

E - SERIES INTENSIFIER PUMP

INSTALLATION, OPERATION & MAINTENANCE MANUAL



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**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: _____

Pump Model Code: _____

Parts & Repairs: (Use the space below to document service history)

1.0 INTRODUCTION	PAGE
1.1 Description.1	
1.2 The E-SERIES Pump.....	1
2.0 INSTALLATION AND OPERATION	
2.1 Prior to Operation	1
2.2 Check List	2
2.3 Reservoir Filling and Draining	2
2.3.1 One, Two, and Five Gallon.....	2
2.3.2 Self-Contained Vented.....	2
2.3.3 Self-Contained Bellows	3
2.4 Bleeding the Unit	4
3.0 MAINTENANCE AND SERVICE	
3.1 General	3
*3.1.1 Air Spool Lubrication.....	3
3.2 Hydraulic Valve Adjustment	4
3.2.1 Kick Down Relief Valve (RV1) and Sequence Valve (SQV1); Calculation of setpoints.....	4
3.2.2 Pressure Relief Valve (RV)	5
3.2.3 Hydraulic Dump Valve	5
3.3 Trouble Shooting Guide.....	6
4.0 GENERAL ASSEMBLY	
4.1 Mounting the Ratio Plate	7
4.2 Mounting the Air Body.....	7
4.3 Mounting the Air Cap	7
4.3.1 E-SERIES Pump Final Assembly	7
4.4 Drawings & Bills-of-Material.....	9

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

SECTION 1.0 INTRODUCTION

1.1 DESCRIPTION

Interface Devices, Inc. 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 E-Series Pump

A complete, ready to operate E-SERIES 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.

The pumps are available with unique 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

The 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 E-SERIES 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[®], Shell Tellus 32[®], 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.

2.3.3 SELF-CONTAINED BELLOWS RESERVOIRS

Remove seal/fill plug (-6 SAE plug on top of Hydraulic Body). Pour oil through a strainer into fill port until bellows is full. Replace seal/fill plug. Bleed the system completely (Sec. 2.4). Top-off the reservoir and be sure seal/fill plug is tight. To drain, remove the seal/fill plug and invert pump to drain. Do NOT use the pump to evacuate the bellows or it may be damaged by excessive vacuum.

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.

*** SPECIAL NOTE *** On HI/LO pump units (those with either “Kick Down” Relief Valves or Sequence Valves) an extra step is required to the bleed process as follows:

Once the pump is bled as above, the internal HI pressure circuit must be bled. The pump will abruptly change pressure when the factory preset “Kick Down” pressure is reached and if air is present, the pump will cycle rapidly. Once the low pressure bleed-off is complete, continue to turn in (CW) the air pressure regulator until the “Kick-down” occurs, normally 700-1000 psi. If the pump suddenly cycles violently then quickly turn out (CCW) the air pressure regulator until ALL system pressure is relieved (bleed-off if necessary). Repeat procedure until “Kick Down” is without stutter.

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.

To perform this task, first remove the left side Air Pilot Cap on the left side of the Air Cap as viewed from the air inlet (Part No. 10298). Extract the Air Spool (Part No. 10659). Extract the Cages and Tee Seals (Part Nos. 10273 & 10629). Clean all the parts and internal cavity. Apply lithium based, waterproof grease to each component and reassemble.

3.2 HYDRAULIC VALVE ADJUSTMENT

The hydraulic valves used on the 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 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 the replacement.

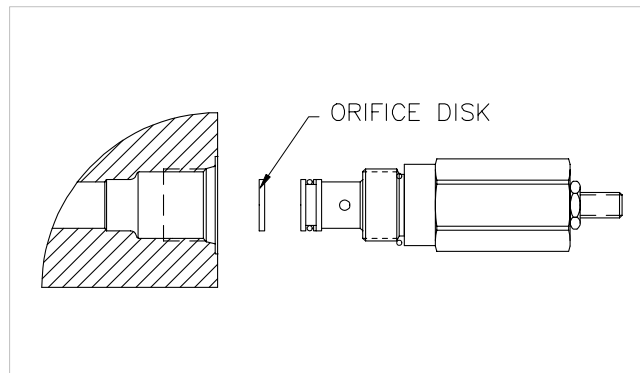


Figure 3.2.1

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 AND 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).

$$\text{In equation form: } ((\text{OP} * \text{LO}) / \text{HI}) * (0.9) = (\text{KDP})$$

Example

Determine the “kick down” pressure for a E-SERIES 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.

3.2.2 PRESSURE RELIEF VALVE (RV)

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.

3.2.3 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 doesn't cycle with air connected after extended non-use period.	<ul style="list-style-type: none"> • Check that supply air pressure exceeds 50 psi • Check that Air Cap valve spool is not stuck in the null position; if so, push the spool to the end of its stroke manually. • Perform spool lubrication task in 3.1.1 • Check for flow through the air pressure regulator.
Pump brings system up to normal operating pressure but "chugs" intermittently.	<ul style="list-style-type: none"> • Check all system components for leaks including valves that may be bypassing internally. • 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.
Pump runs but does not generate pressure.	<ul style="list-style-type: none"> • Pump is airbound; check fluid reservoir level and bleed. • Pump relief valve is set below operating pressure or leaking; reduce air supply pressure; reset the RV setpoint; replace the RV if faulty. • Pump internal check valves are jammed with foreign material; remove and clean; be sure that reservoir does not contain any foreign material. • Dump valve is leaking; check air supply to dump valve; check for debris in valve seat (see diagram).
Pump Air Cap leaking air continuously.	<ul style="list-style-type: none"> • Leak from air regulator; replace diaphragm. • Leak from muffler(s); spool valve seals worn or contaminated; clean/replace seals.

SECTION 4.0 GENERAL ASSEMBLY

This section is provided to give a general overview for all the service needs of the E-SERIES pumps. An exploded view of all basic parts is included at the back of this manual.

The general assembly of all Series 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

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 in.) 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 E-SERIES 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 in.) 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 approx. 20 ft/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.

REV	DESCRIPTION	DATE
A	ITEM 5 WAS FINGER SPRING #R0984-008 ALSO SEE NEW ID# PART NUMBERS	5/30/01

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	50-010D7	O-RING
7	2	50-010B7	O-RING
6	1	50-115B7	O-RING
5	2	LC-024A-4	COMPRESSION SPRING
4	2	50-020B7	O-RING
3	1	10284	CAP
2	1	10538	PISTON/NEEDLE
1	1	10113	HOUSING & SEAT

SOLE FULL

DRW BY: TWH

DATE: 5/12/03

SHT: 1 OF 1

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

TITLE: DUMP VALVE ASSY (NORMALLY OPEN)

DATE: 5/12/03

DRG NO: EP-451

REV: A

ASSEMBLY PART NUMBER 10029

File Name: Z:\PROGRAMS\ACAD\W39\M3B7\X-DUMP.V-NO-ADWG

REV	ASSEMBLY	DATE
A	ADDED NEW IDN PART NUMBERS	7/23/01

NC HYD SYM

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	50-010D7	O-RING
7	2	50-010B7	O-RING
6	1	50-115B7	O-RING
5	1	CO180-063-1000M	COMPRESSION SPRING
4	2	50-020B7	O-RING
3	1	10284	CAP
2	1	1053B	PISTON/NEEDLE
1	1	10113	HOUSING & SEAT

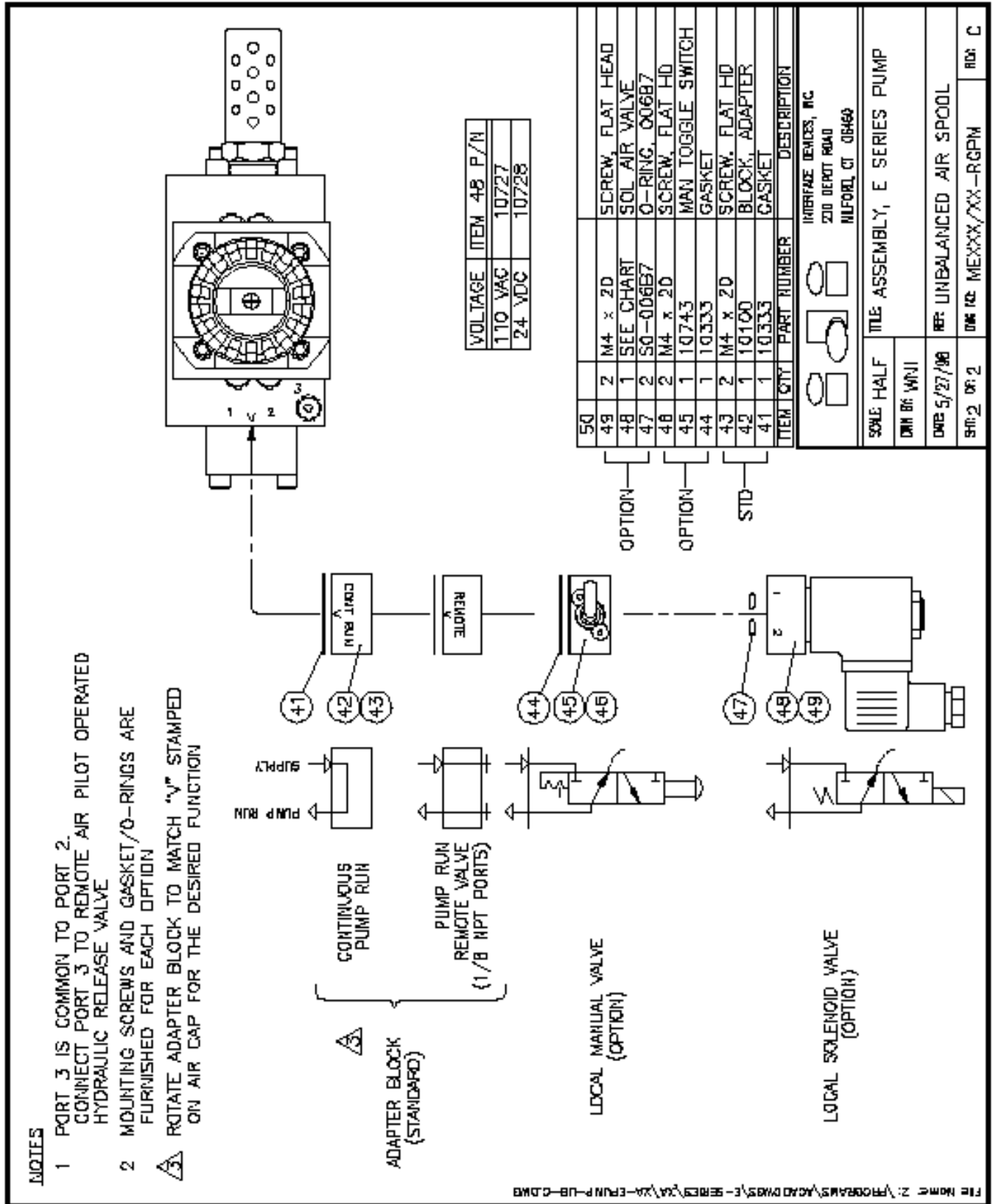
DESCRIPTION: A SUBPLATE MOUNTED, NORMALLY CLOSED, ZERO-LEAKAGE, 10,000 PSI HYDRAULIC DUMP VALVE-AIR PILOT OPERATED (65 PSI MIN).

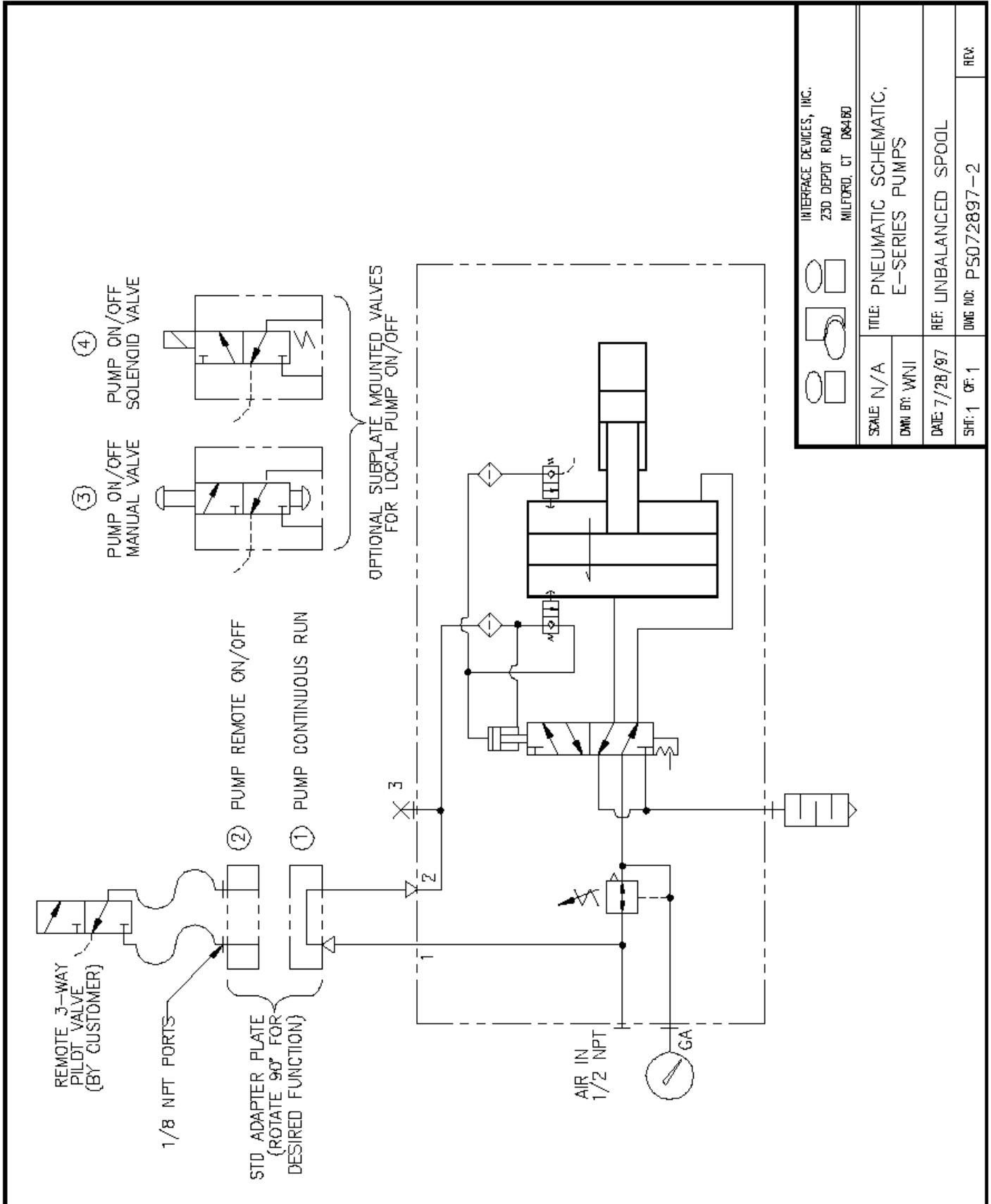
INTERNE DEVICES, INC.
230 DEPT ROAD
MILFORD, CT 06460

SCALE FULL	TITLE: DUMP VALVE ASSY (NORMALLY CLOSED)	
DWG BY: TWH		
DATE: 5/12/03	REF:	
SHT: 1 OF: 1	DWG NO: EP-450	REV: A

ASSEMBLY PART NUMBER: 10028

File Name: Z:\PROGRAMS\GAD00039\ASSEMBLY\A-DUMPVALV-NC.DWG





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

SCALE: N/A	TITLE: PNEUMATIC SCHEMATIC, E-SERIES PUMPS
DATE: 7/28/97	REF: UNBALANCED SPOOL
DWG BY: WJ/JI	DWG NO: P5072897-2
SHT: 1 OF: 1	REV:

