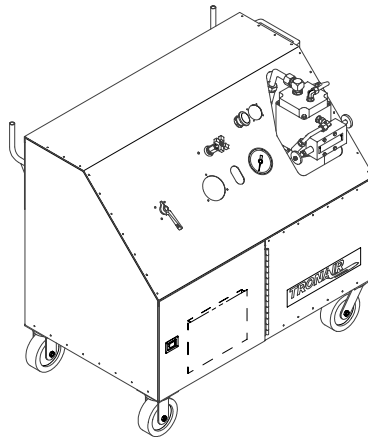




Operation & Service Instructions

TECHNICAL MANUAL



Model: 5130 Hydraulic Power Unit

02/2003 – AA – Rev. OR

Includes Illustrated Parts Lists

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Model: 5130
Hydraulic Power Unit

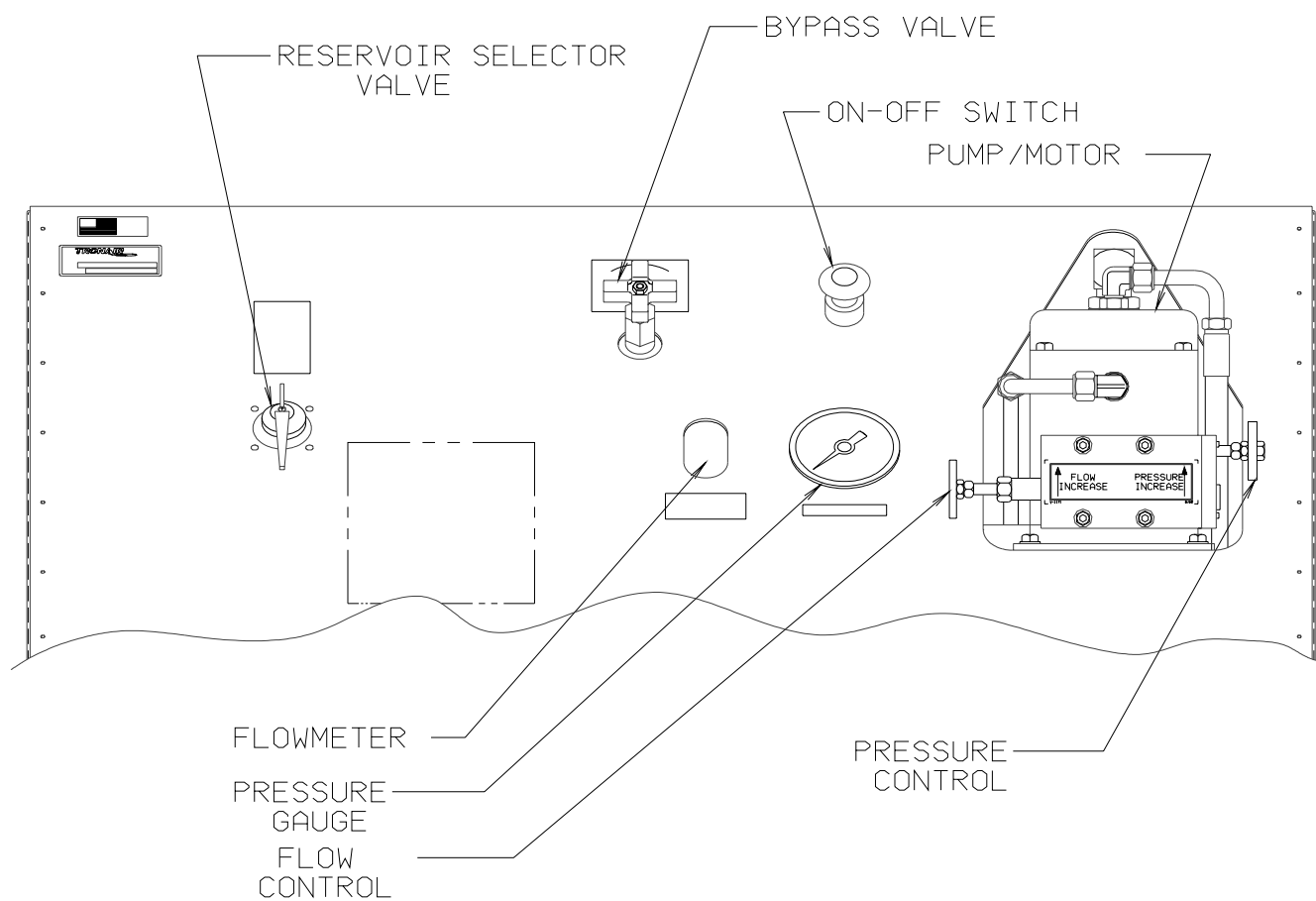
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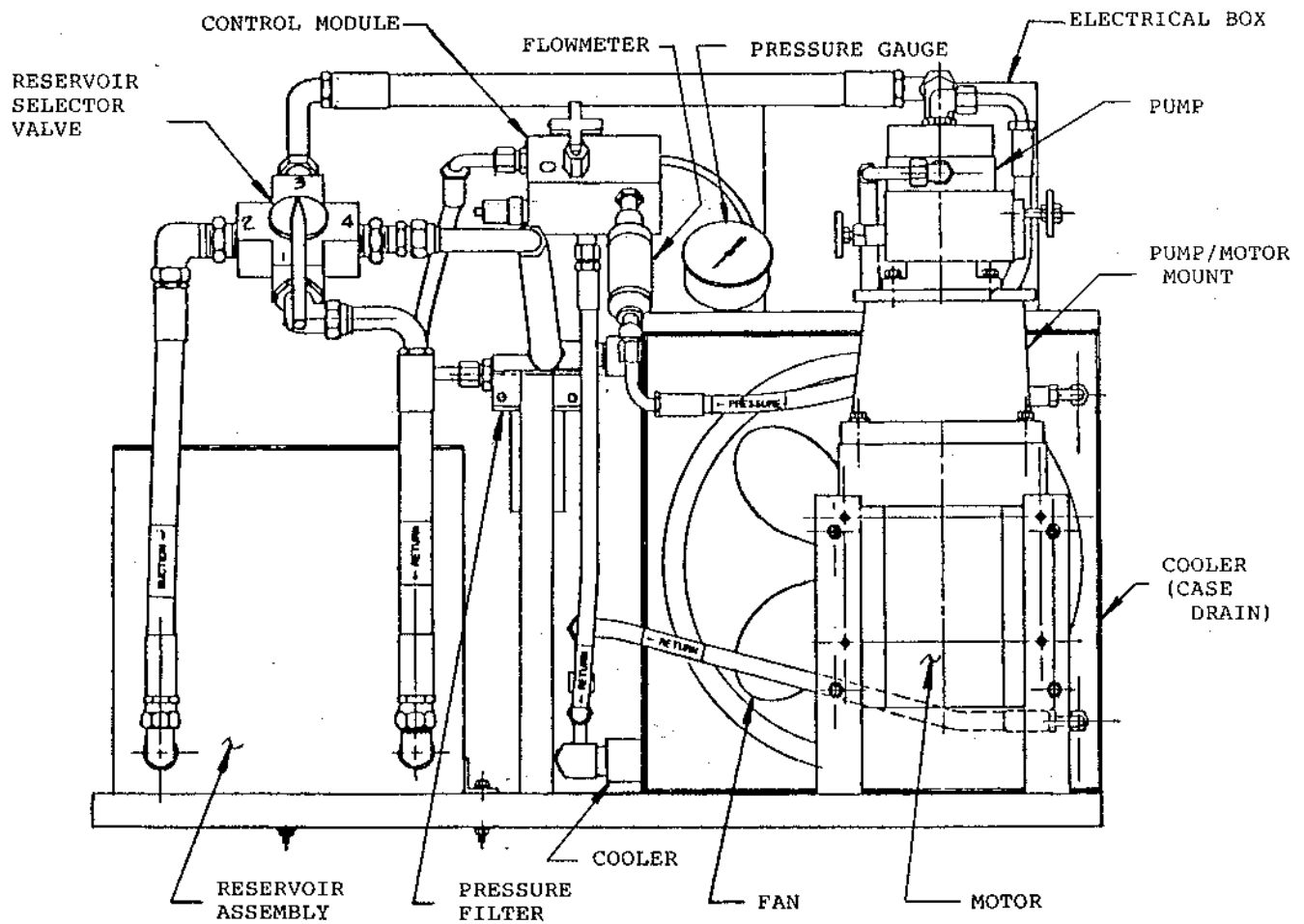
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Front Panel Controls

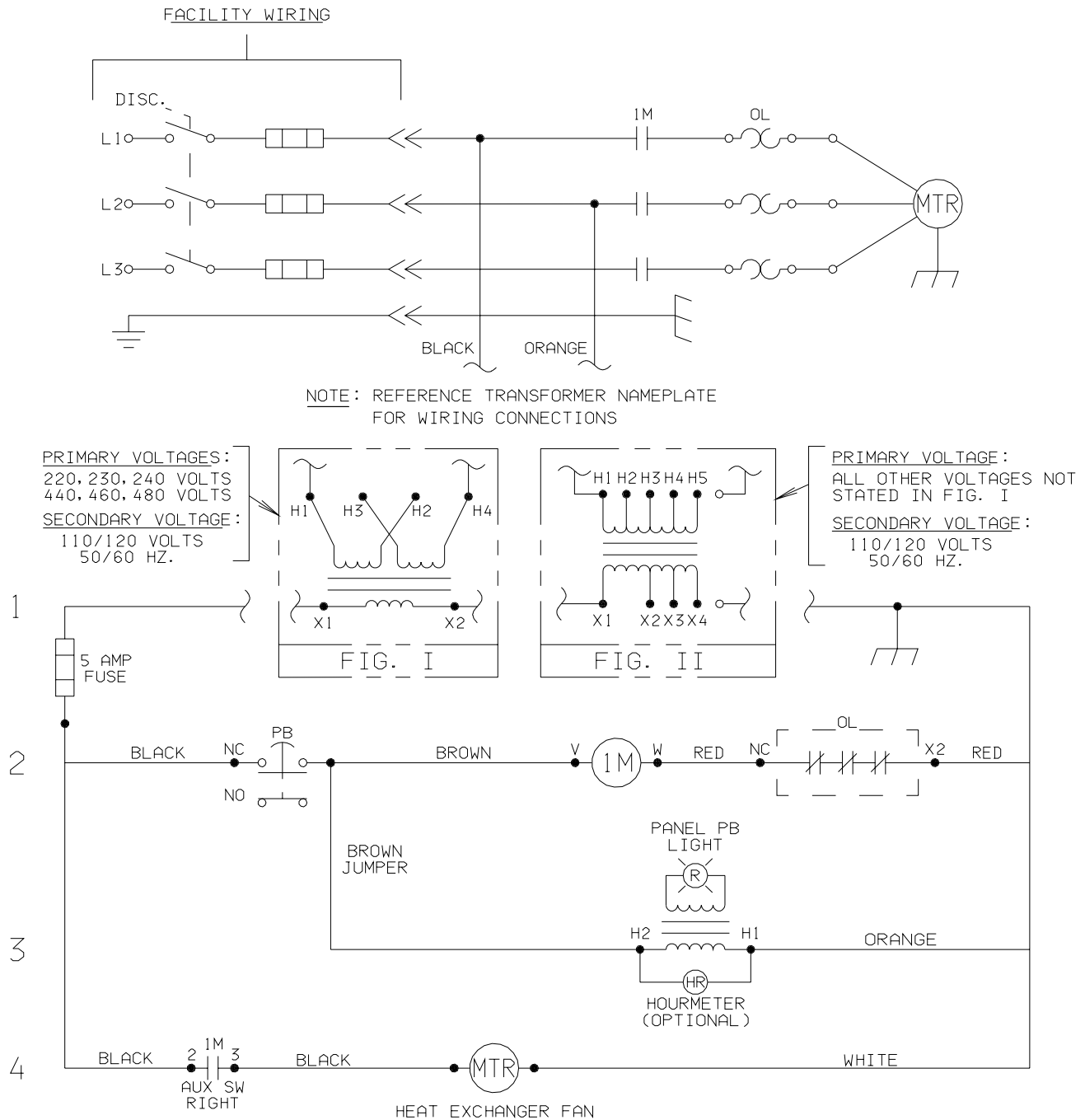


Internal Components



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Electrical Schematic

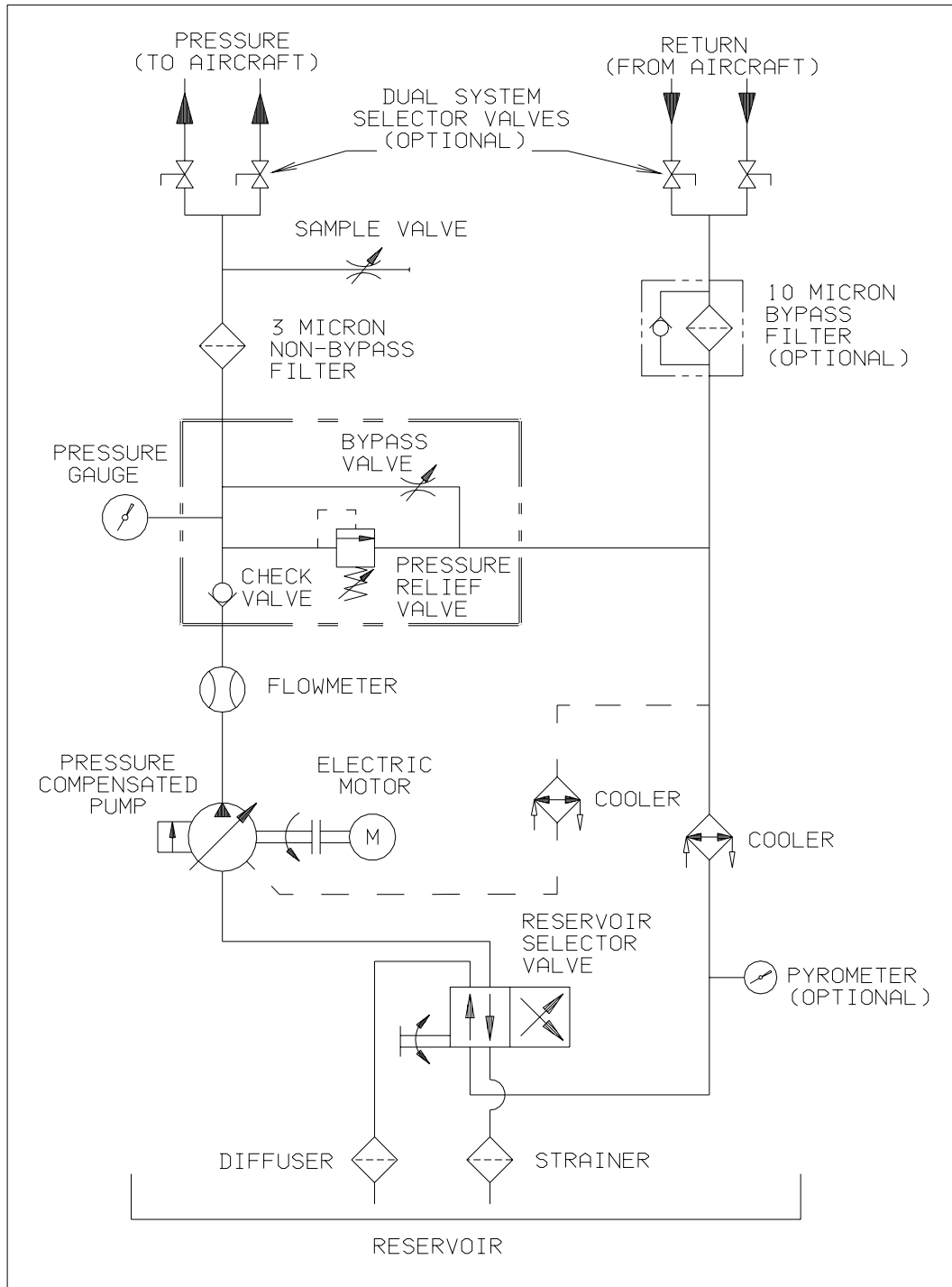


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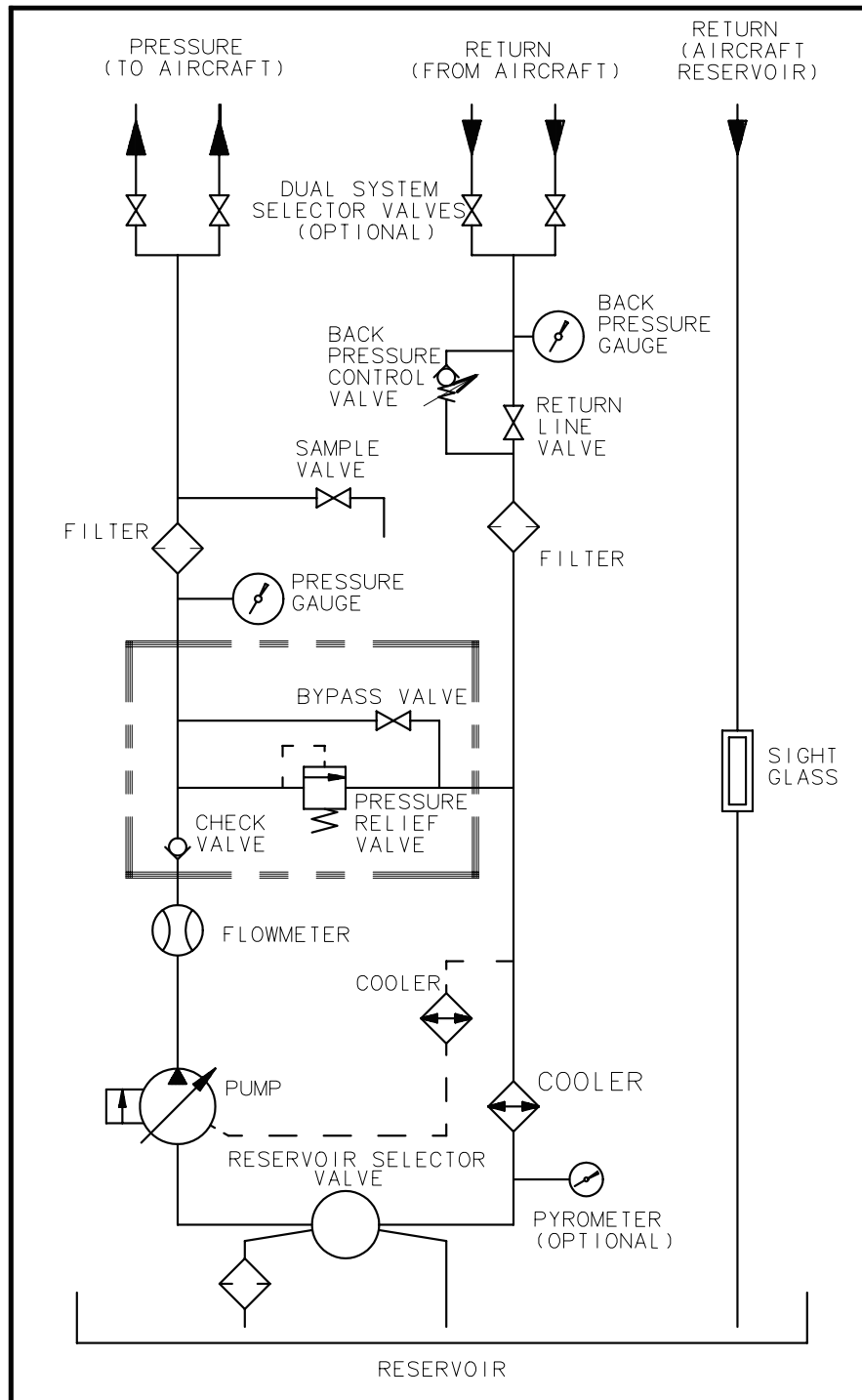
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Hydraulic Schematic (Standard Model)



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Hydraulic Schematic (Option T – Return Back-Pressure with Sight Gauge)



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Model: 5130
Hydraulic Power Unit

1.0 GENERAL DESCRIPTION

The Tronair Hydraulic Power Unit (HPU) provides a source of clean, pressurized hydraulic fluid for performing required aircraft maintenance.

Some important features are:

- Pressure compensated pump with integral pressure and flow controls
- 10 gallon (37.8 liters) reservoir w/selector valve
- Bypass valve
- Case drain cooler
- Manual starter with overload protection
- Non bypass filter with 2 micron filter element

2.0 TECHNICAL SPECIFICATIONS

2.1 HYDRAULIC

Fluid: Aviation Phosphate Ester, Type IV
Pressure Range: 250 – 3,000 psi (17.2 –207 bars)
Flow Range: 0-6 gpm (22.7 liters)
Filtration: 2 Micron Absolute
Reservoir Capacity: 13 gallons (49.2 liters)

2.2 ELECTRICAL

Power Requirements: 3 Phase

60 Hz

15 amps @ 208 VAC
13.6 amps @ 230 VAC
6.8 amps @ 460 VAC
5.4 amps @ 575 VAC

50 Hz

15.0 amps @ 220 VAC
7.48 amps @ 380, 415, 440 VAC

2.3 MECHANICAL

Dimensions: Length 45 inches (114.3 cm)
Width 33 inches (83.8 cm)
Height 44 inches (111.8 cm)

Weight: 525 lbs (238.1 kg)

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Hydraulic Power Unit

3.0 PREPARATION FOR USE

The HPU is shipped completely assembled and only the following steps are required to make the unit operational.

3.1 SERVICING RESERVOIR

Fill the reservoir with the correct fluid until fluid level is slightly above the minimum oil level mark.

3.2 CONNECTING ELECTRICAL LEADS

Install plug onto the electrical cord and check for proper motor rotation by "bumping" the on-off switch. Correct motor rotation is indicated by an arrow on pump motor adapter. If rotation is not correct, change any two of the three input leads at the plug or inside the electrical component box.

NOTE: *Balanced three phase voltage must be available to prevent overheating and damage to the motor.*

Voltage unbalanced between phases occurs when the voltages differ from one another. Some reasons for imbalance are:

- 1. Unequal loading of each phase.*
- 2. Poor connections in the supply.*
- 3. Single phase condition caused by blown fuses or bad connections.*

If these conditions occur in the incoming power system, a protective device, such as a voltage monitor, should be installed on the machine to prevent motor damage.

4.0 OPERATION

Due to the complexity, differences, and ongoing changes in aircraft hydraulic systems, no attempt has been made to relate to any specific aircraft operation. It is suggested that this manual and the HPU be studied thoroughly in order to obtain optimum benefit of the various features. By combining an understanding of the HPU and the aircraft hydraulic system, many services not mentioned in this manual may be performed. Refer to the hydraulic schematic, front panel controls, and internal components pages for clarification while reading this manual.

4.1 GENERAL COMMENTS

Most questions or problems concerning hydraulic power units are usually caused by improper training or understanding of hydraulics. The following comments are given to aid in obtaining maximum benefits from the hydraulic power unit.

4.1.1 Training

Be sure that all personnel who will use the machine read the operating manual and receive training. We encourage customers to call Tronair to discuss any operating or testing requirements.

4.1.2 Use of the HPU Reservoir

It is suggested that the integral reservoir be used whenever possible. Use of this reservoir eliminates any possibility of cavitation of the pump. Most complaints of pump noises are due to fluid restrictions in the aircraft systems when using the aircraft reservoir. Also, if the integral reservoir is used, the HPU will run considerably cooler. This occurs because the pump case drain oil is directed to the reservoir instead of the pump return. The only compromise in using the HPU reservoir is that the aircraft system reservoir must be serviced after testing, which is standard procedure.

4.0 Operation continued on following page.

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Hydraulic Power Unit

4.0 OPERATION (con't)

4.2 PRELIMINARY ADJUSTMENTS AND OPERATIONS

The following are basic to the operation of the HPU and should be thoroughly understood. The pressure and flow controls have lock nuts to prevent rotation of the control shafts during operation. These nuts should be moved away from the pump during adjustments of flow or pressure in order to eliminate binding of the control shafts.

4.2.1 Flow Control Adjustment

1. Open bypass valve.
2. Select "Hydraulic Power Unit" position with reservoir selector valve.
3. Start HPU.
4. Adjust flow control for maximum desired flow. Observing the flowmeter, read flow (gallons per minute) directly from flowmeter scale. Be sure the control shaft locknut is loose during adjustment. Tighten after adjustment to maintain setting.

4.2.2 Pressure Control Adjustment

1. Open bypass valve.
2. Select "Hydraulic Power Unit" position with reservoir selector valve.
3. Start HPU.
4. Close bypass valve.
5. Adjust pressure control for desired pressure. Be sure the control shaft locknut is loose during adjustment. Tighten after adjustment to maintain setting.

NOTE: *Once the flow and pressure controls have been adjusted, it is not necessary to change these settings after each operation unless desired.*

4.2.3 Reservoir Selector Valve Operation

Operation of the reservoir selector valve allows the operator to select either the aircraft reservoir (Closed Loop) of the HPU reservoir (Open Loop).

CAUTION!



The reservoir selector valve should only be operated when the HPU is NOT running. The operation of the reservoir selector valve should be done prior to starting the HPU.

4.2.3.a Aircraft Reservoir Position (Closed Loop)

In this position, the HPU is dependent on the aircraft reservoir and system for an adequate supply of fluid. Cavitation, due to an inadequate fluid supply from the aircraft, may be indicated by erratic indication of the system pressure gauge or flowmeter. Usually, the aircraft fluid supply will be restricted due to small return oil lines in the aircraft. Sometimes this problem can be minimized or eliminated by pressurizing the aircraft reservoir with air.



CAUTION!

If the aircraft reservoir is pressurized, DO NOT EXCEED the aircraft manufacturer's recommendations.

If the aircraft reservoir cannot be pressurized or the cavitation persists, decrease the flow control setting until the cavitation is eliminated.

4.2.3 Reservoir Selector Valve Operation continued on following page.

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4.0 OPERATION

4.2 PRELIMINARY ADJUSTMENTS AND OPERATIONS

4.2.3 Reservoir Selector Valve Operation (con't)

4.2.3.b HPU Reservoir Position (Open Loop)

In this position, the HPU reservoir supplies oil to the pump and accepts return oil from the aircraft. It is desirable to operate the HPU in this mode since it eliminates any possibility of cavitation.

Since the HPU reservoir is vented to atmosphere and the aircraft is at a higher level, it is normal for the aircraft reservoir to drain into the HPU reservoir. It is, therefore, necessary to be sure that sufficient room is available in the HPU reservoir to accommodate the additional fluid.



CAUTION!

The aircraft system reservoir must be serviced after completion of operational testing.

In the "HPU Reservoir" position, faster landing gear swings are usually possible since there is no restrictions to flow at the pump inlet.

On most aircraft, the aircraft reservoir may usually be serviced by disconnecting the return hose. Normally servo leakage or operation of a hydraulic component will allow some flow to the aircraft reservoir. Caution should be observed if this method is used.

WARNINGS!



- **When using the HPU reservoir, it may be possible to overfill the aircraft reservoir if several landing gear swings are done in a short time period.**
- **Always wait approximately 15 seconds between gear swings to allow the aircraft reservoir to drain into the HPU.**
- **Do not change the reservoir selector valve position while the machine is running.**

4.2.4 Bypass Valve Operation

The bypass valve is used for unloading the pump flow in conjunction with the flowmeter.

4.2.4.a Start Up Operation

The bypass valve should be opened prior to starting the HPU in order to allow the motor to start under a no load condition.

4.2.4.b Shut down Operation

Prior to shutdown, the bypass valve may be opened to bleed off any residual system pressure.

CAUTION!



Excessive heat, which could damage machine components, will be generated if the bypass valve is partially opened or is used for regulating flow or pressure.

- **Use the flow and pressure controls for regulation.**
- **Use the bypass valve for unloading the system.**

4.0 Operation continued on following page.

Model: 5130
Hydraulic Power Unit

4.0 OPERATION (con't)

4.3 SAMPLE VALVE

A sample valve is provided on the rear of the unit to obtain a fluid sample for analysis or inspection. In order to obtain a representative fluid sample, it is suggested that American National Standard number B93.19-1972 be followed.

4.4 BLEEDING AIR FROM SYSTEM

Rapid fluctuations of the pressure gauge and flowmeter are indications of cavitation or entrapped air in the hydraulic lines and/or components. Air may enter the system when:

- Operating the unit with insufficient oil in the reservoir.
- Changing a component on the aircraft.
- Changing the hose connections and/or couplings.

To Easily Purge the Unit of Air:

1. Fill reservoir to recommended level.
2. Open bypass valve.
3. Place reservoir selector valve in "Hydraulic Power Unit" position.
4. Start unit and adjust flow control to maximum position.
5. Run unit for five (5) minutes and shut off.
6. If additional bleeding is required, proceed with the following steps:
 - a. Connect the pressure and return hoses together. (Kits containing the necessary fitting(s) are available from Tronair)
 - b. If the unit is equipped with pressure and return ball valves, open the ball valves prior to starting the unit.



WARNING!

Failure to open the return ball valves will cause hose or valve rupture. Property damage and personal injury can result.

- c. Place the reservoir selector valve in the "Hydraulic Power Unit" position.
- d. Open the bypass valve on the instrument panel
- e. Start unit and adjust flow control to maximum position.
- f. Close the bypass valve and allow the unit to run for 5 minutes.

Under some conditions where a large amount of air has entered the system, the pump may not be able to draw an initial prime and will not pump. If this occurs, it may be necessary to fill the pump inlet line with fluid.

4.0 Operation continued on following page.

4.0 OPERATION (con't)

4.5 ABBREVIATED OPERATING INSTRUCTIONS

These instructions may be used for fast reference after a thorough understanding of the HPU operation has been achieved.

4.5.1 Initial Adjustments

1. Set flow control (Section 4.2.1).
2. Set pressure control (Section 4.2.2).

4.5.2 Prior to Starting

1. Select reservoir valve position (Section 4.2.3).
2. Open bypass valve (Section 4.2.4).

4.5.3 Operation

1. Start HPU.
2. Close bypass valve.

4.5.4 Shut Off

1. Open bypass valve.
2. Stop HPU.

4.6 OPTIONS

The following options are available. Refer to the appropriate option description for operation information.

4.6.1 Dual System (Option C) Operation

The Dual System option allows control of fluid flow to aircraft with two hydraulic systems. The systems consist of two sets of hoses and valves located in the pressure and return systems. The valves are mounted on the rear of the hydraulic power unit and are of the 90 degree ball type. The valves are open when the operating handle is in line with the valve.

Although both systems may be operated simultaneously, usually only one system is required at any one time. If both valve sets are open simultaneously, the pump output will be divided between the two systems. Also, cross flow between the reservoirs may occur if a reservoir level or pressure differential exists. Select valve positions prior to starting machine.

To Operate the Dual System:

1. Before starting machine, open pressure and return valves of the *same system*.



WARNING!

Ensure pressure and return hoses of the *same system* are paired and used together.

2. After completing tests on one system, shut the machine **OFF** before selecting the second system.

Model: 5130
Hydraulic Power Unit

4.0 OPERATION

4.6 OPTIONS (con't)

To Operate the Dual System (continued):



WARNING!

Never open or close dual system valves without shutting off the Hydraulic Power Unit. Damage to the aircraft system or reservoir may result if either return line valve is closed while the machine is running.

3. If equipped with the **Dual System Crossover Check (Option D)**, separate pressure gauges are located after each system pressure shut off valve. This allows bleed down pressures to be read when the pressure valves are closed. Follow aircraft manufacturer's instructions.

4.6.2 Hourmeter (Option F – 60 Hz)

The Hourmeter records operating hours of the HPU. The main use of the Hourmeter is to schedule filter changes.

4.6.3 Pyrometer (Option K)

The Pyrometer indicates fluid temperature in the return system. It is normal for this temperature to increase when the aircraft is not demanding any flow and the HPU is holding pressure.

CAUTION!

If this temperature rises to 150° F:



- 1. Operate from HPU reservoir or,**
- 2. Open the bypass valve or,**
- 3. Cycle the landing gear a few times or,**
- 4. Shut off the HPU.**

4.6.4 Hand Pump (Option M)

This pump is used primarily for filling aircraft reservoirs after testing, bleeding brakes, etc.

4.0 OPERATION

4.6 OPTIONS (con't)

4.6.5 Return Back-Pressure with Sight Gauge (Option T) Operation

The Return Back-Pressure with Sight Gauge option consists of two valves and a pressure gauge mounted on the rear of the machine, a sight glass mounted on the control panel, and a third hose for connection to the aircraft reservoir. The two valves are connected in parallel and consists of a 90 degree ball valve and an adjustable pressure relief valve.

Refer to the HPU Hydraulic Schematic. With the ball valve open, all aircraft return oil will flow through this valve. If, however, the valve is closed, the flow path will be through the pressure relief valve. The pressure relief valve may be adjusted to obtain any desired return line back pressure as specified in the Citation maintenance manual. The return line back-pressure may be read on the adjacent pressure gauge.

Since the Citation has an onboard unloading valve, the **Hydraulic Power Unit reservoir should be used for all tests**. This allows the pump to operate in an unload condition most of the time, therefore, extending pump life.

To Fill Aircraft Reservoir:

1. Be sure that there is sufficient oil in the HPU reservoir.
2. Both bypass valves open, start machine and adjust flow control for approximately one (1) gpm (3.8 lpm).
3. Close bypass valve and return line ball valve. This will force oil returning from the aircraft through the return pressure relief valve, causing a back pressure in the aircraft return line.
4. Be sure that the aircraft system has unloaded. If not, adjust pressure control for 1,500 psi (103.4 bars) until aircraft does unload, indicated by a drop in the panel system pressure gauge.
5. Read the back pressure gauge and adjust the back pressure valve for 20 – 25 psi (1.4 – 1.7 bars), if necessary. This action, with the one (1) gpm (3.8 lpm) flow rate, will fill the aircraft reservoir with an overflow visible through the HPU panel mounted sight glass.
6. When little or no air is visible in the sight glass, the aircraft reservoir is filled. The return line ball valve may now be opened and aircraft testing may start. The flow control should be adjusted for a higher desired flow.
7. For any tests requiring line back pressure, close the return line ball valve and adjust the return line back pressure valve.

NOTE: *Since the Citation reservoir is pressurized, the return line ball valve may be closed prior to shut down to prevent the aircraft reservoir from draining.*

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Hydraulic Power Unit

5.0 MAINTENANCE

5.1 GENERAL MAINTENANCE

- The hydraulic power unit should be maintained in a safe and clean condition at all times.
- Locate and correct the source of any and all leaks.
- Inspect hoses and electrical cord periodically for damage and wear. Replace as required.

5.2 FILTER MAINTENANCE

The main pressure filter has a replaceable element that is *not cleanable*. It is recommended that this filter be changed after every 25 hours of operation, annually, or whatever a reduced maximum flow is noticed. Refer to the parts list for the correct filter element number.

5.3 LUBRICATION

The swivel casters are equipped with grease fittings which should be lubricated annually.

5.4 STORAGE

In the event that the HPU will not be used for 12 months or longer, the reservoir may be drained. The unit should then be appropriately covered in order to maintain cleanliness.

6.0 TROUBLE SHOOTING

6.1 NO FLOW OR PRESSURE

- Flow control set too low:..... Increase flow setting
- Motor running in wrong direction: See Section 3.0 "Preparation for Use"
- Insufficient oil in reservoir: See Section 3.0 "Preparation for Use"
- Air in hydraulic lines: See Section 4.4 "Bleeding Air From System"
- Faulty pump: Repair or replace pump

6.2 FLUCTUATING PRESSURE OR FLOW

- Pump cavitation: See Section 4.2.3.a "Aircraft Reservoir Position"
- Air in hydraulic lines: See Section 4.4 "Bleeding Air From System"

6.3 UNIT OVERHEATS

- Running unit for long time periods Cycle landing gear or other components without operating aircraft components: periodically or allow unit to cool.
- Bypass valve partially open: See Section 4.2.4 "Bypass Valve Operation".

- NOTES:**
1. *Running time under deadhead condition can be increased substantially by selecting the "Hydraulic Power Unit" position; reservoir selector valve.*
 2. *When a pressure compensated pump is required to hold pressure without any flow delivery (dead headed condition) it is normal for the pump case drain flow and temperature to increase. By selecting the "Hydraulic Power Unit" position of the selector valve, all of the oil in the reservoir is utilized for cooling.*

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7.0 PARTS LIST INDEX

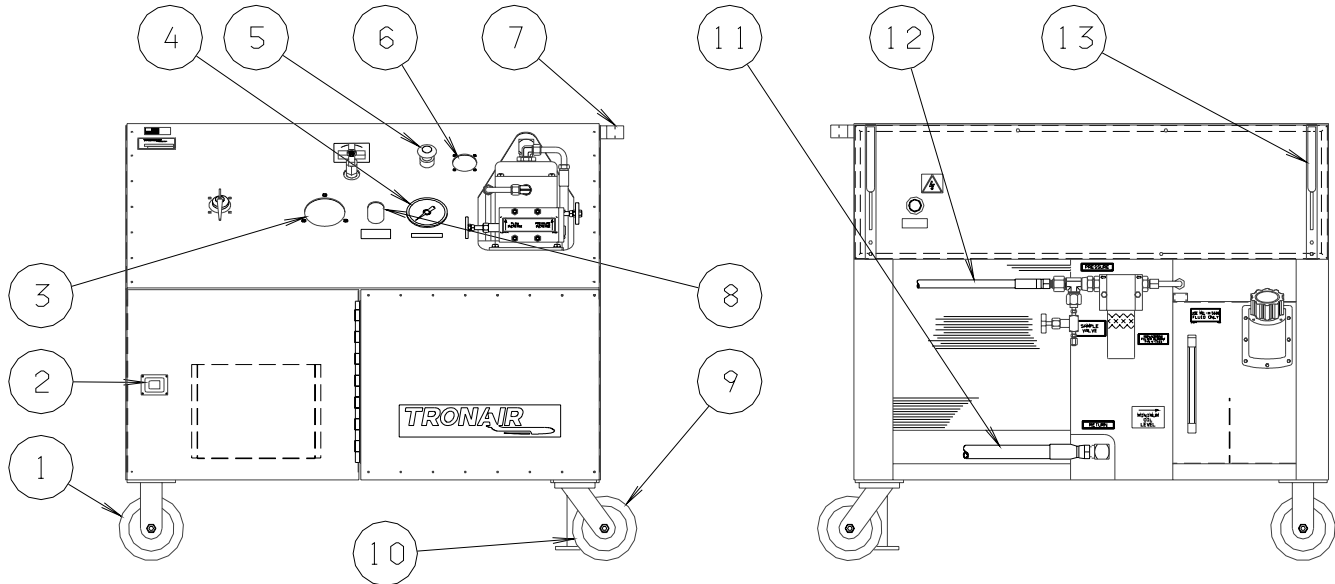
Reference the following pages for ordering information of Replacement Parts and Kits.

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

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External Components

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



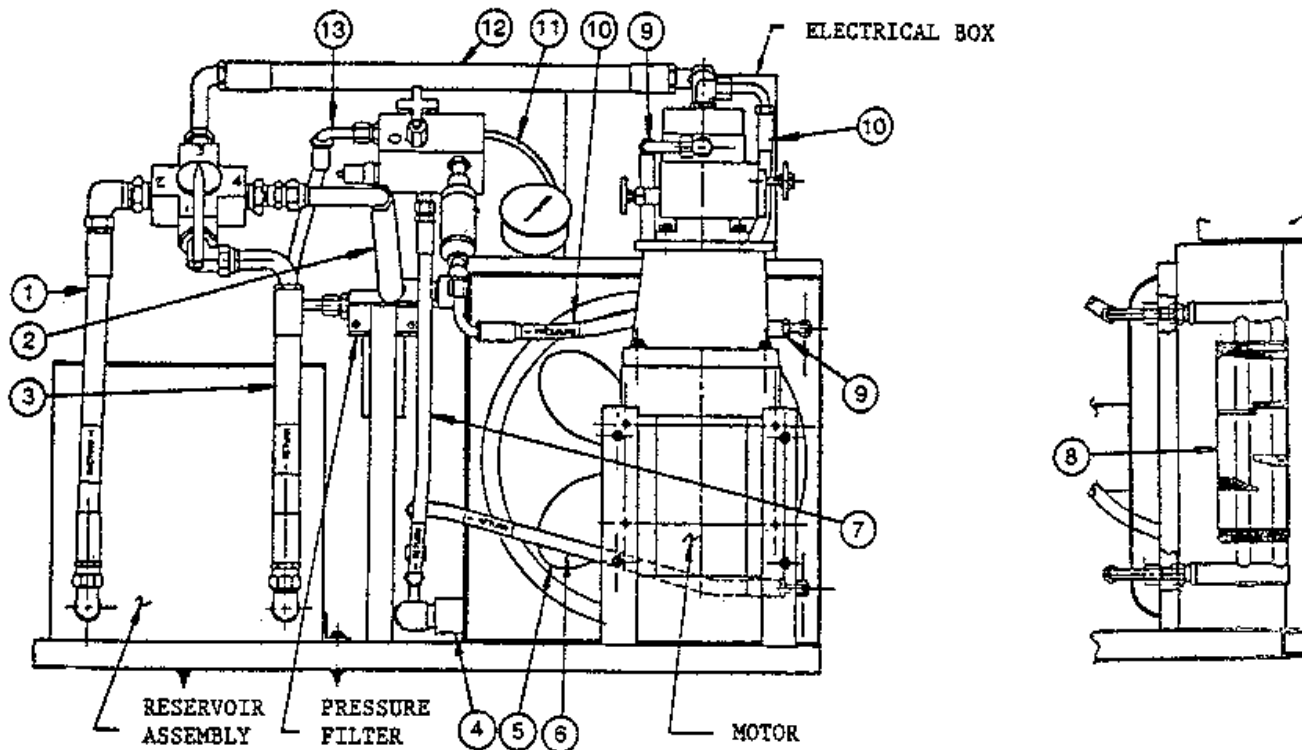
Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	U-1013.....	Caster (Rigid).....	2
2.....	H-1207.....	Latch.....	1
3.....	HC-1134-02.....	Pyrometer (Option K)	1
4.....	HC-1399	Gauge, Pressure.....	1
5.....	EC-1058	Switch, On/Off.....	1
	EC-1225	Lamp, Replacement.....	1
6.....	EC-1060	Hourmeter (Option F)	1
7.....	H-1584.....	Handle	1
8.....	HC-2153	Flowmeter	1
9.....	U-1014.....	Caster (Swivel).....	2
10.....	H-1175.....	Lock, Floor.....	1
11.....	TF-1041-01*180.....	Hose, Return.....	1
	TF-1041-01*300.....	Hose, Return (Option A).....	1
12.....	TF-1041-09*180.....	Hose, Pressure	1
	TF-1041-09*300.....	Hose, Pressure (Option A)	1
13.....	Z-1296-01.....	Hanger, Hose.....	2

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Internal Components

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

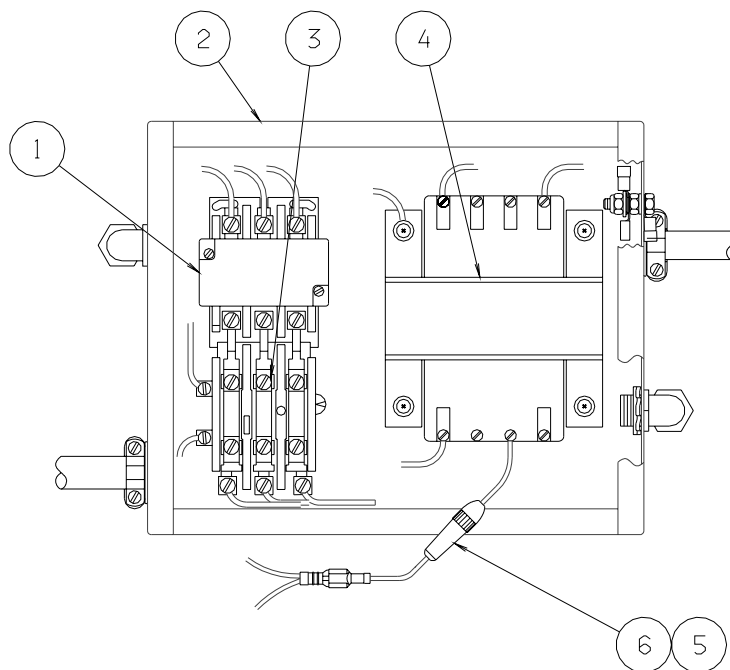
ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	TF-1041-01*20.8.....	Assembly, Hose	1
2.....	TF-1041-07*16.2.....	Assembly, Hose	1
3.....	TF-1041-07*17.3.....	Assembly, Hose	1
4.....	HC-1214.....	Cooler.....	1
5.....	EC-1229.....	Fan.....	1
6.....	TF-1041-10*32.0.....	Assembly, Hose	1
7.....	TF-1041-09*28.0.....	Assembly, Hose	1
8.....	HC-1388-01.....	Cooler (Case Drain)	1
9.....	TF-1041-08*22.5.....	Assembly, Hose	1
10.....	TF-1041-40*30.0.....	Assembly, Hose	1
11.....	TF-1041-05*16.0.....	Assembly, Hose	1
12.....	TF-1041-06*29.0.....	Assembly, Hose	1
13.....	TF-1041-42*22.0.....	Assembly, Hose	1

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Electrical Components

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	EC-1203-04-F	Starter	1
2	EC-1067	Box, Electrical	1
3	See Table A	Heater	3
4	See Table B	Transformer	1
5	EC-1328	Holder, Fuse	1
6	EC-1210-08	Fuse	1

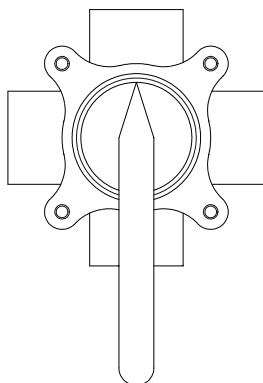
Table A — Heaters	
Part Number	Used With:
EC-1207-E61	208V/60 Hz
EC-1207-E60	230V/60 Hz, 200V/50 Hz, 220V/50 Hz
EC-1207-E51	380V/50 Hz, 415V/50 Hz, 440V/50 Hz, 460V/60 Hz
EC-1207-E47	575V/60 Hz

Table B — Transformers	
Part Number	Used With:
EC-1074	220V/50 Hz, 230V/60 Hz, 440V/50 Hz, 460V/60 Hz
EC-1075	208V/60 Hz 575V/60 Hz, 200V/50 Hz 380V/50 Hz, 400V/50 Hz, 415V/50 Hz

NOTE: Specify proper voltage and Hz when ordering.

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Reservoir Selector Valve

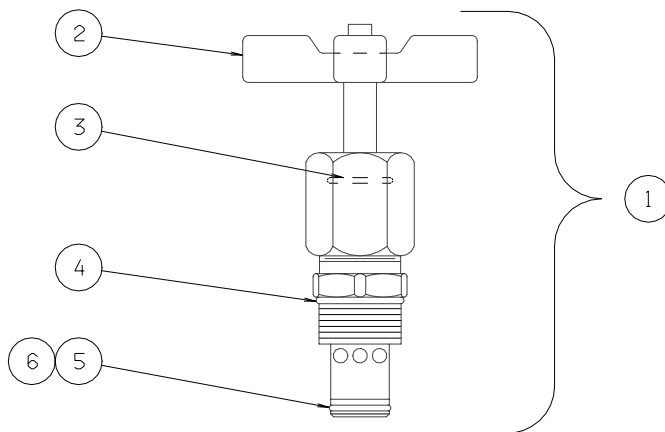


FLUID	PART NUMBER	DESCRIPTION	QTY
Aviation Phosphate Ester, Type IV	K-2140	Kit, Replacement Selector Valve	1

Note: *This valve is not field serviceable. Contact Tronair for service information.*

Bypass Valve

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

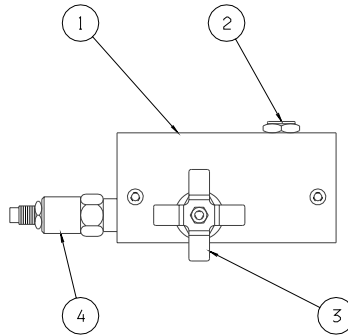
ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-1711	Assembly, Bypass Valve.....	1
2	HC-1130	Handle, Valve.....	1
3	HC-2006-012.....	O-ring	1
4	HC-2013-910.....	O-ring	1
5	HC-2006-014.....	O-ring	1
6	HC-2020-014.....	Ring, Backup.....	1

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Control Module

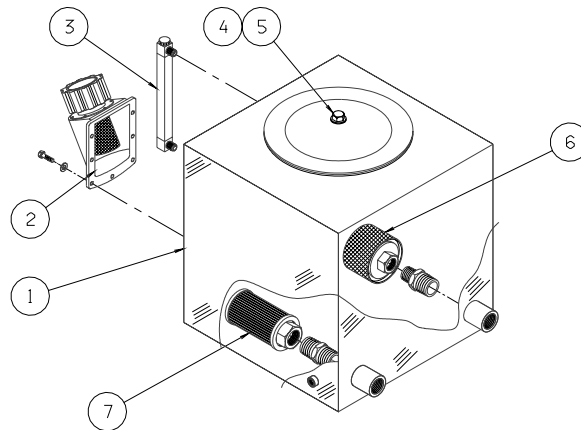
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1	J-1476	Body, Valve	1
2	Z-1712	Valve, Check	1
3	Z-1711	Valve, Bypass.....	1
4	Z-1713	Valve, Pressure Relief.....	1

Reservoir Assembly



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

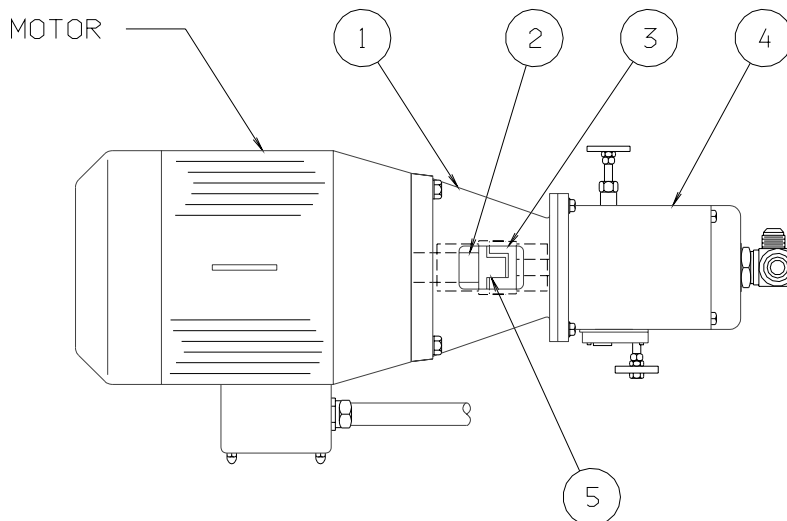
ITEM	PART NUMBER	DESCRIPTION	QTY
1	H-1164	Reservoir	1
2	HC-1106	Filler, Breather	1
3	HC-1383-08.....	Gauge, Sight.....	1
4	H-1733-02	Gasket, Cover.....	1
5	H-1735-02	Washer, Nylon	1
6	HC-1029	Diffuser	1
7	HC-1107	Strainer	1

TRONAIR

Model: 5130
Hydraulic Power Unit

Pump/Motor Assembly

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1	HC-1393-11	Mount, Pump/Motor	1
2	H-2224-03	Coupling, Body (Motor)	1
3	H-2224-01	Coupling, Body (Pump)	1
4	K-1651	Kit, Hydraulic Pump with Hardware	1
5	H-2227	Coupling—Spider	1

PUMP REPLACEMENT PARTS

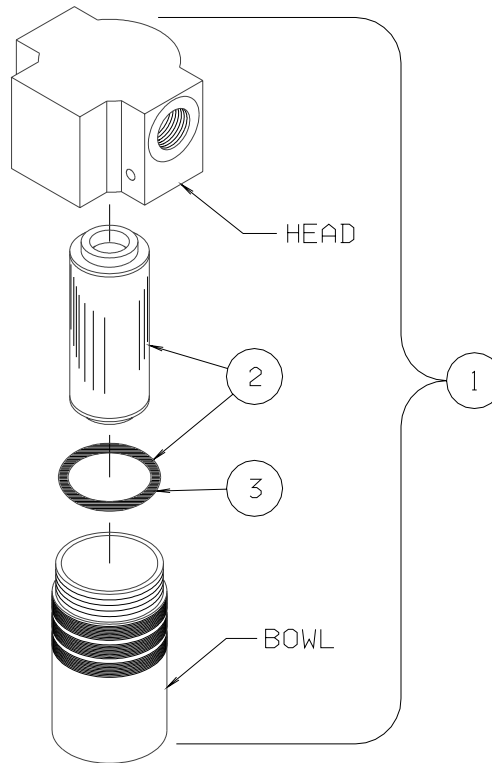
PART NUMBER	DESCRIPTION	QTY
HC-1543	Shaft Seal	1
♦ K-1995	Kit, Gaskets & O-rings	1

NOTE: All bolts are Grade 5.

- ♦ See Appendix II – Pump manufacturer's service booklet for additional information of Hydraulic Pump and additional repair kits.

Filter Assembly

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1	HC-1084	Assembly, Filter	1

FILTER REPLACEMENT PARTS

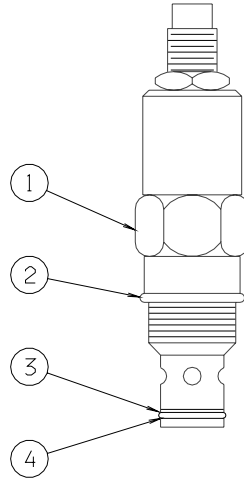
ITEM	PART NUMBER	DESCRIPTION	QTY
2	K-1415	Kit, Filter Element	1
3	HC-2006-138	O-ring, Bowl	1

NOTE: Item 3 is included in Item 2.

Model: 5130
Hydraulic Power Unit

Pressure Relief Valve

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

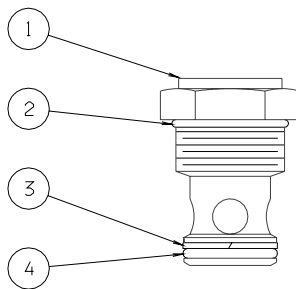


Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	HC-1353-02.....	Valve, Pressure Relief.....	1
2.....	HC-2013-910.....	O-ring.....	1
3.....	HC-2006-014.....	O-ring.....	1
4.....	HC-2020-014.....	Ring, Backup.....	1

Check Valve

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



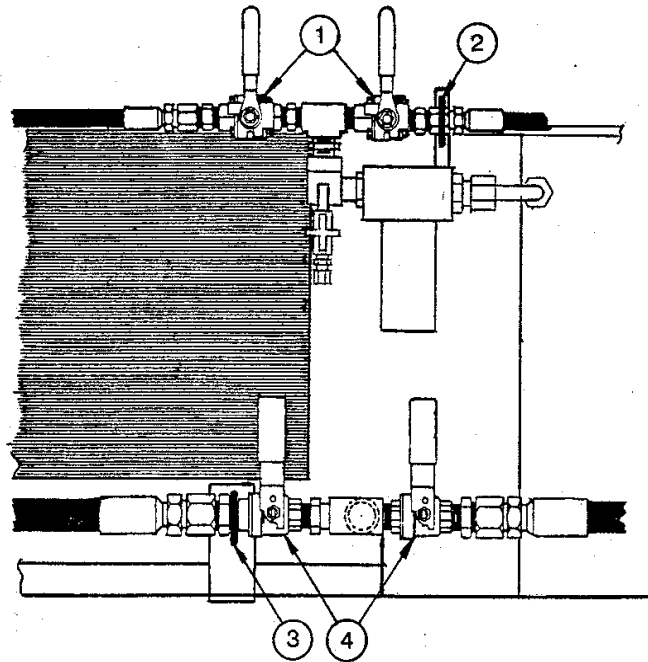
Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	Z-1712.....	Valve, Check.....	1
2.....	HC-2013-910.....	O-ring.....	1
3.....	HC-2006-014.....	O-ring.....	1
4.....	HC-2020-014.....	Ring, Backup.....	1

TRONAIR

Dual System (Option C)

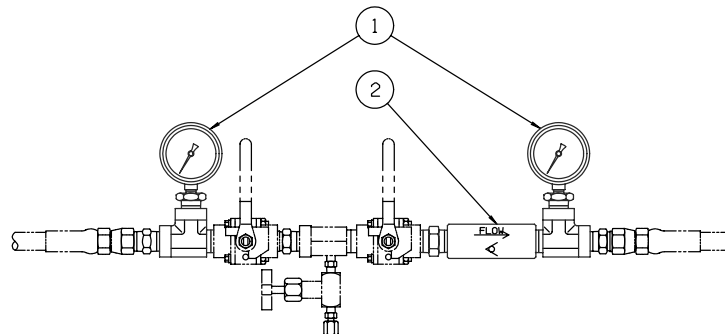
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	HC-1654-04	Valve, Ball (Pressure)	2
2	G-1009-09	U-Bolt	1
3	G-1009-18	U-Bolt	1
4	HC-1111	Valve, Ball (Return)	2

Dual System Crossover Check (Option D)

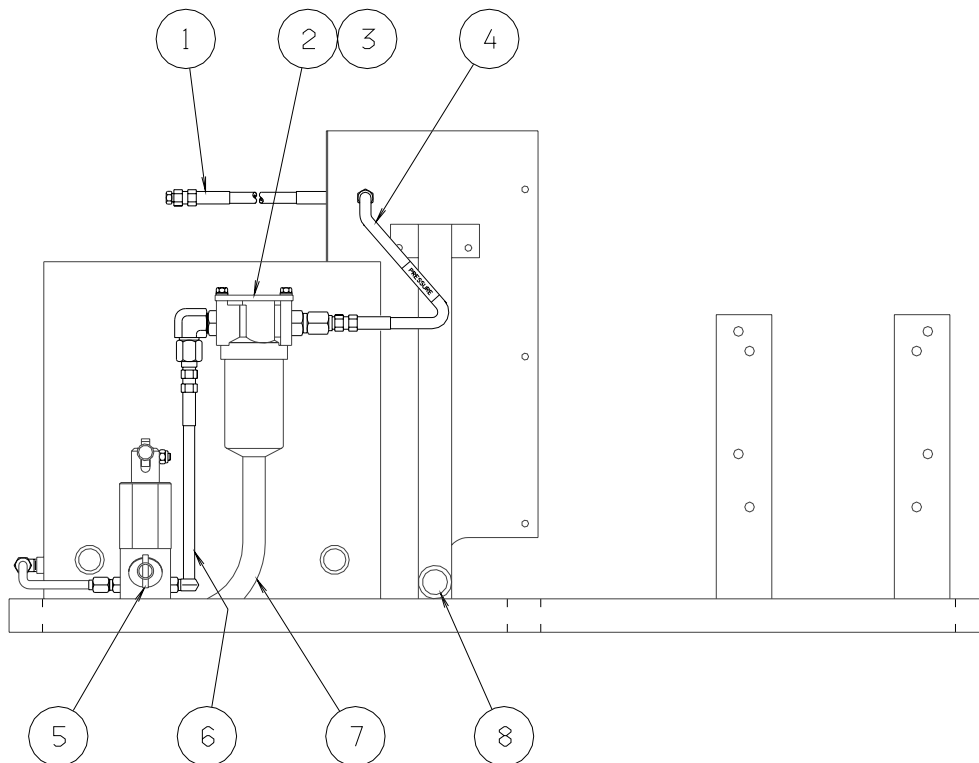
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	HC-1042	Gauge, Pressure	2
2	HC-1059	Valve, Check	1

Reservoir Fill Hand Pump (Option M)

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



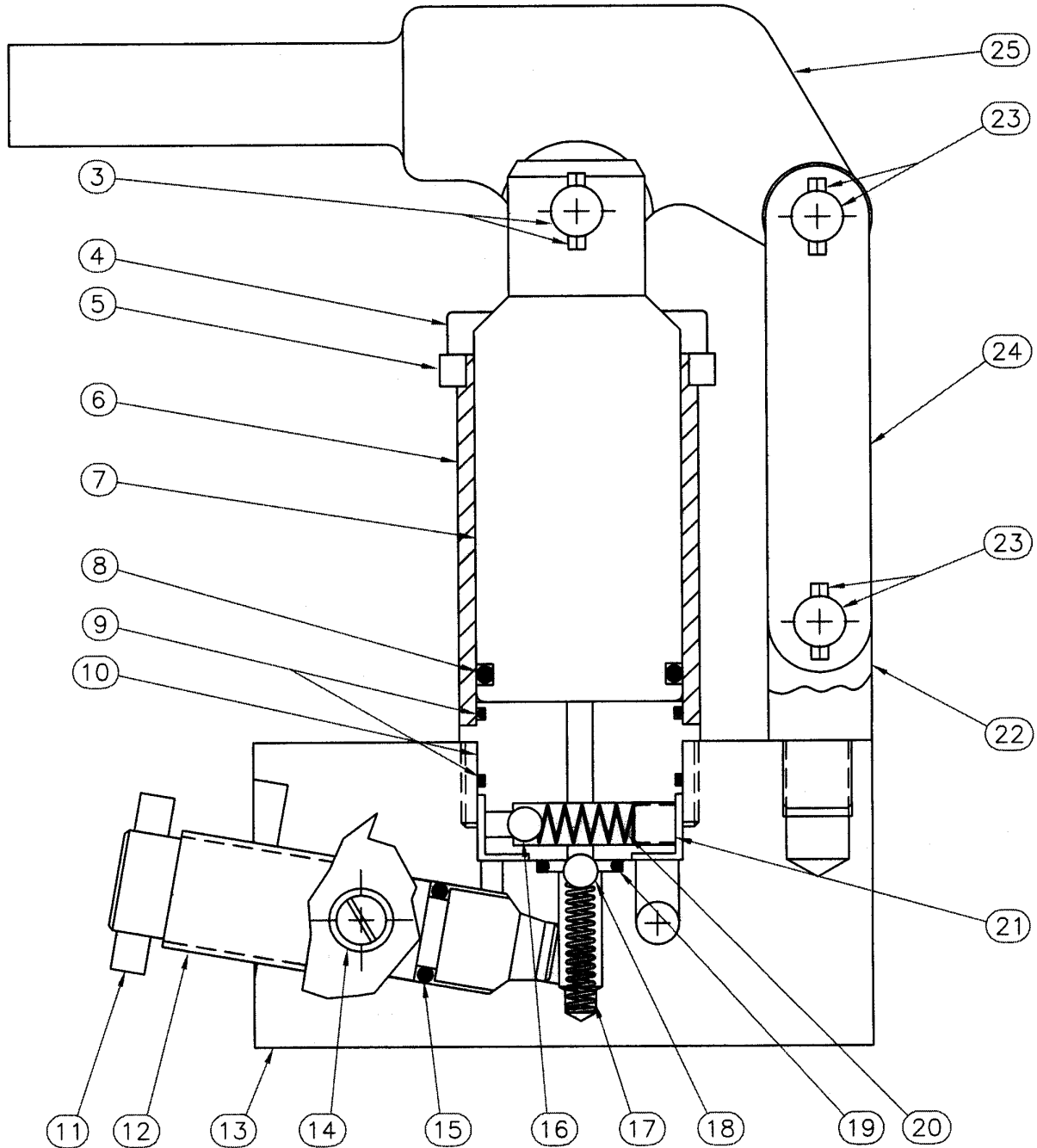
Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	TF-1041-01*180.....	Hose	1
2.....	HC-1480	Assembly, Filter	1
3.....	K-3099.....	Kit, Replacement Filter Element.....	1
4.....	TF-1041-05*27.0.....	Hose	1
◆ 5.....	HC-2162	Hand Pump 500 psi.....	1
	HK-3700.....	Kit, Hand Pump Seal.....	1
6.....	TF-1041-05*09.9.....	Hose	1
7.....	Z-2881-01	Weldment, Filter Bracket	1
8.....	H-1009-01	Handle, Pump.....	1

◆ Reference Pages 26 & 27 for Hand Pump exploded view and additional Replacement Parts and Kits.

Hand Pump (Option M)

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Hand Pump (Option M)

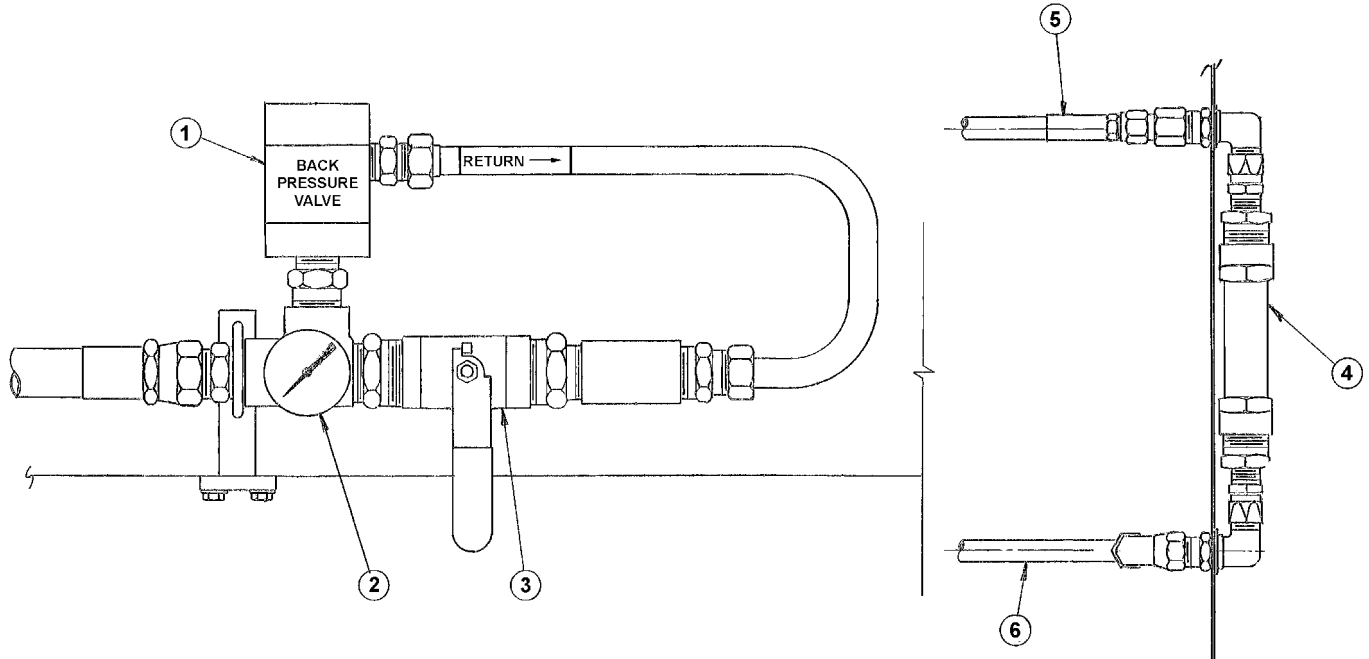
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
3.....	531-000.....	Clevis Pin Assembly	1
4.....	568-120.....	Tie Rods	4
5.....	582-125.....	Retaining Flange	1
6.....	504-120.....	Tube	1
7.....	507-121.....	Piston.....	1
10.....	503-120.....	Valve Block.....	1
11.....	<i>Reference Only</i>	<i>Available only in Assembly</i>	1
13.....	CXD-020023-001.....	Body	1
14.....	530-000T	Retainer	1
12.....	5M2-B01-0500T.....	Screw Release	1
21.....	540-000.....	Plug	1
22.....	508-000.....	Pivot	1
SRK-PSB-120		Kit, O-ring; consists of:	
8.....	.....	O-ring, BUNA.....	1
9.....	.....	O-ring, BUNA.....	2
15.....	.....	O-ring, BUNA.....	1
19.....	.....	O-ring, BUNA.....	1
SRK-PHR-120		Kit, Check Ball/Spring; consists of:	
16.....	.....	Intake Check Ball.....	1
17.....	.....	Outlet Check Spring.....	1
18.....	.....	Outlet Check Ball.....	1
20.....	.....	Intake Check Spring.....	1
SRK-PL-000T		Kit, Bracket; consists of:	
23.....	.....	Linkage Pin Assembly	2
24.....	.....	Strap	2
25.....	.....	Bracket Handle.....	1
511-240T		Kit, Handle; consists of:	
<i>Not Shown</i>.....	.....	Handle Grip.....	1
<i>Not Shown</i>.....	.....	Handle	1

Return Back-Pressure and Sight Gauge (Option T)

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

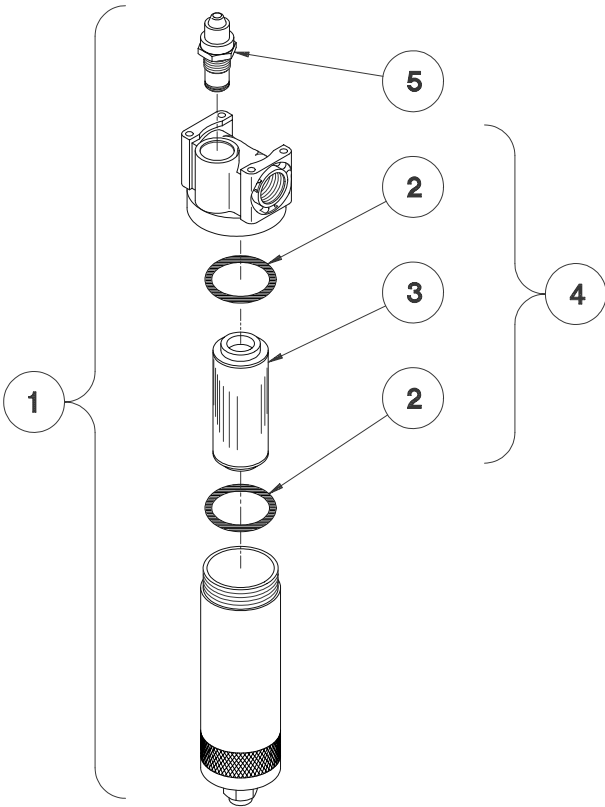


Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	HC-1118.....	Valve, Back-Pressure	1
2.....	HC-1117.....	Gauge, Pressure.....	1
3.....	HC-1111.....	Valve, 1 1/4 Ball	1
4.....	HC-1115.....	Indicator, Sight Flow.....	1
5.....	TF-1041-02*27.5.....	Assembly, Hose (#6).....	1
6.....	TF-1041-02*34.0.....	Assembly, Hose (#6).....	1
Not Shown.....	TF-1041-02*180.....	Assembly, Hose (#6).....	1

Return Filter Assembly (Option W)

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Part numbers given for Aviation Phosphate Ester, Type IV Fluid Type Units only.

ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	HC-1477	Assembly, Filter	1

FILTER REPLACEMENT PARTS

ITEM	PART NUMBER	DESCRIPTION	QTY
2.....	HC-2006-142.....	O-ring.....	2
3.....	HC-1476	Element, Filter.....	1
4.....	K-3097.....	Kit, Filter Element.....	1
5.....	HC-1851	Indicator, Clogging	1

NOTE: Item 4 is included with Item 3.



APPENDIX I

Instrument
Certification
Notice



APPENDIX II

Oilgear
Manual



APPENDIX III

Lincoln
Motor
Manual



APPENDIX IV

MSDS
Hydraulic
Fluid