

EO 15-100BA-2

ROYAL CANADIAN AIR FORCE



HANDBOOK WITH PART LIST
PESCO VACUUM PUMPS
MODEL 3P SERIES 194, 207, 211

"REVISION"
NOTICE

**LATEST REVISED PAGES
SUPERSEDE THE SAME
PAGES OF PREVIOUS DATE**

Insert revised pages into basic
publication. Destroy superseded pages.

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

22 MAR 52
Revised 2 Dec 60

LIST OF RCAF REVISIONS

DATE	PAGE NO	DATE	PAGE NO
2 Dec 60	26		

EO 15-100BA-2

ROYAL CANADIAN AIR FORCE



HANDBOOK WITH PART LIST
PESCO VACUUM PUMPS MODEL 3P
SERIES 194, 207 AND 211

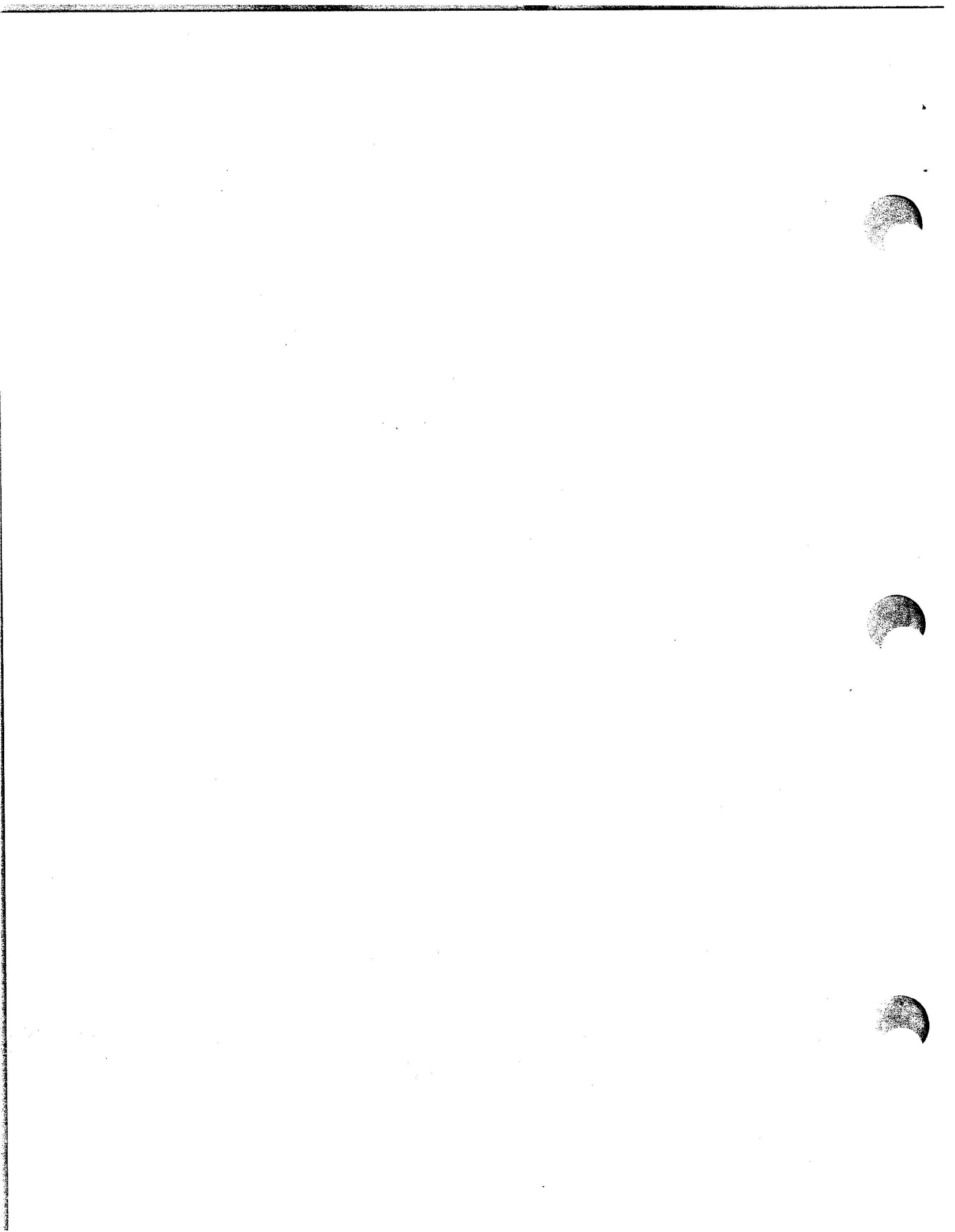
(This EO replaces TO 03-30AA-1 dated 1 Jan 43)

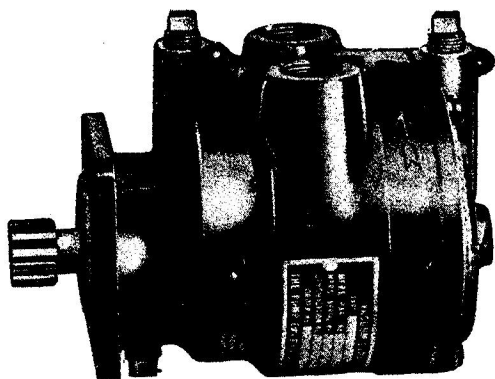
ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

22 MAR 52

TABLE OF CONTENTS

SECTION		PAGE
	Specification.....	1
	Table No. 1.....	2
	Chart - Pesco Vacuum Pump.....	5
	Assemblies.....	5
I	Introduction.....	6
II	Description.....	6
	1. General.....	6
	2. Rotor and Blade Design.....	6
	3. Internal Venting.....	8
	4. Coupling.....	8
	5. Sealed Ball Bearings.....	8
	6. Lubrication.....	8
	7. Integral Relief Valve.....	8
III	Installation.....	9
	1. Preliminary Procedure.....	9
	2. Vent Plugs.....	9
	3. Mounting.....	9
	4. Air Lines.....	9
	5. Lubrication.....	9
IV	Principle of Operation.....	12
V	Accessories.....	13
	1. Relief Valve.....	13
	2. Oil Separator.....	14
	3. Safety Valve.....	14
	4. Air Filter.....	15
VI	Lubrication.....	15
VII	Inspection and Maintenance.....	15
	1. General.....	15
	2. Inspection.....	15
	Column No. 43-Airplanes.....	15
	General.....	15
	100-Hour Inspection.....	15
	3. Depot Repair at Regular Engine.....	15
	Overhaul Periods.....	15
VIII	Disassembly, Inspection, Re- pair, and Reassembly.....	22
	1. Disassembly.....	22
	2. Inspection and Repair.....	22
	3. Reassembly.....	22
IX	Final Test.....	25
	1. Equipment.....	25
	2. Test.....	25
	3. Remedial Action.....	34
	Parts List.....	35





Model 3P-194 Series
FOR SUCTION ONLY

MODEL 3P-194 SERIES

OLD MODEL NO. 194

DISPLACEMENT - 7.0. cu. in. per revolution.

RATED CAPACITY - 4.5 cu. ft. of free air per minute at 1500 r.p.m. with 4 in. Hg suction and 1 in. Hg pressure.

SUCTION - 10 in. Hg maximum.

OPERATING SPEED - 4500 r.p.m. maximum recommended.

ROTATION - Pump will operate in either direction.

OIL CONSUMPTION - Oil consumption 40 to 100 c.c. per hour at 3750 r.p.m. with 107°C (224°F) discharge temperature.

MODEL 3P-207 SERIES

OLD MODEL NO. 207

DISPLACEMENT - 14.4 cu. in. per revolution.

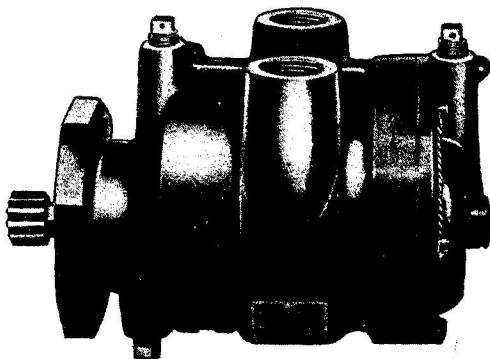
RATED CAPACITY - 8 cu. ft. of free air per minute at 1500 r.p.m. with 4 in. Hg suction and 1 in. Hg pressure, or 10 cu. ft. per minute (minimum) at 2250 r.p.m. with 4 in. Hg suction and 16 in. Hg pressure.

SUCTION - 10 in. Hg maximum.

OPERATING SPEED - 4500 r.p.m. maximum recommended.

ROTATION - Pump will operate in either direction.

OIL CONSUMPTION - Oil consumption 75 to 150 c.c. per hour at 3750 r.p.m. with 175° C (347°F) discharge temperature.



Model 3P-207 Series
FOR SUCTION AND PRESSURE

MODEL 3P-211 SERIES

OLD MODEL NO. 211

DISPLACEMENT - 22.2 cu. in. per revolution.

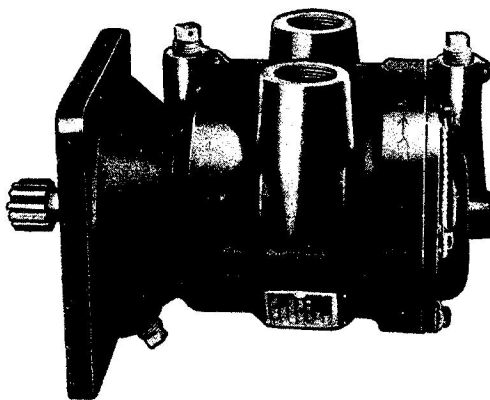
RATED CAPACITY - 17 cu. ft. of free air per minute at 2250 r.p.m. with 4 in. Hg suction and 16 in. Hg pressure.

SUCTION - 10 in. Hg maximum.

OPERATING SPEED - 4500 r.p.m. maximum recommended.

ROTATION - Pump will operate in either direction.

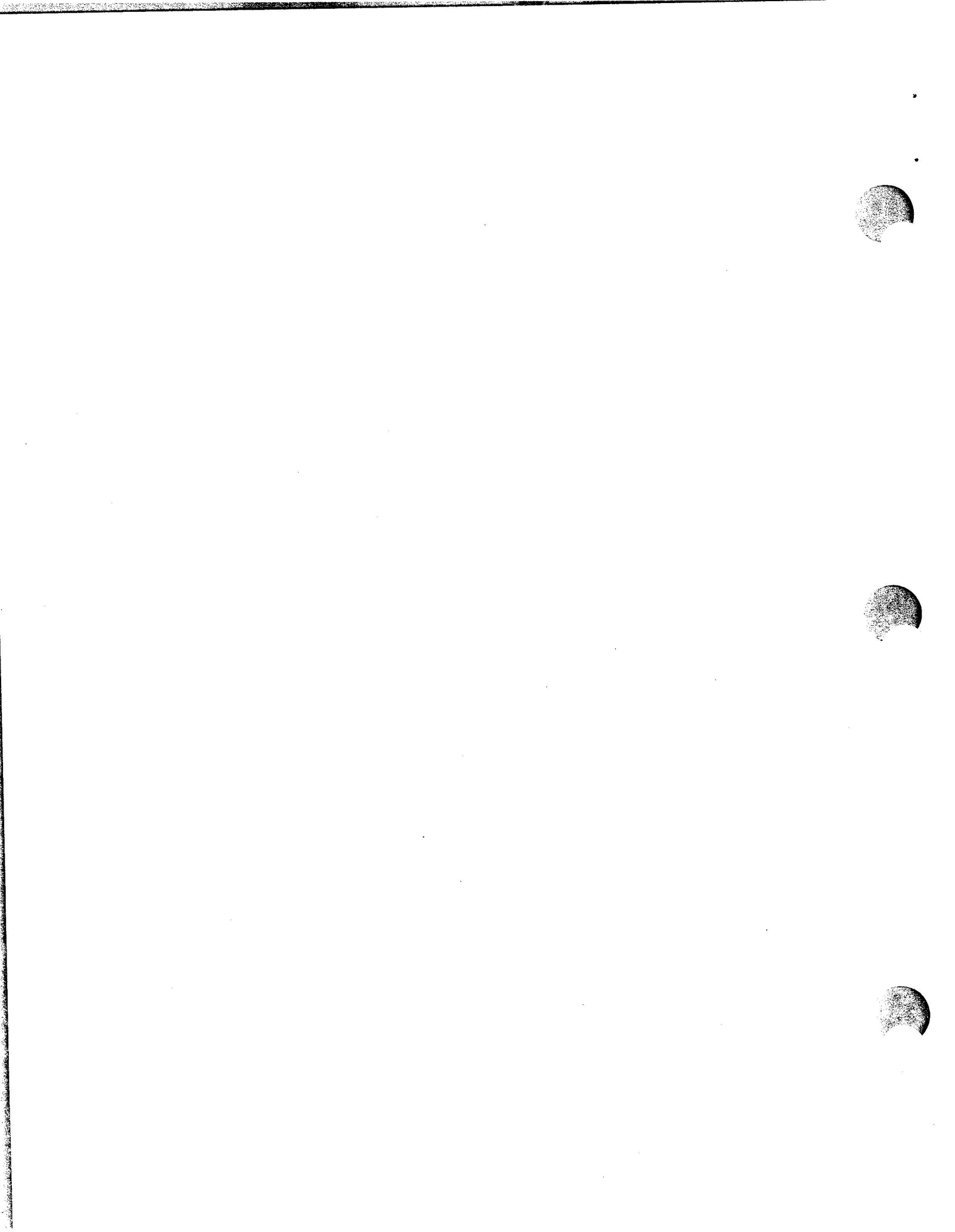
OIL CONSUMPTION - Oil consumption 75 to 190 c.c. per hour at 3750 r.p.m. with 165° C (329°F) discharge temperature.



Model 3P-211 Series
FOR SUCTION AND PRESSURE

TABLE I

A.C. Type	Size	P.O. or Contract No.	Type Pump Drive	Complete Assembly		Pump		Suction Relief Valve		Safety Valve		Oil Separator	
				Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model
B-1	1	34-4083-P	Mill. Gun Synchronizing Tongue	177	3P-177	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-1A	1	35-4788		190	3P-190	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-1A	1	10357	Mill. Gun Synchronizing Tongue	202	3P-202	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-1A	1	21057	Hex.	202-E	3P-202-E	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-1A	1	43-2679-UN		202-J	3P-202-J	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-2	2	34-2126-P	Tongue	172	3P-172	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-2	2	34-2593-P											
B-2	2	34-3320-P											
B-2	2	34-4212-P											
B-2A	2	35-4699-P	Tongue	194	3P-194	195	3V-195	218	3S-218	218	3S-218	218	3S-218
B-2A	2	10357		194	3P-194	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-2A	2	39-2809-P	Tongue	194	3P-194	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-2A	2	DAW-535-											
B-2A	2	ac-259	Tongue	194	3P-194	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-2A	2	15715	Tongue	194	3P-194	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-2A	2	42-2914-P		194-E	3P-194-E	195	3V-195	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-2A	2	27043											
B-2A	2	43-5683-P											
B-2A	2	W-535-											
B-2A	2	ac-34493											
B-3	3	43-7706-AF		207-B	3P-207-B	215	3V-215	218-F	3S-218-F	218-F	3S-218-F	218-F	3S-218-F
B-3	3	42-22798-P	Tongue	207-D	3P-207-D	215	3V-215	218-S	3S-218-S	218-S	3S-218-S	218-S	3S-218-S
B-3	3	38-5970-P											
B-3	3	10357											
B-3	3	41-2915-EP											
B-3	3	15715											
B-3	3	43-2906-UN											
B-3	3	42-12824	12 Tooth Spline	207-K	3P-207-K	215	3V-215	218-S	3S-218-S	218-S	3S-218-S	218-S	3S-218-S
B-3	3	43-7706-AF											
B-4	4	38-5970-P	Six Tooth Square Spline, Large Flange	211	3P-211	216	3V-216	218-E	3S-218-E	218-E	3S-218-E	218-E	3S-218-E
B-4	4	38-4025-P	Generator	284	3K-284	284-A	3K-284-A	218-T	3S-218-T	218-T	3S-218-T	218-T	3S-218-T
B-4	4	15715		284-A	3K-284-A	211-F	3P-211-F	218-T	3S-218-T	218-T	3S-218-T	218-T	3S-218-T
B-4	4	41-3059-EP		284-A	3K-284-A	211-F	3P-211-F	218-T	3S-218-T	218-T	3S-218-T	218-T	3S-218-T
B-4	4	41-3059-EP											
B-6	2	12573	12 Tooth Spline Involute Small Flange	347	3K-347	194-D	3P-194-D	218-R	3S-218-R	218-R	3S-218-R	218-R	3S-218-R
B-7	3	12573	12 Tooth Involute Spline Small Flange	345	3K-345	207-J	3P-207-J	218-S	3S-218-S	218-S	3S-218-S	218-S	3S-218-S
B-8	4	12573	12 Tooth Involute Spline Small Flange	346	3K-346	211-J	3P-211-J	218-T	3S-218-T	218-T	3S-218-T	218-T	3S-218-T
B-8	4	15715											
B-8	4	15807											
B-8	4	21930											
B-8	4	33477											
B-8	4	27043	12 Tooth Involute Spline Small Flange	346-A	3K-346-A	211-J	3P-211-J	218-Y	3S-218-Y	218-Y	3S-218-Y	218-Y	3S-218-Y



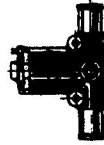
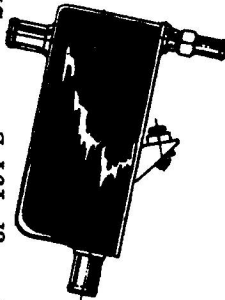
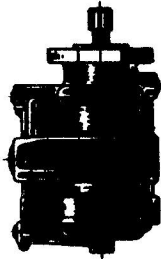
PESCO VACUUM PUMP ASSEMBLIES

The following chart indicates the various accessories including the Vacuum Pump, Oil Separator, Suction Relief Valve, and Safety Valve which go to make up the complete assembly.

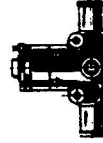
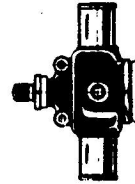
A.C. Type	Complete Assembly		Pump Model		Oil Separator		Suction Relief Valve		Air Filter
	Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model	
B-2A	330	3K-330	194	3P-194	218-R	3S-218-R	195	3V-195	
B-2A	330-A	3K-330-A	194-E	3P-194-E	218-R	3S-218-R	195	3V-195	
B-6	347	3K-347	194-D	3P-194-D	218-R	3S-218-R	195	3V-195	
B-11	357	3K-357	194-F	3P-194-F	218-R	3S-218-R	195	3V-195	
B-11A		3K-357-B	194-E	3P-194-E	218-R	3S-218-R		3V-195-E	3F-568-A



A.C. Type	Complete Assembly		Pump Model		Oil Separator		Suction Relief Valve		Safety Valve
	Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model	
B-3	486	3K-486	207-D	3P-207-D	218-F	3S-218-F	215	3V-215	
B-3	345	3K-345	207-D	3P-207-D	218-S	3S-218-S	215	3V-215	
B-7	356	3K-356	207-J	3P-207-J	218-S	3S-218-S	215-B	3V-215-B	217-G
B-12	356-B	3K-356	207-JA	3P-207-JA	218-S	3S-218-S	215-B	3V-215-B	217-G
B-13		3K-356-B	207-LA	3P-625	218-SB	3S-647-A	215-C	3V-215-C	217-GA



A.C. Type	Complete Assembly		Pump Model		Oil Separator		Suction Relief Valve		Safety Valve
	Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model	
B-4	284	284-3K	211	3P-211	218-E	3S-218-E	216	3V-216	217
B-4	284-A	3K-284-A	211-F	3P-211-F	218-T	3S-648	216-B	3V-216-B	217-H
B-8	346	3K-346	211-J	3P-211-J	218-T	3S-648	216-B	3V-216-B	217-H
B-8	346-A	3K-346-A	211-J	3P-211-J	218-Y	3S-648	216-B	3V-216-B	217-H



SECTION IINTRODUCTION

1. This handbook is issued as the basic Technical Order for the equipment involved.

2. The vacuum pumps described herein are manufactured by Pump Engineering Service Corp., Cleveland, O. These pumps are engine-driven units, built in four sizes and designated as listed in Table I. Types B-1 to B-2A inclusive, and types B-6 and B-11 are designated to furnish suction for the operation of flight instruments, and in addition will provide pressure for operating anti-icing equipment of the inflated tube variety.

3. The accessories furnished with vacuum pumps include a suction relief valve, an oil separator and a safety valve. A separate relief valve is not required with the B-2 pump, Pesco Model 172*, because the pump has a built-in relief valve. The purpose of the relief valve is to keep the suction constant throughout

the full range of pump speeds. The oil separator serves to remove lubricating oil from the pump discharge air and return it to the engine crankcase. Safety valves are used only with B-4, B-7, B-8, and B-12 pumps to protect the pumps from over-heating in the event of excessive back pressure.

4. The following pages are devoted to descriptions and detailed instructions regarding installation and maintenance of Pesco pumps and accessories as shown on Table I.

5. Reference has been made in this handbook to the following Technical Order which contains applicable data and instructions:

T. O. No.

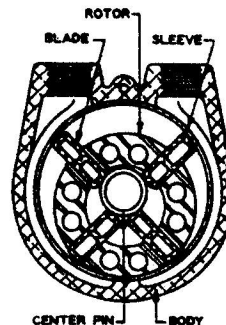
01-1-1 Cleaning of Aeronautical Equipment.

SECTION IIDESCRIPTION1. General.

a. Pesco vacuum pumps are of the rotary, four-vane positive displacement type and will operate equally well for either direction of rotation. Each pump consists essentially of a cast aluminum housing containing a tempered sleeve in which an offset rotor with four moving vanes is driven by means of a coupling mated with the engine drive gear.

b. The pumps in each of the four size groups differ from each other with respect to type of drive, type of mounting flange, type of drive coupling, or other design features. In the first group, Type B-1, Model 190* is the same as the Type B 1, Model 177*, except that it has a solid adapter neck and tongue type drive in lieu of the built up neck and military gun synchronizer type drive. The Type B-1A is essentially the same as the Type B-1, Model 190*, except that it has a tongue type drive. The Type B-6 pump is the same as the Type B-2A except for the spline drive in lieu of the tongue drive, and internal vents. The Type B-2 contains an integral suction relief valve. The B-11 pump is the same as the B-6 pump except for an improved spring coupling. In the third group, the B-7 pump is the same as the B-3 pump except for the spline drive

and internal vents. The B-12 pump is the same as the B-7 pump except for an improved spring coupling. In the fourth group, the B-8 is the same as the B-4, Model 211*, except for the 12 tooth involute spline in lieu of the 6 tooth square spline and improved circular spring coupling. The Type B-4, Model 211F*, differs from the Type B-4, Model 211*, in that it has the improved, circular spring coupling.

2. Rotor and Blade Design.

Two distinct rotor and blade combinations are used in Pesco vacuum pumps, one for small capacity pumps intended only for instrument and automatic pilot operation and the other for large capacity pumps intended for operation of anti-icing equipment as well as instruments.

a. Small Pumps. - In the smaller vacuum pumps the rotor contains four separate cast aluminum blades in

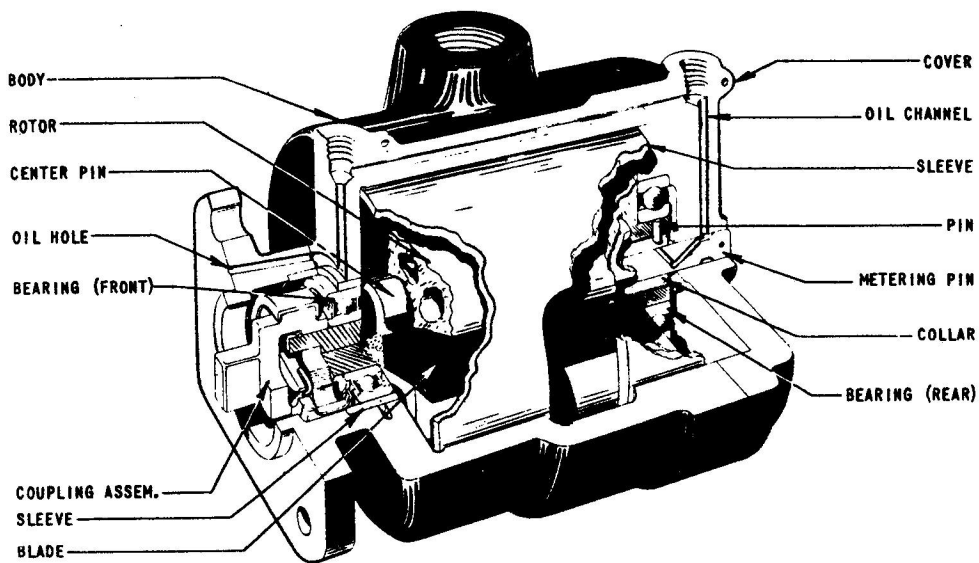


ILLUSTRATION PESCO MODEL 194-E

PESCO VACUUM PUMP MODEL 194 SERIES TYPE - B-2A, B-6, B-11

FIG. 1

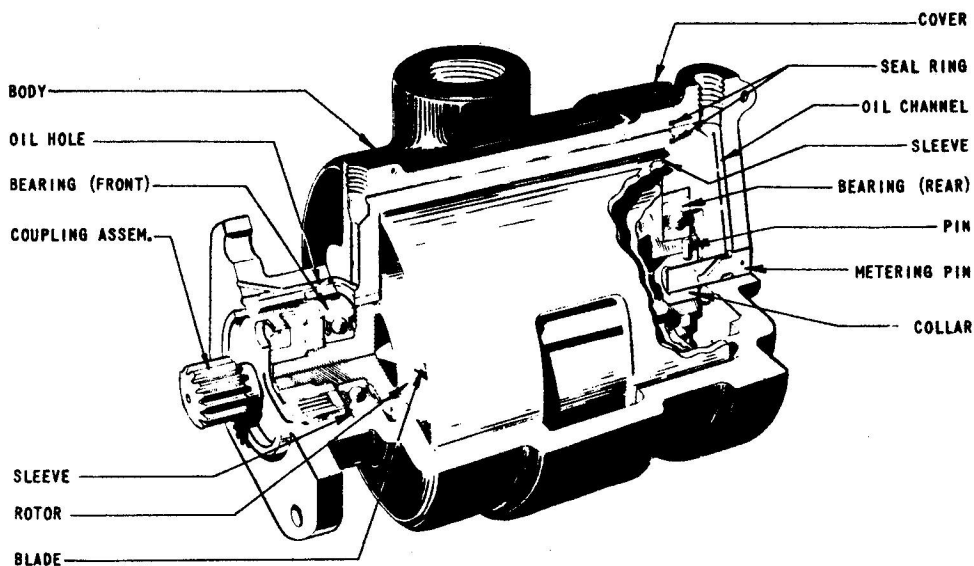
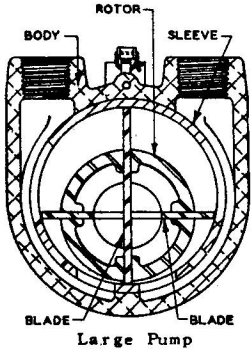


ILLUSTRATION PESCO MODEL 207-LA

PESCO VACUUM PUMP MODEL 207 AND 211 SERIES TYPES B-3, B-4, B-7, B-8, B-12, B-13

FIG. 2

equally spaced slots. A center pin "floating" in the hollow section of the rotor keeps the blades in contact with the wall of the sleeve. At higher operating speeds, centrifugal force alone is sufficient to maintain blade contact.

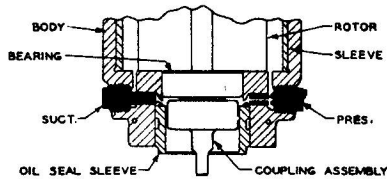


b. Large Pumps. - In the large "heavy duty" pumps the four pumping vanes are provided by two through blades moving back and forth at right angles to each other. One blade has a central opening and the other consists of two identical parts, both indented so that they may be hooked together and inserted through the opening in the other blade as well as through a pair of slots in the rotor. This arrangement requires a special bore for the body sleeve.

3. Internal Venting.

a. The Pesco vacuum pump bodies were redesigned in the early part of 1939 to provide internal venting from the discharge side of the pump to the neck of the pump in place of the external 1/4" tube formerly used. The purpose of the venting system is to allow enough air to by-pass from the discharge side to compensate for any suction existing around the coupling; otherwise this suction may draw oil or oil vapor from the engine crankcase in the event of a faulty engine drive seal, giving the appearance of excessive oil consumption.

b. Both sides of the pump body are drilled as shown in the figure below. The special plug marked "SUCTION" is used to block the passage leading to the suction side of the pump; the plug marked "PRES" allows a restricted air flow from the discharge side of the pump into the neck. The two plugs are made interchangeable to accommodate either direction of rotation.



* Old number shown; see Table 1 on Page 2 for conversion to new number.

c. When installing a pump on an engine, note the direction of rotation of the engine drive gear and determine which port is the intake port. Make sure that special plug marked "SUCTION" is installed on the same side of the pump as the intake port, tighten the two plugs carefully and fasten them with safety wire.

d. The Types B-11 and B-12 pumps have a new design incorporating a positive seal ball bearing in the drive end of the pump. This bearing is packed with grease and requires no special lubrication. Internal venting of the pump has been eliminated and the pump body is not provided with vent plugs.

4. Coupling.

In Types B-1 and B-2 pumps the coupling is pinned to the rotor shaft. In the other types the coupling engages the rotor shaft by means of spring leaves designed to minimize torsional oscillation. In the Types B-4, B-8, B-11 and B-12, Model 211F*, pumps, the coupling is provided with circular spring leaves.

5. Sealed Ball Bearings.

All recent models of Pesco vacuum pumps are provided with a positive seal ball bearing in the drive end of the pump. Internal venting of the pump is not required with the use of this bearing; therefore, the pump body is not provided with vent plugs. The bearing is packed with grease and sealed by the bearing manufacturer and requires no further lubrication.

6. Lubrication.

Simple internal oil metering devices are incorporated in the pumps to allow the proper amount of engine oil to enter the pump for correct lubrication. The Type B-1, Model 177*, B-1A and B-2 pumps require external oil lines; the others have provisions for oiling through the mounting pad. (See Figure 1, Page 5)

7. Integral Relief Valve.

An adjustable spring loaded disc type suction relief valve is incorporated in the B-2 pumps to maintain constant suction through varying pump speeds. The valve assembly is readily accessible without disassembly of the pump and can be reversed to accommodate either direction of rotation.

SECTION IIIINSTALLATION

NOTE: This section is intended only as a general guide to installation as installation problems vary with different types of service planes. Air Corps installation drawings should be consulted for further instructions.

1. Preliminary Procedure.

First remove the cover plate and gasket from the engine pump pad and wipe the pad clean, and note carefully the direction of rotation of the engine drive gear. Then refer to the arrows on the exterior machined surface at the rear of the pump and determine which of the two ports is the intake port. Remove the shipping plugs from the two ports and test the pump for freedom of operation by turning the coupling with the fingers. If the coupling resists turning, refer to Section VIII, paragraph 3 f. If the pump is intended for lubrication through the mounting pad, check the oil holes in the pad to insure free oil passage.

2. Vent Plugs.

If the pump is equipped with special hex-headed plugs next to the mounting flange, make sure that the plug marked "SUCTION" is installed on the same side of the pump as the intake port. Interchange the two plugs, if necessary, tighten them carefully and secure them with safety wire. Refer to Section II, paragraph 3.

3. Mounting.

Place the gasket in position over the mounting

studs and see that it does not block the oil hole or holes in the pad. Mount the pump in the position most desirable for connection of air lines, tighten the mounting nuts carefully and evenly, and see that they are properly secured.

4. Air Lines.

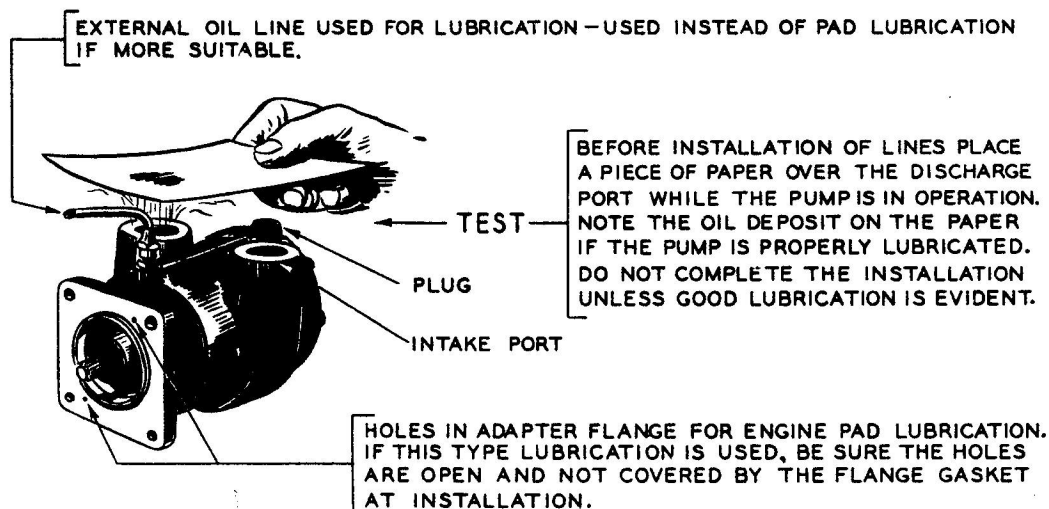
Install suction and discharge lines to the proper pump ports. The inlet port for either direction of rotation is designated by arrows stamped on the exterior machined surface next to the cover. See Section V, paragraphs 1 b and 2 b, for installation of the suction relief valve and oil separator. Tighten all connections carefully and see that tubing is properly supported and bonded.

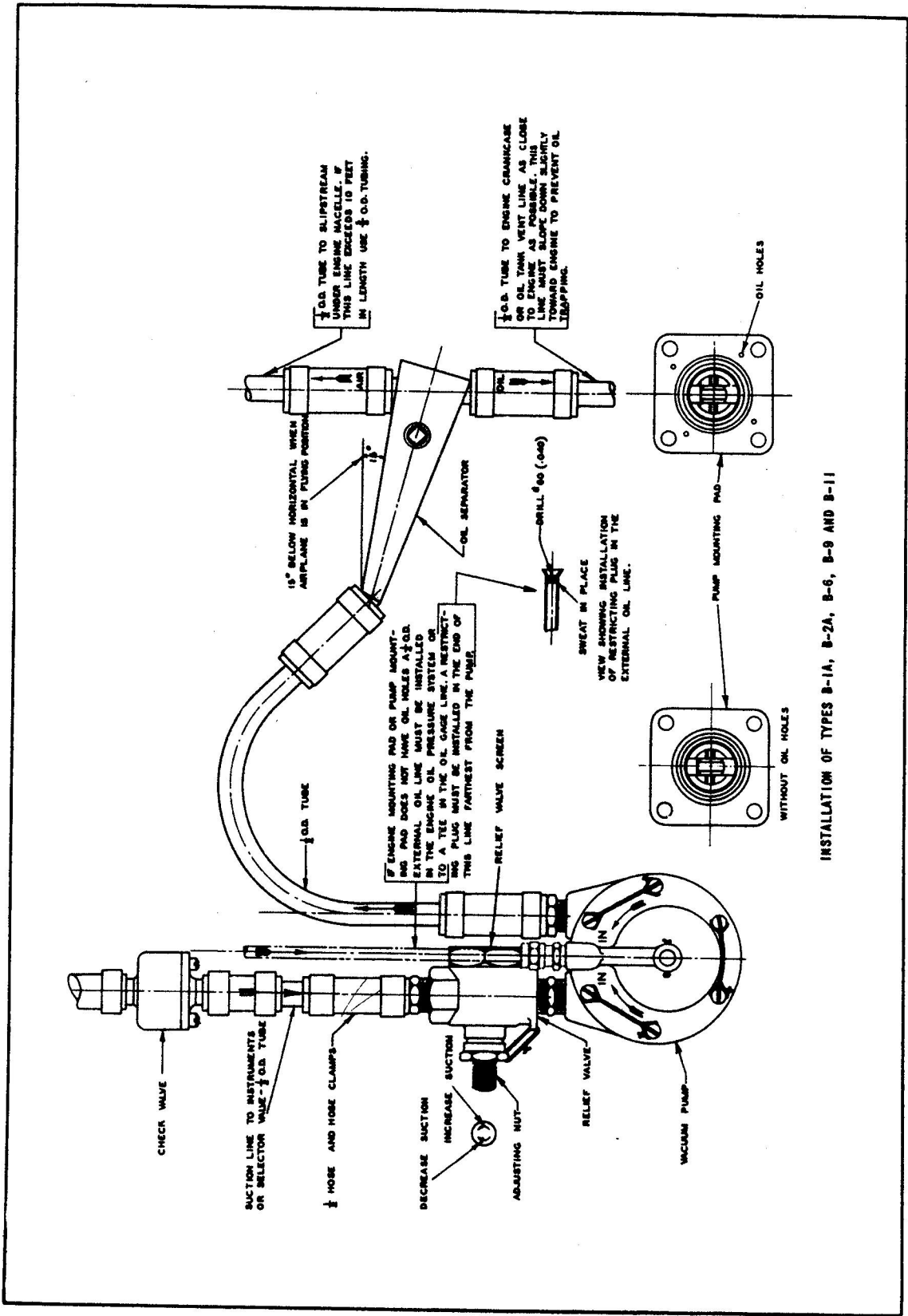
5. Lubrication.

All vacuum pumps must be properly lubricated to prevent seizure. If the engine has oil ducts to the mounting pad and the pump pad has oil holes, no further provision for lubrication is necessary; otherwise, an external oil line must be installed. Either system must be tested before the installation can be regarded as complete.

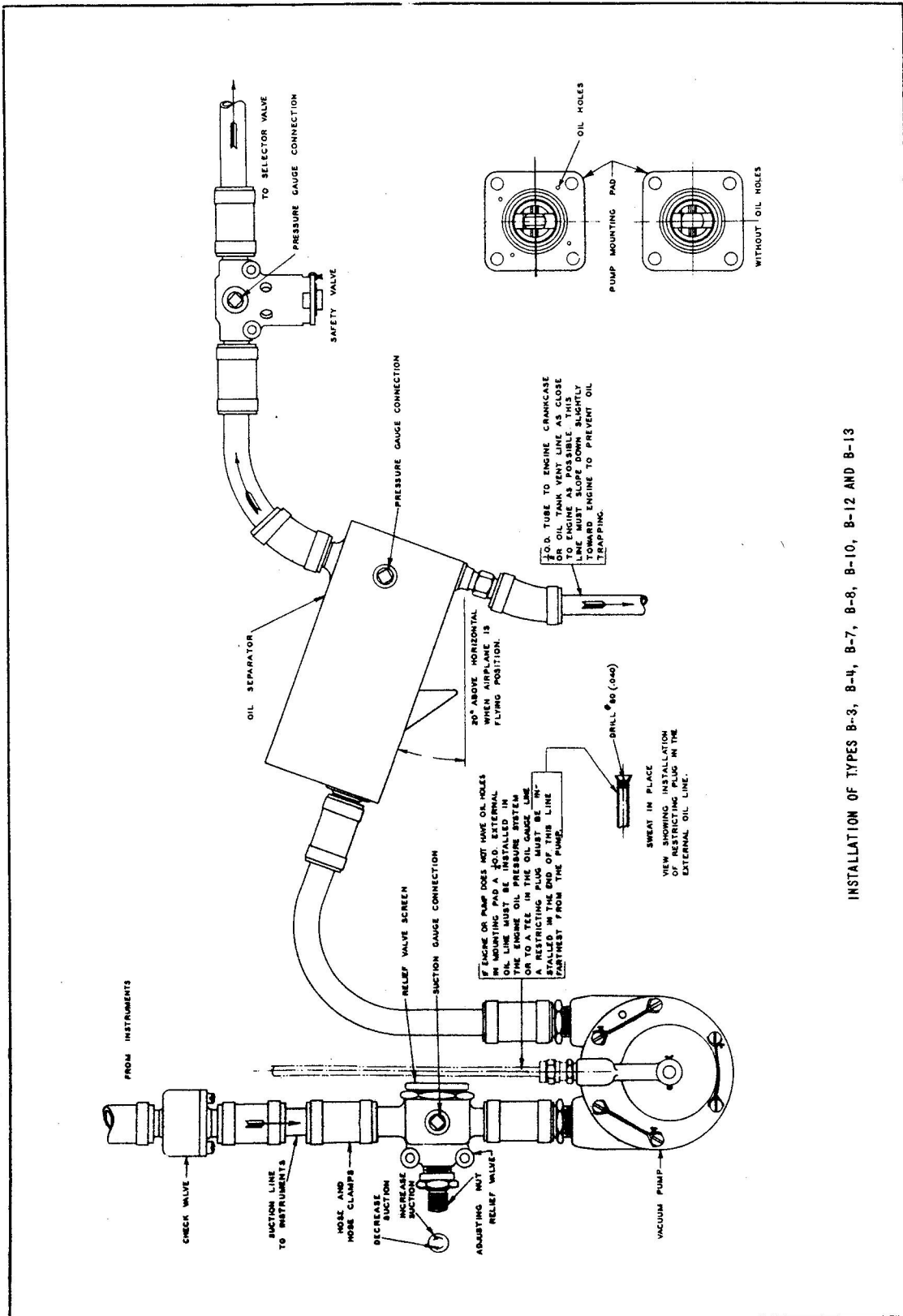
CAUTION. Be sure that the oil holes provided in the pump pad, line up with the oil holes on the engine drive pad. If no oil holes are provided on the engine pad, turn the gasket so as to block the holes on the pump pad and use an external oil line to one of the ports provided on the pump body.

PRE-INSTALLATION LUBRICATION TEST





INSTALLATION OF TYPES B-1A, B-2A, B-6, B-9 AND B-11

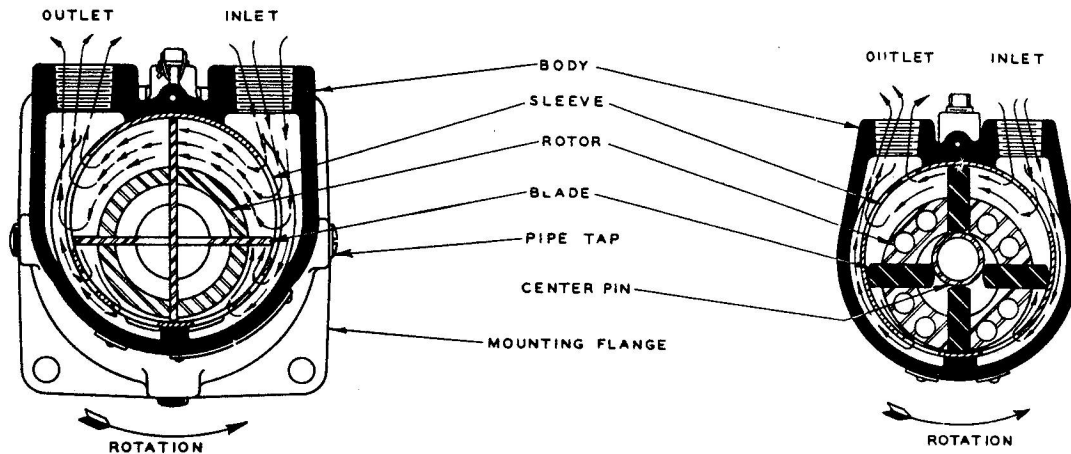


INSTALLATION OF TYPES B-3, B-4, B-7, B-8, B-10, B-12 AND B-13

SECTION IV
PRINCIPLE OF OPERATION

1. The pump is coupled directly to the engine drive gear and functions continuously as long as the engine is running. Torque is transmitted from the engine drive gear to the pump rotor by means of the coupling. The bore of the sleeve is divided into four sections by rotor and blades. Since the axis of the rotor is eccentric with that of the sleeve, the sections are of unequal volume, the smaller sections being next to the point where the rotor is closest to the wall of the sleeve.

As the rotor turns, the four sections pass successively the point where the volume of each is at a minimum. From this point the volume of each section increases during one-half revolution, thus creating a suction and drawing in air from the nearest port. During the second half revolution, the section volume decreases and the air is forced out through a second port. At normal operating speeds the rapid succession of intakes produces a steady suction. See Chart below.



CROSS-SECTIONAL VIEW SHOWING DIRECTION OF ROTATION & AIR FLOW

FIG. 5 - ILLUSTRATION OF PUMP OPERATION

SECTION V
ACCESSORIES1. Relief Valve.

a. Description. - The relief valve is a spring-loaded disc type valve contained in a cast aluminum housing, with pipe threaded ports or tube ends on opposite sides. The disc is held against a screened valve seat by a spring whose tension may be altered by means of an adjusting nut on the outside of the housing. The valves with tube ends also incorporate provisions for mounting.

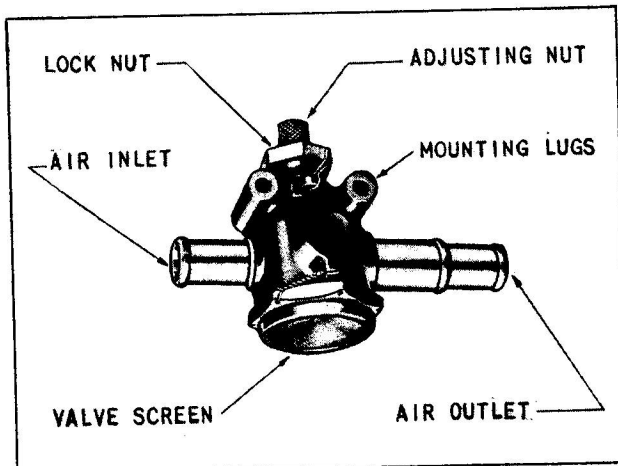


FIG. 6 - PESCO MODEL 3V-215-B & G SUCTION RELIEF VALVE

b. Installation. - Install the valve in the suction line near the pump intake port. Between the pump and the valve install a short length of tubing (6 to 24") connected to the pump and the valve by hose connections and pipe nipples. Mount the valve with the screen facing downward or to one side - NEVER UPWARD. The screen must be as easily accessible as possible for periodic cleaning.

c. Adjustment. - The valve is properly adjusted when shipped from the factory. If it is necessary to alter the adjustment, loosen the lock nut and turn the adjusting nut counterclockwise to increase suction or clockwise to decrease suction.

d. Inspection and Maintenance.

(1) Inspection. - See Section VII.

(2) Depot Repair. - At regular engine overhaul periods, disassemble the valve and clean the parts in gasoline. Inspect the bakelite valve disc for wear. Slight wear may be corrected by lapping the disc carefully on a lapping plate. If wear is excessive, a new part must be substituted. Check

the spring tension by measuring the force required to compress the spring as follows:

Part Number	Type Valve	Compressed To	Min. Force Allowable
3V-195	B-1, 1A, 2, 2A, 6, and 11	1-1/8 in.	16 oz.
3V-215	B-3, 7, 12 and 13	1-1/8 in.	16 oz.
3V-215G	----	59/64 in.	36 oz.
3V-216	B-4 and 8	1-7/8 in.	16 oz.

2. Oil Separator.

a. Description. - The purpose of the oil separator is to remove oil from the pump discharge air, and return it to the crankcase. The separator is made of sheet brass and has tube connections for inlet, air discharge and oil outlet. It contains no moving parts. On most of the smaller separators, the oil outlet is a tube connection with a restriction at the end. On a few of the smaller separators and on all the larger separators the oil outlet is a removable fitting containing a perforated disc strainer.

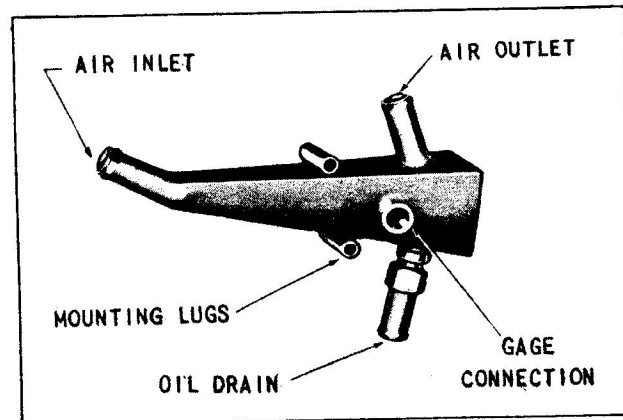


FIG. 7 - PESCO MODEL 3S-218-R OIL SEPARATOR

b. Installation. - Install the separator in the vacuum pump discharge line and see that it is mounted at the angle indicated. Where mounting brackets or tubular mounting supports are provided they are attached in such a way as to provide the proper mounting angle. Some of the larger separators are provided also with cushions to be placed on either side of the mounting brackets to minimize vibration. Mounting the separator at the specified angle is essential for obtaining maximum efficiency.

c. Inspection and Maintenance.(1) Inspection. - See Section VII.

(2) Depot Repair. - Wash out the separator with a suitable grease solvent, first removing the oil outlet fitting and screen from the separator, which have the removable type screen. Clean the removable fitting and screen and dry all parts. Make a leakage test of the separator when immersed in water and subjected to internal pressure of 10 pounds per square inch after assembling the removable parts on the separator. Repair all leaks by silver soldering if possible. Following this test, dry the separator thoroughly and spray the interior lightly with a thin oil.

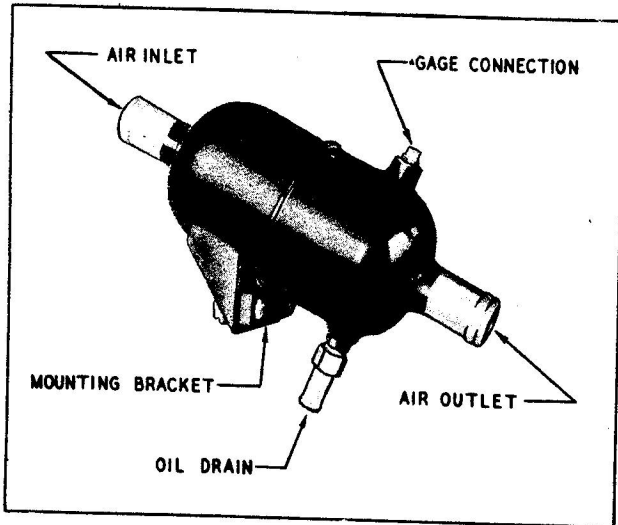


FIG. 8 - PESCO MODEL 3S-648 OIL SEPARATOR

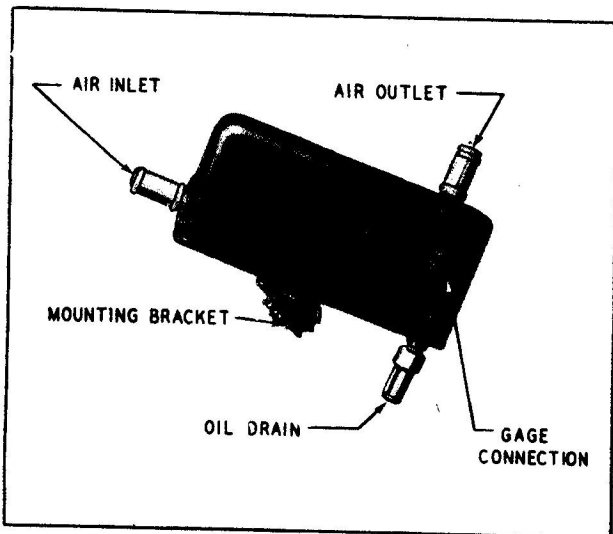


FIG. 9 - PESCO MODEL 3S-218-S OIL SEPARATOR

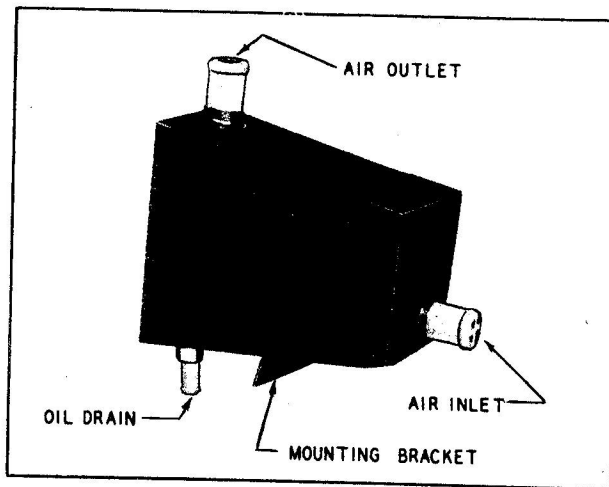


FIG. 10 - PESCO MODEL 3S-649 OIL SEPARATOR

3. Safety Valve.

a. Description. - The Pesco safety valve is a spring-loaded disc type valve contained in an aluminum housing with two threaded ports or tube ends. The valve is designed to relieve excessive back pressure in the discharge line to prevent overloading the pump. It will open at 20 to 24 in. Hg. The valves can be adjusted by means of combined various spacing washers to alter the spring tension.

b. Installation. - Install the valve in the pump discharge line, after the oil separator, using a 6 to 12 inch length of tubing connected to the oil separator and the valve by hose connections and pipe fittings if necessary. Install the valve so that the valve guide assembly can be removed readily for periodic cleaning and inspection.

c. Inspection and Maintenance. - See Section VII.

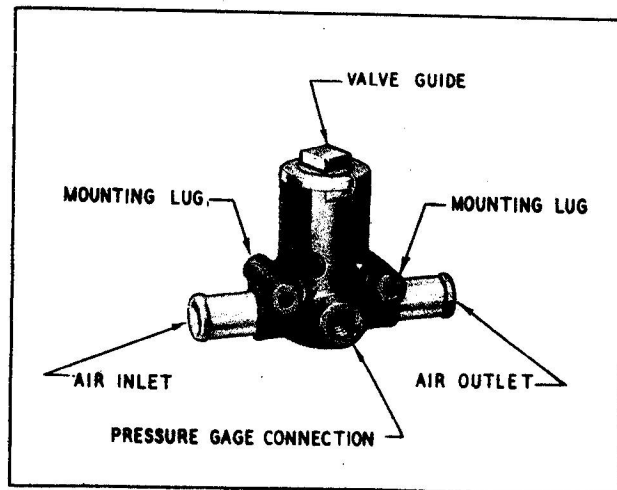


FIG. 11 - PESCO MODEL 3V-217-H SAFETY VALVE

4. Air Filter.

a. Description. - The vacuum pump filter is a cylindrical shaped unit provided with a hose nipple connection and a filter element, which is easily removed for cleaning. This unit is designated for removing the greater percentage of dust or abrasive particles from the inlet air to the vacuum pump in order to prevent excessive wear.

b. Installation. - The filter is to be installed in conjunction with a suction relief valve which is provided with a corresponding hose nipple connection in place of the flat screen. The filter should be located near the suction relief valve and preferably in the coolest location in the enclosure.

c. Inspection and Maintenance. - The filter element should be cleaned at periodic intervals depending on the operating conditions. If the element is of the oiled metallic wire type, it should be cleaned by washing in

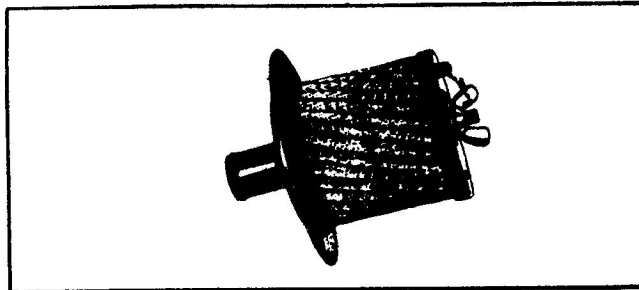


Fig. 11A - Model 3F-568-A Air Filter

a suitable solvent and blowing dry with compressed air. The element should then be immersed in engine oil and permitted to drain for 20 hours. If the element is of the dry type, it may be cleaned by blowing thoroughly with compressed air in the opposite direction to the normal flow.

SECTION VI

LUBRICATION

1. To prevent overheating and seizure during operation, each pump must be properly lubricated. Lubrication is provided by engine oil supplied under pressure to an oil metering device incorporated in the pump. The oil is conducted to the metering device by an external oil line or through an internal oil channel

from oil ducts in the engine mounting pad. The metering device restricts the flow of oil to the amount required for correct lubrication. The oil pressure should be approximately 50 pounds per square inch and must be at least 25 pounds per square inch. No other form of lubrication is required.

SECTION VII

INSPECTION AND MAINTENANCE

1. General.

For Preflight inspection see Handbook for the engine in which installed.

2. Inspection.

Column No. 43 - Airplanes - General.

100-Hour Inspection. - Pump: Check for security of mounting.

Relief Valve: Examine the valve screen, and if it is dirty, remove the valve and loosen the screen assembly with a wrench. Clean the screen in gasoline and replace.

Safety Valve: Remove the valve guide and wash it in a suitable cleaning fluid. If the valve disc is worn, dress it carefully with a flat oilstone. Test the spring tension by measuring the force required to compress it to 1-1/8 inches long. The force must be at least 3.7 pounds.

Oil Separator with Removable Screen: The oil outlet fittings and screens will be removed and cleaned in a suitable cleaning fluid.

Oil Separator without Removable Screens: These separators which do not have the removable screen should be removed, thoroughly washed, and cleaned with a suitable cleaning solvent (see Technical Order 01-1-1) and then dried with compress air.

Vent Plug: If the pump is intended for internal venting remove the special hex-head plug marked "PRES" located near the mounting flange and clean the air passages in the plug.

3. Depot Repair at Regular Engine Overhaul Periods.

a. Pump. - Disassemble, inspect, repair and assemble as specified in Section VIII.

b. Relief Valve. - See Section V.

c. Oil Separator. - See Section V.

d. Air Filter. - See Section V.

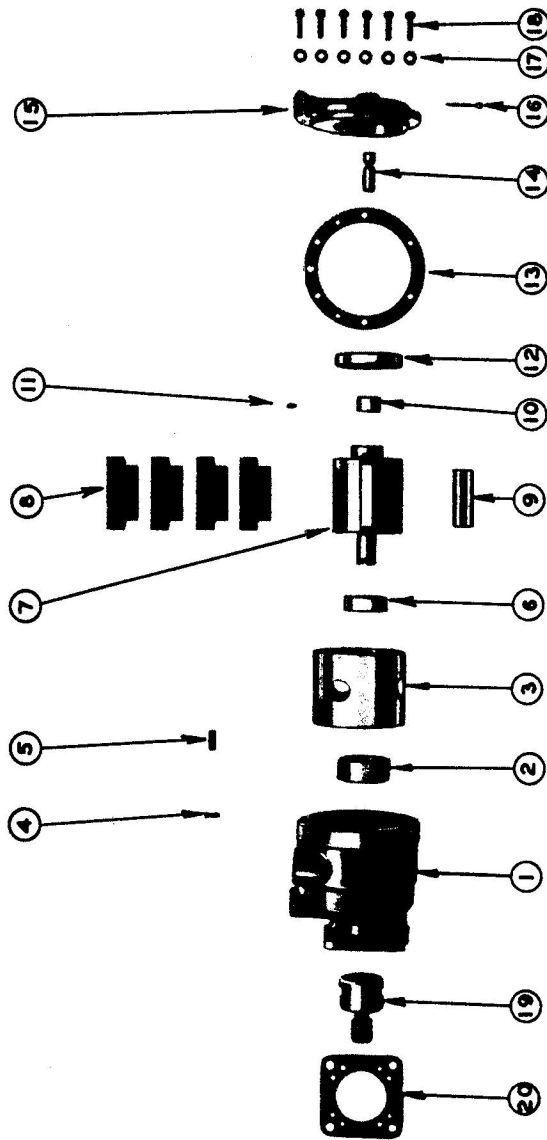


FIG. 12 - PARTS PHOTO FOR 194 SERIES

REFERENCE PARTS LIST FOR 194 SERIES

Ind. No.	Part Name	Old Model	New Model	Old Model	New Model	Old Model	New Model	Old Model	New Model
		194	3P-194 Type B-2A	194-D	3P-194-D Type B-6	194-E	3P-194-E Type B-2A	194-F	3P-194-F Type B-11
1	Body Assembly		194-1		194-1		194-1		194-1
2	Oil Seal Sleeve		194-10		194-10		194-10		194-10
3	Body Sleeve		194-4		194-4		194-4		194-4
4	Anchor Pin		172-12		172-12		172-12		172-12
5	Cover Pin		172-24		172-24		172-24		172-24
6	Ball Bearing		177-23B		177-23B		177-23B		177-23B
7	Rotor		194-27		194-27		194-27A		194-27A
8	Blade		172-3A		172-3A		172-3A		172-3A
9	Center Pin		172-5		172-5		172-5		172-5
10	Metering Collar		190-15		190-15		190-15		190-15
11	Anchor Pin		190-13		190-13		190-13		190-13
12	Ball Bearing		172-21		172-21		172-21		172-21
13	Gasket - .003"		194-19		194-19		194-19		194-19
	Gasket - .001"		194-19A		194-19A		194-19A		194-19A
14	Metering Pin		190-14		190-14		190-14		190-14
15	Cover		194-2		194-2		194-2		194-2
16	Cotter Pin		177-19		177-19		177-19		177-19
17	Washer		194-22		194-22		194-22		194-22
18	Fill. Hd. Screw		194-21		194-21		194-21		194-21
19	Coupling Assembly		194-29		194-29B		194-38		207-16C
20	Flange Gasket		194-20		194-20		194-20		194-20

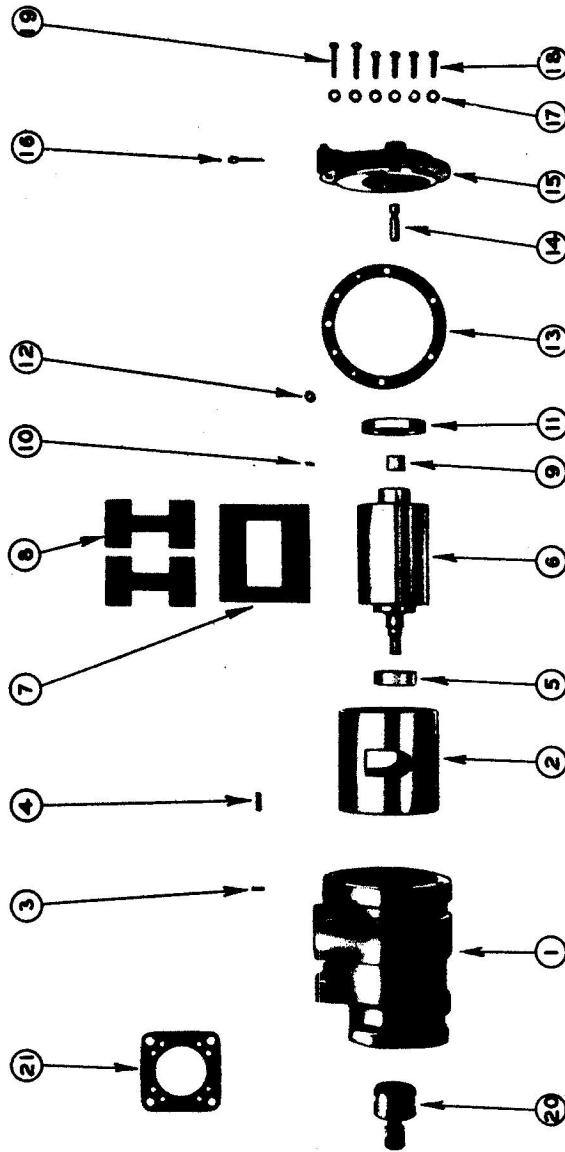


FIG. 13 - PARTS PHOTO FOR 207 SERIES

REFERENCE PARTS LIST FOR 3P-207 SERIES

Ind. No.	Part Name	Old Model-New Model 207-B 3P-207-B Type 8-3	Old Model-New Model 207-D 3P-207-D Type 8-3	Old Model-New Model 207-J 3P-207-J Type 8-7	Old Model-New Model 207-JA 3P-207-JA Type 8-12	Old Model-New Model 207-K 3P-207-K Type 8-3	Old Model-New Model 207-LA 3P-625 Type 8-13
1	Body Assembly	207-15A	207-15C	207-15C	207-15C	207-15A	207-15F
2	Sleeve	207-10	207-10	207-10	207-10	207-10	207-10C
3	Anchor Pin	172-12	172-12	172-12	172-12	172-12	172-12
4	Cover Dowel	172-24	172-24	172-24	172-24	172-24	172-24
5	Ball Bearing	177-23B	177-23B	177-23B	177-23B	177-23B	177-23B
6	Rotor Assy.	207-3	207-3A	207-3A	207-3A	207-3	207-3A
7	Blade (Whole)	207-4	207-4	207-4	207-4	207-4	207-4
8	Blade (Half)	207-5	207-5	207-5	207-5	207-5	207-5
9	Metering Collar	207-8	207-8	207-8	207-8	207-8	207-8
10	Anchor Pin	207-9	207-9	207-9	207-9	207-9	207-9
11	Ball Bearing	172-21	172-21	172-21	172-21	172-21	172-21
12	Seal Ring	436-5	436-5	436-5	436-5	436-5	436-5
13	Gasket - .003"	207-13	207-13	207-13	207-13	207-13	207-13
	Gasket - .001"	207-13A	207-13A	207-13A	207-13A	207-13A	207-13
14	Metering Pin	207-6	207-6	207-6	207-6	207-6	207-6
15	Cover Assy.	207-25	207-25	207-25	207-25	207-25	207-25
16	Cotter Pin	177-19	177-19	177-19	177-19	177-19	177-19
17	Washer	194-22	194-22	194-22	194-22	194-22	194-22
18	Screw	194-21	194-21	194-21	194-21	194-21	194-21
19	Screw	230-34	230-34	230-34	230-34	230-34	230-34
20	Coupling Assembly	206-19	194-29	194-29B	207-16D	194-29C	207-16D

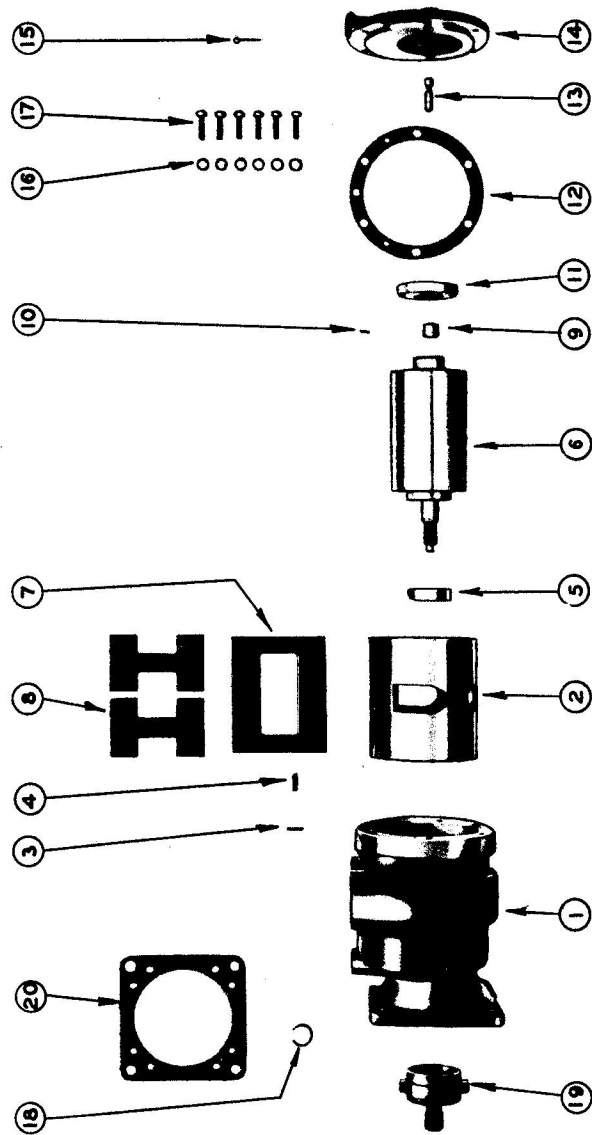


FIG. 14 - PARTS PHOTO FOR 211 SERIES

REFERENCE PARTS LIST FOR 211 SERIES

Index Number	Part Name	Old Model	New Model	Old Model	New Model	Old Model	New Model
		211	3P-211 Type 8-4	211-F	3P-211-F Type 8-4	211-J	3P-211-J Type 8-8
1	Body Assembly	211-42B	211-42B	211-42B		211-1C	
2	Sleeve	211-3	211-3	211-3		211-3	
3	Anchor Pin	211-9	211-9	211-9		211-9	
4	Cover Dowel	172-24	172-24	172-24		172-24	
5	Ball Bearing	211-18B	211-18B	211-18B		211-18B	
6	Rotor	211-4	211-4	211-4B		211-4C	
7	Blade (Whole)	211-7	211-7	211-7		211-7	
8	Blade	211-8	211-8	211-8		211-8	
9	Metering Collar	207-8	207-8	207-8		207-8	
10	Anchor Pin	211-10	211-10	211-10		211-10	
11	Ball Bearing	211-20	211-20	211-20		211-20	
12	Gasket - .003"	211-15	211-15	211-15		211-15	
	Gasket - .001"	211-15A	211-15A	211-15A		211-15A	
13	Metering Pin	207-6	207-6	207-6		207-6	
14	Cover Assembly	211-47	211-47	211-47		211-47	
15	Cotter Pin	177-19	177-19	177-19		177-19	
16	Washer	181-22	181-22	181-22		181-22	
17	Screw	211-17	211-17	211-17		211-17	
18	Snap Ring	211-19	211-19	211-40		211-40	
19	Coupling Assembly	211-11	211-11	211-11C		211-11D	
20	Flange Gasket	211-21	211-21	211-21		211-21	

SECTION VIIIDISASSEMBLY, INSPECTION AND REPAIR, ASSEMBLY - (DEPOT)

NOTE: The overhaul procedure outlined below is to be undertaken only at regular overhaul depots.

1. Disassembly.

a. General. - Removing the six cover screws and taking off the cover gives access to all moving parts.

b. Lock Nut. - A special wrench is required to loosen the locknut in the mounting flange of the Type B-1, Model 190* Pump.

c. Bearings. - To remove bearings from the rotor, place the rotor with its outer edge on a set of blocks or on a single block with a hole 1/8" larger than the outside diameter of the bearing. Then insert a thin piece of soft metal (soft steel or brass) in each of the rotor slots successively and tap lightly the end of the metal to force the bearing off the rotor shaft. The metal should be at least an inch longer than the pump blades.

d. Metering Collar. - The metering collar is anchored to the rotor by a pin pressed lightly into a hole in the rotor shaft. To remove the pin, bump the end of the shaft carefully on a wooden bench or block.

e. Sleeve. The sleeve can be removed by forcing out the anchor pin and heating the body to about 121°C. (250°F.) in a gas oven or oil bath. The part can then be bumped out on a wooden bench or block.

2. Inspection and Repair.

After disassembly wash all parts except the front bearing in a suitable cleaning fluid. Do not wash the front bearing because the fluid would dissolve the grease with which the bearing is packed by the bearing manufacturer. Inspect the parts carefully and reject any parts that may be defective as well as those showing wear in excess of the tolerances indicated in Figures 15 and 16. Observe the following:

a. Blades. - If the sides are rough or scored, dress them carefully on a flat oilstone, but see that the original radius on the edges is maintained.

b. Rotor. - Particles of aluminum from the aluminum blades may build up in the rotor slots to cause excessive scuffing. To remedy this condition, dress the rotor slots carefully with a thin, flat oilstone.

c. Pump Body. - To prevent leakage from the mating holes in the pump body and pump head all Type B-12 pumps not already changed should be worked at time of overhaul to incorporate rubber seal ring, Pesco Part No. 436-5. The pump body, Pesco Part No. 207-1D shall be reworked as per change letter K. This reworking consists of the machining of an annular groove about the oil feed hole in the anti-drive end of the pump body. The rubber seal ring shall be assembled as per Assembly Drawing, Pesco No. 207-JA*, change letter F.

c. Bearings. - (1) Reject the bearings if they are found to be rough turning. To test for roughness, hold the outer race in one hand and turn the inner race with the finger while pressing endwise. Test both sides in this manner. Then test for radial roughness by turning the inner race and pressing radially with the finger.

(2) Only the proper types of bearings as specified by the applicable assembly drawings shall be used. It should be noted that an open type bearing is used in the covers of the pumps whereas a greased packed bearing is used in the drive end.

e. Metering Pin and Collar. - DO NOT attempt to lap the pin or ream the collar, as the result will be excessive oil consumption. If either part is worn, replace with a new part.

f. Coupling. - If the coupling is of the spring type, see that none of the spring leaves are broken. If any spring leaves are broken, remove the retainer and replace all leaves. Slip a new retainer over the assembly and spin over the edge of the retainer in a lathe to bind the assembly.

3. Assembly.

The following precautions should be followed during reassembly. Any other details of reassembly not specifically mentioned can be determined by reference to the applicable assembly drawings.

a. Measurement of Pump Parts for Clearance. Measure all pump parts to insure that the clearances as given in the applicable clearance figures are within the allowable limits.

b. Sleeve. - First heat the body to about 121°C. (250°F.) and insert the sleeve so

*Old number shown; see Table 1 on Page 2 for conversion to new number.

FITS AND CLEARANCES FOR PESCO VACUUM PUMPS

TYPES B-1, B-1A, B-2A, B-6, & B-11

PART FIT		MIN. - MAX. WHEN NEW		PART FIT	MIN. - MAX. WHEN NEW		PART FIT
		B-1 & B-1A	B-2A & B-6		B-1 & B-1A	B-2A & B-6	
LET. A	ROTOR SLOT THICKNESS	.3128 - .3135	.3128 - .3135	G	SLEEVE LENGTH	3.003 - 3.004	B-1 & B-1A
B	BLADE WIDTH	.3105 - .3112	.3105 - .3112	H	ROTOR LENGTH	2.9995 - 3.000	B-2A & B-6
C	BLADE CENTER PIN DIAMETER	.9991 - .9996	.9679 - .9684	J	SLAVE I.D.	2.9995 - 3.002	
D	SLEEVE I.D.	.7440 - .7445	.6795 - .6800	K	BEARING O.D.	1.3780 - 1.3786	
E	COVER I.D.	2.7530 - 2.7535	2.6280 - 2.6285	M	ROTOR SHAFT O.D.	1.3775 - 1.3780	
F	BEARING I.D.	2.0000 - 2.0010	2.0000 - 2.0010		BEARING I.D.	.5906 - .5908	
	ROTOR SHAFT DIAMETER	1.9995 - 2.0000	1.9995 - 2.0000		ENGINE DRIVE SPLINE	.5903 - .5905	
	COVER HOLE DIAMETER	1.0000 - 1.0003	1.0000 - 1.0003			.7112 - .7174	
	METERING PIN DIAMETER	.3745 - .3750	.3745 - .3750				
	COLLAR I.D.	.3765 - .3767	.3765 - .3767				
		.3772 - .3775	.3772 - .3775				

CLEARANCES

LET.	B-1, B-1A	B-2A & B-6
A	.0016	.0016
B	.003	.003
C	.0093	.0093
D	.0113	.0112
E	.015	.015
F	.0000	.0000
G	.0015	.0015
H	.002	.002
I	.0006 T	.0006 T
J	.0001	.0001
K	.0022 T	.0015 T
	.0015 T	.0015 T
	.0005	.0005
	.001	.001
	.0015	.0015
	.0015	.0015
	.0025	.0025
	.007	.007
	.0015	.0015
	.0025	.0025
	.007	.007
	.0000	.0000
	.0011	.0011
	.0005 T	.0005 T
	.0001	.0001
	.001	.001
	.001	.001

* MAXIMUM WEAR

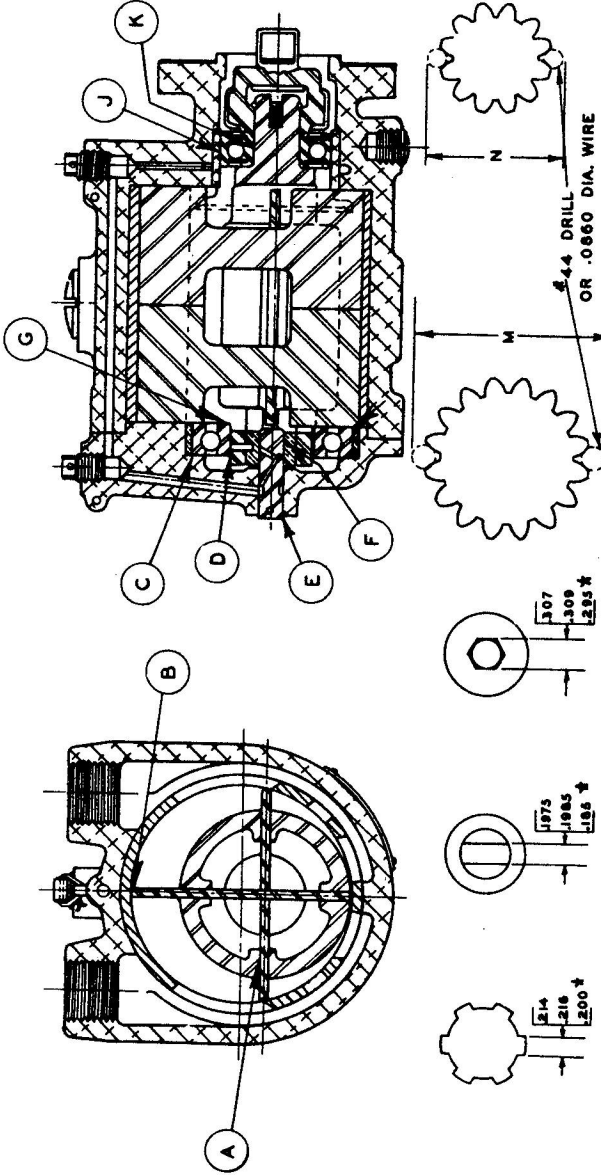
LET.	MIN. - MAX. WHEN NEW	MIN. - MAX. WHEN NEW	MIN. - MAX. WHEN NEW
	B-1 & B-1A	B-2A & B-6	B-1 & B-1A
G	.3128 - .3135	.3128 - .3135	3.003 - 3.004
H	.3105 - .3112	.3105 - .3112	2.9995 - 3.000
J	.9991 - .9996	.9679 - .9684	2.9995 - 3.002
K	.7440 - .7445	.6795 - .6800	1.3780 - 1.3786
M	2.7530 - 2.7535	2.6280 - 2.6285	1.3775 - 1.3780
	2.0000 - 2.0010	2.0000 - 2.0010	.5906 - .5908
	1.9995 - 2.0000	1.9995 - 2.0000	.5903 - .5905
	.9997 - 1.0000	.9997 - 1.0000	.7112 - .7174
	1.0000 - 1.0003	1.0000 - 1.0003	
	.3745 - .3750	.3745 - .3750	
	.3765 - .3767	.3765 - .3767	
	.3772 - .3775	.3772 - .3775	

* USE GASKETS AS REQUIRED FOR PROPER CLEARANCE AT (G) & (H)

PUMP ENGINEERING SERVICE CORP.

FITS AND CLEARANCES FOR PESCO VACUUM PUMPS

TYPES B-3, B-4, B-7, B-8, B-12, & B-13



LET.	CLEARANCES		
	B-3,7,12	B-4	B-8
A	.001	.001	.001
	.0027	.0027	.0027
	.003	.003	.004
B	.004	.004	.006
	.009	.009	.0092
	.011	.011	.011
C	.0000	.0000	.0005
	.0006	.0006	.002
	.0025	.0025	.0025
D	.0006 T	.0007 T	.0007 T
	.0000	.0000	.0000
	.001	.001	.001
E	.0022 T	.0022 T	.0015 T
	.0015 T	.0015 T	.0015 T
F	.0005	.0005	.0005
	.001	.001	.001
	.0012	.0012	.0012
G	.0015	.0015	.0015
	.0025	.0025	.0025
	.007	.007	.007
H	.0015	.0015	.0015
	.0025	.0025	.0025
	.007	.007	.007
J	.0000	.0000	.0000
	.0011	.0011	.0011
	.0025	.0025	.0025
K	.0005 T	.0005 T	.0005 T
	.0001	.0001	.0001
	.001	.001	.001

LET.	MIN.-MAX. WHEN NEW		PART FIT
	B-3 B-7 & B-12	B-4 & B-8	
A	29985	3.0002	BLADE LENGTH
	1.3760	1.3766	SLEEVE I.D.
	1.3775	1.3780	BEARING O.D.
	.5906	.5906	SHAFT DIA.
	.5903	.5905	BEARING I.D.
	.9114	.9177	16 TOOTH SPLINE
	.7112	.7174	12 TOOTH SPLINE

LET.	MIN.-MAX. WHEN NEW		PART FIT
	B-3, B-7, & B-12	B-4 & B-8	
H	.095	.096	ROTOR SLOT
J	.0933	.094	BLADE THICKNESS
	2.744	2.747	BLADE WIDTH
	2.751	2.753	SLEEVE BORE
	2.0000	2.0005	SLEEVE I.D.
	1.9997	2.0000	BEARING O.D.
	1.0000	1.0003	SHAFT DIA.
	.9997	1.0000	BEARING I.D.
	.3120	.3125	COVER HOLE
	.3140	.3142	METERING PIN DIA.
	.3147	.3150	COLLAR I.D.
	3.003	3.004	SLEEVE LENGTH
	2.9995	3.0000	ROTOR LENGTH

LET.	MIN.-MAX. WHEN NEW		PART FIT
	B-3, B-7, & B-12	B-4 & B-8	
	.1875	.188	ROTOR SLOT
	.1965	.1975	BLADE THICKNESS
	.186	.188	BLADE WIDTH
	.307	.309	SLEEVE BORE
	.309	.311	SLEEVE I.D.
	.312	.315	BEARING O.D.

LET.	MIN.-MAX. WHEN NEW		PART FIT
	B-3, B-7, & B-12	B-4 & B-8	
	.1875	.188	ROTOR SLOT
	.1965	.1975	BLADE THICKNESS
	.186	.188	BLADE WIDTH
	.307	.309	SLEEVE BORE
	.309	.311	SLEEVE I.D.
	.312	.315	BEARING O.D.

* USE GASKETS AS REQUIRED FOR PROPER CLEARANCE AT (G) & (H)

PUMP ENGINEERING SERVICE CORP.

that the anchor pin hole corresponds with the hole in the body. Insert the anchor pin and peen over the edge of the hole to lock the pin in place.

c. Metering Pin. - Insert the metering pin in the cover carefully to prevent tilting which would cause misalignment with the collar.

d. Cover. - When mounting the cover assembly on the pump, take care that the pin does not wedge in the collar. Rotate the cover from side to side as the metering pin engages the collar until the dowel pin in the body engages the locating hole in the cover.

e. Coupling Assembly. - If not already accomplished, brass retainers in coupling assembly Part

No. 194-26, will be removed and replaced with steel liner, Part No. 194-15 (Change "F"). Brass retainers removed will be disposed of locally. All Pesco type B-2A pumps, No. 194* procured prior to those on Air Corps Order No. 36-2649-P, are affected by this change.

f. Assembly Test. - Test the pump for freedom of operation by turning the coupling with the fingers. If the assembly is tight, bump the entire unit sharply but carefully on a wooden bench or block to free the parts. Also wash out the pump with gasoline to remove any particles of foreign matter. Disassemble the pump, if necessary, to recheck clearances and eliminate tight spots. When the pump turns freely after reassembly, proceed with the final test outlined in Section IX.

SECTION IX

FINAL TEST

1. Equipment.

a. Drive. - A test stand in accordance with USAF Specification 50225, or equal, should be utilized for testing vacuum pumps after overhaul. Test Stand Assemblies, stock Nos. 7800-737630 or 7800-737650, have been furnished all activities authorized to overhaul vacuum pumps.

b. Air and Oil Flow Measurement. - Adequate provisions are provided on the test stands for air and oil flow measurement. Operational instructions for this measurement are in T. O. No. 05-95A-13 or 05-1-42.

c. Installation. - See T. O. No. 05-95A-13 or 05-1-42.

2. Test.

During all of the following runs the oil pressure at the vacuum pump should be maintained at 50 pounds per square inch.

a. Capacity Test. - (1) First run in the pump for one hour at the R. P. M. listed below with the inlet and outlet control valves wide open. R. P. M. must be maintained within $\pm 5\%$ of that listed below and the capacity should be corrected on the basis of direct proportion to R. P. M. (See Capacity Chart.)

(2) (Deleted in revision dated 27 May 1948.)

(3) Measure the capacity again at the conditions

specified in the foregoing list. The capacity as measured during this last run should not be less than 95% of the minimum capacities listed.

b. (Deleted in revision dated 27 May 1948.)

c. Temperature Rise and Oil Flow Test. - Run the pump for an additional hour at the speed as listed in the following table and with the inlet and outlet controls wide open. At the end of the "Run In," set the suction to 6 In. Hg and the outlet pressure to the value as given in the following table. After sufficient time for the outlet temperature to reach its maximum value, read the inlet and outlet temperatures and measure the oil flow. The difference in the two temperatures or the temperature rise should not exceed the maximum permissible temperature rise as listed. In addition the oil flow should be within the range as listed. (See Temperature Rise Chart.)

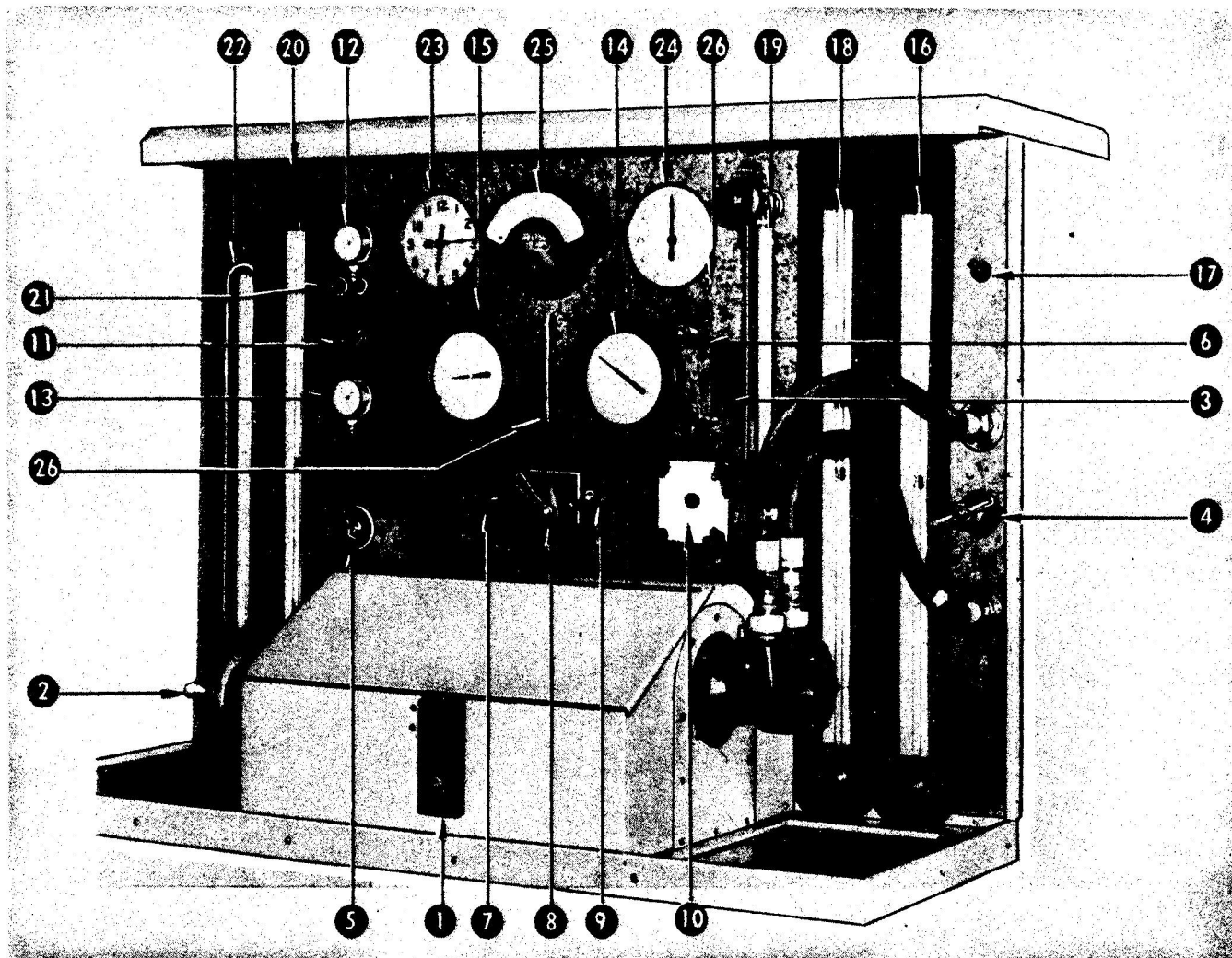
d. Safety Valve Test. - Install the oil separator in the outlet line from the vacuum pump and install the safety valve after the oil separator. Measure the pressure between the oil separator and the safety valve. Operate the vacuum pump at 3750 R. P. M. and 4 In. Hg suction; then increase the pressure until the safety valve opens. Relieve the pressure and note whether the safety valve closes. Repeat a second and third time. The pressure at which the valve opens should not exceed 24 In. Hg and the pressure maintained after opening shall be between 15 and 19 In. Hg.

SEAL LEAKAGE CHART						
Pump Series	RPM	Inlet Suction In. Hg.	Outlet Suction In. Hg.	Oil Pressure PSI	Seal Leakage CC/HR	DPH Max.
3P-194	3750	8.0	3.35	50	10	240
3P-207	3750	8.7	5.5	50	10	240
3P-211	3750	7.2	19.3	50	10	240

*CAPACITY TEST CHART				
Type	Speed R.P.M.	Suction In. Hg	Pressure In. Hg	Rated Capacity C.F.M.
B-1, B-1A	1000	4	1	4.2
B-2, B-2A, B-6, B-11	1500	4.2	2.0	4.5 - 4.9
B-3, B-7, B-12	1500	4.4	1.8	7.9 - 8.7
B-3, B-7, B-12	2250	4.5	17.1	9.8 - 11.0
B-4, B-8	2250	4.1	17.5	17.0 - 19.0

*TEMPERATURE RISE AND OIL FLOW TEST					
Type	R.P.M.	Inlet Suction	Outlet Press.	Max Permissible Temp. Rise	Oil Flow
B-1, B-1A	2500	6" Hg	1" Hg	82°C. or 180°F.	.07 to .22 lb/hr or 40 to 120 cu. cm/hr
B-2, B-2A B-6, B-11	3750	6.85" Hg	3.4" Hg	83°C. or 181°F.	.07 to .22 lb/hr or 40 to 120 cu. cm/hr
B-3, B-17 B-12, B-13	3750	6.4" Hg	18.5" Hg	153°C. or 307°F.	.16 to .37 lb/hr or 85 to 200 cu. cm/hr
B-4, B-8	3750	6.6" Hg	17.5" Hg	143°C. or 289°F.	.15 to .37 lb/hr or 80 to 200 cu. cm/hr

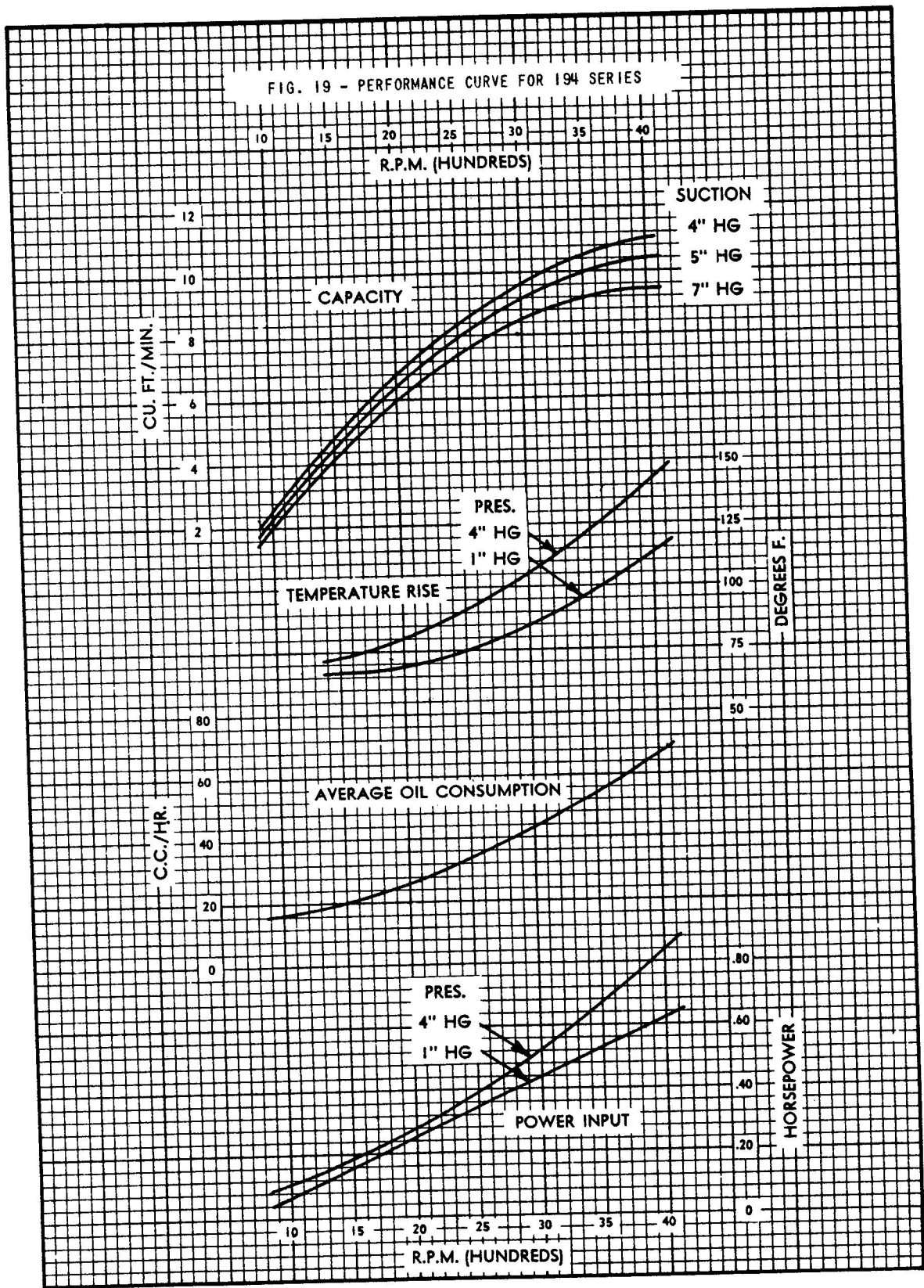
*All suction and pressures shall be measured as closely to the pump ports as possible.

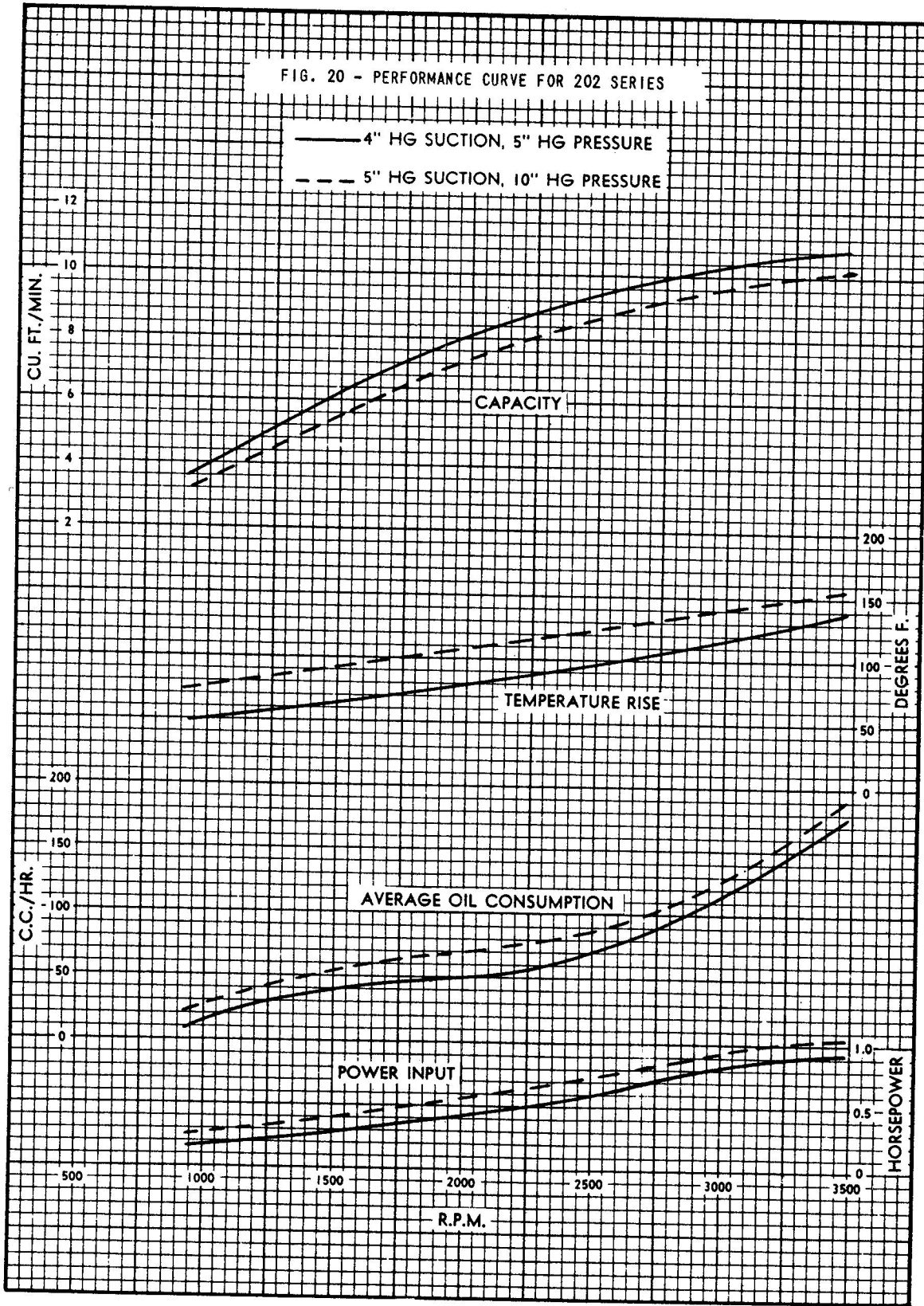


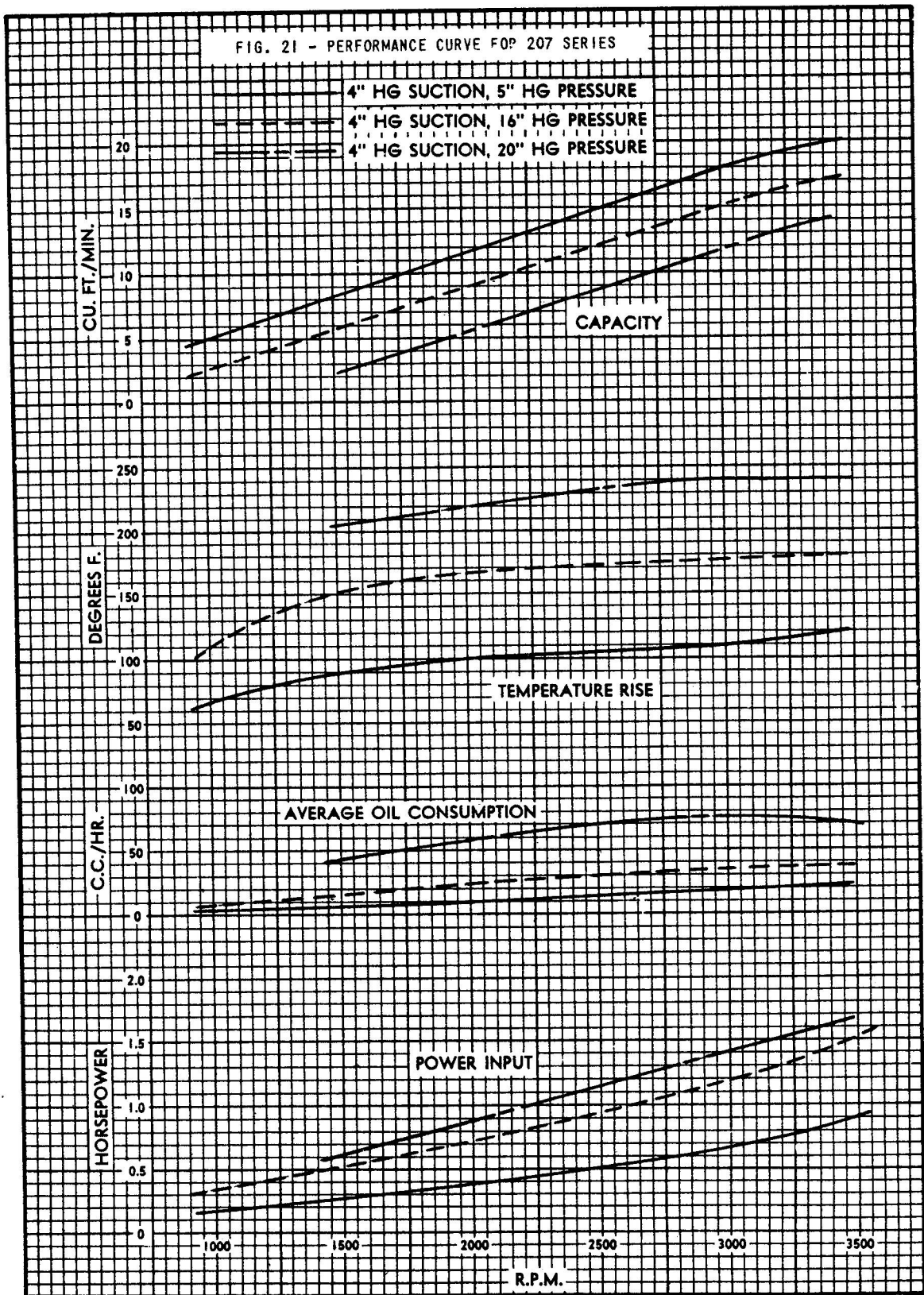
- | | |
|--------------------------------------|--------------------------------------|
| 1. Pushbutton station | 14. Intake temperature gage |
| 2. Varidrive speed-control wheel | 15. Discharge temperature gage |
| 3. Light switch | 16. Suction manometer |
| 4. Suction throttling valve | 17. Suction manometer vent cock |
| 5. Pressure throttling valve | 18. Flow-manometer |
| 6. Flow manometer shut-off valve | 19. Oil-consumption gage |
| 7. Oil-consumption gage filler valve | 20. Pressure manometer |
| 8. Selector valve | 21. Pressure manometer vent cock |
| 9. Pump oil-supply control valve | 22. Flowmeter |
| 10. Orifice plate | 23. Time-of-day clock |
| 11. Air pressure regulator | 24. Timer |
| 12. Shop-air-line pressure gage | 25. Tachometer indicator (voltmeter) |
| 13. Regulated-pressure gage | 26. Timer switch |

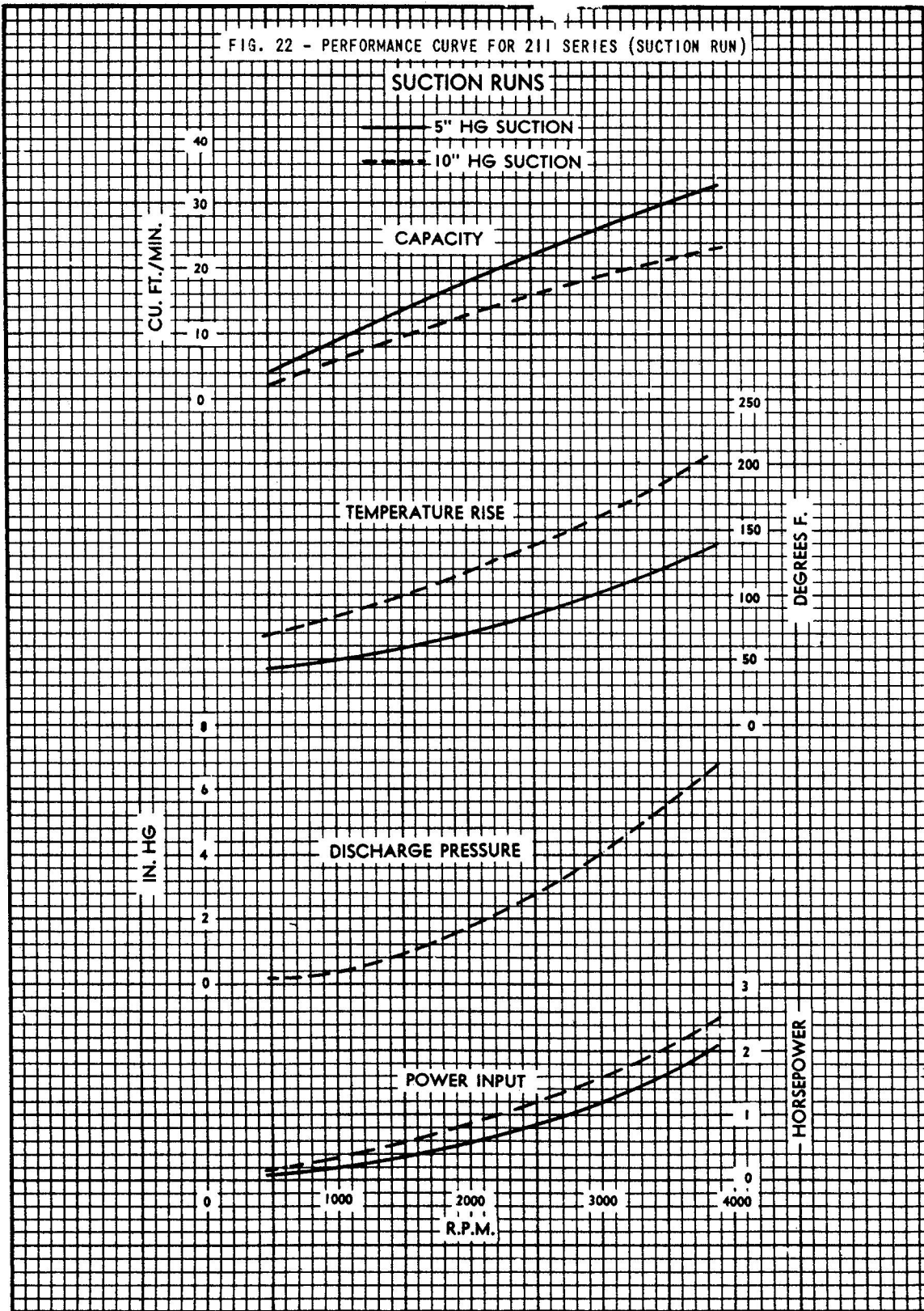
Figure 16A - Instrument Panel

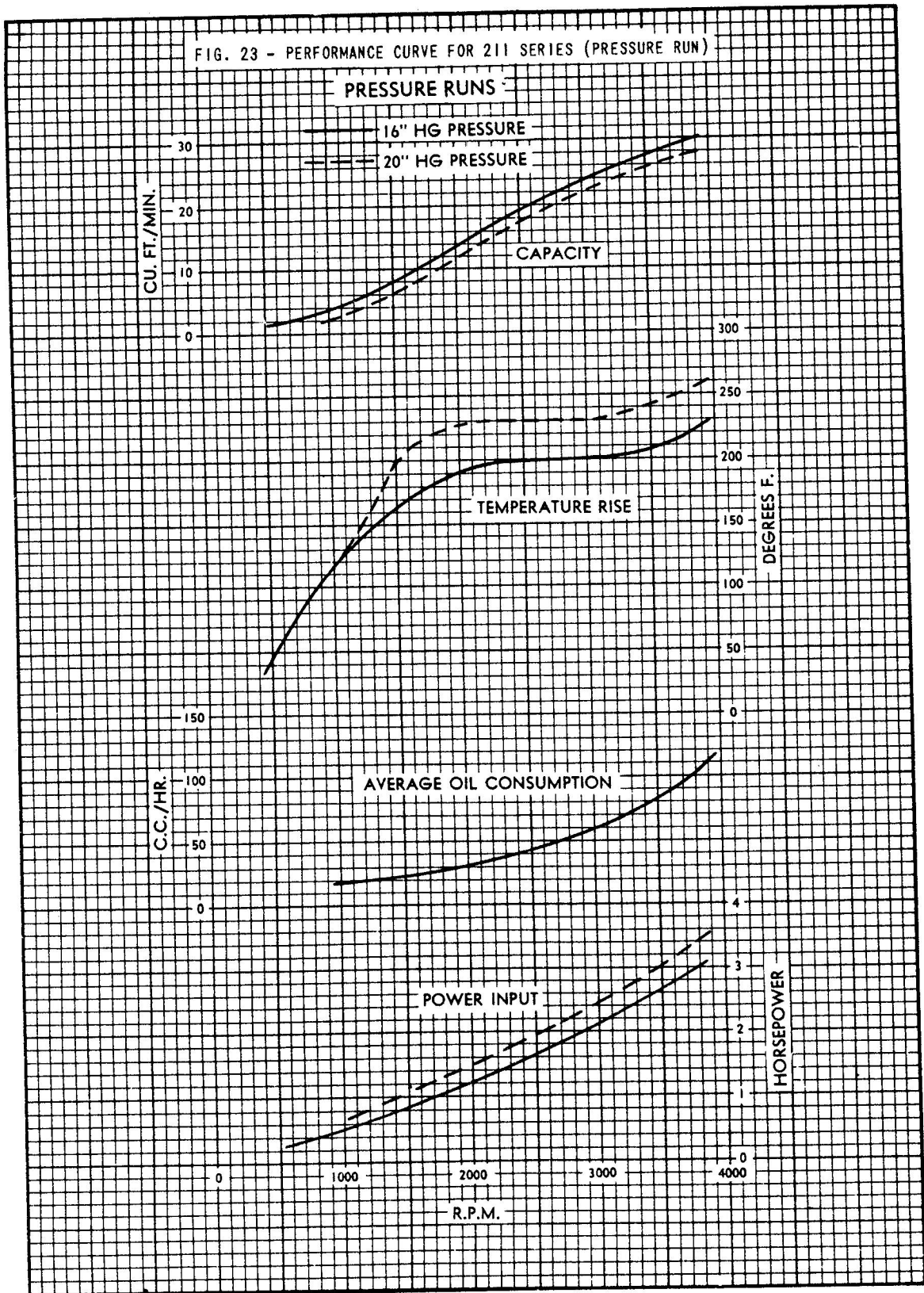












e. Leakage Test. - Fabricate an air tight box large enough to hold the safety valve, in this box place three openings, one for connecting the safety valve to the pump, one for a line from the safety valve to the manually controlled pressure regulating valve and one for a line to a calibrated bell-jar. After obtaining such a box, it is necessary to place the safety valve in the air tight box and install the box in the outlet line between the pump and the aforementioned pressure regulating valve. Run a line from the third connection on the box so that the open end of the line will be under the calibrated bell-jar which has been filled with water and inverted in a pan of water. With the pump running at 2250 R.P.M. and with as little inlet restriction as possible increase the outlet pressure sufficiently to open the safety valve. Repeat until the valve has been opened three times. Set the outlet pressure to 18 In. Hg and measure the leakage which will be shown by the difference in water level in the bell-jar. The leakage should not exceed .1 C.F.M. (.1 cubic foot per minute).

3. Remedial Action.

a. Pump Capacity. - Should the pump fail to provide the capacity specified in paragraph 2 a. (1) above, disassemble the pump and recheck clearances. Substitute new blades, if necessary, to reduce clearances in the rotor slots. End clearance for the rotor and blades can be reduced by using thinner cover gaskets. If the pump has internal venting, make sure that the special hex. headed plugs next to the mounting flange are properly located.

b. Air Temperature Rise and Oil Consumption. - In event of excessive air temperature rise, check the oil consumption to make sure that the pump is properly lubricated. If oil consumption is low, probe the oil passage with a wire and make sure it is not blocked or restricted with foreign matter. If oil consumption is satisfactory, disassemble pump and check rotor and blade end clearances. Check blade dimensions. If rotor and blade end clearances and blade dimensions are found to be satisfactory, install a new body liner. If oil consumption is excessive, check the clearance between the metering pin and collar and replace either or both parts. Also make sure that the metering pin fits tightly in the cover. If there is evidence of leakage around the oil seal sleeve in the neck of the housing, remove the sleeve, clean it thoroughly, coat it lightly with Copalite Liquid and reassemble it in the pump body.

c. Relief Valve. - If the relief valve tends to leak or fails to regulate properly, disassemble it and inspect the adjusting mechanism, the valve seat and the valve disc. Replace any parts that may be damaged or worn excessively. Slight wear on the valve disc or valve seat may be corrected with a flat oilstone. Refer to Section V, paragraph 1 d. (2).

d. Safety Valve. - If the safety valve leaks excessively or fails to function as specified in paragraph 2 d., disassemble the valve and inspect and repair the disc and valve seat. Also check the spring tension. Refer to Section VII, paragraph 2.

TROUBLES AND REMEDIES

<u>Trouble</u>	<u>Possible Cause</u>	<u>Remedy</u>
Excessive oil in discharge	Excessive oil flow to pump or clogged separator	Check venting plugs to make sure they are installed properly and that pressure plug holes are not plugged. Remove separator drain fittings and clean. Check engine drive to ensure that engine drive seal is not leaking excessively.
High Suction	Suction relief valve screen clogged	Remove and clean suction
Low Suction	1. Suction relief valve leaks 2. Pump failure	1. See paragraph 3.c. Page 49 2. Remove pump and replace
Low Pressure	1. Safety valve leaks 2. Pump failure	1. See paragraph 3.c. Page 49 2. Remove pump and replace

PART LIST



PART LIST
TABLE OF CONTENTS

Subject	Model No.*	Page
Vacuum Pump Assembly	3P-177 (177)	39
Vacuum Pump Assembly	3P-190 (190)	39
Parts Reference Drawing	3P-177 (177)	40
Parts Reference Drawing	3P-190 (190)	41
Vacuum Pump Assembly	3P-172 (172)	43
Vacuum Pump Assembly	3P-194-F (194-F)	43
Parts Reference Drawing	3P-172 (172)	44
Parts Reference Drawing	3P-194-F (194-F)	45
Vacuum Pump Assembly	3P-194 (194)	47
Vacuum Pump Assembly	3P-194-E (194-E)	47
Parts Reference Drawing	3P-194 (194)	48
Parts Reference Drawing	3P-194-E (194-E)	49
Vacuum Pump Assembly	3P-194-D (194-D)	51
Vacuum Pump Assembly	3P-211-J (211-J)	51
Parts Reference Drawing	3P-194-D (194-D)	52
Parts Reference Drawing	3P-211-J (211-J)	53
Vacuum Pump Assembly	3P-202 (202)	55
Vacuum Pump Assembly	3P-202-E (202-E)	55
Vacuum Pump Assembly	3P-202-J (202-J)	57
Parts Reference Drawing	3P-202 (202)	58
Parts Reference Drawing	3P-202-E (202-E)	59
Parts Reference Drawing	3P-202-J (202-J)	60
Vacuum Pump Assembly	3P-207-D (207-D)	61
Vacuum Pump Assembly	3P-207-J (207-J)	61
Vacuum Pump Assembly	3P-207-B (207-B)	63
Parts Reference Drawing	3P-207-D (207-D)	64
Parts Reference Drawing	3P-207-J (207-J)	65
Parts Reference Drawing	3P-207-B (207-B)	66
Vacuum Pump Assembly	3P-207-JA (207-JA)	67
Vacuum Pump Assembly	3P-625 (207-LA)	67
Parts Reference Drawing	3P-207-JA (207-JA)	68
Parts Reference Drawing	3P-625 (207-LA)	69
Vacuum Pump Assembly	3P-207-K (207-K)	71
Parts Reference Drawing	3P-207-K (207-K)	72
Vacuum Pump Assembly	3P-211 (211)	73
Vacuum Pump Assembly	3P-211-F (211-F)	73
Parts Reference Drawing	3P-211 (211)	74
Parts Reference Drawing	3P-211-F (211-F)	75

* Numbers in parentheses are the old model numbers.

EO 15-100BA-2

PART LIST
TABLE OF CONTENTS

Subject	Model No.*	Page No.
Safety Valve Assembly	3V-217 (217)	77
Safety Valve Assembly	3V-217-G (217-G)	77
Parts Reference Drawing	3V-217 (217)	78
Parts Reference Drawing	3V-217-G (217-G)	79
Safety Valve Assembly	3V-217-H (217-H)	81
Safety Valve Assembly	3V-217-GA (217-GA)	81
Parts Reference Drawing	3V-217-H (217-H)	82
Parts Reference Drawing	3V-217-GA (217-GA)	83
Oil Separator Assembly	3S-647-A (218-SB)	85
Oil Separator Assembly	3S-218 (218)	85
Parts Reference Drawing	3S-647-A (218-SB)	86
Parts Reference Drawing	3S-218 (218)	87
Oil Separator Assembly	3S-218-E (218-E)	89
Oil Separator Assembly	3S-218-F (218-F)	89
Parts Reference Drawing	3S-218-E (218-E)	90
Parts Reference Drawing	3S-218-F (218-F)	91
Oil Separator Assembly	3S-218-R (218-R)	93
Oil Separator Assembly	3S-218-S (218-S)	93
Parts Reference Drawing	3S-218-R (218-R)	94
Parts Reference Drawing	3S-218-S (218-S)	95
Oil Separator Assembly	3S-648 (218-T)	97
Oil Separator Assembly	3S-649 (218-Y)	97
Parts Reference Drawing	3S-648 (218-T)	98
Parts Reference Drawing	3S-649 (218-Y)	99
Relief Valve Assembly	3V-195 (195)	101
Relief Valve Assembly	3V-215 (215)	101
Parts Reference Drawing	3V-195 (195)	102
Parts Reference Drawing	3V-215 (215)	103
Parts Reference Drawing	3V-215-G (215-G)	104
Relief Valve Assembly	3V-215-B (215-B)	105
Relief Valve Assembly	3V-215-C (215-C)	105
Relief Valve Assembly	3V-215-G (215-G)	105
Parts Reference Drawing	3V-215-B (215-B)	106
Parts Reference Drawing	3V-215-C (215-C)	107
Relief Valve Assembly	3V-216 (216)	109
Relief Valve Assembly	3V-216-B (216-B)	109
Parts Reference Drawing	3V-216 (216)	110
Parts Reference Drawing	3V-216-B (216-B)	111

* Numbers in parentheses are the old model numbers.

ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-177
Old Model 177

Part No.	Part Name	Qty. Req.
177	Pump Assembly Vacuum	1
177	Body	1
177-15	Sleeve	1
172-12	Anchor Pin	1
177-4	Rotor	1
177-23	Ball Bearing	1
177-9	Coupling	1
177-6	Pin	1
177-3	Blade	4
177-5	Center Pin	1
177-2	Cover	1
177-38	Plug Assembly	1
177-13	Plug	1
177-21	Screw	1
177-19	Cotter Pin	1
177-21	Ball Bearing	1
172-18	Washer	6
172-17	Screen	6
172-24	Dowel	1
177-27	Safety Wire	3
177-20	Gasket	1
177-7	Adaptor	1
177-16	Studs	4
177-17	Nuts	4
177-28	Gasket	2
R-400-20	Wire	2
177-8	Female Coupling	1
172-32	Name Plate	1
172-30	Pipe Plug	2
174-28	Drive Screw	2
M-400-18	Pipe Plug	1

CONTRACT NO.

34-4083-P

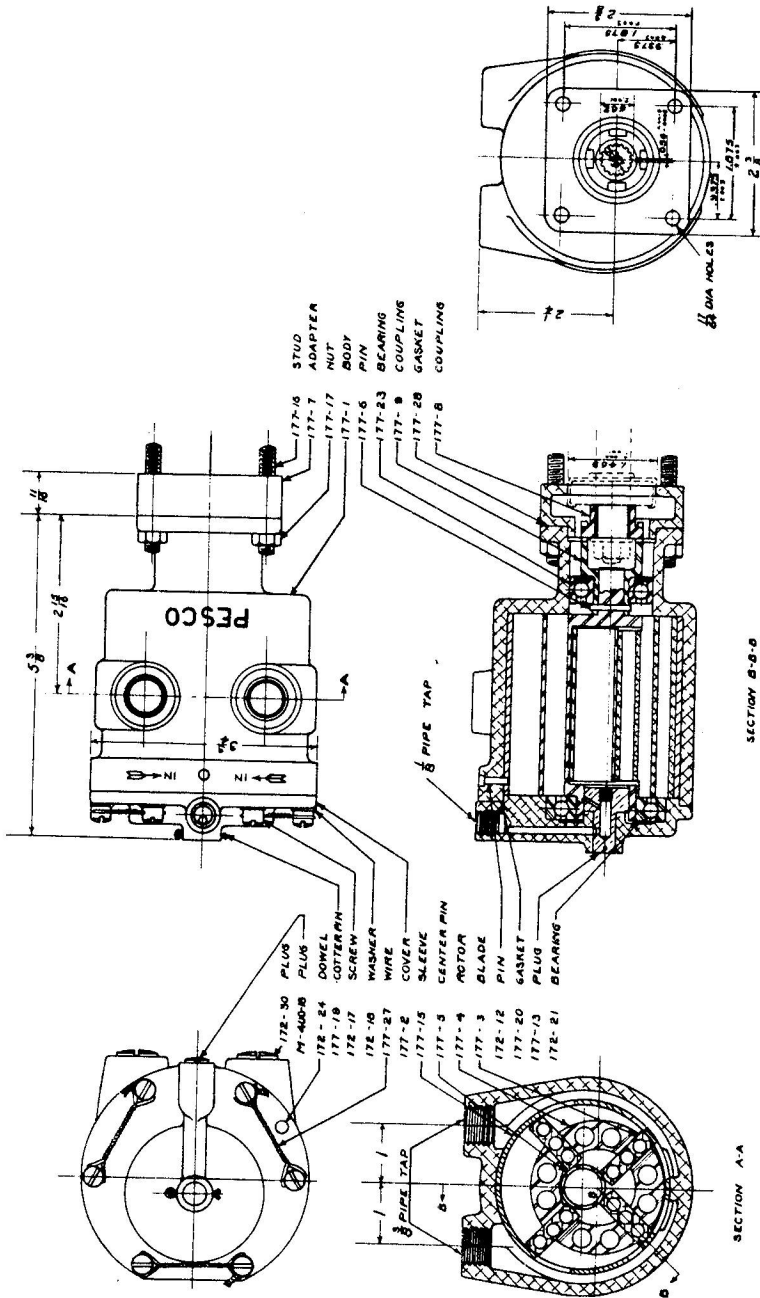
Vacuum Pump Assembly
Pesco Model 3P-190
Old Model 190

Part No.	Part Name	Qty. Req.
190	Vacuum Pump Assembly	1
190-1	Body	1
190-19	Oil Seal Sleeve Assem.	1
190-4	Oil Seal Sleeve	1
190-18	Oil Seal Ring	1
177-15	Sleeve	1
172-12	Anchor Pin	1
190-3	Rotor	1
177-23	Ball Bearing	1
190-2	Cover	1
190-14	Oil Metering Pin	1
190-15	Metering Collar	1
190-13	Anchor Pin	1
172-21	Ball Bearings	1
177-5	Center Pin	1
177-3	Blade	4
190-16	Gasket	3
190-16A	Gasket	1
177-19	Cotter Pin	1
172-18	Washer	6
172-17	Screw	6
190-20	Coupling Assembly	1
190-7	Flexible Coupling	1
190-8	Flexible Coupling	1
190-9	Spring Seat	1
190-10	Spring (Coil)	1
190-11	Spring (Leaf)	20
190-12	Coupling Retainer	1
172-24	Dowel	1
190-6	Drive Nut	1
190-5	Thrust Nut	1
190-17	Thrust Collar	1
194-20	Gasket	1
172-30	Pipe Plug - 3/8	2
M-400-18	Pipe Plug - 1/8	3
172-32	Name Plate	1
174-28	Drive Screw	2
177-27	Safety Wire	3

CONTRACT NO.

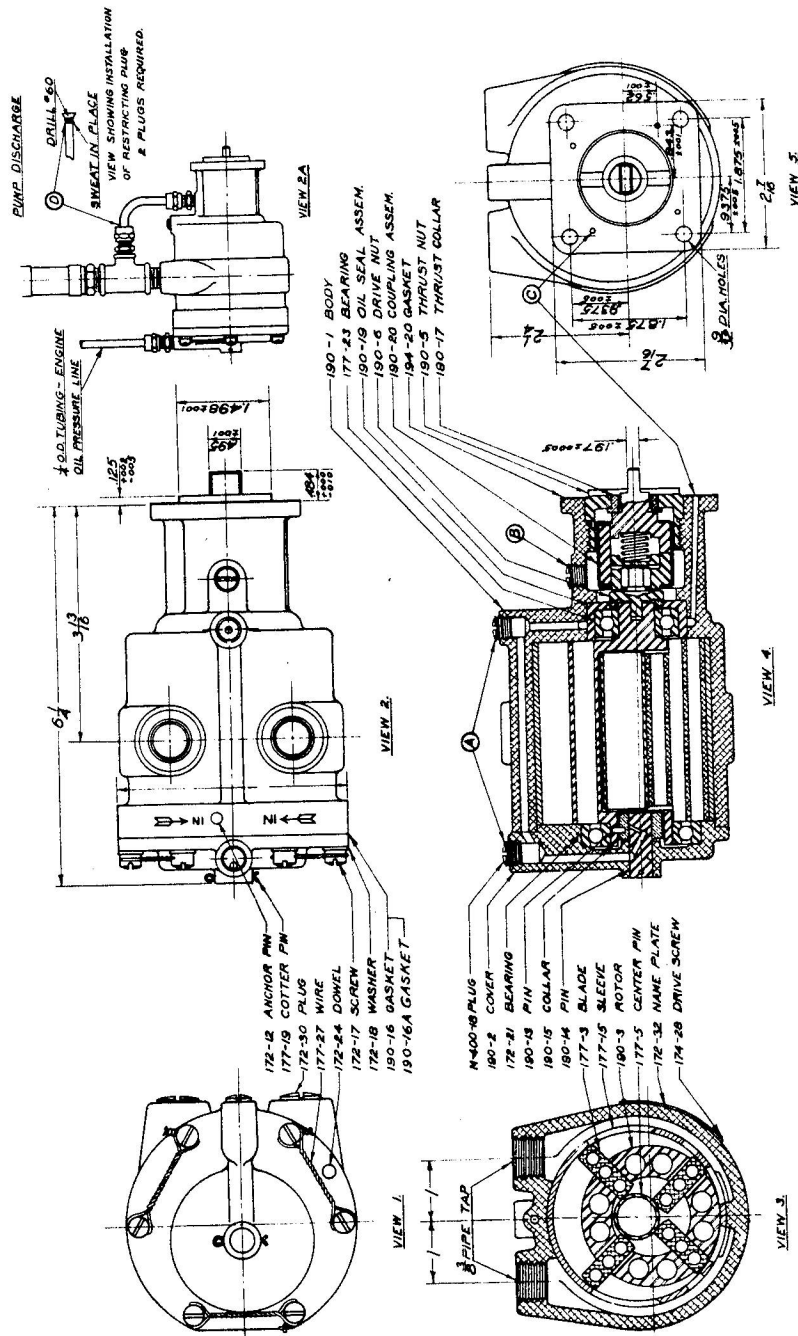
34-4083-P

PARTS REFERENCE DRAWING



VACUUM PUMP ASSEMBLY - 3P-177 (177)

PARTS REFERENCE DRAWING





ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-172
Old Model 172

Vacuum Pump Assembly
Pesco Model 3P-194-F
Old Model 194-F

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
NOTE - This model has been rescinded.					

CONTRACT NO.

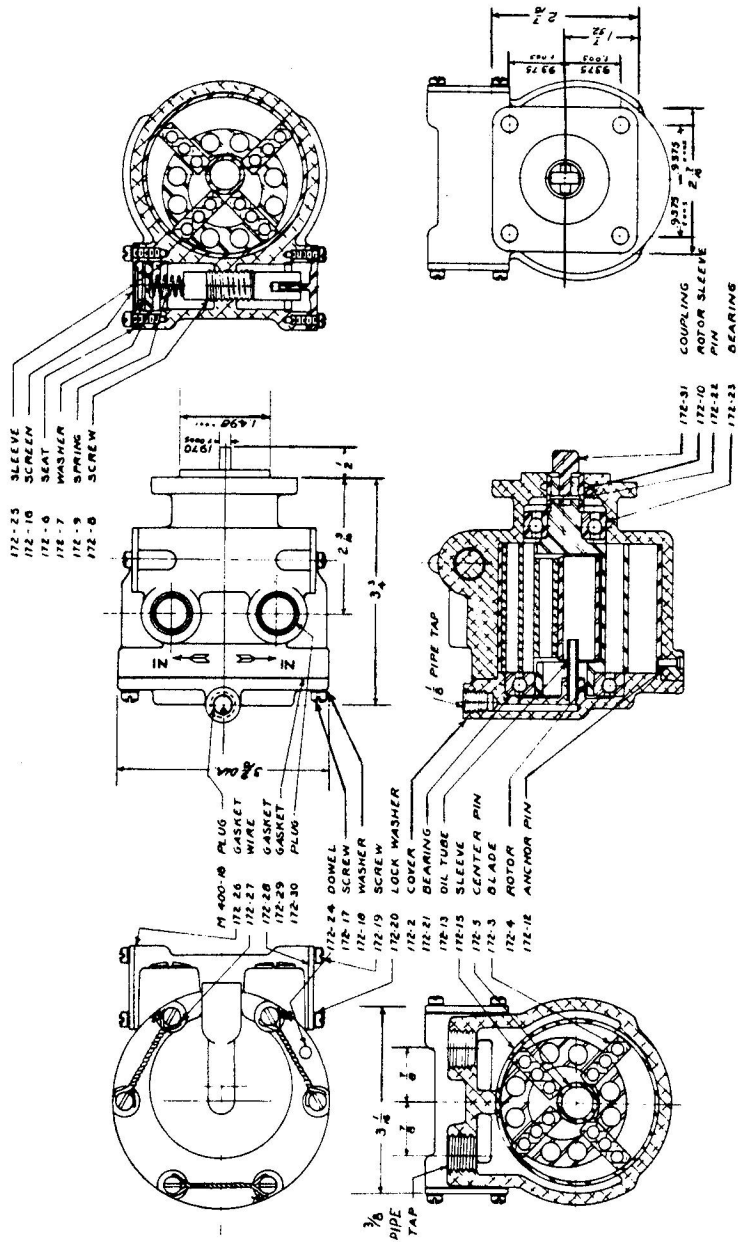
34-2126-P	34-3320-P
34-2593-P	34-4212-P

194-F	Vacuum Pump Assembly Comp.	1
194-1	Body	1
194-10	Sleeve - Oil Seal	1
194-4	Sleeve	1
172-12	Anchor Pin	1
194-27A	Rotor	1
177-23B	Bearing - Ball	1
207-16C	Coupling Assembly	1
207-23A	Coupling	1
207-18A	Thrust Plate	1
207-19C	Spring	1
207-20A	Sleeve	1
207-21A	Retainer	1
207-22	Snap Ring	1
172-3A	Blade	4
172-5	Pin - Center	1
190-15	Collar - Metering	1
190-13	Pin - Collar Anchor	1
172-21	Bearing - Ball S-10-R Norma Hoffman	1
194-2	Cover	1
190-14	Pin - Metering	1
177-19	Pin - Cotter	1
172-24	Dowel - Cover	1
194-19	Gasket - .003 thick	3
194-19A	Gasket - .001 thick	1
194-22	Washer	6
194-21	Screw - Fill. Hd.	6
M-400-18	Plug - 1/8 Pipe	1
172-30	Plug - 3/8 Pipe	2
194-20	Gasket - Flange	1

CONTRACT NO.

15715	27043
15807	33477
21930	

PARTS REFERENCE DRAWING



VACUUM PUMP ASSEMBLY - 3P-172 (172)



ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-194
Old Model 194

Vacuum Pump Assembly
Pesco Model 3P-194-E
Old Model 194-E

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
194	Vacuum Pump Assem. Comp.	1	194-E	Vacuum Pump Assembly	1
194-1	Body	1	194-1	Body	1
194-10	Oil Seal Sleeve	1	194-4	Sleeve - Body	1
194-4	Sleeve - Body	1	194-10	Sleeve - Oil Seal	1
172-12	Anchor Pin	1	172-12	Anchor Pin	1
194-27	Rotor	1	194-27A	Rotor	1
177-23B	Ball Bearing	1	177-23B	Ball Bearing	1
194-29	Coupling Assembly	1	194-38	Coupling Assembly	1
194-28	Coupling	1	207-17B	Coupling	1
202-5	Retainer	1	207-18A	Thrust Plate	1
202-7	Spring	9	207-19C	Spring	1
202-6	Snap Ring	1	207-20A	Sleeve	1
172-3A	Blade	4	207-21A	Retainer	1
172-5	Center Pin	1	207-22	Snap Ring	1
190-15	Metering Collar	1	172-3A	Blade	4
190-13	Pin - Collar Anchor	1	172-5	Center Pin	1
172-21	Ball Bearing	1	190-15	Metering Collar	1
194-2	Cover	1	190-13	Pin - Collar Anchor	1
190-14	Metering Pin	1	172-21	Ball Bearing	1
177-19	Cotter Pin	1	194-2	Cover	1
172-24	Dowel - Cover	1	190-14	Metering Pin	1
194-19	Gasket - Cover .003" thick	3	177-19	Cotter Pin	1
194-19A	Gasket - Cover .003" thick	1	172-24	Dowel - Cover	1
194-22	Washer	6	194-19	Gasket - .003" thick	3
194-21	Screw - Fill. Hd.	6	194-19A	Gasket - .001" thick	1
M-400-18	Pipe Plug - 1/8	1	194-21	Screw - Fill. Hd.	6
172-30	Pipe Plug - 3/8	2	194-22	Washer	6
207-14	Name Plate	1	172-30	Shipping Plug - 3/8	2
M-400-22	Drive Screw	4	M-400-18A	Pipe Plug - 1/8	2
194-20	Gasket - Flange	1	M-400-18	Pipe Plug - 1/8	1
172-27	Safety Wire	3	M-400-22	Drive Screw	4
M-400-18A	Plug - 1/8 Pipe	2	194-20	Gasket - Flange	1
172-27A	Safety Wire	2	297-35B	Lockwire	3
			195-10	Lockwire	2

CONTRACT NO.

35-4699-P DAW535-ac-259
10357 15715
39-2809-P

CONTRACT NO.

42-2914-P 43-5683-P
27043



ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-194-D
Old Model 194-D

Vacuum Pump Assembly
Pesco Model 3P-211-J
Old Model 211-J

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
194-D	Vacuum Pump Assembly	1	211-J	Vacuum Pump Assembly	1
194-1	Body	1	211-42B	Body Assembly	1
194-10	Oil Seal Sleeve	1	211-1C	Body	1
194-4	Sleeve - Body	1	211-6	Oil Seal Sleeve	1
172-12	Anchor Pin	1	211-3	Sleeve	1
194-27	Rotor	1	211-9	Anchor Pin	1
177-23B	Ball Bearing	1	211-4C	Rotor Assembly	1
194-29B	Coupling Assembly	1	211-5A	Insert	1
194-28C	Coupling	1	211-18B	Ball Bearing	1
202-7	Spring	9	211-11D	Coupling Assembly	1
202-5	Retainer	1	211-45	Coupling	1
202-6	Snap Ring	1	211-35	Sleeve	1
172-3A	Blade	4	211-39	Retainer	1
172-5	Center Pin	1	211-37	Spring	1
190-15	Metering Collar	1	211-40	Snap Ring	1
190-13	Pin-Collar Anchor	1	211-38	Square Pin	1
172-21	Ball Bearing	1	211-52	Plug - Square	1
194-2	Cover	1	278-45	Rivet	2
190-14	Pin - Metering	1	211-41	Snap Ring	1
177-19	Cotter Pin	1	211-7	Blade (Whole)	1
172-24	Dowel - Cover	1	211-8	Blade (Half)	2
194-19	Gasket - Cover .003" thick	3	207-8	Metering Collar	1
194-19A	Gasket - Cover .001" thick	1	211-10	Pin - Collar Anchor	1
194-22	Washer	6	211-47	Cover Assembly	1
194-21	Screw - Fill Hd.	6	211-28	Cover	1
M-400-18	Plug - 1/8 Pipe	1	211-46	Bushing	1
172-30	Plug - 3/8 Pipe	2	207-6	Metering Pin	1
207-14	Name Plate	1	177-19	Cotter Pin	1
M-400-22	Drive Screw	4	211-20	Ball Bearing	1
194-20	Gasket - Flange	1	172-24	Dowel - Cover	1
172-27	Safety Wire	3	211-15	Gasket - Cover	3
M-400-18A	Plug - 1/8 Pipe	2	211-15A	Gasket - Cover	1
172-27A	Safety Wire	2	181-22	Washer	6
			211-17	Screw - Fill. Hd.	6
			M-400-18A	Pipe Plug - 1/8 Sq. Hd.	2
			M-400-18	Pipe Plug - 1/8	1
			211-16	Pipe Plug - 3/4	2
			207-14	Name Plate	1
			174-28	Drive Screw	2
			172-27	Safety Wire	3
			172-27A	Safety Wire	4
			211-21	Gasket - Flange	1

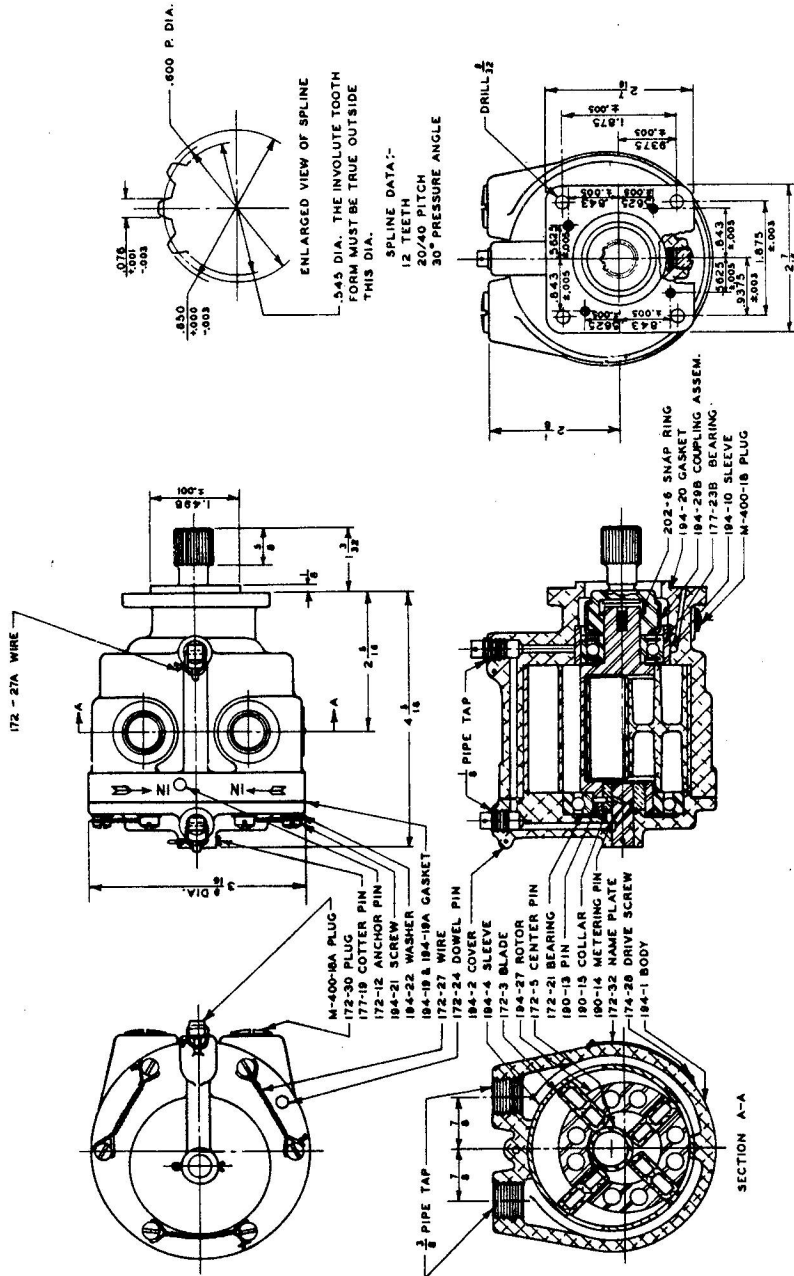
CONTRACT NO.

12573

CONTRACT NO.

12573	21930
15715	33477
15807	27043

PARTS REFERENCE DRAWING



VACUUM PUMP ASSEMBLY - 3P-194-D (194-D)



ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-202
Old Model 202

Vacuum Pump Assembly
Pesco Model 3P-202-E
Old Model 202-E

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
202	Vacuum Pump Assembly Comp.	1	202-E	Vacuum Pump Assembly	1
202-25	Body Assembly	1	202-26	Body Assembly	1
202-27	Sleeve	1	202-19	Body	1
202-1	Body	1	202-27	Sleeve	1
172-12	Anchor Pin	1	202-20	Sleeve - Oil Seal	1
177-15	Sleeve	1	177-15	Sleeve	1
202-12	Rotor	1	172-12	Anchor Pin	1
177-23B	Bearing Ball	1	202-12	Rotor	1
202-15	Coupling Assembly	1	177-23B	Bearing Ball	1
202-4	Coupling - Male	1	194-29	Coupling Assembly	1
202-7	Spring	9	194-28	Coupling - Male	1
202-5	Retainer	1	202-7	Spring	9
202-6	Snap Ring	1	202-5	Retainer	1
177-3	Blade	4	202-6	Snap Ring	1
177-5	Pin - Center	1	177-3	Blade	4
190-15	Collar - Metering	1	177-5	Pin - Center	1
190-13	Pin - Collar Anchor	1	190-15	Collar - Metering	1
172-21	Bearing - Ball	1	190-13	Pin - Collar Anchor	1
202-2	Cover	1	172-21	Bearing Ball	1
190-14	Pin - Metering	1	202-21	Cover	1
177-19	Pin - Cotter	1	202-22	Gasket - (.003 thick)	3
172-24	Dowel - Cover	1	202-22A	Gasket - (.001 thick)	1
202-8	Gasket - Cover	1	190-14	Pin - Metering	1
194-22	Washer	6	177-19	Pin Cotter	1
194-21	Screw Fill. Hd.	6	172-24	Dowel - Cover	1
M-400-18	Plug 1/8 Pipe	1	194-22	Washer	6
172-30	Plug 3/8 Pipe	2	194-21	Screw - Fill. Hd.	6
177-8	Coupling - Female	1	M-400-18	Plug 1/8 Pipe	1
172-32	Name Plate	1	172-30	Plug 3/8 Pipe	2
174-28	Drive Screw	2	172-32	Name Plate	1
172-27	Safety Wire	3	174-28	Drive Screw	2
177-28	Gasket - Flange	1	172-27	Safety Wire	3
			194-20	Gasket - Flange	1
			M-400-18A	Plug 1/8 Pipe	2
			172-27A	Wire - Safety	2

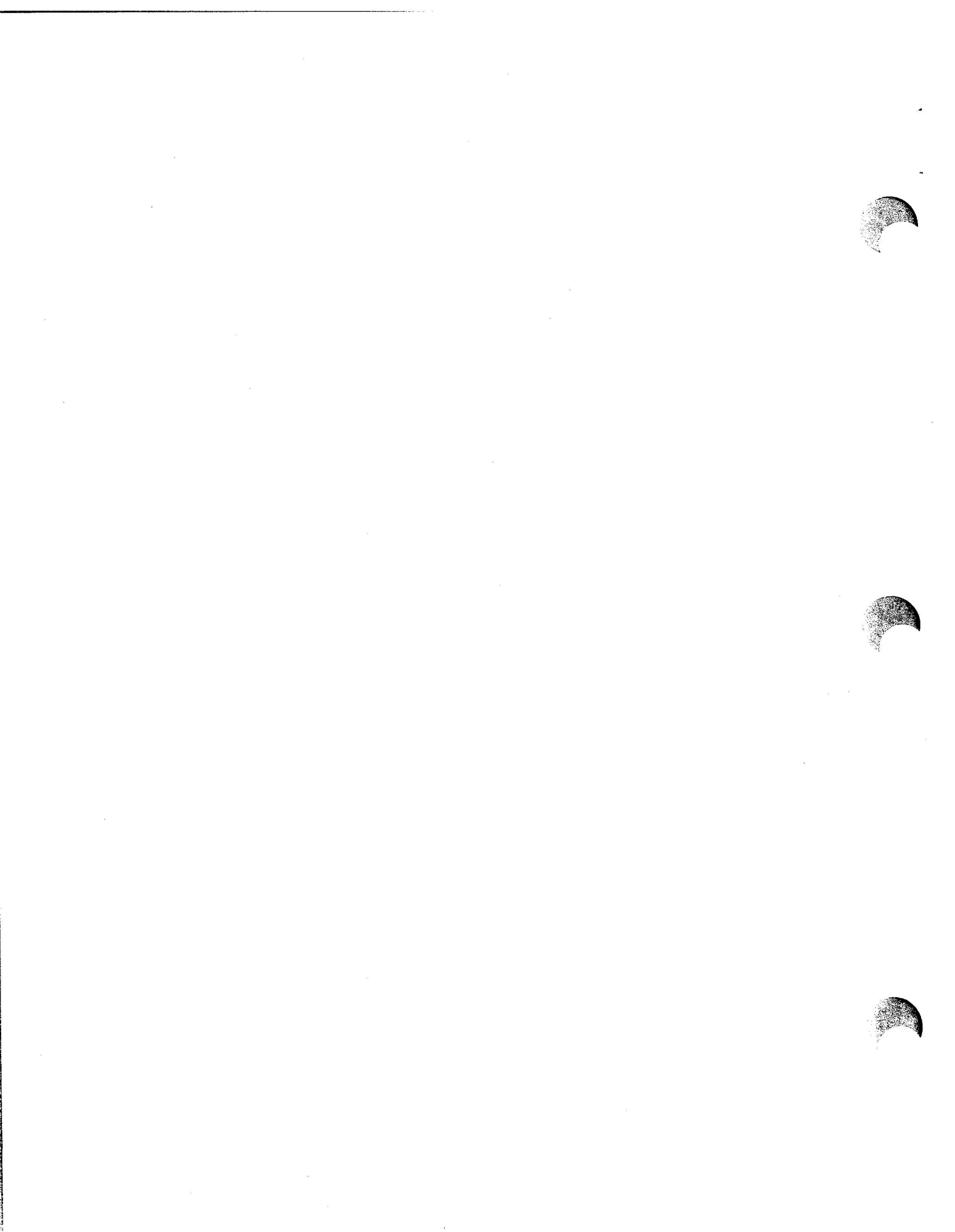
CONTRACT NO.

354788

10357

CONTRACT NO.

21057



ASSEMBLY PARTS LIST

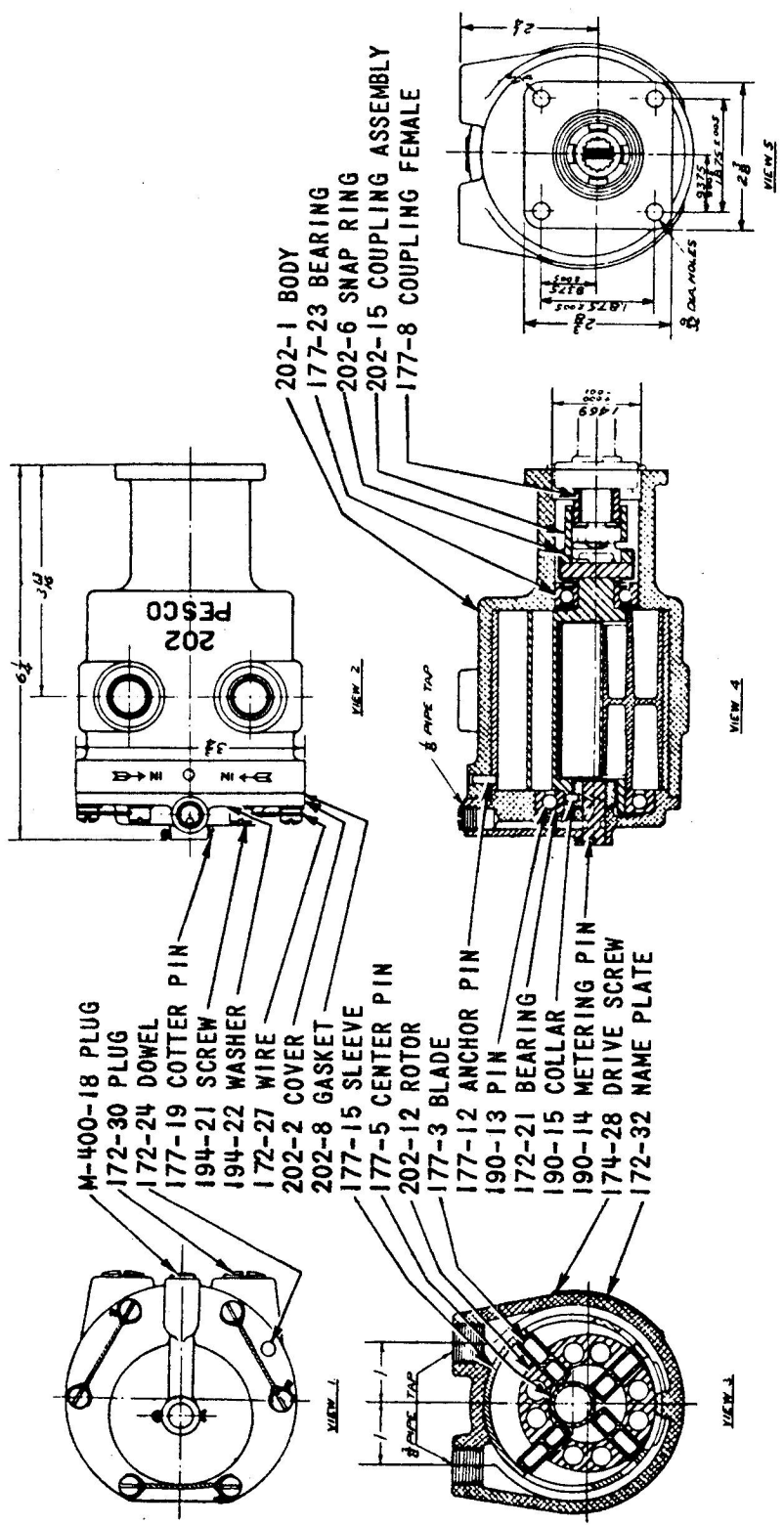
Vacuum Pumo Assembly
 Model 3P-202-J
 Old Model 202-J

Part No.	Part Name	Qty. Req.
3P-202-J	Vacuum Pump Assembly	1
202-24	Body Assembly	1
202-19A	Body	1
202-20A	Oil Sleeve	1
202-27	Sleeve	1
172-12	Anchor Pin	1
177-15	Sleeve	1
202-12	Rotor	1
177-23B	Ball Bearing	1
202-15A	Coupling Assembly	1
202-4A	Coupling - Male	1
202-7	Spring	9
202-5	Retainer	1
202-6	Snap Ring	1
177-3	Blade	4
177-5	Center Pin	1
190-15	Metering Collar	1
190-13	Pin - Collar Anchor	1
172-21	Ball Bearing	1
202-21	Cover	1
190-14	Metering Pin	1
177-19	Cotter Pin	1
172-24	Dowel - Cover	1
202-22	Gasket - Cover .003" Thick	3
202-22A	Gasket - Cover .001" Thick	1
194-22	Washer	6
194-21	Screw - Fill. Hd.	6
M-400-18A	Pipe Plug - 1/8	5
172-30	Pipe Plug - 3/8	2
172-32	Name Plate	1
174-28	Drive Screw	2
172-27	Safety Wire	3
172-27A	Safety Wire	3
202-23A	Gasket - Flange	1
202-14	Shipping Block	1
194-23	Screw - Rd. Hd.	2
194-24	Nut	2

CONTRACT NO.

43-2679-UN

PARTS REFERENCE DRAWING

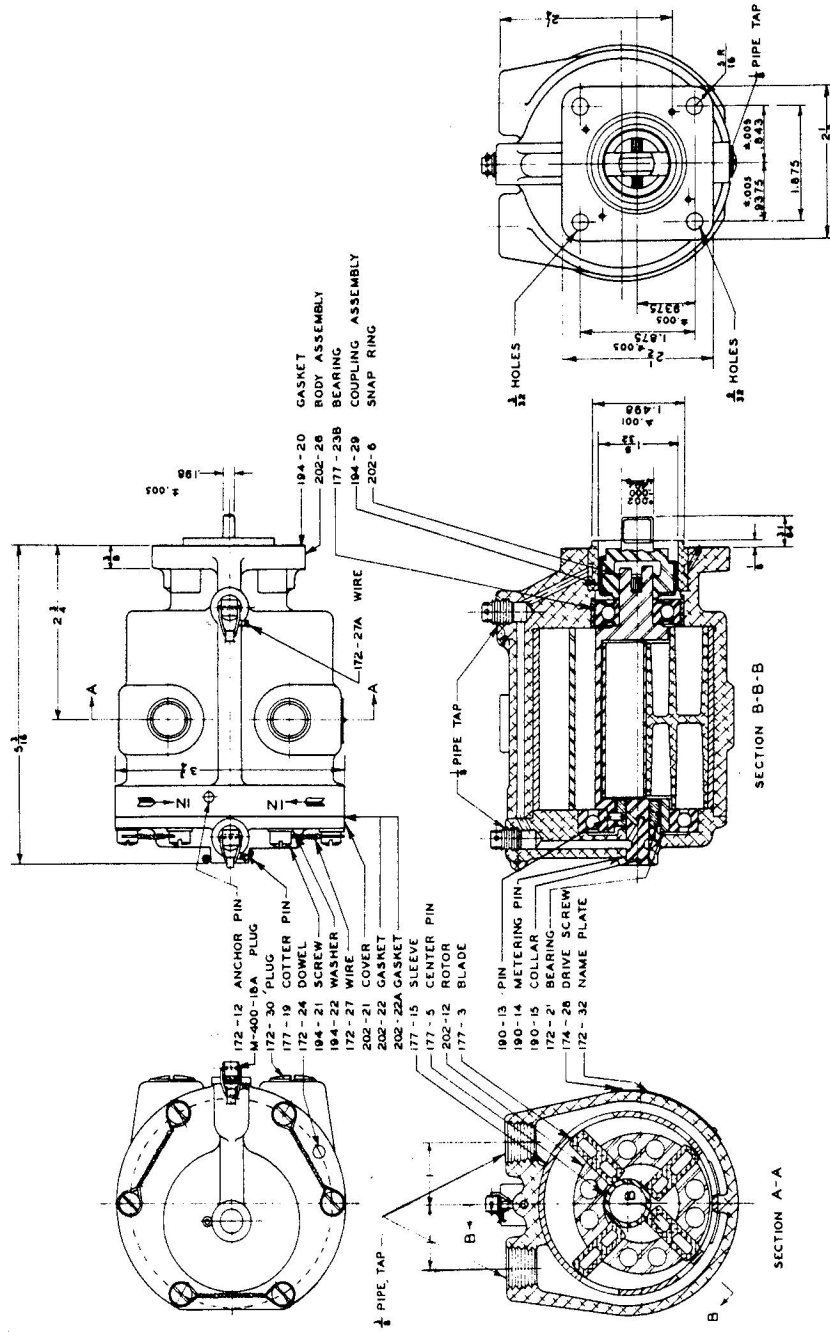


- M-400-18 PLUG
- 172-30 PLUG
- 172-24 DOWEL
- 177-19 COTTER PIN
- 194-21 SCREW
- 194-22 WASHER
- 172-27 WIRE
- 202-2 COVER
- 202-8 GASKET
- 177-15 SLEEVE
- 177-5 CENTER PIN
- 202-12 ROTOR
- 177-3 BLADE
- 177-12 ANCHOR PIN
- 190-13 PIN
- 172-21 BEARING
- 190-15 COLLAR
- 190-14 METERING PIN
- 174-28 DRIVE SCREW
- 172-32 NAME PLATE

- 202-1 BODY
- 177-23 BEARING
- 202-6 SNAP RING
- 202-15 COUPLING ASSEMBLY
- 177-8 COUPLING FEMALE

VACUUM PUMP ASSEMBLY - 3P-202 (202)

PARTS REFERENCE DRAWING



VACUUM PUMP ASSEMBLY - 3P-202-E (202-E)

ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-207-D
Old Model 207-D

Vacuum Pump Assembly
Pesco Model 3P-207-J
Old Model 207-J

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
207-D	Vacuum Pump Assembly	1	207-J	Vacuum Pump Assembly	1
207-15C	Body Assembly	1	207-15C	Body Assembly	1
207-1D	Body	1	207-1D	Body	1
207-7	Oil Seal Sleeve	1	190-21	Taper Plug	4
207-10	Sleeve	1	207-7	Oil Seal Sleeve	1
190-21	Taper Plug	4	207-10	Sleeve	1
172-12	Anchor Pin	1	172-12	Anchor Pin	1
207-3	Rotor Assembly	1	207-3	Rotor Assembly	1
207-12C	Insert	1	207-12C	Insert	1
177-23B	Ball Bearing	1	177-23B	Ball Bearing	1
194-29	Coupling Assembly	1	194-29B	Coupling Assembly	1
194-28	Coupling	1	194-28C	Coupling	1
202-5	Retainer	1	202-7	Spring	9
202-7	Spring	9	202-5	Retainer	1
202-6	Snap Ring	1	202-6	Snap Ring	1
207-4	Blade (Whole)	1	207-4	Blade (Whole)	1
207-5	Blade (Half)	2	207-5	Blade (Half)	2
207-8	Collar - Metering	1	207-8	Collar - Metering	1
207-9	Pin - Collar Anchor	1	207-9	Pin - Collar Anchor	1
207-25	Cover Assembly	1	207-25	Cover Assembly	1
207-2B	Cover	1	207-2B	Cover	1
207-24	Bushing	1	207-24	Bushing	1
207-6	Metering Pin	1	207-6	Metering Pin	1
177-19	Pin - Cotter	1	177-19	Pin - Cotter	1
172-21	Bearing Ball	1	172-21	Bearing Balls	1
172-24	Dowel - Cover	1	172-24	Dowel - Cover	1
207-13	Gasket - Cover .003" thick	3	207-13	Gasket - Cover .003" thick	3
207-13A	Gasket - Cover .001" thick	1	207-13A	Gasket - Cover .001" thick	1
194-22	Washer	6	194-22	Washer	6
194-21	Screw - Fill. Head.	4	230-34	Screw - Fill. Head	2
230-34	Screw - Fill. Head	2	194-21	Screw - Fill. Head	4
436-5	Seal Ring	1	436-5	Seal Ring	1
M-400-18	Plug 1/8 Pipe	1	M-400-18	Plug 1/8 Pipe	1
M-400-19	Plug 1/2 Pipe	2	M-400-19	Plug 1/2 Pipe	2
207-14	Name Plate	1	207-27	Name Plate - Patent	1
174-28	Drive Screw	2	M-400-22	Drive Screw	4
172-27	Safety Wire	1	172-27	Safety Wire	3
194-20	Gasket - Flange	1	194-20	Gasket Flange	1
M-400-18A	Plug - 1/8 Pipe	2	M-400-18A	Plug - 1/8 Pipe	2
172-27A	Wire Safety	2	172-27A	Safety Wire	2

CONTRACT NO.

38-5970-P
10357

41-2915-EP
15715

CONTRACT NO.

12573



ASSEMBLY PARTS LIST

Vacuum Pump Assembly
 Model 3P-207-B
 Old Model 207-B

Part No.	Part Name	Qty. Req.
3P-207B	Vacuum Pump Assembly	1
207-15A	Body Assembly	1
207-1B	Body	1
207-7	Oil Seal Sleeve	1
207-10	Sleeve	1
172-12	Anchor Pin	1
207-3	Rotor Assembly	1
207-12C	Insert	1
177-23B	Ball Bearing	1
206-19	Coupling Assembly	1
206-6	Coupling - Male	1
202-7	Spring	9
202-5	Retainer	1
202-6	Snap Ring	1
207-4	Blade (Whole)	1
207-5	Blade (Half)	2
207-8	Collar - Metering	1
207-9	Pin - Collar Anchor	1
207-25	Cover Assembly	1
207-2B	Cover	1
207-24	Bushing	1
177-19	Cotter Pin	1
172-21	Ball Bearing	1
172-24	Dowel - Cover	1
207-13	Gasket - Cover	3
207-13A	Gasket - Cover	1
194-22	Washer	6
230-34	Screw - Fill. Hd.	2
194-21	Screw - Fill. Hd.	4
436-5	Seal Ring	1
207-6	Metering Pin	1
M-400-18	Plug - 1/8 Pipe	1
M-400-19	Plug - 1/2 Pipe	2
207-14	Name Plate	1
174-28	Drive Screw	2
172-27	Safety Wire	1
211-21	Gasket - Flange	1
211-22	Shipping Block	1
211-23A	Screw - Rd. Hd.	2
194-24	Nut	2
M-400-25	Washer Steel	2
M-400-18A	Plug - 1/8 Pipe	2
172-27A	Wire - Safety	2

CONTRACT NO.

43-7706-AF

ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-207-JA
Old Model 207-JA

Vacuum Pump Assembly
Pesco Model 3P-625
Old Model 207-LA

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
207-JA	Vacuum Pump Assembly	1	207-LA	Vacuum Pump Assembly	1
207-15C	Body Assembly	1	207-15F	Body Assembly	1
207-1D	Body	1	207-1H	Body	1
190-21	Taper Plug	4	207-7	Oil Seal Sleeve	1
207-7	Oil Seal Sleeve	1	207-10C	Sleeve	1
207-10	Sleeve	1	172-12	Anchor Pin	1
172-12	Anchor Pin	1	207-37	Assembly - Rotor	1
207-3A	Rotor Assembly	1	207-3A	Rotor	1
207-12C	Insert	1	207-12C	Insert	1
177-23B	Ball Bearing	1	190-13	Pin	1
207-16D	Coupling Assembly	1	177-23B	Ball Bearing	1
207-23A	Coupling	1	207-16D	Assembly - Coupling	1
207-21A	Retainer	1	207-23A	Coupling	1
207-19B	Spring	1	207-21A	Retainer	1
207-18A	Thrust Plate	1	207-19B	Spring	1
207-20A	Sleeve	1	207-18A	Thrust Plate	1
207-22	Snap Ring	1	207-20A	Sleeve	1
207-4	Blade (Whole)	1	207-22	Snap Ring	1
207-5	Blade (Half)	2	207-4	Blade (Whole)	1
207-8	Collar - Metering	1	207-5	Blade (Half)	2
207-9	Pin - Collar Anchor	1	207-8	Metering Collar	1
207-25	Cover Assembly	1	207-9	Pin - Collar Anchor	1
207-23B	Cover	1	207-38	Assembly - Cover	1
207-24	Bushing	1	207-41	Cover	1
207-6	Metering Pin	1	207-42	Bushing	1
177-19	Cotter Pin	1	177-19	Cotter Pin	1
172-21	Ball Bearing	1	172-21	Ball Bearing	1
172-24	Dowel (Cover)	1	172-24	Dowel (Cover)	1
207-13	Gasket (Cover)	3	207-6	Metering Pin	1
207-13A	Gasket (Cover)	1	207-13	Gasket Cover	1
194-22	Washer	6	436-5	Seal Ring	1
230-34	Screw - Fill. Hd.	2	194-21	Screw - Fill. Hd.	4
194-21	Screw - Fill. Hd.	4	230-34	Screw - Fill. Hd.	2
436-5	Seal Ring	1	194-22	Washer	6
M-400-18A	Plug - 1/8 Pipe	2	211-16	Pipe Plug - 3/4	2
M-400-18	Plug - 1/8 Pipe Tap	1	M-400-18	Pipe Plug - 1/8	4
M-400-19	Plug - 1/2 Pipe Tap	2	M-400-18A	Pipe Plug - 1/8 Sq. Hd.	1
207-27	Name Plate - Patent	1	207-14	Name Plate	1
M-400-22	Drive Screw	4	M-400-22	Drive Screw	4
172-27	Safety Wire	3	211-21	Gasket - Mounting Flange	1
194-20	Gasket - Flange	1	172-27	Lock Wire	3
172-27A	Safety Wire	2	172-27A	Lock Wire	2
			207-30	Bearing Disc - Front	1
			207-40	Bearing Disc - Rear	1
			207-39	Key	1
			207-32	Spring	7
			207-36	Strainer	1
			207-35	Ring - Lock	1
			207-34	Retainer	1
			396-5	Gasket	1

CONTRACT NO.

39-6430	21930
15715	27043
15807	33477

CONTRACT NO.

42-2914-P



ASSEMBLY PARTS LIST

Vacuum Pump Assembly
 Pesco Model 3P-207-K
 Old Model 207-K

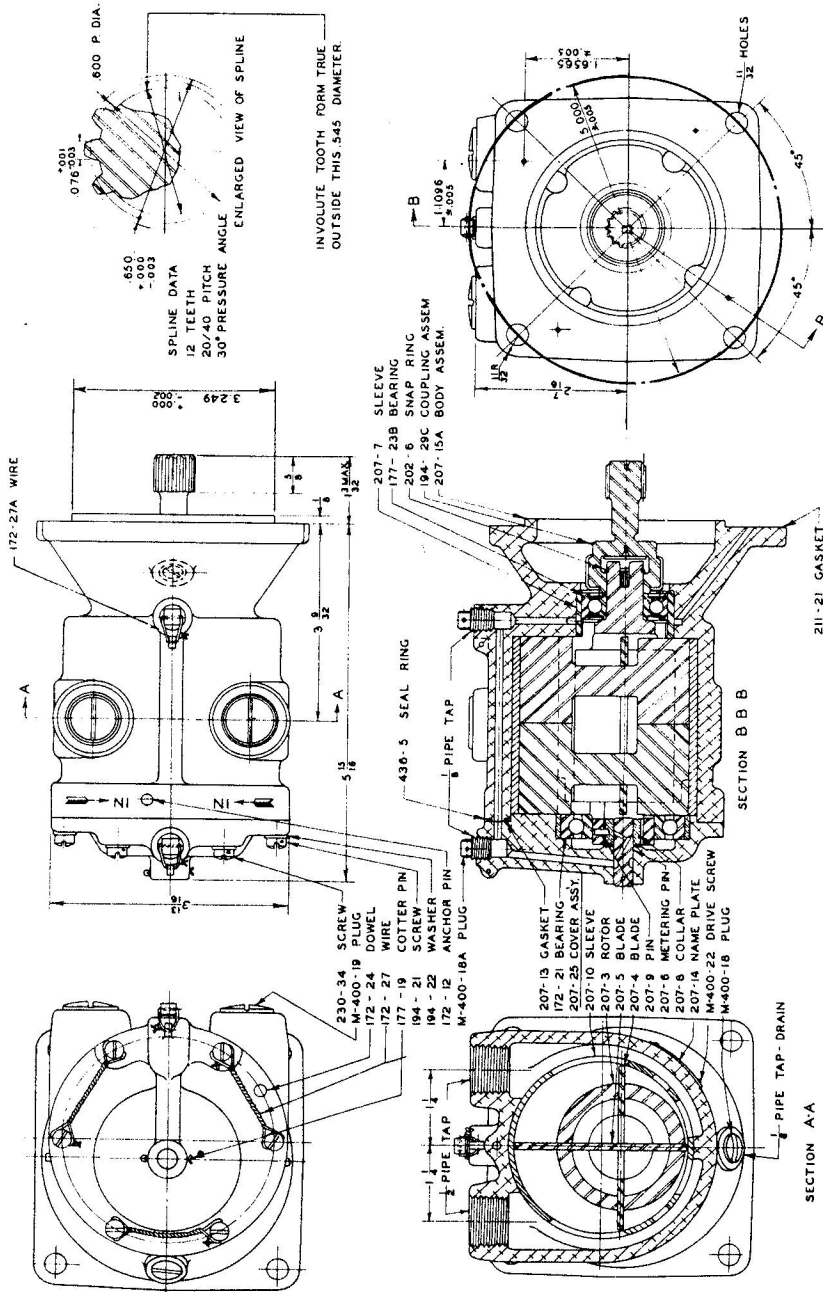
Part No.	Part Name	Qty. Req.
207-K	Vacuum Pump Assembly Comp.	1
207-15A	Body Assembly	1
207-1B	Body	1
207-7	Sleeve - Oil Seal	1
207-10	Sleeve	1
172-12	Anchor Pin	1
207-3	Rotor Assembly	1
207-12C	Insert	1
177-23B	Bearing - Ball	1
194-29C	Coupling Assembly	1
202-7	Spring	9
194-28E	Coupling	1
202-5	Retainer	1
202-6	Snap Ring	1
207-4	Blade (Whole)	1
207-5	Blade (Half)	2
207-8	Collar - Metering	1
207-9	Pin - Collar Anchor	1
207-25	Cover Assembly	1
207-24	Bushing	1
207-2B	Cover	1
177-19	Pin - Cotter	1
172-21	Bearing - Ball	1
172-24	Pin - Dowel	1
207-13	Cover - Gasket	3
207-13A	Cover - Gasket	1
194-22	Washer	6
230-34	Screw - Fill. Hd.	2
194-21	Screw - Fill. Hd.	4
436-5	Seal Ring	1
207-6	Pin - Metering	1
M-400-18	Plug - 1/8 Pipe	1
M-400-19	Plug - 1/2 Pipe	2
211-21	Gasket - Flange	1

CONTRACT NO.

42-12824

EO 15-100BA-2

PARTS REFERENCE DRAWING



VACUUM PUMP ASSEMBLY - 3P-207-K (207-K)

ASSEMBLY PARTS LIST

Vacuum Pump Assembly
Pesco Model 3P-211
Old Model 211

Vacuum Pump Assembly
Pesco Model 3P-211-F
Old Model 211-F

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
211	Vacuum Pump Assembly Comp.	1	211-F	Vacuum Pump Assembly Comp.	1
211-42B	Body Assembly	1	211-42B	Body Assembly	1
211-1C	Body	1	211-1C	Body	1
211-6	Oil Seal Sleeve	1	211-6	Oil Seal Sleeve	1
211-3	Sleeve	1	211-3	Sleeve	1
211-9	Anchor Pin	1	211-9	Anchor Pin	1
211-4	Rotor Assembly	1	211-4B	Rotor Assembly	1
211-5A	Insert	1	211-5A	Insert	1
211-18B	Bearing - Ball	1	211-18B	Bearing Ball	1
211-11	Coupling Assembly	1	211-11C	Coupling Assembly	1
211-12	Coupling	1	211-36	Coupling	1
211-14	Retainer	1	211-35	Sleeve - Coupling	1
211-13	Spring	9	211-39	Retainer	1
211-19	Snap Ring	1	211-37	Spring	1
211-7	Blade (Whole)	1	211-40	Snap Ring	1
211-8	Blade (Half)	2	211-52	Plug - Square	1
207-8	Collar - Metering	1	211-38	Square Pin	1
211-10	Pin - Collar Anchor	1	278-45	Rivet	2
211-47	Cover Assembly	1	211-41	Snap Ring	1
211-2B	Cover	1	211-7	Blade (Whole)	1
211-46	Bushing	1	211-8	Blade (Half)	2
207-6	Metering Pin	1	207-8	Collar - Metering	1
177-18	Pin Cotter	1	211-10	Pin - Collar Anchor	1
211-20	Bearing - Ball	1	211-47	Cover Assembly	1
172-24	Dowel Cover	1	211-2B	Cover	1
211-15	Gasket - Cover	3	211-46	Bushing	1
211-15A	Gasket - Cover	1	207-6	Metering Pin	1
181-22	Washer	6	177-19	Pin - Cotter	1
211-17	Screw Fill. Hd.	6	211-20	Bearing - Ball	1
M-400-18	Plug 1/8 Pipe	1	172-24	Dowel - Cover	1
211-16	Plug 3/4 Pipe	2	211-15	Gasket - Cover	3
207-14	Name Plate	1	211-15A	Gasket - Cover	1
174-28	Drive Screw	2	181-22	Washer	6
172-27	Safety Wire	3	211-17	Screw - Fill. Hd.	6
211-21	Gasket - Flange	1	M-400-18A	Plug 1/8 Pipe	2
M-400-18A	Plug 1/8 Pipe	2	M-400-18	Plug 1/8 Pipe	1
172-27A	Wire Safety	2	211-16	Plug 3/4 Pipe	2
			207-14	Name Plate	1
			174-28	Drive Screw	2
			172-27	Safety Wire	3
			172-27A	Safety Wire	2
			211-21	Gasket - Flange	1

CONTRACT NO.

38-5970-P 38-4025-P

CONTRACT NO.

15715 41-3059-EP



ASSEMBLY PARTS LIST

Safety Valve Assembly
Pesco Model 3V-217
Old Model 217

Safety Valve Assembly
Pesco Model 3V-217-G
Old Model 217-G

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
217	Safety Valve Assembly	1	217-G	Safety Valve Assembly	1
217-1	Body	1	217-13	Body	1
217-3A	Seat - Valve	1	217-3D	Valve Seat	1
217-8A	Guide-Valve Assembly	1	217-14	Valve & Stem Assembly	1
217-2A	Guide Valve	1	217-4E	Valve	1
217-6	Screen	1	217-10	Valve Stem	1
217-7	Retainer	1	217-5F	Spring	1
217-4A	Valve	1	217-9	Spacer 1/16 thick	*
217-5A	Spring	1	217-9A	Spacer 1/32 thick	*
211-16	Plug - 3/4 Pipe	2	217-2D	Valve Guide	1
195-14	Safety Wire	1	R-400-20	Lock Wire	1
			M-400-18A	Plug - Sq. Hd. 1/8 Pipe	1

* Use as Required

CONTRACT NO.

38-5970-P

38-4025-P

CONTRACT NO.

12573

39-6430

15715

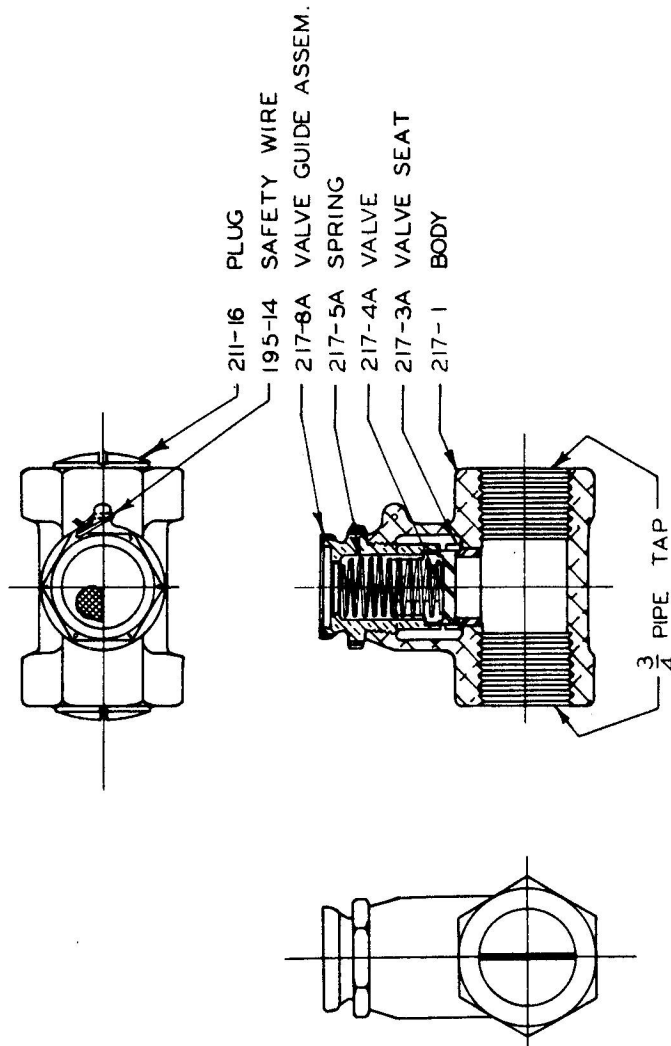
15807

21930

270-43

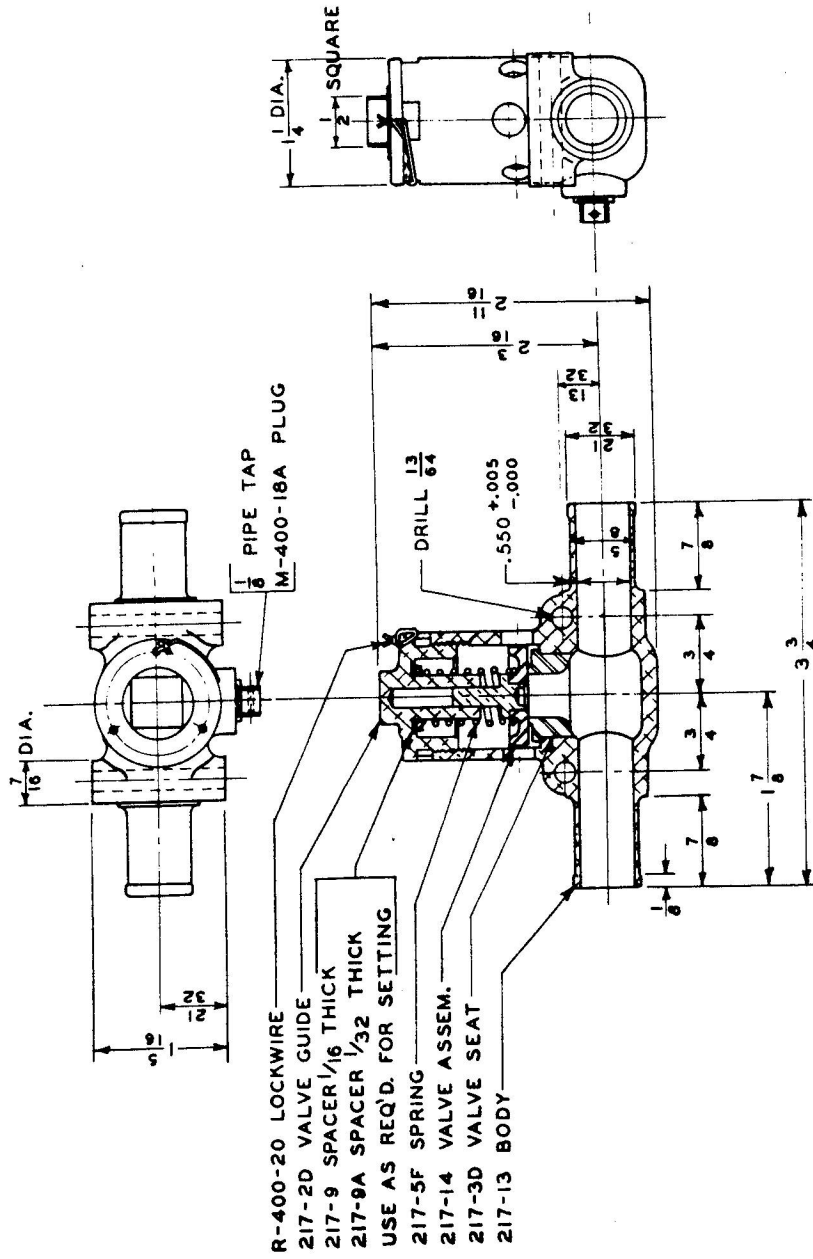
33477

PARTS REFERENCE DRAWING



SAFETY VALVE ASSEMBLY - 3V-217 (217)

PARTS REFERENCE DRAWING



SAFETY VALVE ASSEMBLY - 3V-217-G (217-G)



ASSEMBLY PARTS LISTSafety Valve Assembly
Pesco Model 3V-217-H
Old Model 217-H

Part No.	Part Name	Qty. Req.
217-H	Safety Valve Assembly	1
217-15	Body	1
217-3C	Valve Seat	1
217-11	Valve Assembly	1
217-4D	Valve	1
217-10	Valve Stem	1
217-5E	Spring	1
R-400-20	Lock Wire	1
217-9	Spacer 1/16" thick	*
217-9A	Spacer 1/32" thick	*
217-16	Valve Guide	1
M-400-18A	Plug	1

* Use as Required

CONTRACT NO.

15715	15807
41-3059-EP	21930
12573	33477
15715	

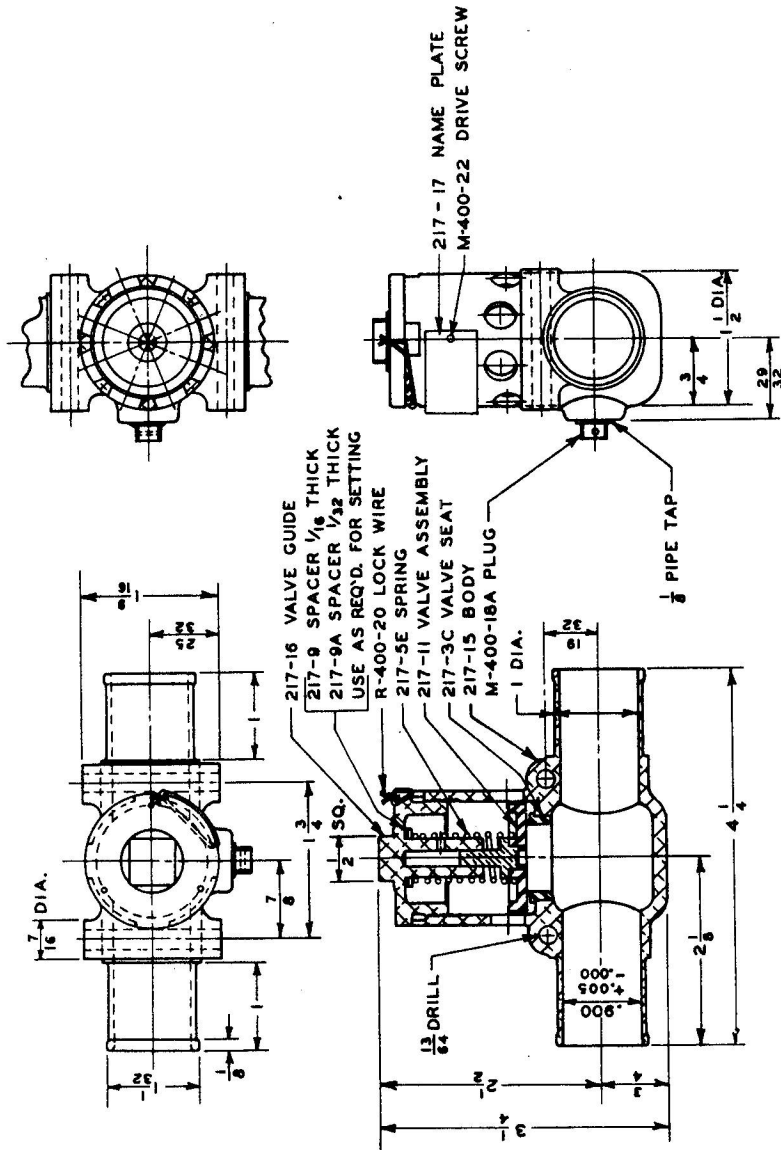
Safety Valve Assembly
Pesco Model 3V-217-GA
Old Model 217-GA

Part No.	Part Name	Qty. Req.
217-GA	Safety Valve Assembly	1
217-13A	Body	1
217-3D	Valve Seat	1
217-14	Valve & Stem Assembly	1
217-4E	Valve	1
217-10	Stem	1
217-5F	Spring	1
217-9	Spacer 1/16" thick	*
217-9A	Spacer 1/32" thick	*
217-2D	Valve Guide	1
R-400-20	Lock Wire	1
M-400-18A	Plug	1
217-17	Pesco Name Plate	1
M-400-22	Drive Screw	2

CONTRACT NO.

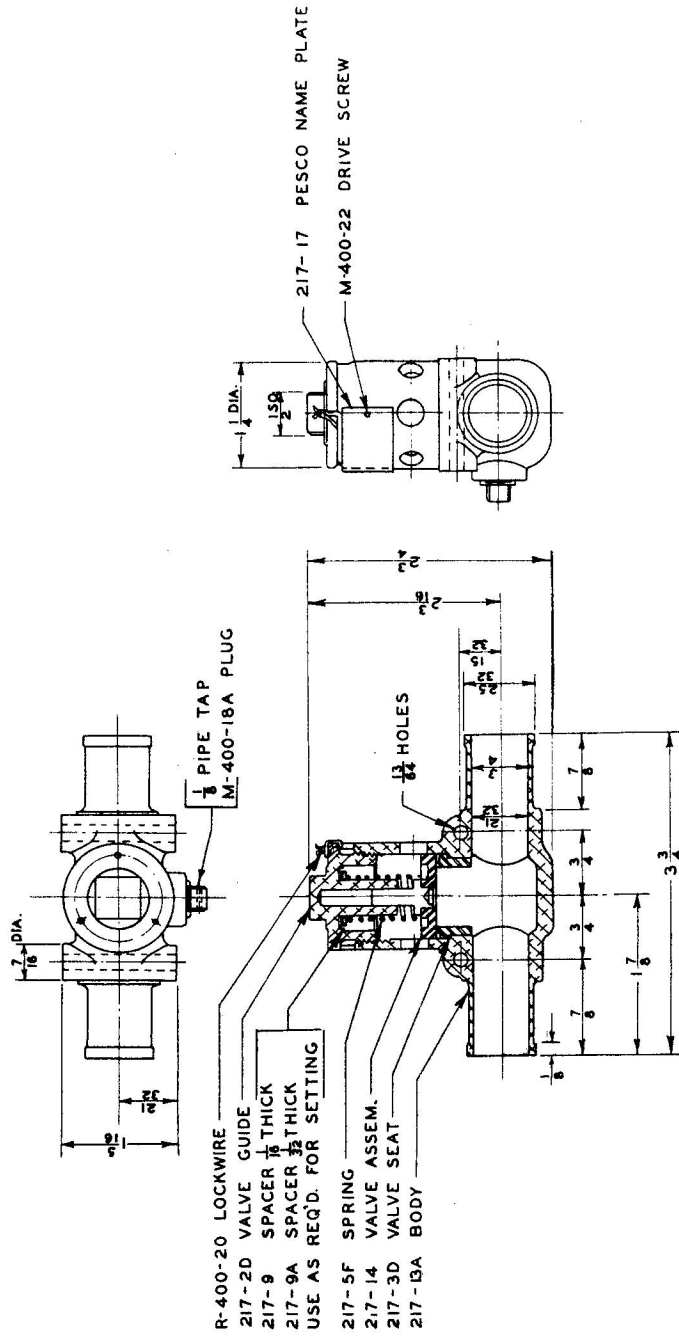
42-2914-P

PARTS REFERENCE DRAWING



SAFETY VALVE ASSEMBLY - 3V-217-H (217-H)

PARTS REFERENCE DRAWING



SAFETY VALVE ASSEMBLY - 3V-217-GA (217-GA)



ASSEMBLY PARTS LIST

Oil Separator Assembly
 Pesco Model 3S-647-A
 Old Model 218-S8

Oil Separator Assembly
 Pesco Model 3S-218
 Old Model 218

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
218-S	Oil Separator Assembly	1			
647-A	Oil Separator Assembly	1			
218-7	Oil Outlet Boss	1			
218-4	Gasket	1			
218-3A	Strainer	1			
218-8	Nipple	1			
218-6	Boss - Gauge Conn.	1			
M-400-18A	1/8 Pipe Plug	1			
218-14	Name Plate	1			
218-19	Screw	2			
218-20	Nut	2			
218-22	Plate - Bracket	1			
218-23	Cushion - Bracket	2			
218-24	Screw	2			
313-14	Nut	2			
291-24	Cotter Pin	2			
218-25	Spacer	2			

NOTE - The Pesco Model 218 oil separator is sold only as a complete assembly and does not contain any replaceable parts.

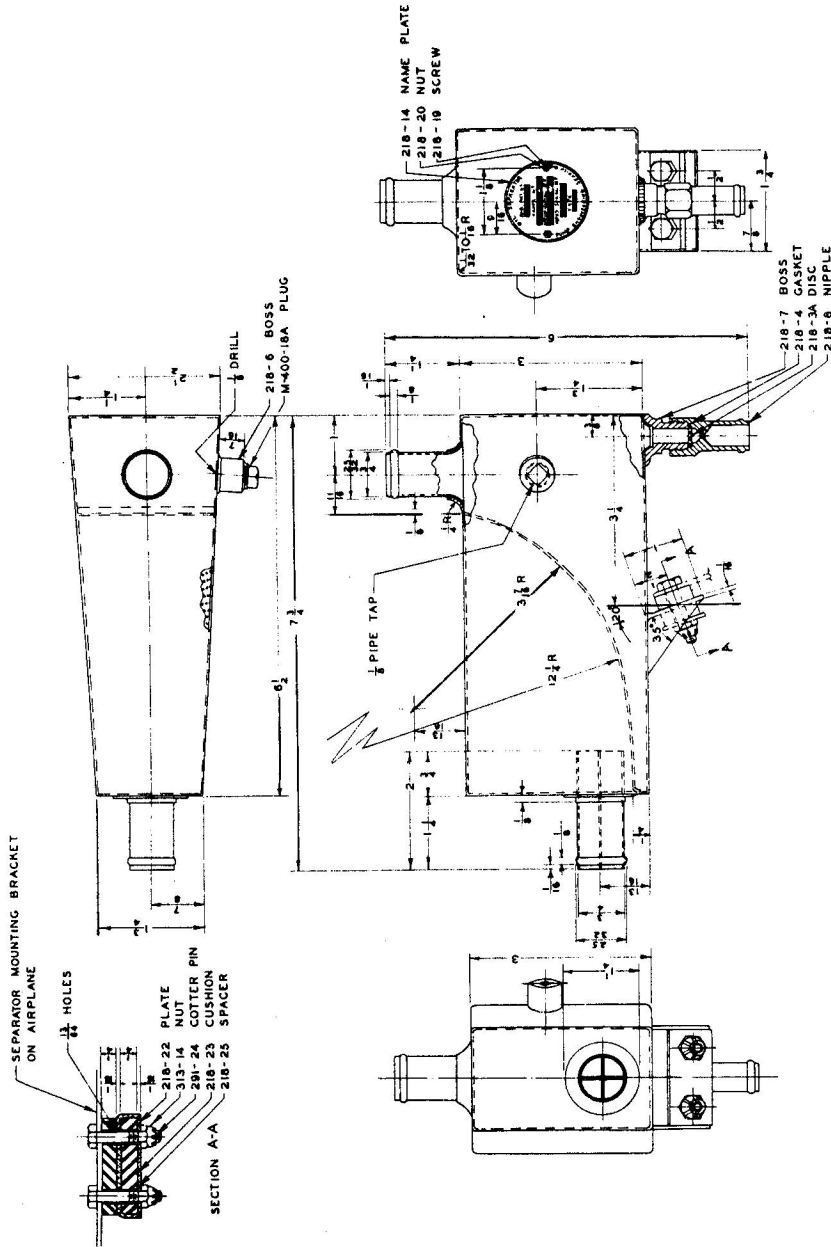
CONTRACT NO.

34-4083-P	34-3320-P
35-4788	34-4212-P
10357	35-4699-P
34-2126-P	10357
34-2593-P	

CONTRACT NO.

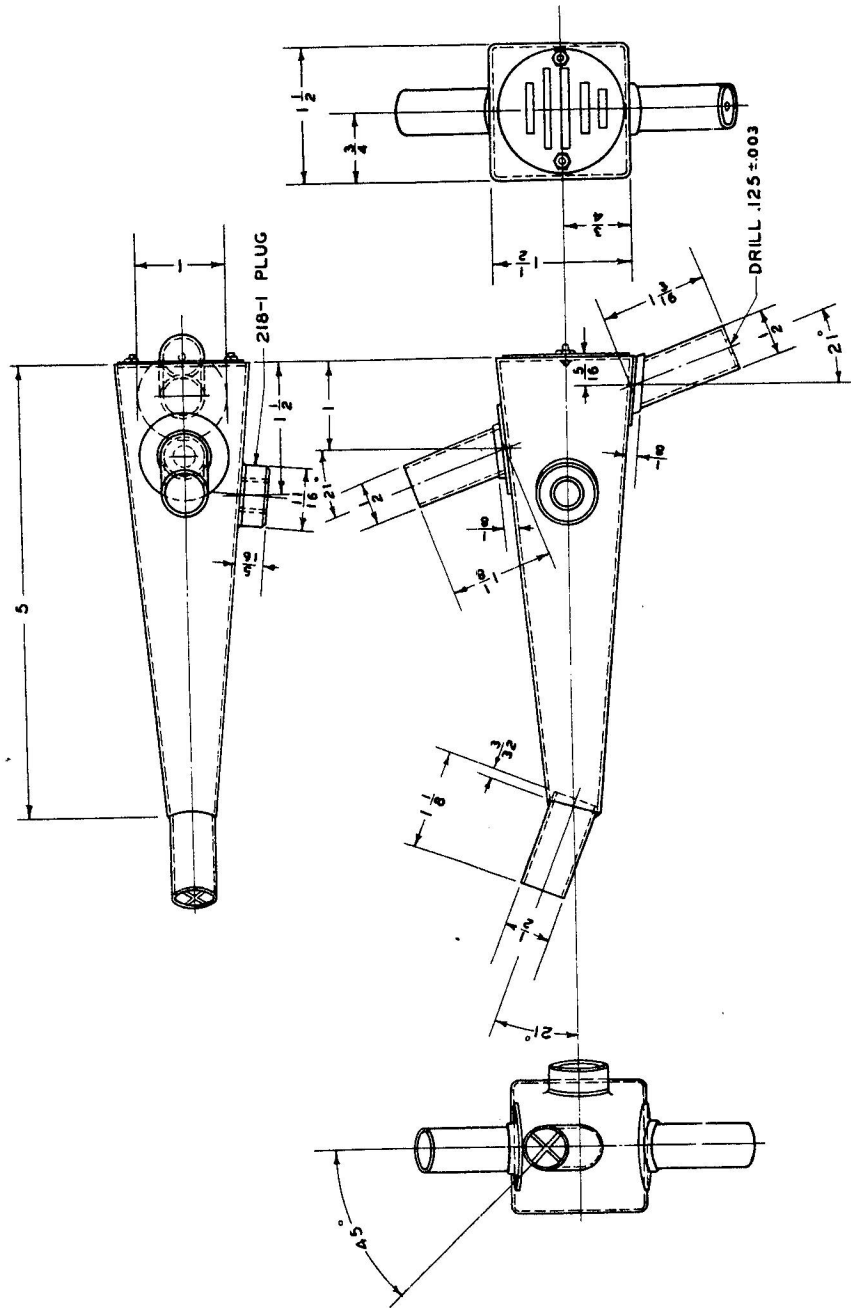
42-2914-P

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-647-A (218-S8)

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-218 (218)



ASSEMBLY PARTS LIST

Oil Separator Assembly
Pesco Model 3S-218-E
Old Model 218-E

Oil Separator Assembly
Pesco Model 3S-218-F
Old Model 218-F

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
218-E	Oil Separator Assembly	1	218-F	Oil Separator Assembly	1
218-7	Oil Outlet	1	218-7	Oil Outlet	1
218-4	Gasket	1	218-4	Gasket	1
218-3A	Strainer	1	218-3A	Strainer	1
218-8	Nipple	1	218-8	Nipple	1
218-6	Plug	1	218-6	Plug	1
M-400-18	Pipe Plug 1/8	1	M-400-18	1/8 Pipe Plug	1
218-14	Name Plate	1	218-14	Name Plate	1
218-19	Screw	2	218-19	Screw	2
218-20	Nut	2	218-20	Nut	2

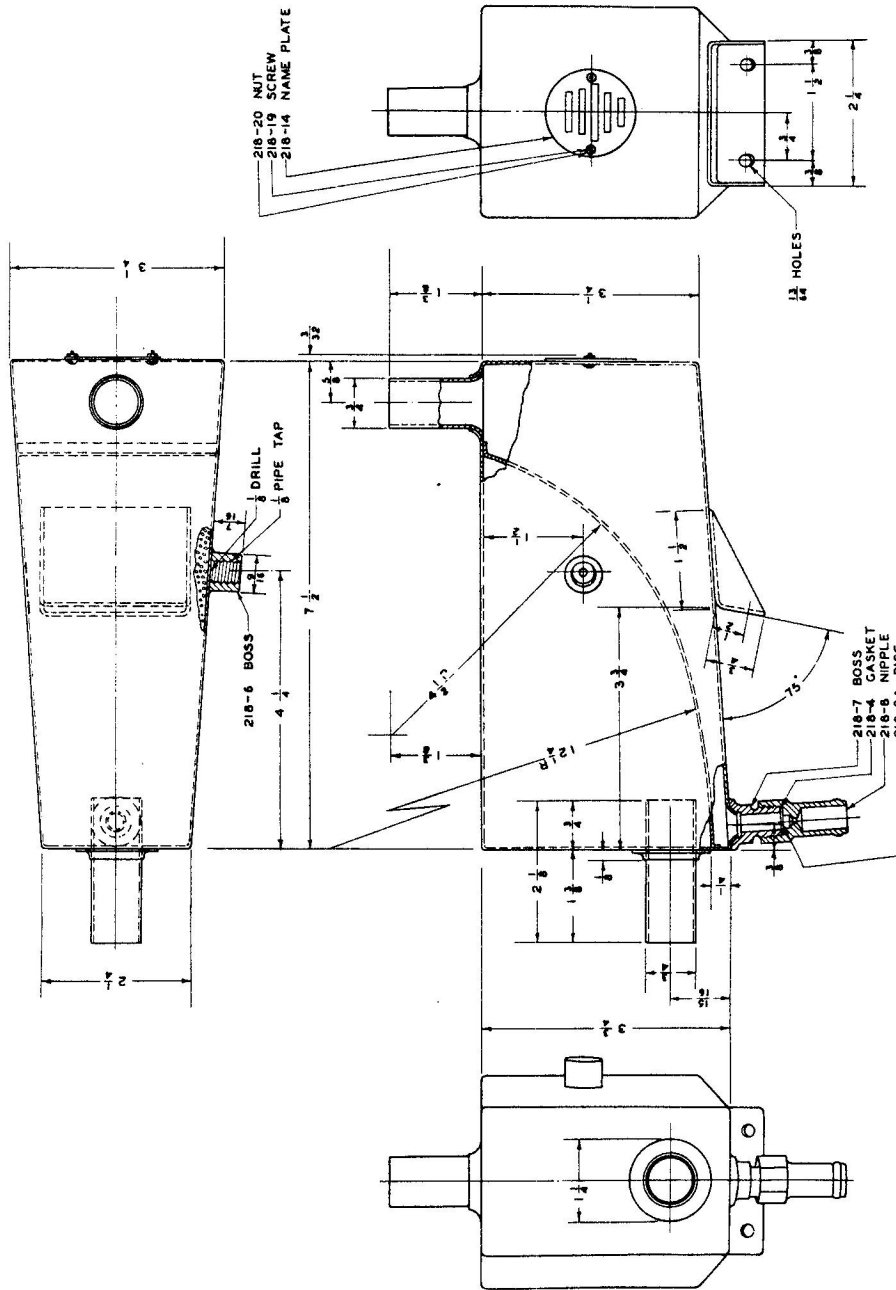
CONTRACT NO.

38-5970-P 38-4025-P

CONTRACT NO.

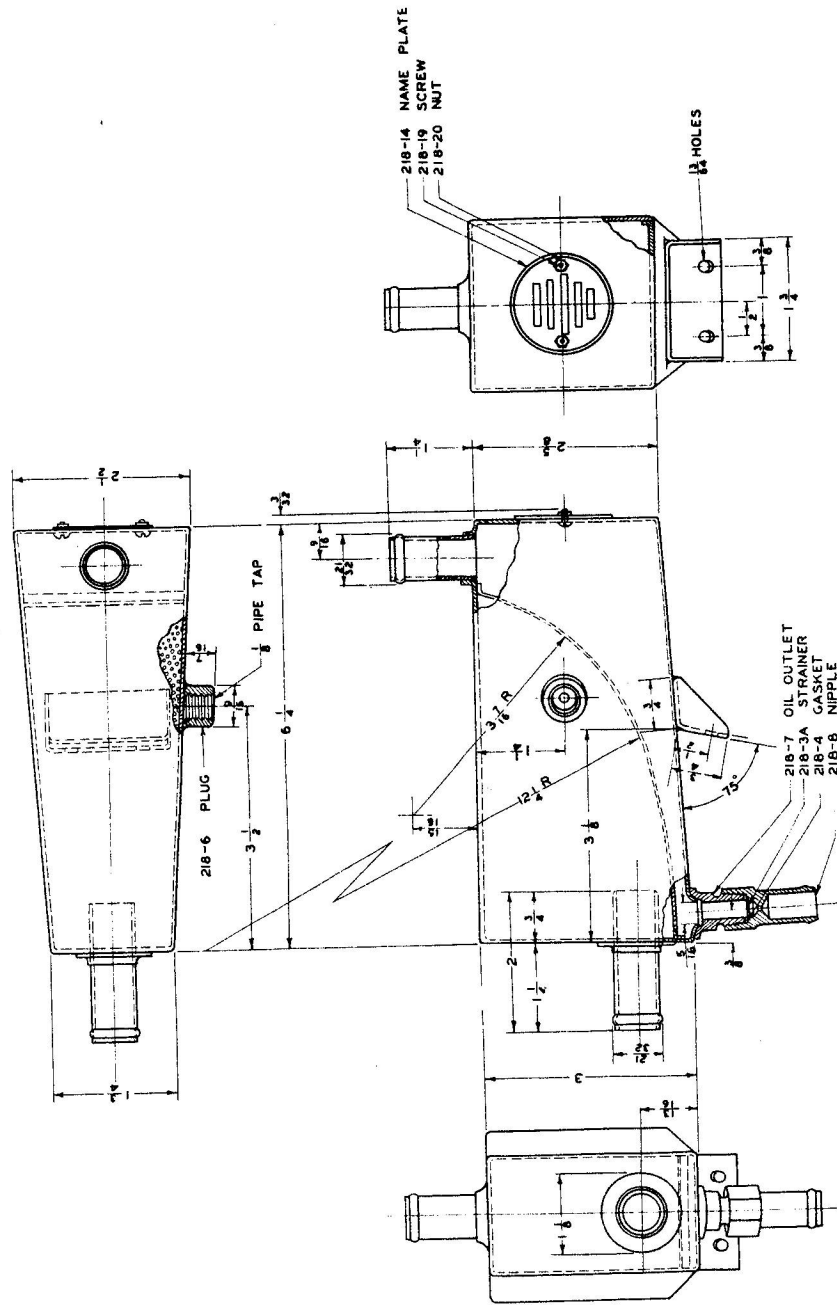
38-5970-P 41-2915-EP
10357

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-218-E (218-E)

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-218-F (218-F)



ASSEMBLY PARTS LIST

Oil Separator Assembly
Pesco Model 3S-218-R
Old Model 218-R

Oil Separator Assembly
Pesco Model 3S-218-S
Old Model 218-S

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
218-R	Oil Separator Assembly	1	218-S	Oil Separator Assembly	1
218-7	Oil Outlet	1	647-A	Oil Separator Assembly	1
218-4	Gasket	1	218-7	Oil Outlet Boss	1
218-3A	Strainer	1	218-4	Gasket	1
218-8	Nipple	1	218-3A	Strainer	1
218-6	Plug	1	218-8	Nipple	1
218-14	Name Plate	1	218-6	Boss - Gauge Conn.	1
218-19	Screw	2	M-400-18A	1/8 Pipe Plug	1
218-20	Nut	2	218-14	Name Plate	1
M-400-18	Shipping Plug	1	218-19	Screw	2
			218-20	Nut	2
			218-22	Plate - Bracket	1
			218-23	Cushion - Bracket	2
			218-24	Screw	2
			313-14	Nut	2
			291-24	Cotter Pin	2
			218-25	Spacer	2

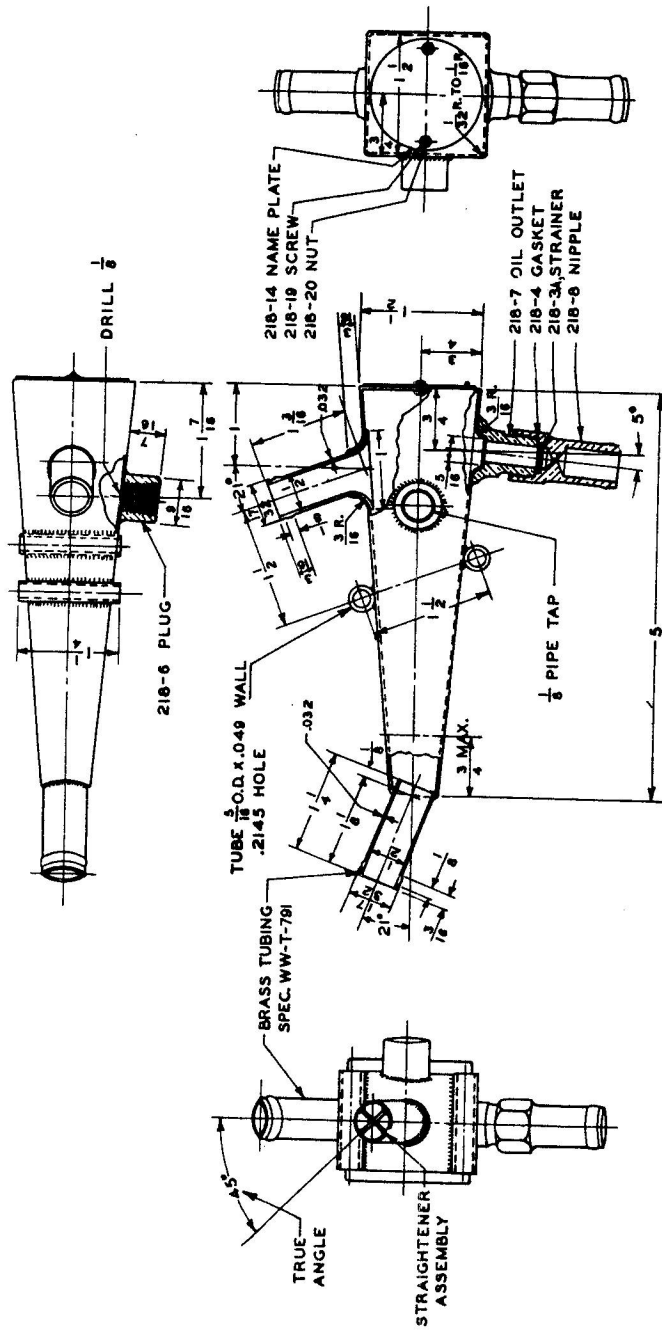
CONTRACT NO.

21057	43-5683-P
39-2809-P	12573
DAW535-ac-259	15807
15715	21930
42-2914-P	27043
	33477

CONTRACT NO.

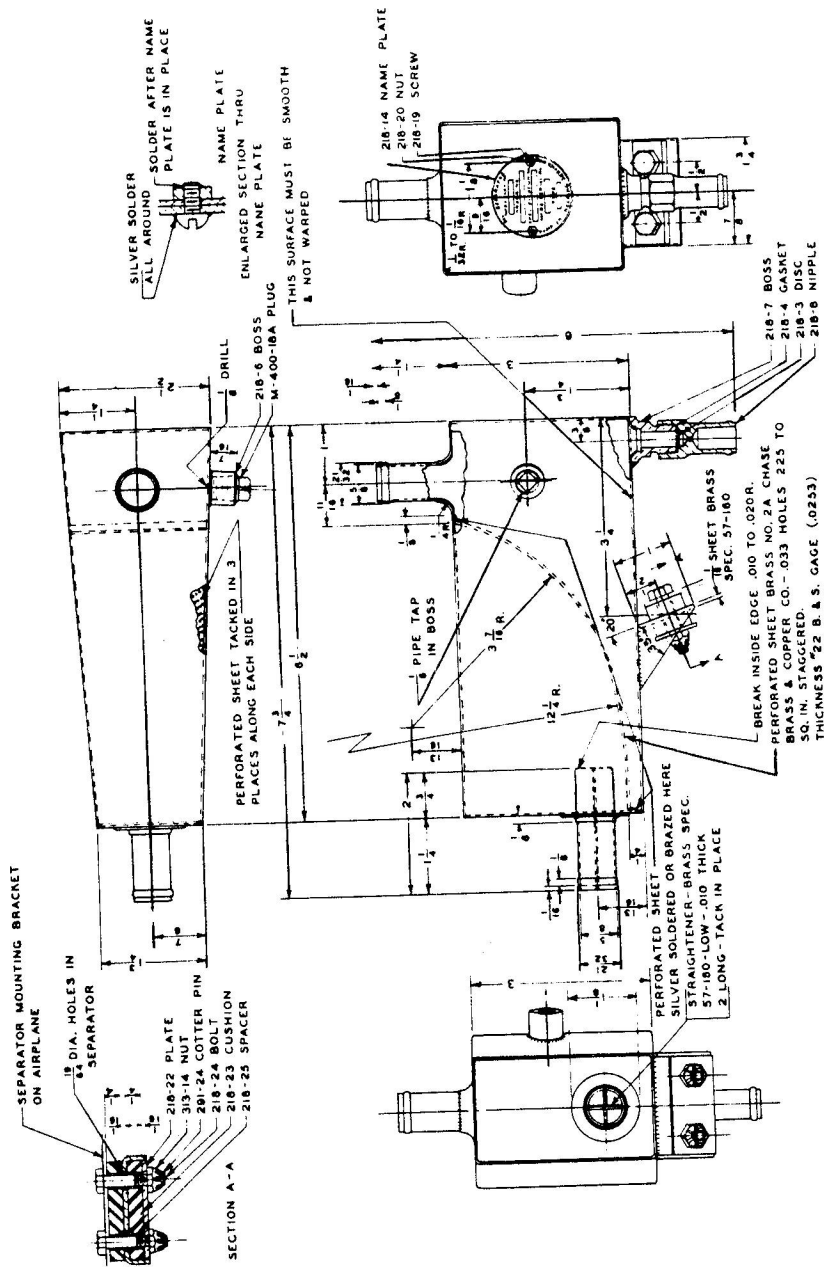
15715	15807
42-12824	21930
12573	27043
39-6430	33477

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-218-R (218-R)

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-218-S (218-S)



ASSEMBLY PARTS LIST

Oil Separator Assembly
Pesco Model 3S-648
Old Model 218-T

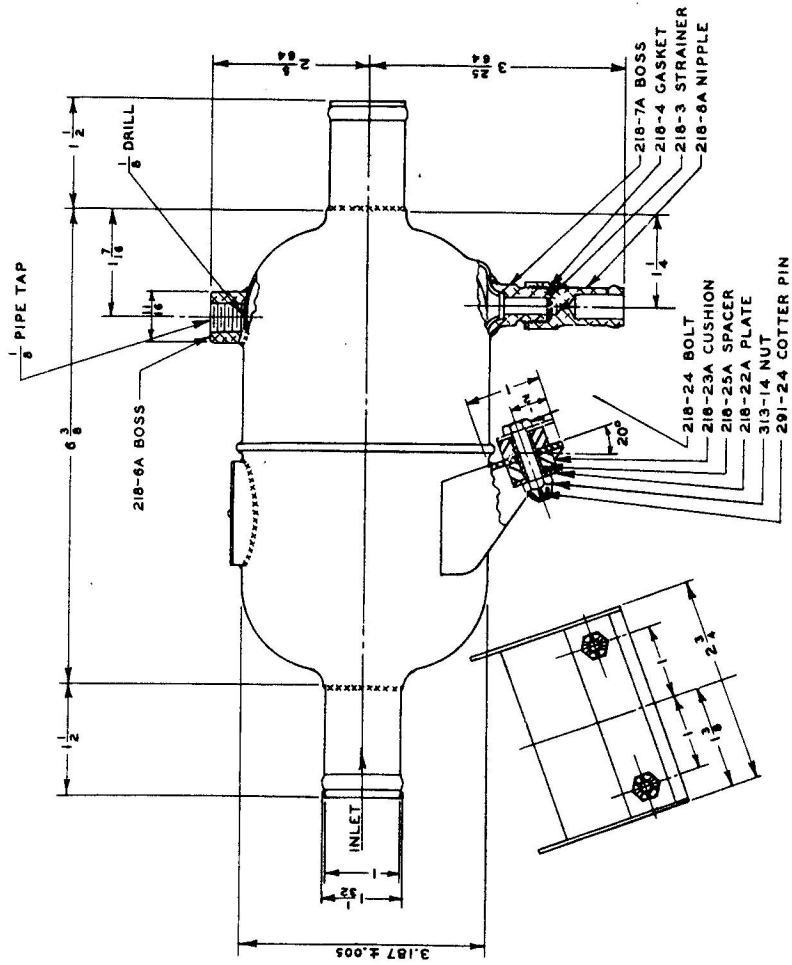
Oil Separator Assembly
Pesco Model 3S-649
Old Model 218-Y

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
648	Oil Separator Assembly	1	649	Oil Separator Assembly	1
218-54	Shell Assembly	1	218-24	Bolt	2
218-45	Shell - Inlet	1	313-14	Nut	2
218-46	Shell - Outlet	1	218-25	Spacer	2
218-47	Tube - Inlet	1	218-22A	Plate	1
218-48	Tube - Outlet	1	218-23A	Cushion	2
218-52	Baffle Washer	1	291-24	Cotter Pin	2
218-51	Baffle	1	218-14B	Name Plate	1
218-51A	Baffle	1	M-400-22C	Drive Screw	2
218-50	Cup	2			
218-49	Boss - Name Plate	1		CONTRACT NO.	
218-6A	Boss - Pressure	1		27043	
218-7A	Boss - Oil Outlet	1			
218-53	Bracket	1			
218-22A	Plate - Bracket	1			
218-25	Spacer	2			
218-23A	Cushion - Neoprene	2			
218-24	Bolt	2			
313-14	Nut	2			
291-24	Cotter Pin	2			
218-4	Gasket	1			
218-3A	Strainer	1			
218-8	Nipple	1			
M-400-18A	Shipping Plug	1			
218-14B	Name Plate	1			
M-400-22	Drive Screw	2			

CONTRACT NO.

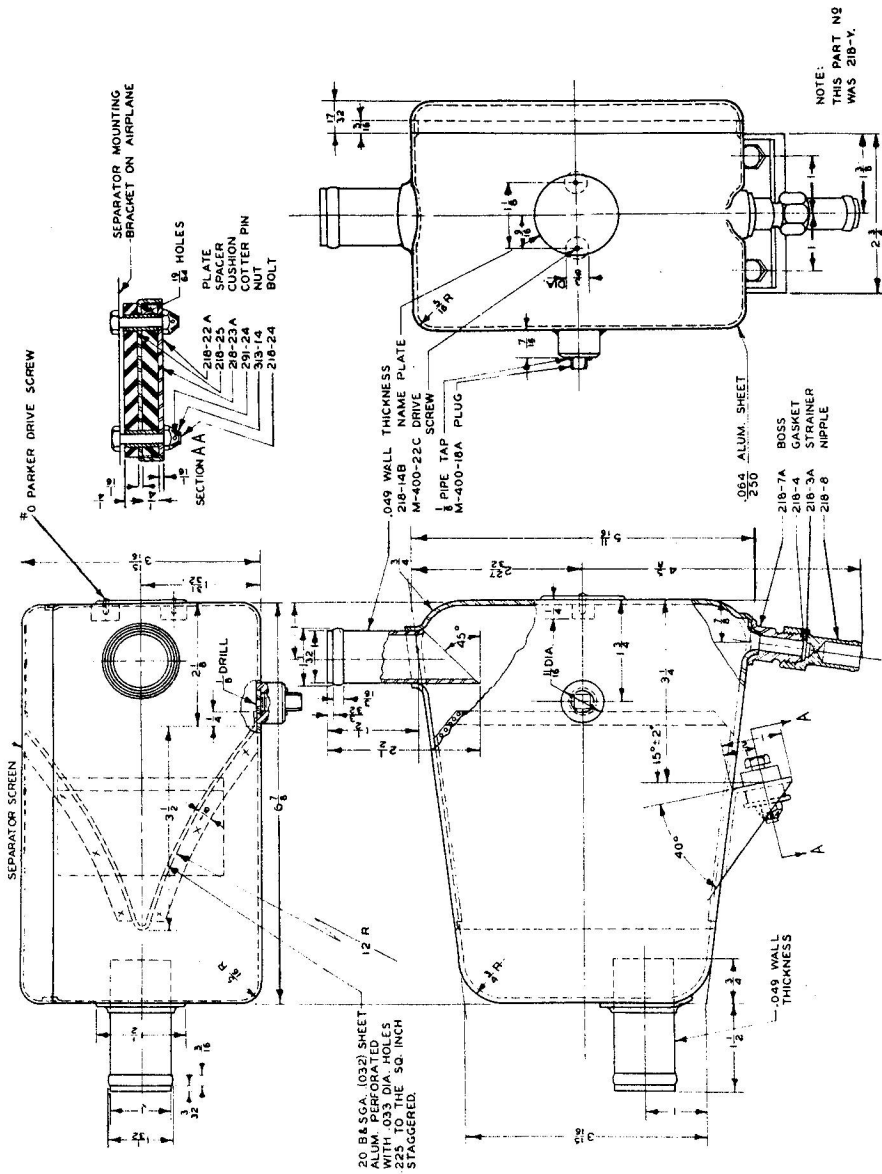
15715	15807
41-3059-EP	21930
12573	33477
15715	

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-648 (218-T)

PARTS REFERENCE DRAWING



OIL SEPARATOR ASSEMBLY - 3S-649 (218-Y)



ASSEMBLY PARTS LIST

Relief Valve Assembly
Pesco Model 3V-195
Old Model 195

Relief Valve Assembly
Pesco Model 3V-215
Old Model 215

Part No.	Part Name	Qty. Req.	Part No.	Part Name	Qty. Req.
195	Relief Valve Assembly	1	215	Relief Valve Complete	1
195-1	Body	1	215-1	Body	1
195-5	Control Valve Guide	1	215-5	Guide-Control Valve	1
195-6	Control Valve	1	215-2	Seat-Control Valve-Assy.	1
195-15	Control Valve Seat Assy.	1	215-3	Seat-Control Valve	1
195-3	Control Valve Seat	1	215-7	Screen	1
195-7	Screen	1	215-8	Retainer	1
195-9	Screen Retainer	1	215-6	Valve	1
195-11	Gasket	1	215-9	Gasket-Control Seat	1
215-4	Spring	1	215-4C	Spring	1
195-4	Control Screw	1	195-4	Screw - Control	1
195-2	Adjusting Nut	1	195-2	Nut - Adjusting	1
195-12	Gasket	1	195-12	Gasket-Adjusting Nut	1
R-400-29	Lock Nut	1	R-400-29	Lock Nut	1
172-30	Plug - 3/8 Pipe	2	M-400-19	Plug - 1/2 Pipe	2
195-10	Safety Wire	1	195-10	Safety Wire	1
195-14	Safety Wire	1	195-14	Safety Wire	1
M-400-18A	Pipe Plug 1/8 Sq. Hd.	1			
M-400-22	Drive Screw	4			
195-23	Name Plate	1			
215-11A	Name Plate - For use by Pesco	1			
215-11C	Name Plate - For use by Aro Equip.	1			
215-11D	Name Plate - For use by Detroit Gear	1			

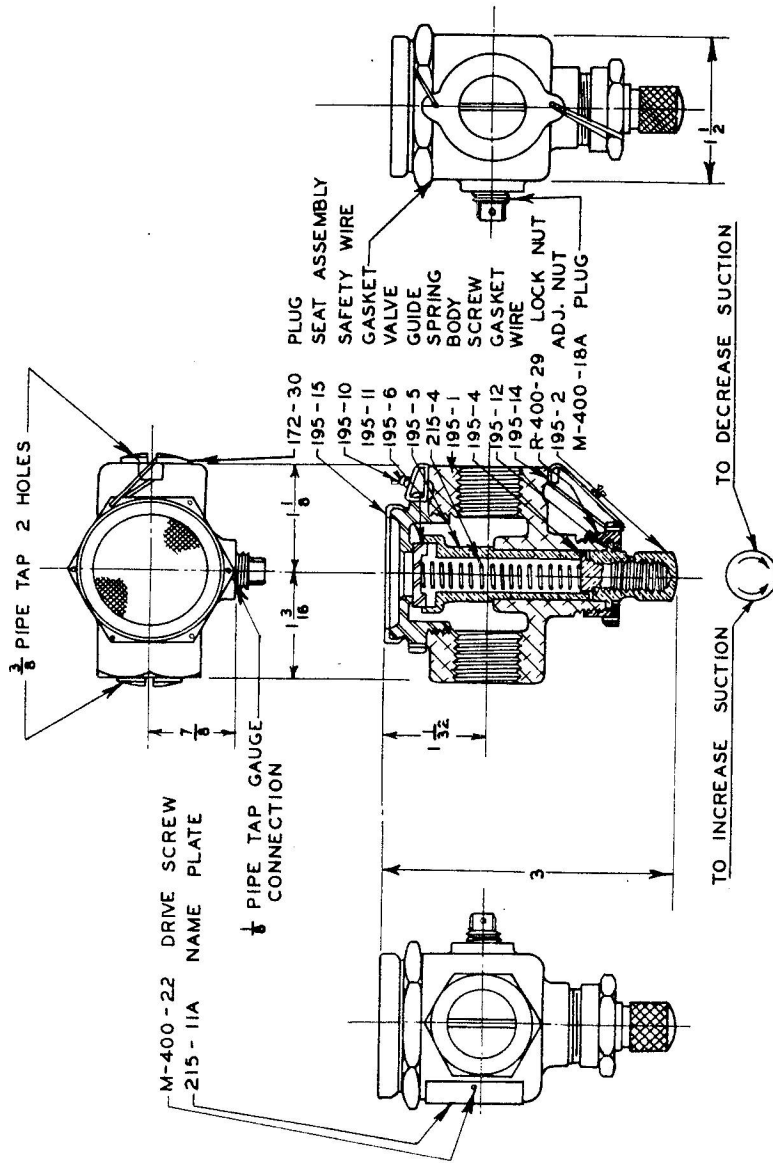
CONTRACT NO.

38-5970-P 15715
10357 42-12824
41-2915-EP

CONTRACT NO.

34-4083-P DAW535-ac-259
35-4788 15715
10357 42-2914-P
21057 27043
34-2126-P 43-5683-P
34-2593-P 12573
34-3320-P 15807
34-4212-P 21930
35-4699-P 27043
10357 33477
39-2809-P

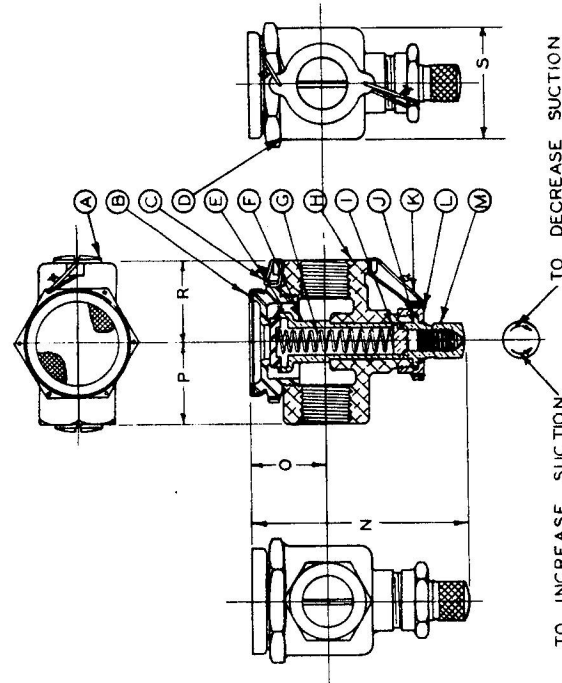
PARTS REFERENCE DRAWING



RELIEF VALVE ASSEMBLY - 3V-195 (195)

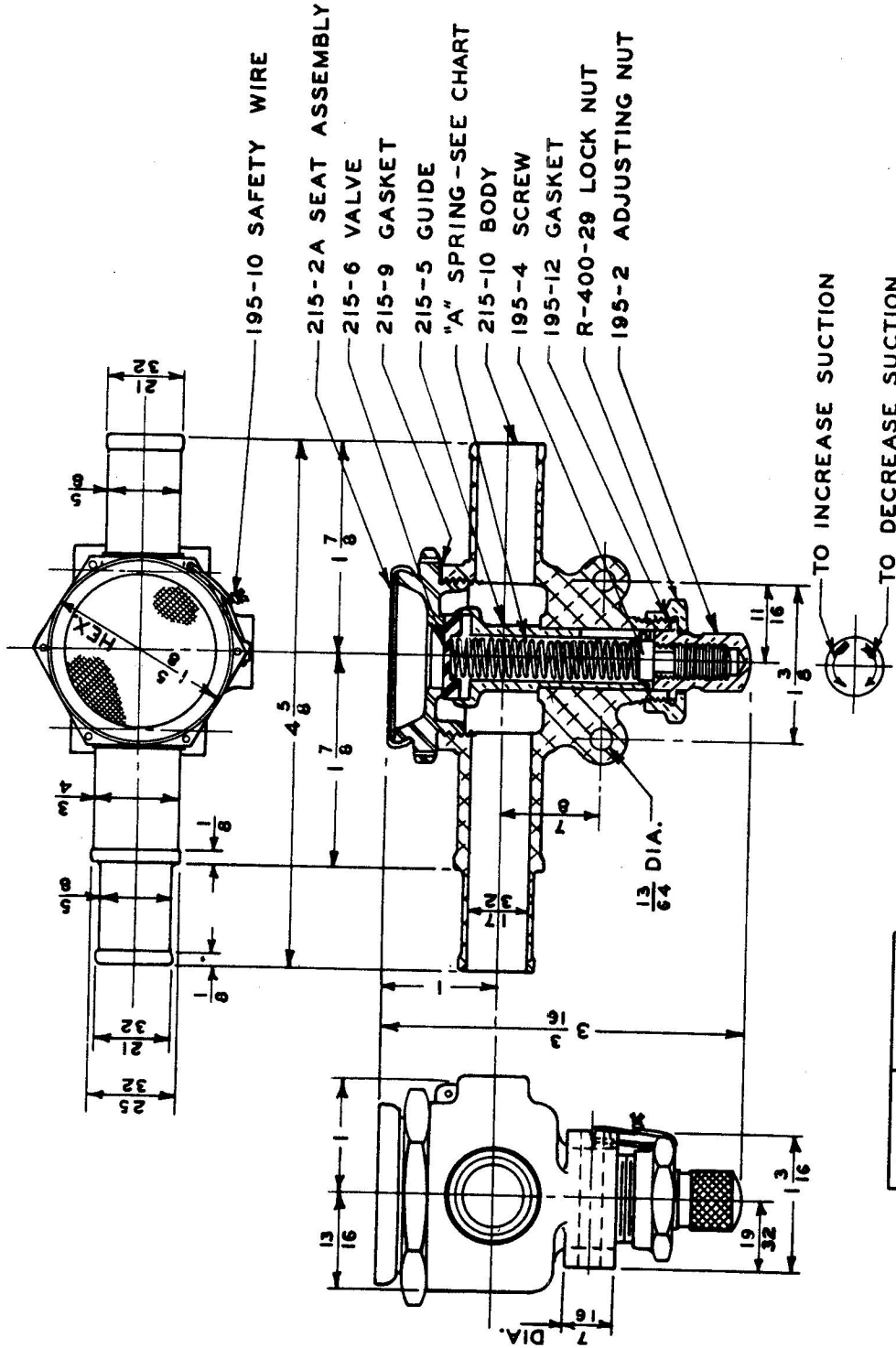
PARTS REFERENCE DRAWING

RELIEF VALVE



LET	PART	MODEL		
		195	215	216
A	PLUG	172-30	M-400-9	211-16
B	SEAT ASSEMBLY	195-15	215-2	216-2
C	SAFETY WIRE	195-10	195-10	195-10
D	GASKET	195-11	215-9	216-9
E	VALVE	195-6	215-6	216-12
F	GUIDE	195-5	215-5	216-14
G	SPRING	195-8	215-4	216-15
H	BODY	195-1	215-1	216-1
I	SCREW	195-4	195-4	195-4
J	GASKET	195-12	195-12	195-12
K	SAFETY WIRE	195-14	195-14	195-14
L	LOCK NUT	R-400-29R-400-29	R-400-29	R-400-29
M	ADJUSTING NUT	195-2	195-2	195-2
N	DIMENSION	3	3	3 1/4
O	"	1 3/32	1 1/8	1 1/4
P	"	3/16	5/16	3/8
R	"	1 1/8	1 5/16	1 3/8
S	"	1 1/2	1 5/8	1 3/4

RELIEF VALVE ASSEMBLY - 3V-215 (215)



- 195-10 SAFETY WIRE
- 215-2A SEAT ASSEMBLY
- 215-6 VALVE
- 215-9 GASKET
- 215-5 GUIDE
- "A" SPRING - SEE CHART
- 215-10 BODY
- 195-4 SCREW
- 195-12 GASKET
- R-400-29 LOCK NUT
- 195-2 ADJUSTING NUT

215-G	215-26
MODEL	"A"

RELIEF VALVE ASSEMBLY - MODEL 3V-215-G

ASSEMBLY PARTS LIST

Relief Valve Assembly
Pesco Model 3V-215-B
Old Model 215-B

Part No.	Part Name	Qty. Req.
215-B	Relief Valve Assembly	1
215-10	Body	1
215-5	Guide	1
215-2A	Valve Seat Assembly	1
215-3A	Valve Seat	1
215-7	Screen	1
215-8	Retainer	1
215-6	Valve	1
215-9	Gasket	1
215-4B	Spring	1
195-4	Screw	1
195-2	Nut	1
195-12	Gasket	1
R-400-29	Lock Nut	1
M-400-18A	Plug Sq. Hd.	1
195-10	Safety Wire	2

Relief Valve Assembly
Pesco Model 3V-215-C
Old Model 215-C

Part No.	Part Name	Qty. Req.
215-C	Relief Valve Assembly	1
215-12	Body	1
215-5	Guide	1
215-2A	Valve Seat Assembly	1
215-3A	Valve Seat	1
215-7	Screen	1
215-8	Retainer	1
215-6	Valve	1
215-9	Gasket	1
215-4B	Spring	1
195-4	Screw	1
195-2	Nut	1
195-12	Gasket	1
R-400-29	Lock Nut	1
M-400-18A	Pipe Plug-1/8 Sq. Hd.	1
195-10	Lock Wire	2
M-400-22	Drive Screw	2
215-11	Name Plate - For use by Pesco	1

CONTRACT NO.

12573	21930
39-6430	27043
15715	33477
15807	

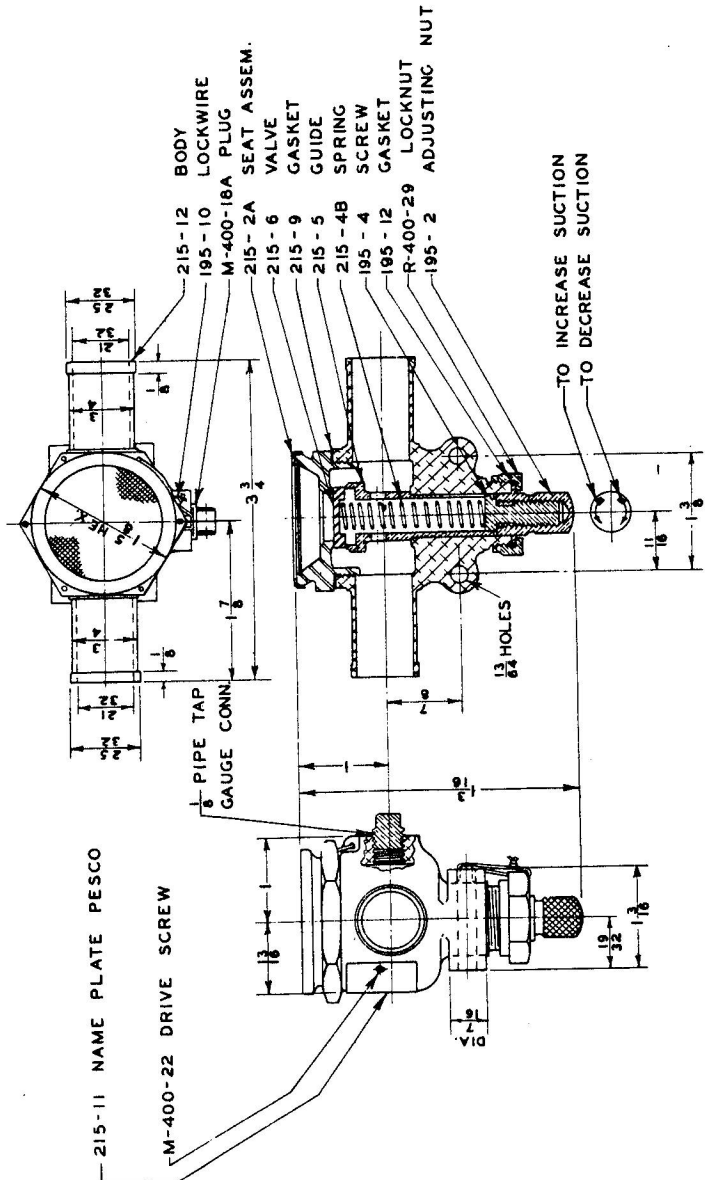
CONTRACT NO.

42-2914-P

Relief Valve Assembly
Pesco Model 3V-215-G
Old Model 215-G

Part No.	Part Name	Qty. Req.
3V-215	Relief Valve Assembly	1
215-10	Body	1
215-5	Guide	1
215-2A	Valve Seat Assembly	1
215-3A	Valve Seat	1
215-7	Screen	1
215-8	Retainer	1
215-6	Valve	1
215-9	Gasket	1
215-26	Spring	1
195-4	Screw	1
195-2	Nut	1
195-12	Gasket	1
R-400-29	Lock Nut	1
195-10	Safety Wire	2
M-400-22	Drive Screw	4
215-11	Name Plate (Used by Pesco)	1
215-11E	Name Plate (For use by Aro Equip.)	1
215-11F	Name Plate (For use by Det. Gear)	1

PARTS REFERENCE DRAWING



RELIEF VALVE ASSEMBLY - 3V-215-C (215-C)



ASSEMBLY PARTS LIST

Relief Valve Assembly
Pesco Model 3V-216
Old Model 216

Relief Valve Assembly
Pesco Model 3V-216-B
Old Model 216-B

Part No.	Part Name	Qty. Req.	Part No	Part Name	Qty. Req.
216	Relief Valve Complete	1	216-B	Relief Valve Assembly	1
216-1	Body	1	216-16	Body	1
216-14	Guide-Control Valve	1	216-11	Guide-Control Valve	1
216-2	Valve Seat	1	216-2	Seat Assembly	1
216-3	Seat-Control Valve	1	216-3	Seat-Control Valve	1
216-7	Screen	1	216-7	Screen	1
216-8	Retainer	1	216-8	Retainer	1
216-12	Valve	1	216-12	Valve-Vacuum Control	1
216-9	Gasket-Control Seat	1	216-9	Gasket-Control Seat	1
216-13	Spring	1	216-13A	Spring	1
195-4	Screw-Control	1	195-4	Screw-Control	1
195-2	Nut-Adjusting	1	195-2	Nut-Adjusting	1
195-12	Gasket-Adjusting Nut	1	195-12	Gasket-Adjusting Nut	1
R-400-29	Lock Nut	1	R-400-29	Lock Nut	1
211-16	Plug 3/4 Pipe	2	M-400-18A	Plug-1/8	1
195-10	Safety Wire	1	195-10	Safety Wire	2
195-14	Safety Wire	1			

CONTRACT NO.

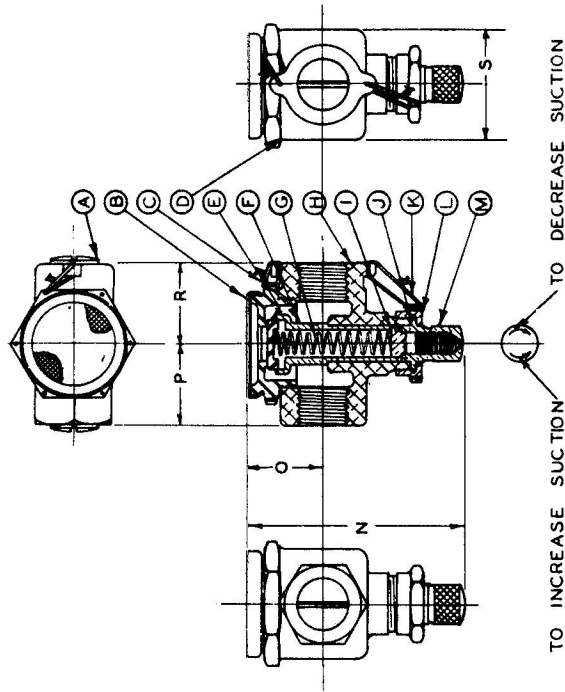
38-5970-P 38-4025-P

CONTRACT NO.

15715 15807
41-3059-EP 21930
12573 33477
15715 27043

PARTS REFERENCE DRAWING

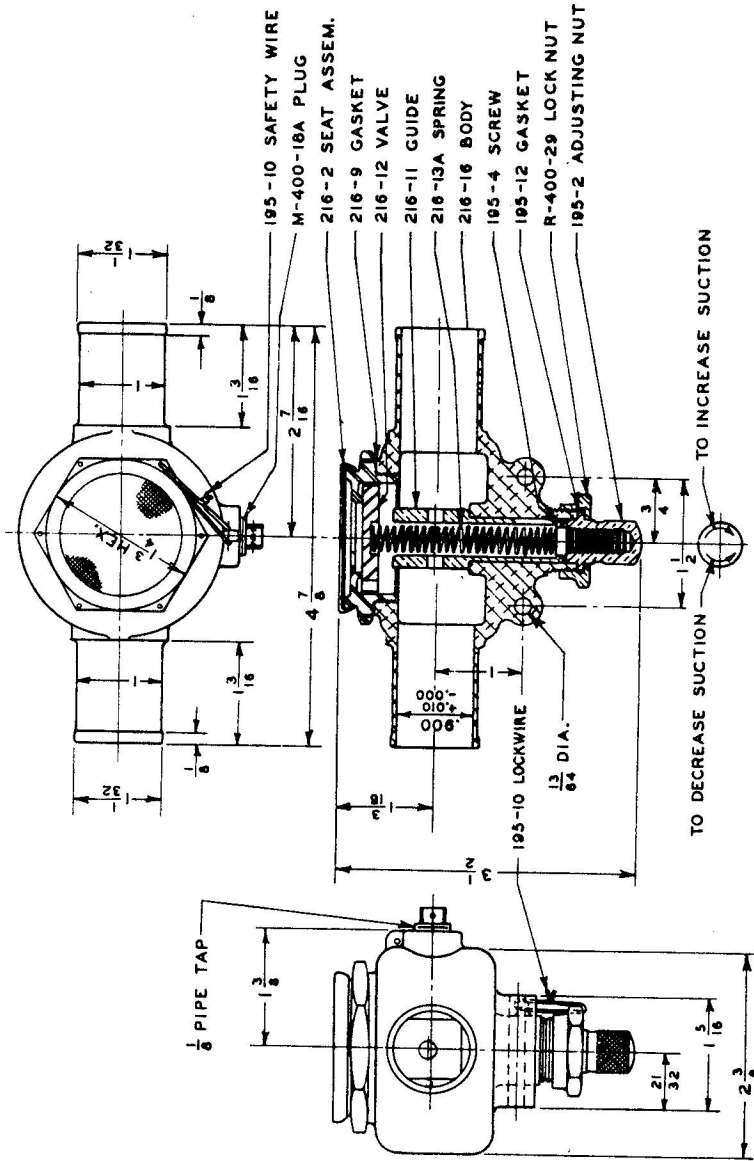
RELIEF VALVE



LET	PART	MODEL		
		195	215	216
A	PLUG	172-30	M-400-9	211-16
B	SEAT ASSEMBLY	195-15	215-2	216-2
C	SAFETY WIRE	195-10	195-10	195-10
D	GASKET	195-11	215-9	216-9
E	VALVE	195-6	215-6	216-12
F	GUIDE	195-5	215-5	216-14
G	SPRING	195-8	215-4	216-15
H	BODY	195-1	215-1	216-1
I	SCREW	195-4	195-4	195-4
J	GASKET	195-12	195-12	195-12
K	SAFETY WIRE	195-14	195-14	195-14
L	LOCK NUT	R-400-29	R-400-29	R-400-29
M	ADJUSTING NUT	195-2	195-2	195-2
N	DIMENSION	3	3	3 1/4
O	"	1 3/2	1 1/8	1 1/4
P	"	1 3/16	1 5/16	1 3/8
R	"	1 1/8	1 1/8	1 3/8
S	"	1 1/2	1 5/8	1 3/4

RELIEF VALVE ASSEMBLY - 3V-216 (216)

PARTS REFERENCE DRAWING



- 195-10 SAFETY WIRE
- M-400-18A PLUG
- 216-2 SEAT ASSEM.
- 216-9 GASKET
- 216-12 VALVE
- 216-11 GUIDE
- 216-13A SPRING
- 216-16 BODY
- 195-4 SCREW
- 195-12 GASKET
- R-400-29 LOCK NUT
- 195-2 ADJUSTING NUT

TO DECREASE SUCTION

TO INCREASE SUCTION

RELIEF VALVE ASSEMBLY - 3V-216-B (216-B)

