641	3SHAFT
5	P-1358-2	SPRING
14	P-13-A	CUP V1 SPRING RETAIN
1	P-1529-2	EYE BOLT
19	P-1530-3	SPRING
1	P-162-C	LEVER
1	P-164	SPRING
6	P-170	SPRING
51	P-183	GASKET
8	P-197	FILTER
27	P-2008-A	SEAT VALVE
25	P-2010-9	SPRING
123	P-2011	SPACER SEAT
9	P-2017-1	SPRING
21	P-2018	VALVE GUIDE
6	P-2029	STUD
21	P-2034	SLEEVE
269	P-2039	NOZZLE INJECTOR
16	P-2055-1	LINER CYLINDER
4	P-2057	PACKING RING
1	P-2061-F	PISTON RING
1	P-2069-A	BOLT CON ROD
3	P-21004-B	OIL SEAL
3	P-2109	GASKET
56	P-211331	GASKET
44	P-211336	GASKET
14	P-211338	GEAR HELICAL
1	P-211343-B	IDLER GEAR HUB
5	P-211345-A	PLATE
1	P-211353	ROD
2	P-211354	SHAFT ENGINE CONTROL
2	P-211356	VALVE
41	P-211368	BUSHING
9	P-211369	SHAFT DRIVE
240	P-211370	SEAL
7	P-211372	GEAR

QTY	PART NUMBER	DESCRIPTION
41	P-211373	BUSHING
18	P-211378	RING RETAINER
1	P-211379	CONNECTOR F.W. PUMP
3	P-211387	PUMP FUEL
7	P-211391-1	COUPLING
3	P-211391-A	COUPLING HALF SHAFT
12	P-211392	DISC
4	P-211399	INLET CONN
14	P-211410	HOUSING THERMOSTAT
4	P-211419	CONNECTOR F.W.
11	P-211427-1	COUPLING
25	P-211441	DISC
8	P-211447	SEAL
1	P-211449-1	WATER PIPE
3	P-211465	CONNECTION TEE
3	P-211471	ADAPTER
3	P-211479	SPRING
119	P-211492	FLEXLINE F.W. PUMP
34	P-211552	CLAMP
4	P-211553	CLAMP
28	P-211556	NUT RETAINING
3	P-211558-1	DOWEL
40	P-211564	LINE FLEXIBLE
150	P-211585	LOCK HALF
33	P-211586	CUP VALVE SPRING
1	P-211626	CONNECTOR WATER PUMP
2	P-211698	SLINGER OIL
3	P-211752	BUSHING
3	P-21181	SLEEVE
1	P-211835	PISTON RING
5	P-212250	GEAR
1	P-212268	ELBOW
20	P-21256-1	PIPE
11	P-2145-1	CAPSCREW
83	P-21503-2	FUEL DRIP LINE ASSY
1	P-2417-A	VALVE
304	P-2466	BOLT
1	P-2485	CON ROD
12	P-2490	SPRING
1	P-2571	GASKET
1	P-2587-A	BRACKET
1	P-2610-1	CONNECTION MANIFOLD
568	P-2628	BOLT
4	P-2629	CAP SCREW
17	P-2676	BUSHING

QTY	PART NUMBER	DESCRIPTION
5	P-2723	GEAR
4	P-2768-2	LINK
6	P-278	ELEMENT FILTER
2	P-291	FILTER
28	P-303	STUD
1	P-324	ADAPTER
9	P-38-C-2	BEARING
3	P-427-A	ROCKER ARM
3	P-488-4	VALVE
1	P-520	SHAFT
1	P-529-2	EYE BOLT
1	P-5368-A	AUXILIARY SEAT
5	P-583	GASKET
40	P-62	RING
60	P-63-D-1	RING
160	P-676-1	BUSHING
11	P-89-C-2	BEARING
87	P-8B	SEAT
42	P-91-C-2	BEARING
2	PC-446	BEARING
37	PG-25	FILTER
24	PX-1053	BUSHING
12	PX-1069	WASHER
6	PX-1069	WASHER ADJUSTING
5	PX-1070	WASHER
12	PX-1096	SPRING
3	PX-1099	SPRING
5	PX-1106	SPRING
6	PX-1107	SPRING
3	PX-1234	SPRING
6	PX-4119	OIL SEAL - USED
2	PX-417	BUSHING
3	PX-440	SPRING
2	PX-446	BEARING
8	PX-448	BEARING
6	PX-V104	SPRING
1	R-10581	GASKET
23	R-4306	GASKET
45	R-4306-A	GASKET
1	R-6911-D	GEAR
1	R-6912-D	GEAR
7	R-6912-E	GEAR
18	R-8383	SHIM
1	R-891	BUSHING
52	S-1005	GASKET

QTY	PART NUMBER	DESCRIPTION
17	S-2334	GASKET
126	S-2337	GASKET
1	S-2574	GASKET
154	S-2632	SPRING
13	S-2645	GASKET
70	S-2714	NUT
98	S-2757	BUSHING
18	S-3197	FITTING
78	S-3286	GASKET
24	S-3337	SEAT
5	S-3338	CAP
3	S-3339	SPRING
17	S-3352	SEAL
6	S-579	VALVE
1	S-581	SPRING
101	S-800	GASKET
179	S-810	SEAL RING
36	S-814	GASKET
7	S-962	COLLAR SHAFT SPACER
1	SK-3775-A	CON ROD
5	T-1005	GASKET
1	T-1146-L	BLOCK
104	T-1158	GASKET
245	T-1266	NUT
46	T-1277	GASKET
3	T-1408	STUD
41	W-2310P-2	WEAR RING
7	W-2310P-9	SLEEVE
5	W-751	CRANKSHAFT
28	X-142	FUEL LINE INJECTOR
22	X-1512	VALVE
28	X152	TUBE ASSY
32	X-204	VALVE
7	X-214	BRACKET ARM
1	X-216	INJECTOR ASSEMBLY
5	X-2164	PLUNGER & BARREL
9	X-2223	CAMSHAFT
27	X-260	GUIDE
34	X-2605	VALVE ASSY
13	X-2608	VALVE BODY
23	X-260-C	CAP STEEL
33	X-260-S	SPACER
19	X-260-T	TIP PROTECTOR
7	X-2760	SEAL OIL
1	X-2832	GEAR ASSY

QTY	PART NUMBER	DESCRIPTION
32	X-3225	FUEL PUMP HEAD
10	X-3227	FUEL PUMP PRIMER
30	X-3227-B	BODY
130	X-3227-P	GASKET
1	X-3361	ADAPTER
1	X-490	SPRING ASSY
26	X-5100	TUBE ASSY
12	X-5100-A	NUT CONE
13	X-5100-B	NUT
1	X-522	ROCKER ARM ST
171	X-5343	ROCKER ASSY
3	X-5353	BODY & PLUNGER ASSY
14	X-71	FILTER
2	X-946	ROD ASSEMBLY
12	Y002-106	SHAFT
1	Y011-506	CONNECTOR FLEX
1	Y013-260	HOSE
1	Y013-502	CYLINDER HEAD
4	Y017-502	FUEL PUMP & GOV ASSY
13	Y017-502	PUMP ASSY FUEL
7	Y017-502-4	HOUSING
2	Y017-502-AB	PLATE
3	Y017-502-AC	SHAFT
9	Y017-502-AD	GEAR
81	Y017-502-AE	GASKET
15	Y017-502-SWG	SHAFT W/GEAR
6	Y017-502-SWG-B	SHAFT W/GEAR & BRG
5	Y09-009-061	GASKET
3	YA003-944	ROLLER ASSEMBLY
61	YA006-292	TAPPET ASSY FUEL
3	YA019-529	ROLLER ASSEMBLY
4	YB002-564	STRAINER
1	YB008-735	CONNECTOR
2	YC001-954	ROCKER ARM ASSEMBLY
2	YFTD-35-P	PUMP
1	YHJ-1552-A	INDICATOR VALVE
1	YHMB-3534-6	PLUNGER
4	YHMB-3576-A-1	OIL PUMP BODY PLUNGR
34	YKIT-202-B	GASKET KIT
8	YLD-22-A	VALVE
1	YP-1031	FLYWHEEL
1	YP-11362	FUEL LINE
5	YP-11565	PUMP
1	YP-162-C	CONTROL LEVER ASSY
269	YP-2039	NOZZLE INJECTOR

QTY	PART NUMBER	DESCRIPTION
15	YP-2041-C-10	TUBE INJECTION
21	YP-2065-A	CON ROD
6	YP-211358	FUEL LINE ASSY
1	YP-211359-A	TUBE
3	YP-211360	FUEL LINE
2	YP-211361	FUEL LINE ASSY
1	YP-211362	FUEL LINE
15	YP-211364	TUBE FUEL INJ
6	YP-211374-1	ADAPTER
6	YP-21138	GEAR
22	YP-211425	SHAFT
63	YP-211426	DIPSTICK
1	YP-211879	PUSH ROD ASSY
13	YP-212251-1S	GEAR ASSY
4	YP-213611	SHAFT ASSY
21	YP-2401-B	ROCKER ARM ASSY
23	YP-2402-B	ROCKER LEVER
17	YP-2403-B	ROCKER LEVER
18	YP-2404-B	EXHAUST ROCKER ASSY
3	YP-335-2	SHAFT
1	YP-404-4	ROCKER ARM
6	YP-65B	CONNECTING ROD
2	YPTD-13-13	SHAFT & GEAR
2	YPTD-48-R	BUSHING - PAIR
150	YPTL-46-F	TUBE PARTS ONLY
30	YPTL-46-F	TUBE ASSEMBLY
267	YPTL-46-F-1	NUT
268	YPTL-46-F-2	SLEEVE
1	YT-290-C	THERMOSTAT
2	YT-314-2	HOSE & FITTING
1	YT-314-4	FITTING HOSE
1	YT-314-8	HOSE