

# E-SERIES INTENSIFIER PUMP

## INSTALLATION, OPERATION & MAINTENANCE MANUAL



**INTERFACE DEVICES, INC.** 230 Depot Road, Milford, CT 06460  
Ph: (203) 878-4648, Fx: (203) 882-0885, E-mail: [info@interfacedevices.com](mailto:info@interfacedevices.com)  
[www.interfacedevices.com](http://www.interfacedevices.com)

**IMPORTANT! FILE THIS MANUAL IN A SAFE PLACE FOR FUTURE SERVICE & PARTS NEEDS  
ALWAYS REFERENCE THE SERIAL NUMBER FOR SERVICE & PARTS REQUESTS**

**Pump Serial Number: \_\_\_\_\_**

### STATEMENT OF WARRANTY

INTERFACE DEVICES, INC. (hereafter, the factory) warrants it's products to be free from defects in material and workmanship under normal use and service for a period of one (1) year from date of shipment from the factory. Any defect discovered after the warranty period has expired will be deemed to be outside the above coverage. No goods claimed to be under warranty shall be accepted for return unless authorized by the factory beforehand.

Upon discovery of a defect (other than freight damage) or a shortage of an item received in the original factory container, the purchaser shall, within (10) calendar days, deliver notice of the defect or shortage. Damaged freight claims must be placed with the freight carrier and will not be honored by the factory. If after due investigation of a claim of defect or shortage is found valid, the factory, at it's sole discretion, may discharge it's entire obligations to the purchaser by either repair or replacement of the defective product or component and for shortages by furnishing a replacement of the missing quantity (FOB, factory).

This express warrantee supersedes and is in lieu of all other remedies and warranties, including the implied warranties of merchantability and fitness for a particular purpose, and liability for negligence. IN NO EVENT SHALL THE FACTORY BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL LOSSES, EXPENSES OR DAMAGES INCLUDING DAMAGES FOR PERSONAL INJURY OR COMMERCIAL LOSS.

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**\*This is the only preventative maintenance task required. Please read carefully**

## **SECTION 1.0 INTRODUCTION**

### 1.1 DESCRIPTION

IDI Air/Oil Intensifier Systems are the latest concept in hydraulic power units. These units need no external electrics or plumbing to operate. Just plug in shop air and the unit is ready to go. The manifold design yields an inherently small package that can include air and hydraulic gauges, air regulator, exhaust mufflers, and all necessary pneumatic and hydraulic valving. Thus, the end user enjoys rapid service and little maintenance.

### 1.2 The Pump

A complete, ready to operate pump is just 12 in long and, with the proper ratio, can reach pressures up to 10,000 psi at flow rates to satisfy a wide range of requirements. It's output is rated at 1.67 Hyd. horsepower with maximum air consumption of 28 SCFM.

IDI Air Driven Pumps are available with self-contained reservoirs, sized from 20 to 120 cubic inches and including twin internal 40 micron suction filters. These reservoirs are normally vented like the large tank style but can be furnished with bellows allowing the pump to be operated at any attitude. Weighing just 15 pounds (30 CI reservoir, filled), the units are ideally suited for portable "all-attitude" operation.

## **SECTION 2.0 INSTALLATION AND OPERATION**

### 2.1 PRIOR TO OPERATION

IDI Air Driven Pumps come complete and ready to operate. The only customer requirement is filling of the reservoir and connection of the appropriate air supply and hydraulic system fittings. The air inlet on the pump is ½ NPT.

## 2.2 CHECK LIST

Before operating the unit, complete the following checklist to assure proper and safe operation:

1. Make sure that all hydraulic components (fittings, hoses, valves, etc.) are rated at or above the maximum operating pressure of the power unit.
2. Inlet air pressure must not exceed 150 psig (10 bar). Normal range of supply air pressure shall be not less than 50 and not over 100 psig (4-7 bar).
3. All air supply fittings should be of non-corrosive materials and of pipe size adequate for the pump.
4. Air supply must be free of contaminants and an air filter/separator installed as close as possible to the pump.
5. Air lubrication should NOT be used.
6. The self-contained (or remote option) air regulator MUST be turned out completely counter-clockwise (CCW) before the supply air source is turned on.

## 2.3 RESERVOIR FILLING AND DRAINING

It is recommended that a light grade hydraulic oil be used. (Mobil DTE 24<sup>®</sup>, Shell Tellus 32<sup>®</sup>, or similar) Consult your distributor or the manufacturer if your application requires other than light viscosity petroleum based fluids.

### 2.3.1 ONE, TWO AND FIVE GALLON RESERVOIRS

Remove filler cap and pour clean oil into the reservoir. View the fluid level in the sight gauge on side of reservoir.

To drain, use the pump to evacuate the tank while operating at reduced air pressure until the pump begins to cavitate (rapid cycle), then shut the pump down. One, two and five gallon reservoirs are fitted with a drain plug at the bottom of the tank.

### 2.3.2 SELF-CONTAINED VENTED RESERVOIRS

Remove vent/filler cap. Pour clean oil through a strainer into reservoir until full. Replace vent/filler cap. Top-off the reservoir after system is bled (Sec. 2.4).

To drain, use the pump as above, or invert the entire pump assembly to drain through the fill port.

## 2.4 BLEEDING THE UNIT

Once all the above requirements are met and the reservoir is full, make sure the air regulator is completely turned out counterclockwise (CCW) before opening the air supply. Slowly turn in the air regulator clockwise (CW) until the pump just begins to reciprocate. Crack open the appropriate hydraulic bleed valve or fittings while at this minimal pressure until all air is bled.

Next, turn in (CW) the air pressure regulator until NO MORE THAN 500 psi hydraulic pressure is reading on the system gauge. Cycle the hydraulic system several times. STOP. Turn out (CCW) the air pressure regulator again and bleed the system again as above. Repeat until no air is evident. Top off the reservoir as required.

## **SECTION 3.0 MAINTENANCE AND SERVICE**

### 3.1 GENERAL

The modular design of these units yield maximum service with minimal maintenance. Upon receipt of the unit, inspect the assembly thoroughly. If physical damage is evident, do not operate the unit. Consult your distributor or the manufacturer for replacement parts or corrective action.

#### 3.1.1 AIR SPOOL LUBRICATION

**The only preventative maintenance task for the pump is to re-grease the air spool assembly every 1000 hours of operation. A lithium based waterproof grease should be used for this task.**

For complete instructions, refer to drawing P00-9023 at the end of this manual.

## 3.2 HYDRAULIC VALVE ADJUSTMENT

The valves on IDI Air Driven Pumps are either cartridge or sub-plate mounted and are factory preset to your specifications. In the unlikely event a valve needs to be replaced or reset, turn off the pump, bleed off all system pressure and use the following instructions:

### 3.2.1 PRESSURE RELIEF VALVE (Marked 'RV' – Not supplied on all units)

This valve is incorporated in the system as a safety valve, and should NEVER be used to adjust hydraulic system operating pressure. Setting of this valve should be done only under a “no-flow” (ie: stalled) condition.

With the system under normal operating pressure, turn in (CW) the air pressure regulator until the RV starts to weep fluid back to the reservoir (evidenced by screeching sound). Reduce air pressure below this point before making any increase in setpoint and NEVER exceed system component pressure ratings.

### 3.2.2 KICK DOWN RELIEF VALVE (RV1) AND SEQUENCE VALVE (SQV 1)

**\*\*\* NOTE \*\*\*** For 'Kick Down Relief Valve' (RV1) only, be sure an orifice disk is present in the valve cavity faced radius side down before installing a replacement.

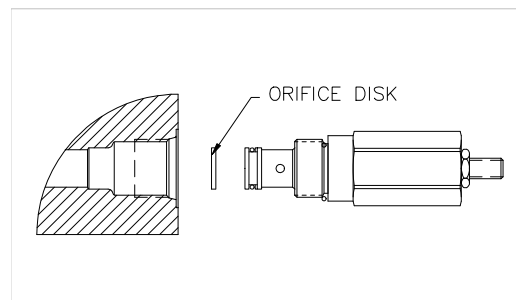


Figure 3.2.1

After the valve is installed in the appropriate cavity, loosen the lock nut on the adjustment screw and turn the stem out (CCW) completely. Then, turn back in (CW) one turn.

Turn the pump on and slowly turn in (CW) the air pressure regulator until the 'kick down' occurs. Make note of the pressure and de-pressurize the system completely before any more adjustment is made. Turn the stem in (CW) in small steps to raise the 'kick down' pressure as required. Please note that the system must be de-pressurized completely between setpoint changes. Tighten lock-nut when complete. Top off reservoir as required.

### 3.2.1.1 CALCULATION OF 'KICK DOWN' PRESSURE FOR RV1 OR SQV1 VALVES (HI/LO PUMPS ONLY)

To calculate the 'kick down' pressure required to achieve proper HI/LO pump operation, first consult the model tag for the available ratio. For example, if the model number of the unit is E060/10, then the HI ratio is 60 and the LO ratio is 10.

To obtain the 'kick down' pressure (KDP), multiply the final operating pressure (OP) times the (LO) ratio number, divide the result by the (HI) ratio number, then multiply this result by the fixed value of (0.9) to yield the (KDP).

In equation form:  $((OP * LO) / HI) * (0.9) = (KDP)$

#### Example

Determine the 'kick down' pressure for a pump model E060/10 operating a filter press system in which the final desired ram pressure is 5000 psi.

Solution  $((5000 * 10) / 60) * 0.9 = 749 \text{ psi KDP}$

Thus, set the 'Kick Down' valve as close as possible to 749 psi to supply maximum output during LO pressure pumping before shifting to HI when the actual load is compressed.

### 3.2.3 HYDRAULIC DUMP VALVE

This optional valve is configured either (NO) Normally Open (pump run, valve closed) or (NC) Normally Closed (pump run, valve open) from the factory. A configuration drawing at the back of this manual details possible field modifications.

### 3.3 TROUBLE SHOOTING GUIDE

If a problem arises with the unit, the following guide should help to make an accurate diagnosis and a proper remedy:

SYMPTOM	CORRECTIVE ACTION
Pump "stalls" after extended no-flow period.	<ul style="list-style-type: none"> <li>• Check that supply air pressure exceeds 50 psi</li> <li>• Check that Air Cap valve spool is not stuck in the null position; if so, push the spool to the end of it's stroke manually.</li> <li>• Perform spool lubrication task in 3.1.1</li> <li>• Check for flow through the air pressure regulator.</li> </ul>
Pump brings system up to normal operating pressure but "chugs" intermittently.	<ul style="list-style-type: none"> <li>• Check all system components for leaks including valves that may be bypassing internally.</li> <li>• If symptom is coupled with evidence of fluid leakage from the air cap muffler, then internal rod seals are worn excessively; repair/replace without delay to prevent internal damage to the pump.</li> </ul>
SYMPTOM	CORRECTIVE ACTION
Pump runs but does not generate pressure.	<ul style="list-style-type: none"> <li>• Pump is airbound; check fluid reservoir level and bleed.</li> <li>• Pump relief valve is set below operating pressure or leaking; reduce air supply pressure; reset the RV setpoint; replace the RV if faulty.</li> <li>• Pump internal check valves are jammed with foreign material; remove and clean; be sure that reservoir does not contain any foreign material.</li> <li>• Dump valve is leaking; check air supply to dump valve; check for debris in valve seat (see diagram).</li> </ul>
Pump Air Cap leaking air continuously.	<ul style="list-style-type: none"> <li>• Leak from air regulator; replace diaphragm.</li> <li>• Leak from muffler(s); spool valve seals worn or contaminated; clean/replace seals.</li> </ul>



## **SECTION 4.0 GENERAL ASSEMBLY**

This section is provided to give a general overview for all the service needs of your IDI Air Driven Pump. An exploded view of all basic parts is included at the back of this manual.

The general assembly of IDI Air Driven Pumps consists of four major sub-assemblies: Air Cap, Air Body, Ratio Plate and Hydraulic Body. It is most efficient if each of these four components is entirely sub-assembled prior to final assembly.

The Ratio Plate Assembly is normally received from the factory complete for replacement. DO NOT disassemble as damage to the seals may occur and could void the warranty.

### **4.1 MOUNTING RATIO PLATE TO HYDRAULIC BODY**

Make sure that all components are clean and dry. Spread a thin film of waterproof grease on the rod, hydraulic piston and bore. Place static seals (O-rings) in the appropriate counterbores in the Hydraulic Body.

While holding the Ratio Plate sub-assembly by the air-end piston, align the actuator to its counterbore and gently rock the hydraulic piston into the bore. Slide the Ratio plate down the shaft until contact is made with the Body. Next, install the four mounting bolts (1/4-20 x 1") and lock-washers into the center pattern and snug to just compress the lock-washers. If there are two more bolt holes along the bottom edge, install these bolts now, without lock-washers, and snug.

Lastly, tighten all bolts in small increments using a cross-type pattern to a final torque of approx. 15 ft/lb.

### **4.2 MOUNTING THE AIR BODY TO THE RATIO PLATE**

Slip body gasket over the air-end piston and align to the edges. Apply a thin film of waterproof grease to the bore of the Air Body and lay atop the piston with chamfered bore edge down. Holding the Air Body and piston with both hands, "squeeze" the body over the air piston seal and wiggle down until contact is made with the Ratio Plate gasket.

Make sure that the serialized face of the Air Body is facing up. On later models, body pins assure proper alignment.

At this point, tie down the Air Body through the Ratio Plate to the Hydraulic Body with the four mounting bolts (5/16-18 x 1 3/4") and lock washers. Snug the bolts until the lock-washers are compressed, NOT torqued.

### 4.3 MOUNTING THE AIR CAP TO THE AIR BODY

Be sure the Air Cap is fully sub-assembled before mounting it to the Air Body. Place another gasket on the Air Body and align to the edges. Place the Air Cap on the Air Body with the air regulator toward the top.

#### 4.3.1 The Pump Final Assembly

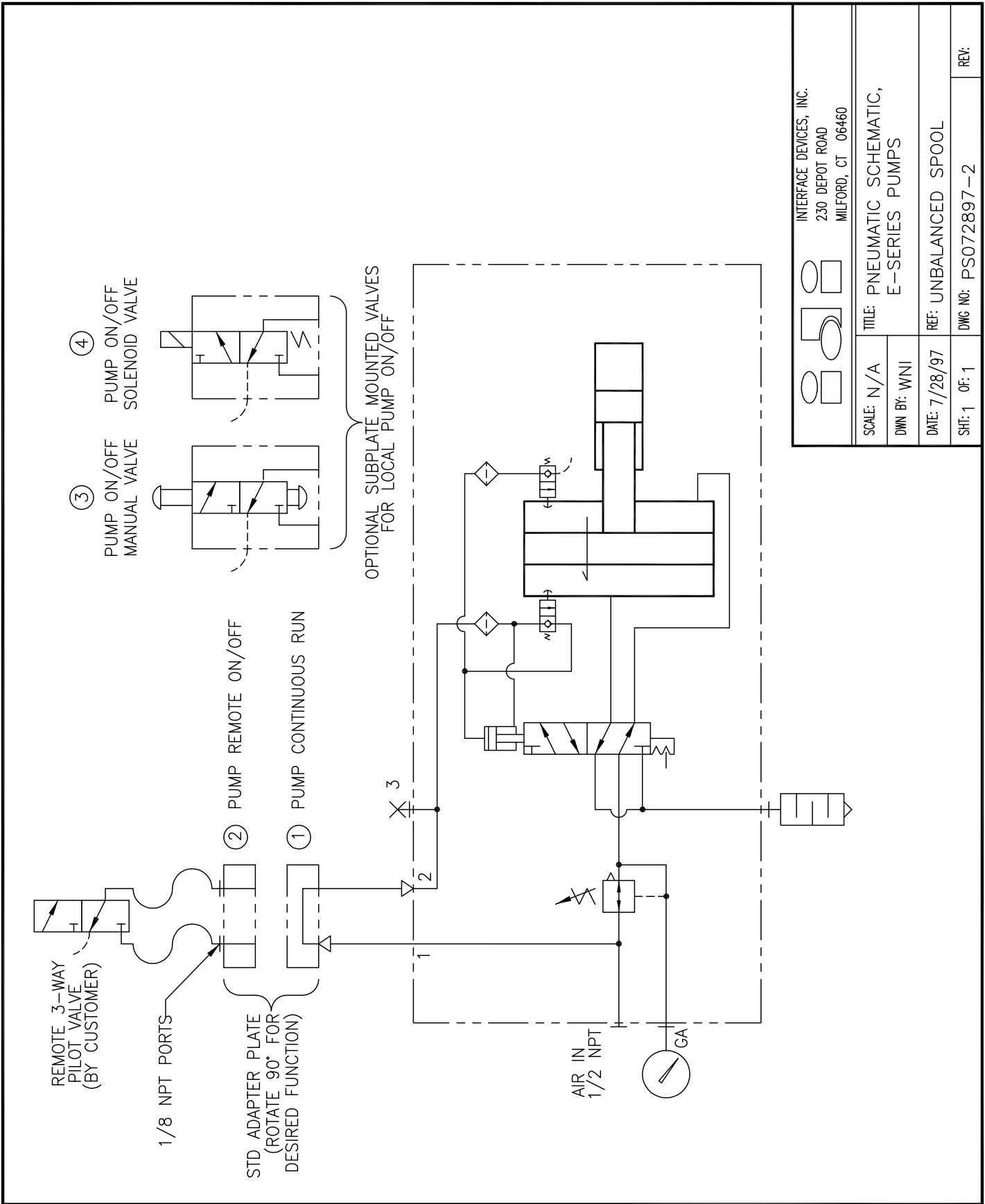
Align the bottom faces of and tie down the Air Cap to the Air Body using the four mounting bolts (5/16-18 x 1") and lock-washers. Snug the bolts using a cross pattern.

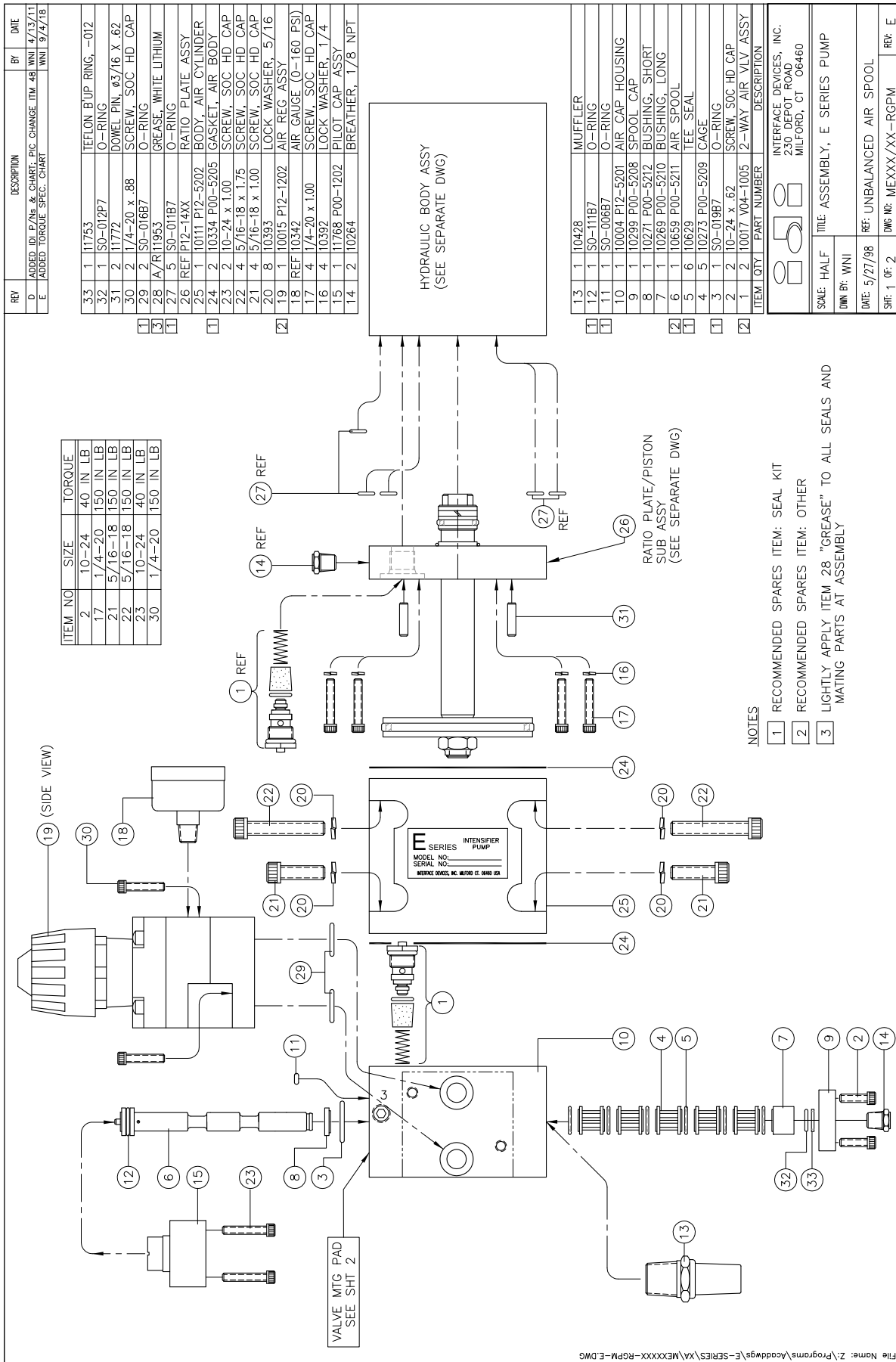
Connect a temporary air supply to the pump (NO OIL YET) and be sure the air regulator is turned out fully (CCW). Slowly turn in (CW) the air regulator until the pump barely reciprocates. Then, while running, torque all eight Air Body bolts to 120-150 in/lb using a cross pattern. If the pump stalls or binds during torquing, remove all air pressure, loosen all eight bolts and restart the procedure.

## SECTION 5.0 RECOMMENDED SPARE PARTS

QTY	PART NUMBER	DESCRIPTION
1	10072	Air Reciprocation Valve Kit
2	10017	2-Way Air Valve
1	DSK-xxx/xx*	Dynamic Seal Kit
1	SSK-xxx/xx*	Static Seal Kit
1	10750	Air Regulator Repair Kit

\*Insert Pump Ratio.

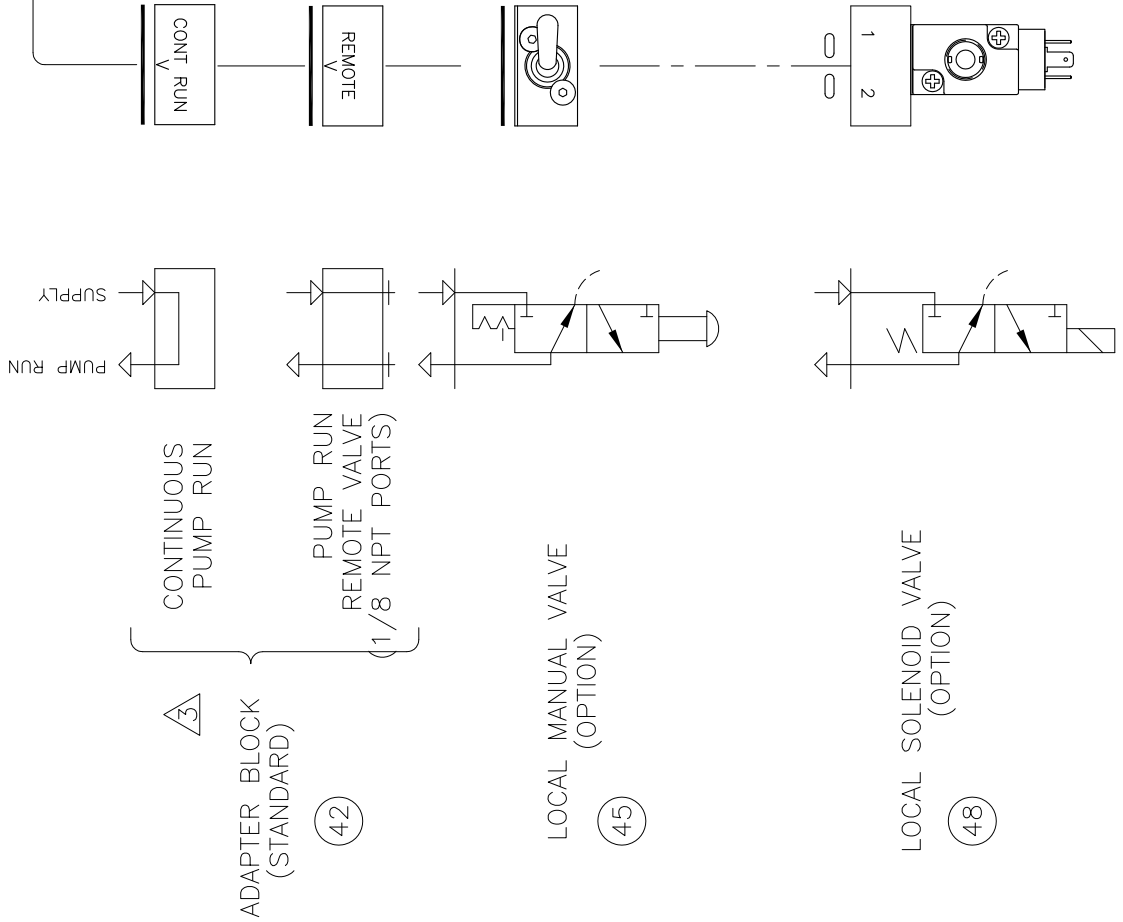
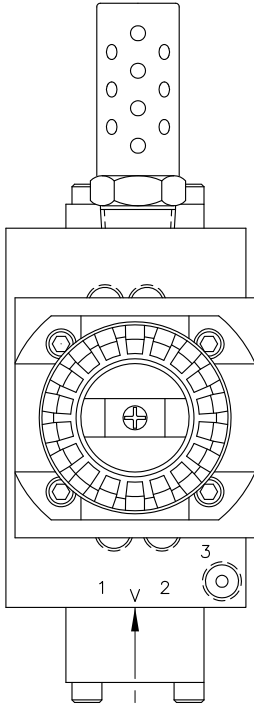




REV	DESCRIPTION	BY	DATE
D	ADDED IDI P/Ns & CHART. PIC CHANGE ITM 48	WNI	4/13/11
E	ADDED TORQUE SPEC. CHART (SHEET 1)	WNI	9/4/18

**NOTES**

- 1 PORT 3 IS COMMON TO PORT 2.  
CONNECT PORT 3 TO REMOTE AIR PILOT OPERATED HYDRAULIC RELEASE VALVE
- 2 MOUNTING SCREWS AND GASKET/O-RINGS ARE FURNISHED FOR EACH OPTION
- 3 ROTATE ADAPTER BLOCK TO MATCH "V" STAMPED ON AIR CAP FOR THE DESIRED FUNCTION



VOLTAGE	ITEM 48	P/N
24 VDC	11835	V04-1003
120 VAC	11836	V04-1003
240 VAC	11918	V04-1003

ITEM	QTY	PART NUMBER	DESCRIPTION
50			
49			
48	1	SEE CHART	SOL AIR VALVE, ASSY
47			
46			
45	1	10743 V04-1001	MAN TOGGLE SWITCH, ASSY
44			
43			
42	1	11235 P00-1206	BLOCK ASSY, ADAPTER
41			

INTERFACE DEVICES, INC.  
230 DEPOT ROAD  
MILFORD, CT 06460

SCALE: HALF  
DWN BY: WNI  
DATE: 5/27/98  
SHT: 2 OF: 2

TITLE: ASSEMBLY, E SERIES PUMP  
REF: UNBALANCED AIR SPOOL  
DWG NO: MEXXXX/XX-RGPM  
REV: E

REV	DESCRIPTION	DATE
A	ADDED NEW IDI P/NS; DWG NO WAS EP-450	7/23/01
B	ITEM 5 WAS C0480-063-1000M	2/23/07

ITEM	QTY	PART NUMBER	DESCRIPTION
11	2	6-32 x .50	SCREW, SOC HD CAP
10	1	10264	BREATHER, 1/8 NPT
9	2	10-24 x .88	SCREW, SOC HD CAP
8	1	SO-010P9	O-RING
7	2	SO-010B7	O-RING
6	1	SO-115B7	O-RING
5	1	10664	COMPRESSION SPRING
4	2	SO-020B7	O-RING
3	1	10284 V02-5002	CAP
2	1	10538 V02-5004	PISTON/NEEDLE
1	1	10113 V02-5001	HOUSING & SEAT

DESCRIPTION: A SUBPLATE MOUNTED, NORMALLY CLOSED, ZERO-LEAKAGE, 10,000 PSI HYDRAULIC DUMP VALVE-AIR PILOT OPERATED (65 PSI MIN).

SCALE: FULL  
 DWN BY: TWH  
 DATE: 5/12/93  
 REF:

TITLE: DUMP VALVE ASSY  
 (NORMALLY CLOSED)

INTERFACE DEVICES, INC.  
 230 DEPOT ROAD  
 MILFORD, CT 06460

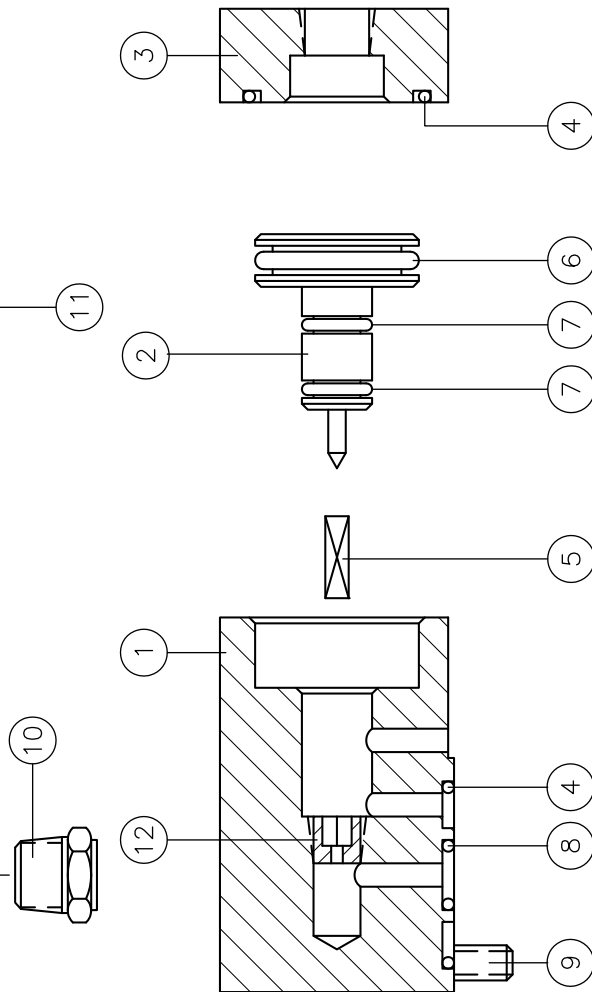
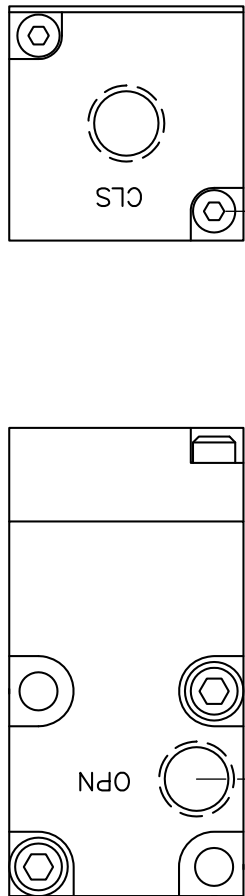
ASSEMBLY PART NUMBER: 10028

SHI: 1 OF: 1      DWG NO: V02-1000      REV: B

Z:\Programs\Acaddwgs\Valves\DUMP\V02-1000-B.DWG Plotted: Feb 23, 2007 2:08PM

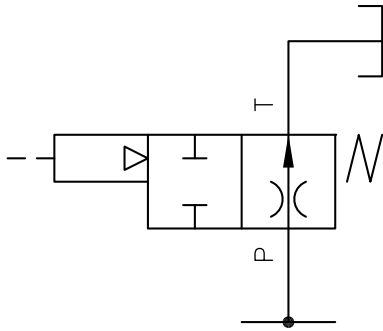
REV	DESCRIPTION	DATE
A	ITEM 5 WAS FINGER SPRING #F0864-006 ADDED NEW IDI P/NS; DWG NO WAS EP-451	5/30/01
B	ITEM 5 WAS LC-024A-4	2/27/07
C	ADDED CHART & ITM 12	3/11/13



DESCRIPTION: A SUBPLATE MOUNTED, NORMALLY OPEN, ZERO-LEAKAGE, 10,000 PSI HYDRAULIC DUMP VALVE-AIR PILOT OPERATED (65 PSI MIN).

ASSEMBLY PART NO	ORIFICE	ITM 12 P/N
10029	.046	10444
10027	.062	10446

(STD)



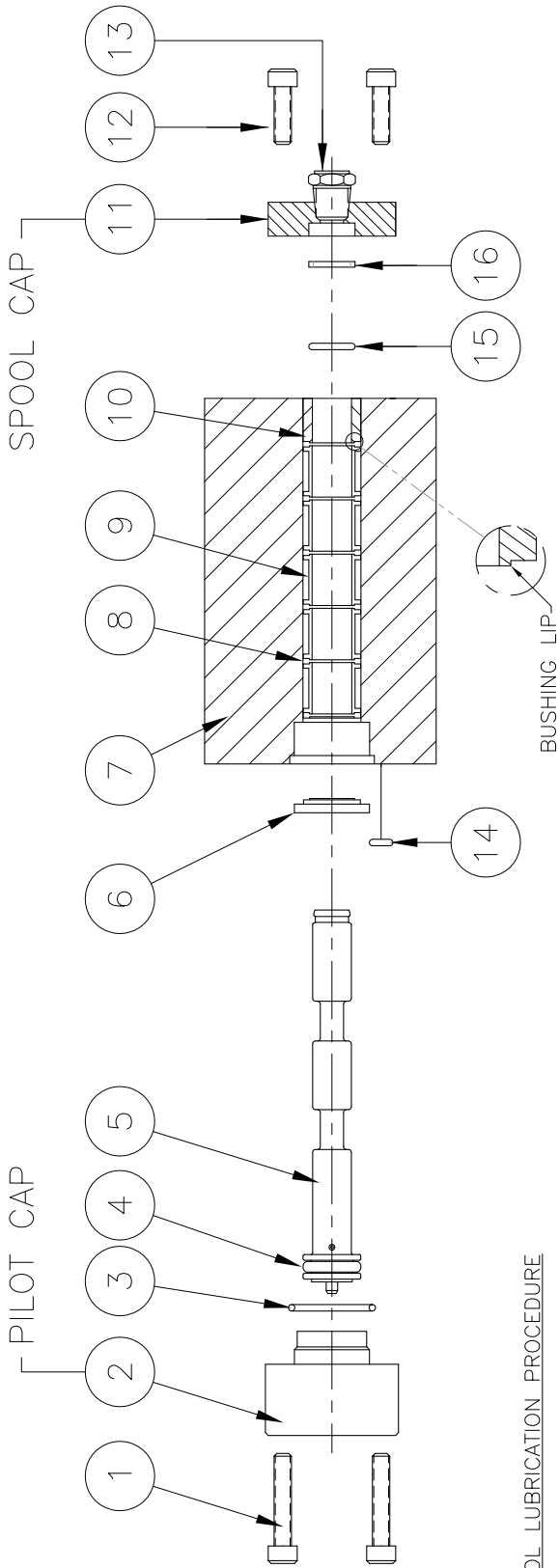
N.O. HYD SYM

ITEM	QTY	PART NUMBER	DESCRIPTION
12	1	SEE CHART	ORIFICE PLUG
11	2	6-32 x .50	SCREW, SOC HD CAP
10	1	10264	BREATHER, 1/8 NPT
9	2	10-24 x .88	SCREW, SOC HD CAP
8	1	SO-010P9	O-RING
7	2	SO-010B7	O-RING
6	1	SO-115B7	O-RING
5	2	10660	COMPRESSION SPRING
4	2	SO-020B7	O-RING
3	1	10284 V02-5002	CAP
2	1	10538 V02-5004	PISTON/NEEDLE
1	1	10113 V02-5001	HOUSING

INTERFACE DEVICES, INC.  
230 DEPOT ROAD  
MILFORD, CT 06460

SCALE: FULL  
DWN BY: TWH  
DATE: 5/12/93  
REF:

SHT: 1 OF: 1  
DWG NO: V02-1001  
REV: C



SPOOL LUBRICATION PROCEDURE

- 1 DISCONNECT AIR SUPPLY
- 2 LOOSEN AND REMOVE SCREWS AND SPOOL CAP (11,12)
- 3 LOOSEN AND REMOVE SCREWS, PILOT CAP AND O-RING (1-3,13,14)
- 5 EXTRACT SPOOL (5), BY PUSHING IT FROM THE SPOOL CAP END USING A BLUNT, SOFT SMALL DIAMETER TOOL.
- 6 CAREFULLY REMOVE THE BUSHINGS, CAGES AND TEE SEALS, (6,8,9,10) ONE AT A TIME. YOU MAY NEED A PICK TYPE TOOL MADE FROM A SOFT MATERIAL SUCH AS BRASS.
- 7 CLEAN ALL THE EXTRACTED PARTS WITH A SUITABLE PARTS CLEANSER
- 8 APPLY WATERPROOF GREASE TO O-RING AND BACKUP RING (15,16)
- 9 INSTALL O-RING AND BACKUP RING (15,16) INTO SPOOL CAP (11)
- 9 INSTALL THE SPOOL CAP (11, 12) DO NOT TIGHTEN - LEAVE APPROX .03" PLAY
- 10 APPLY "WHITE LITHIUM GREASE"\* TO SEALS AND SPOOL (4,5,8)
- 11 REINSTALL THE LONG BUSHING (10) [NOTE ORIENTATION], TEE SEALS (8) & CAGES (9). INSTALL ONE PART AT A TIME, CAREFULLY SEATING EACH PART INDIVIDUALLY. DO NOT REINSTALL THESE PARTS BY PLACING THEM ON THE SPOOL
- 10 INSTALL THE SHORT BUSHING (ITEM 6) AND CONFIRM IT IS SEATED
- 11 REINSTALL AIR SPOOL (5) PRESSING IT IN PLACE TO ALIGN THE SPOOL CAP AND SEALS
- 12 REINSTALL PILOT CAP (2), O-RING AND SCREWS (ITEMS 1-3)  
NOTE ORIENTATION OF PILOT CAP .09ø HOLE TO O-RING (14)
- 10 RETIGHTEN SPOOL CAP SCREWS (ITEM 12)
- 11 RECONNECT AIR SUPPLY

\* RECOMMENDED GREASE:  
DuPont "WHITE LITHIUM GREASE WITH TEFLON" PART # DGW616101

16	1	11753	BU RING, SOLID, -012
15	1	SO-012P9	O-RING (POLY)
14	1	SO-006B7	O-RING
13	1	10264	BREATHER, 1/8 NPT
12	2	10-24 x .62	SOC HD CAP SCR
11	1	10299 P00-5208	SPOOL CAP
10	1	10269 P00-5210	LONG BUSHING
9	5	10273 P00-5209	CAGE
8	6	10629	TEE SEAL
7	REF		AIR CAP HSG
6	1	10271 P00-5212	SHORT BUSHING
5	1	10659 P00-5211	AIR SPOOL
4	1	SO-111B7	O-RING
3	1	SO-019B7	O-RING
2	1	11768 P00-1202	PILOT CAP ASSEMBLY
1	2	10-24 x 1	SOC HD CAP SCR
ITEM	QTY	PART NUMBER	DESCRIPTION

INTERFACE DEVICES, INC.  
230 DEPOT ROAD  
MILFORD, CT 06460

SCALE: HALF TITLE: LUBRICATION INSTRUCTIONS,  
UNBALANCED AIR SPOOL

DWN BY: WNI REF: E & P SERIES PUMPS

DATE: 11/15/16 REV: -  
SHT: 1 OF: 1 DWG NO: P00-9023