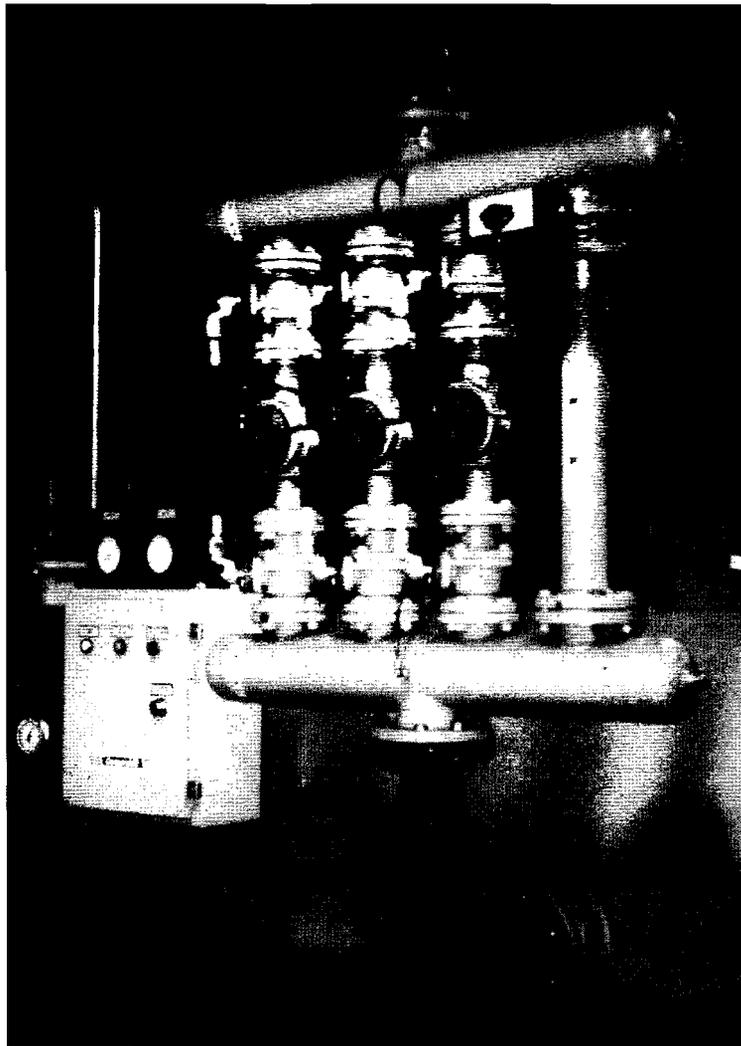


**INTERMEDIATE CONTROL®
E-SERIES (I/C)®**

**INSTALLATION,
OPERATION,
START-UP, &
MAINTENANCE
MANUAL**

DATE OF PURCHASE	
MODEL	E3-202A2
SERIAL NO.	892178
Record above information from name plate. Retain this information for future reference. Replacement Price \$25.00	



CONSERVAIR
Compressed Air
MANAGEMENT
SYSTEMS

CONSERVAIR TECHNOLOGIES TABLE OF CONTENTS

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RECEIVING - INSPECTION

Inspect equipment. Any concealed shipping damage must be reported to the carrier immediately. Damage claims should be filed by the consignee with the carrier.

SAFETY INSTRUCTIONS

When using air compressors and compressed air accessories, basic safety rules, and precautions must always be followed, including the following:

1. READ ALL INSTRUCTIONS FULLY

2. WIRING & BREAKERS

Wiring, breakers, and other electrical equipment must conform to local and national electric codes. Do not operate this unit with damaged wiring after the unit or air handling parts have been dropped or damaged in any manner. Notify authorized service facility for examination, repair or other adjustments.



WARNING

Air from compressor, Pneumatech Air Drying System, and ConservAir Intermediate Control as equipped, is NOT for human respiration (breathing).

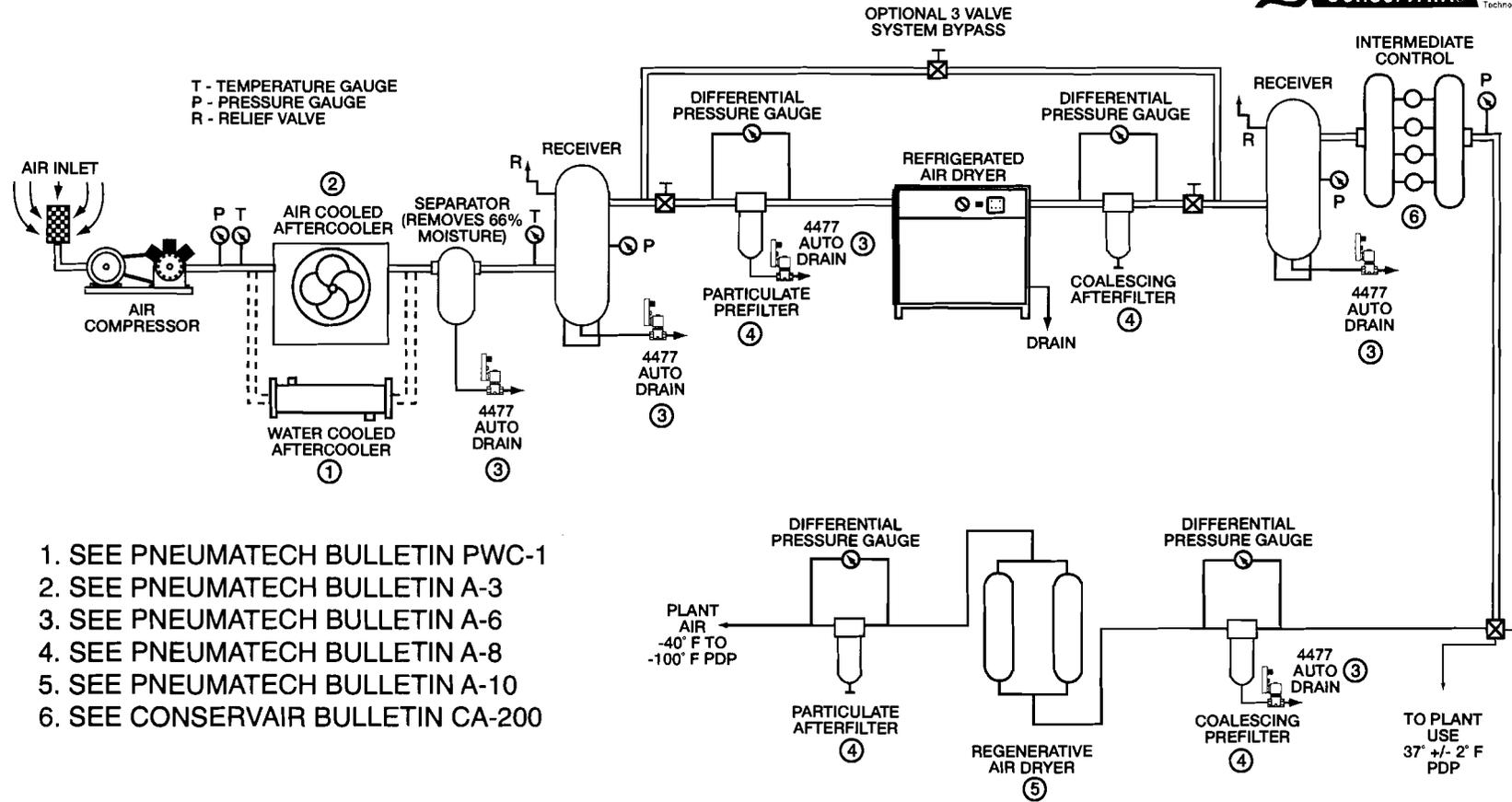
I. INSTALLATION

Your E-Series Intermediate Control Unit (I/C) has been air tested for functions and leaks and is ready for installation. ConservAIR suggests that a temporary or in-line strainer be installed on the inlet side of the I/C to guard against contaminants and insure proper operation.

- 1) Inspect unit upon receipt. Immediately report any damage to the shipping carrier.
- 2) The ConservAIR I/C Unit has an "IN" and "OUT" with directional flow arrows cast right into the Control Element. Orient the I/C unit in accordance with compressed air system flow.
- 3) The ConservAIR I/C Unit can be installed in any plane. The headers are capable of supporting the weight of the unit for either vertical or horizontal mounting. **DO NOT SUPPORT THE UNIT FROM THE CONTROL ELEMENTS OR THE ASSOCIATED CONTROL PIPING.**
- 4) Mount the control panel where most convenient. The panel is designed for top connections. Do not exceed 150 feet from the I/C header to the control panel.
- 5) Pilot air tubing between the I/C header and the control panel is 1/4" OD. See the general arrangement drawing for control panel pneumatic connections. Install the CP-5, 40 micron filter, on the inlet control piping feeding the control panel.
- 6) **LEAK TEST:** An air leak may develop during transportation or installation. Pressurize system and check for any leaks. The servo control line is extremely sensitive to leakage. This line must be bubble tight!
- 7) Connect 115 VAC/Single Phase to the labeled terminal block. A lug is provided for grounding the control panel enclosure. The grounding lug is located next to the terminal block. **Note for (I/C) units with the manual bypass option: Open the bypass located on the I/C header before applying power.**
- 8) **Grounding:** It is mandatory that the I/C control panel be grounded. Use an adequate ground with the conductor sized to NEC specifications.
- 9) During shipments, wire connections may become loose. As recommended by U.L. specification, torque terminal screws inside enclosure to 20 in. lbs.



COMPRESSED AIR SYSTEMS RECOMMENDED INSTALLATION FLOW DIAGRAM



**COMPRESSED AIR SYSTEM
RECOMMENDED
INSTALLATION**



DRAWING NO.
RFF-1103

DATE:
5-1-96

REV.
01

II. START UP & OPERATION (See Control Panel Layout & General Arrangement Drawing)

Prior to start up, check for unusual pressure drops between the compressor and the I/C unit. Ball valves located on the I/C should be open if option included. During start up, relief valves in the storage portion of the system may open. The air compressor system characteristics change after the I/C unit is put on line.

The automatic bypass located on the I/C header is a fail safe open valve (spring open/air to close). If control air is disconnected from the automatic bypass or there is a power failure the automatic bypass will open. Important: Cycle the automatic bypass every three (3) months to insure proper operation.

The control modules on the I/C header are fail closed valves. If control air (servo) is disconnected the valves will close. However, the control panel provides a servo signal to fully open the control valves in the event of a power failure. Isolation valves are provided to isolate each control module for maintenance.

- 1) Turn the control panel power switch to the "off" position. Turning the control power off will insure that the automatic bypass opens. (For manual bypass option open the manual bypass located on the header.)
- 2) Open the control panel door and turn the digital adjustment knob to a setting that is higher than the target discharge pressure. (This will insure that the control modules remain open when power is applied.) The digital adjustment knob comes equipped with a locking lever. Push the lever to the left to adjust the setting. A digital adjustment chart is located in the appendix and on the inside of the control panel door.
- 3) Turn the control panel power switch to the "on" position. This will engage the ServMatic controller and close the automatic bypass. (For manual bypass option close the manual bypass located on the header.)
- 4) Turn the digital adjustment knob counter clockwise to the desired discharge pressure. Turn the digital adjustment knob in small increments allowing the system to stabilize

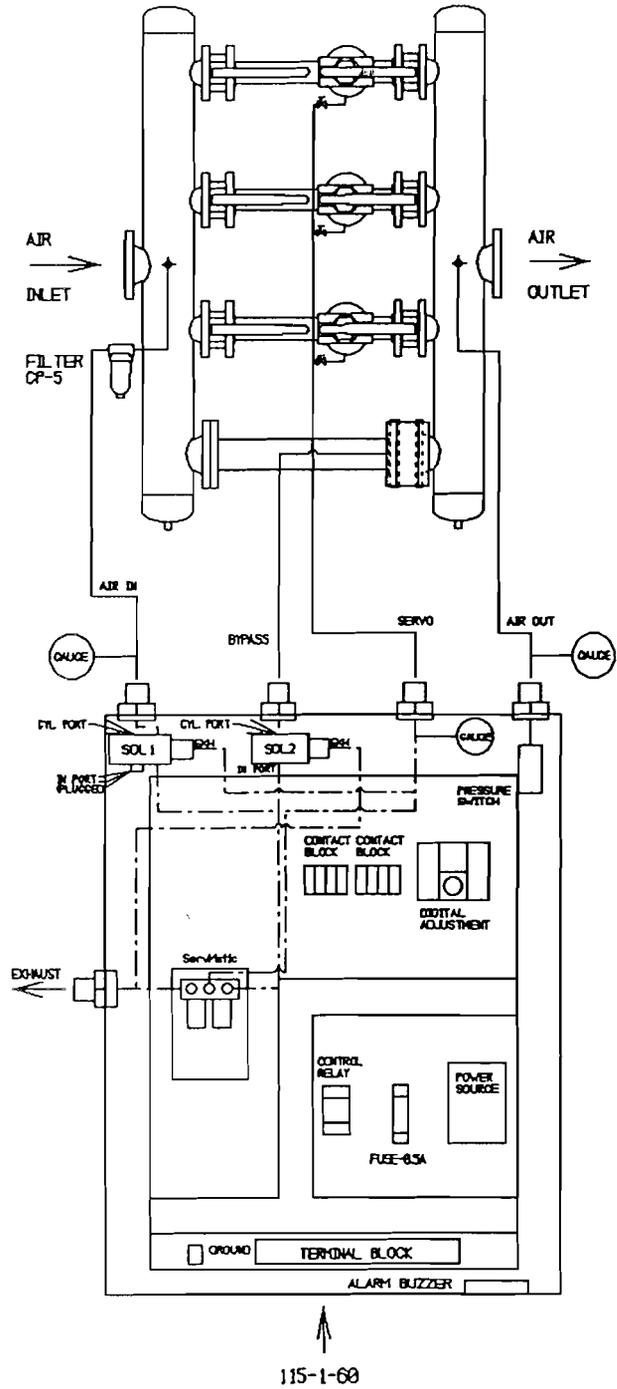
between adjustments. CAUTION! Failure to adjust the I/C in this manner may result in a system drawdown. The "AIR OUT" gauge displays discharge pressure of the I/C unit.

5, 6, and 7 are Start up instructions for the AUTO-BYPASS ONLY.

- 5) The low pressure alarm is factory set at 70 psig. If the discharge air pressure falls below 70 psig the auto bypass opens, the low pressure light illuminates, the bypass ready light turns off, and the buzzer resonates. The low pressure alarm is a latching alarm. To restore normal I/C operation the discharge pressure must rise above 78 psig and an operator must press the low pressure reset button.
- 6) The low pressure alarm is activated by a pressure switch located in the control panel. The pressure switch setting is adjustable from 10-100 psig. To change the low pressure alarm setting the I/C's discharge pressure must be lowered to the desired alarm set point. Then, the thumb wheel on the pressure switch is turned until the alarm activates. The thumb wheel is turned clockwise to increase the setting and counter-clockwise to decrease the setting.
- 7) The automatic bypass has an adjustable travel stop to limit the valves opening when engaged. Set the opening for a fixed pressure drop of approximately 5 psig when the valve is open. This will provide a smoother transition if a low pressure alarm occurs and help prevent a possible compressed air drawdown situation. To set the opening position the bypass valve must be closed. An indicator is mounted on the actuator. When the indicator is perpendicular to the pipe run it is closed. Turn the bolt on the actuator clockwise to limit opening. When the bolt is full clockwise the valve is limited 100% and will not open. Full adjustable range is approximately 8 turns.

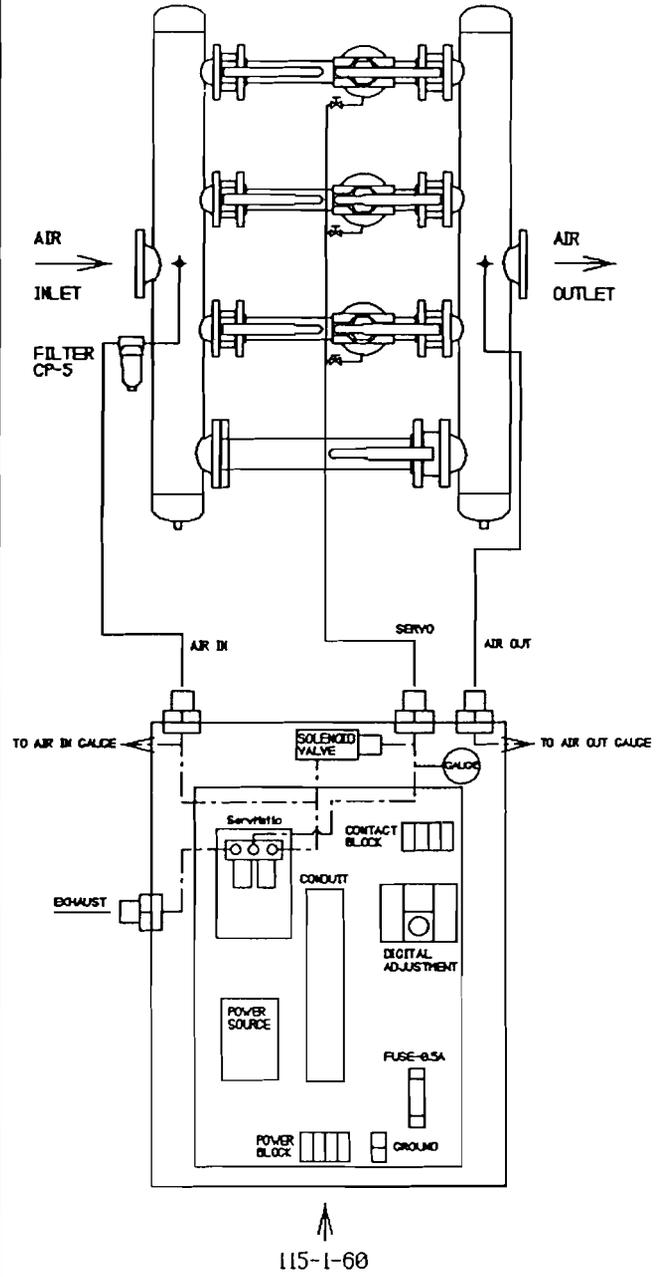
Maximum inlet pressure is 150 PSIG. Maximum regulating pressure is 145 PSIG.

INTERMEDIATE CONTROL W/AUTO BYPASS



115-1-60

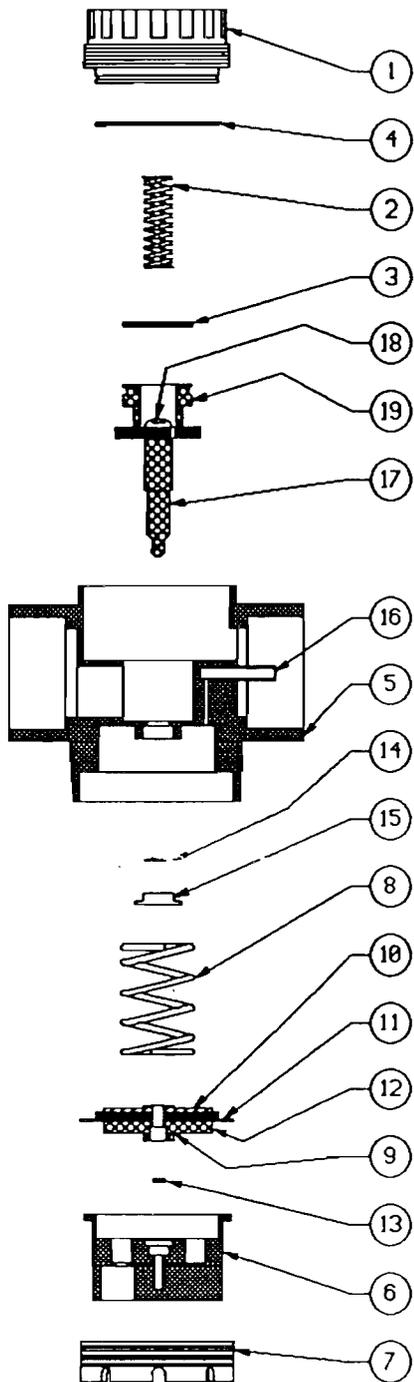
INTERMEDIATE CONTROL W/MANUAL BYPASS



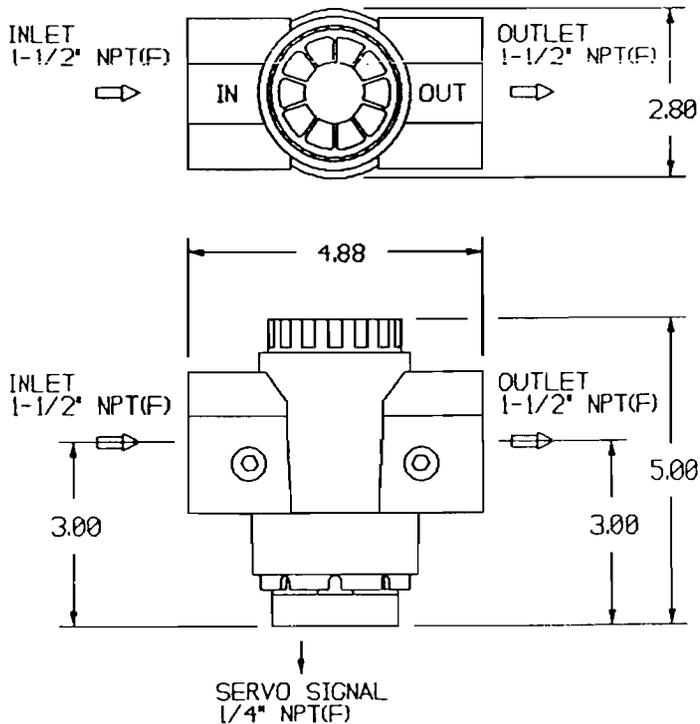
115-1-60

ALL PNEUMATIC CONTROL LINES ARE 1/4" O.D.

DO NOT SCALE		JOB NO.		GENERAL ARRANGEMENT DRAWING	
ALL DIMENSIONS ARE IN INCHES MILLIMETERS				ConservAIR Technologies	
 PROJECTION THIRD ANGLE	REV	DESCRIPTION	BY	DATE	SCALE -
UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS $\pm 1/4$ in (0.4mm) ANGLE $\pm 1^\circ$		THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR BE USED IN WHOLE OR IN PART, AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PERMISSION FROM PNEUMATECH INC.			APPRVD BY: <i>MJZ</i>
					DRAWING NO. MC-1095
					REV. 00
					DATE 3-7-95
					DRAWN BY: MJZ



KEY	PART NO.	DESCRIPTION	SUB-ASSEMBLY	QTY
1.	37-199	CAP		1
2.	37-197	VALVE SPRING		1
3.	37-202	VALVE O-RING		1
4.	37-205	CAP O-RING		1
5.	37-73M-SR195	HEAD		1
6.	37-218	RETAINING RING		1
7.	37-219MS195	DOME		1
8.	37-151	SPRING		1
9.	37-241	PUSHNUT FASTENER	A37-237 DIAPHRAGM ASSEMBLY	1
10.	37-233	SUPPORT		1
11.	37-231	DIAPHRAGM		1
12.	37-237	HOLDER		1
13.	37-28	O-RING		1
14.	37-223	STEM O-RING		1
15.	37-224	RETAINERD x 1/16W		1
16.	37-208A	PILOT TUBE		1
17.	37-204M	STEM	A37-1988M VALVE ASSEMBLY	1
18.	60L-05M	SCREW		1
19.	37-1988	VALVE		1
---	01986	ALLEN PLUG		4
---	L-1149	LABEL		4

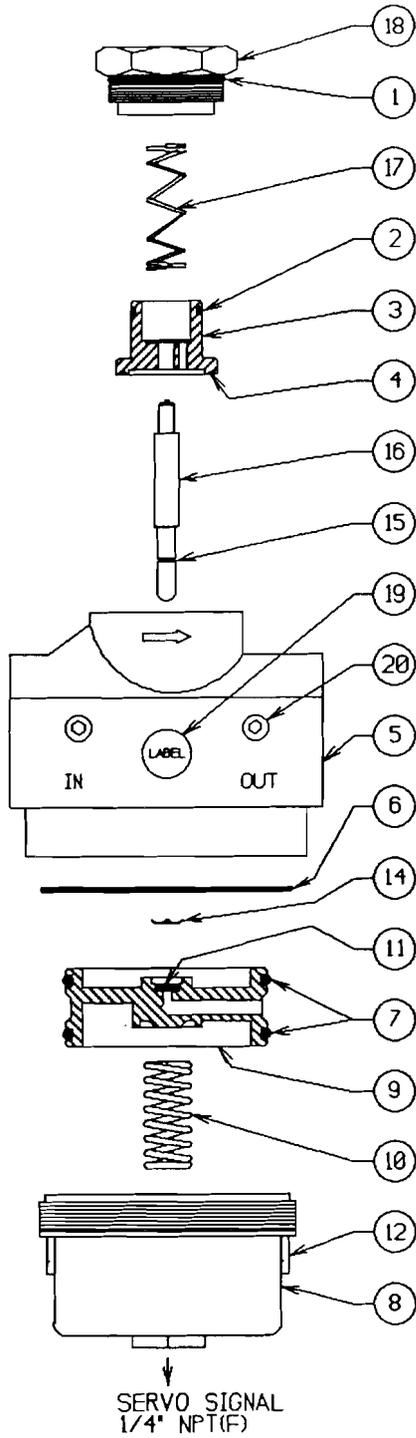


NOTES:

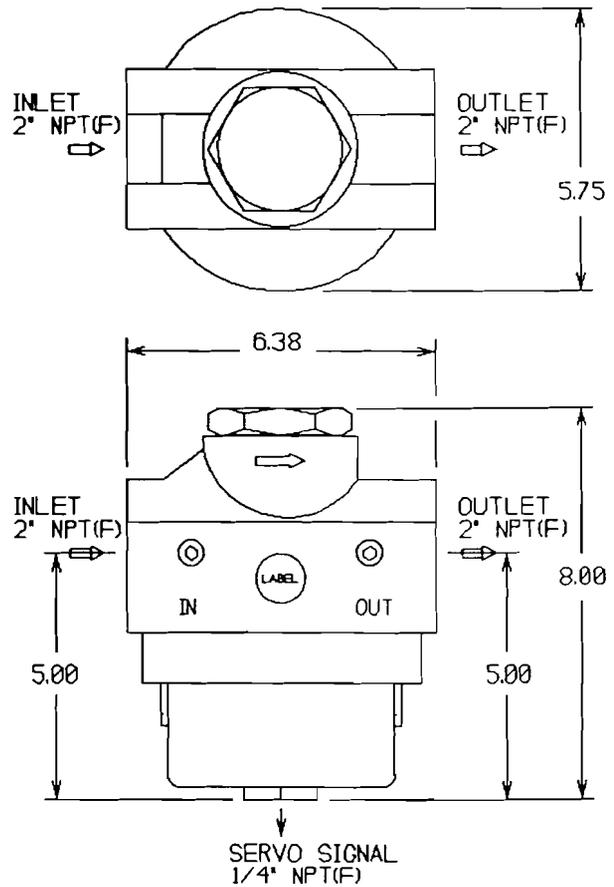
- LUBRICATE DOME WITH PARKER O-LUBE PRIOR TO AND AFTER INSTALLATION OF PISTON.
- ALL DIMENSIONS ARE IN INCHES

DO NOT SCALE		JOB NO.		CF1200 ASSEMBLY DRAWING	
ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)					
 PROJECTION THIRD ANGLE		REV	DESCRIPTION	BY	DATE
UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS ANGLE		THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR BE USED IN WHOLE OR IN PART, AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PERMISSION FROM PNEUMATECH INC.		SCALE -	APPROV BY: <i>[Signature]</i>
				DATE 7-16-95	DRAWN BY: B.J.S.
				DRAWING NO. MC-1140	REV. 00





KEY	PART NO.	DESCRIPTION	SUB-ASSEMBLY	QTY
1.	37-93	O-RING 2-1/8 ID x 1/8W		1
2.	37-92	O-RING 1-1/4 ID x 1/8W		1
3.	37-84	VALVE.	A37-84	1
4.	37-87	VALVE SEAT		1
5.	37-81-2	HEAD		1
6.	37-90	O-RING 5 ID x 1/8W		1
7.	37-91	O-RING 3-7/8 ID x 3/16W		2
8.	37-82MF	DOME (TEFLON COATED)		1
9.	37-83M	PISTON		1
10.	37-191	BIAS SPRING		1
11.	37-98	O-RING 1/4 ID x 1/8W		1
12.	456-11	BREATHER ELEMENT		2
13.	---	-----		--
14.	37-99	RETAINING RING		1
15.	130-21	O-RING 1/4 ID x 1/16W		1
16.	37-89	VALVE STEM		1
17.	37-190	VALVE SPRING		1
18.	37-85F	CAP (TEFLON COATED)		1
19.	L-1148	LABEL		1
20.	01986	ALLEN PLUG		4

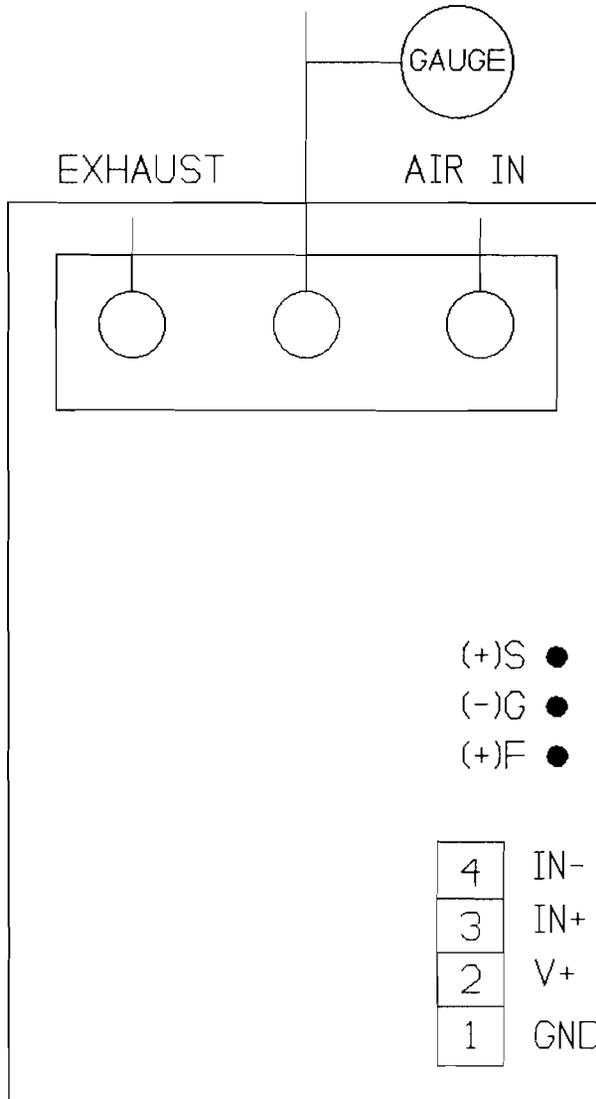


NOTES:

- LUBRICATE DOME WITH PARKER O-LUBE PRIOR TO AND AFTER INSTALLATION OF PISTON.
- ALL DIMENSIONS ARE IN INCHES

DO NOT SCALE		JOB NO.		CF1600RS ASSEMBLY DRAWING			
ALL DIMENSIONS ARE IN INCHES MILLIMETERS							
 PROJECTION THIRD ANGLE		01 ADDED DESCRIPTIONS TO ITEMS 8, 18	DJM	4-14-94			
		REV	DESCRIPTION	BY		DATE	
UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS \pm 1/4 in (0.4mm) ANGLE \pm 1°		THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR BE USED IN WHOLE OR IN PART, AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PERMISSION FROM PNEUMATECH INC.			SCALE - DATE 1-24-94	APRVD BY: <i>[Signature]</i> DRAWN BY: B.J.S.	DRAWING NO. HDA-1161 REV. 01

SERVO
(MUST BE BUBBLE TIGHT
TO CONTROL VALVE)



F ●
G ●
0.0-5.0 VDC
INPUT SIGNAL

S ●
G ●
0.0-5.0 VDC
SERVO SIGNAL

DIGITAL ADJUSTMENT
INPUT SIGNAL
00.0-99.9%
0-150 PSIG

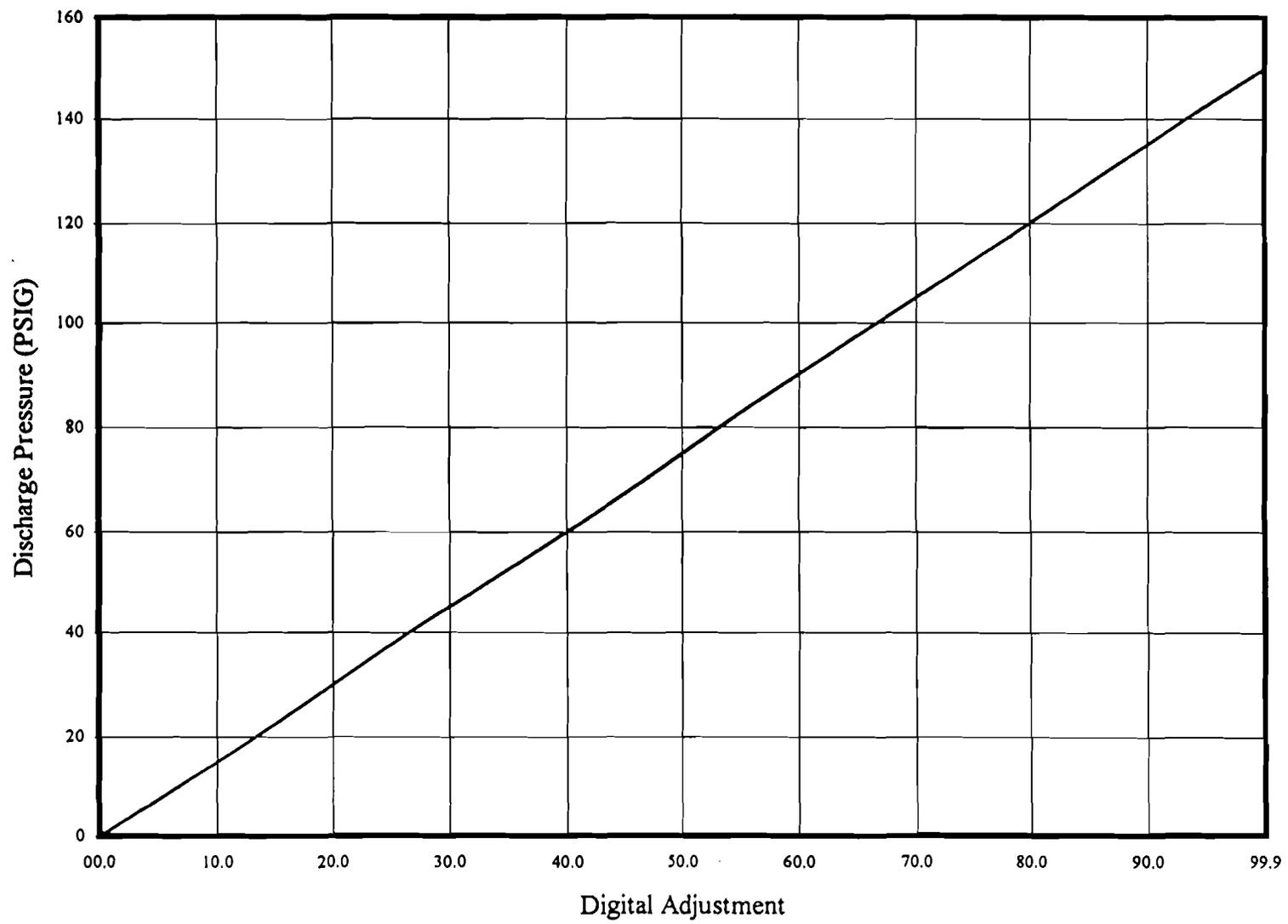
(+)S ●
(-)G ●
(+)F ●

4	IN-	0-15 VDC
3	IN+	
2	V+	15 VDC
1	GND	

The ServMatic poppet valves may require cleaning if residue accumulates in the valves. Before cleaning the ServMatic circuit board, disconnect the power source and remove from the electrical enclosure. Cleaning of the poppet valves should be done on a clean dry surface using a clean cloth.
CAUTION: Each poppet valve is frequency tuned. If the diaphragm or metal O-ring is damaged, or lost, the valve will need to be replaced.

DO NOT SCALE		JOB NO:		SERVMATIC CONTROL DIAGRAM	
ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)					
 PROJECTION THIRD ANGLE	01	ADDED CLEANING NOTE	DJM	9-17-96	
	REV	DESCRIPTION	BY	DATE	
UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS $\pm 1/4$ in (0.1mm) ANGLE $\pm 1^\circ$	THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR BE USED IN WHOLE OR IN PART, AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PERMISSION FROM PNEUMATECH INC.				SCALE: - DATE: 2-14-95
		APRVD BY:	DRAWING NO. MC-1094		REV. 01

DIGITAL ADJUSTMENT CHART



PRESSURE RESET OPTION for Manual Bypass I/C's

The Pressure Reset option allows the operator to change the I/C discharge setting via a local or remote switch.

When the Pressure Reset switch is in the "on" position the Pressure Reset digital adjustment provides the control signal. In the "auto" position a remote switch must be used to activate the Pressure Reset option. The main digital adjustment and Pressure Reset digital adjustment are set the same way as described in the Start Up & Operation section.

PRESSURE RESET OPTION for Auto Bypass I/C's

The Pressure Reset option allows the operator to change the I/C discharge setting via a local or remote switch.

When the Pressure Reset switch is in the "on" position the Pressure Reset digital adjustment provides the control signal. In the "auto" position a remote switch must be used to activate the Pressure Reset option. The main digital adjustment and Pressure Reset digital adjustment are set the same way as described in the Start Up & Operation section.

A time delay relay is used to delay the pressure switch from triggering a low pressure alarm when switching from Pressure Reset mode to normal mode. Increase the delay time if the low pressure alarm activates prematurely.

The Pressure Reset low pressure alarm is factory set at 50 psig. See Start Up & Operation section 5 and 6 for procedure to change the Pressure Reset alarm setting. Note: the Pressure Reset option must be engaged to change the alarm setting.

REMOTE / LOCAL CONTROL OPTION for E Series Intermediate Control

When the control panel selector switch is in the local position, use the digital adjustment to set the desired I/C discharge pressure.

PRESSURE RANGE 0-150 psi

When the control panel selector switch is in the remote position, a customer supplied 4-20 mA signal sets the desired I/C discharge pressure. A pressure transmitter may be installed on the I/C's outlet header to provide the process variable for a PID type control algorithm.

INPUT SIGNAL 4-20 ma

INPUT IMPEDANCE 625 ohm

INPUT CURRENT LOOP POWER 15 vdc min.

PRESSURE RANGE 25-125 psi

IV. TROUBLE-SHOOTING GUIDE

SYMPTOMS

CAUSE

REMEDY

A. Low I/C discharge pressure.
Servo gauge reads zero.

Pneumatic control tubing is leaking or damaged. (Servo line is extremely sensitive to leaks.)

Check for leak and repair as needed.

Control modules on header are stuck closed, internally leaking.

Remove auto bypass valve control line to open bypass (caution: line is pressurized and will continuously vent air). Close control module isolation ball valves. Servo gauge should increase in pressure. Check for leak and repair as needed. Open isolation ball valves. Reattach auto bypass control line.

Open the manual bypass located on the I/C header. Close control module isolation ball valves. Servo gauge should increase in pressure. Check for leak and repair as needed. Open isolation ball valves. Close the manual bypass.

B. High I/C discharge pressure.

ServMatic is defective (see ServMatic drawing).

ServMatic test points F, G should read 0-5 VDC for Digital Adjustment setting 00.0-99.9%. Test points S, G should read the same as F, G. Clean, repair or replace.

Auto bypass valve is open.

Inlet and outlet gauges read the same pressure. Check if bypass solenoid is closed and/or deenergized. Repair or replace the bypass solenoid. Check if there is sufficient pressure to close the auto bypass valve. Repair or replace the bypass actuator.

Manual bypass valve is open.

Inlet and outlet gauges read the same pressure. Close the manual bypass.

ServMatic is defective. (see ServMatic drawing).

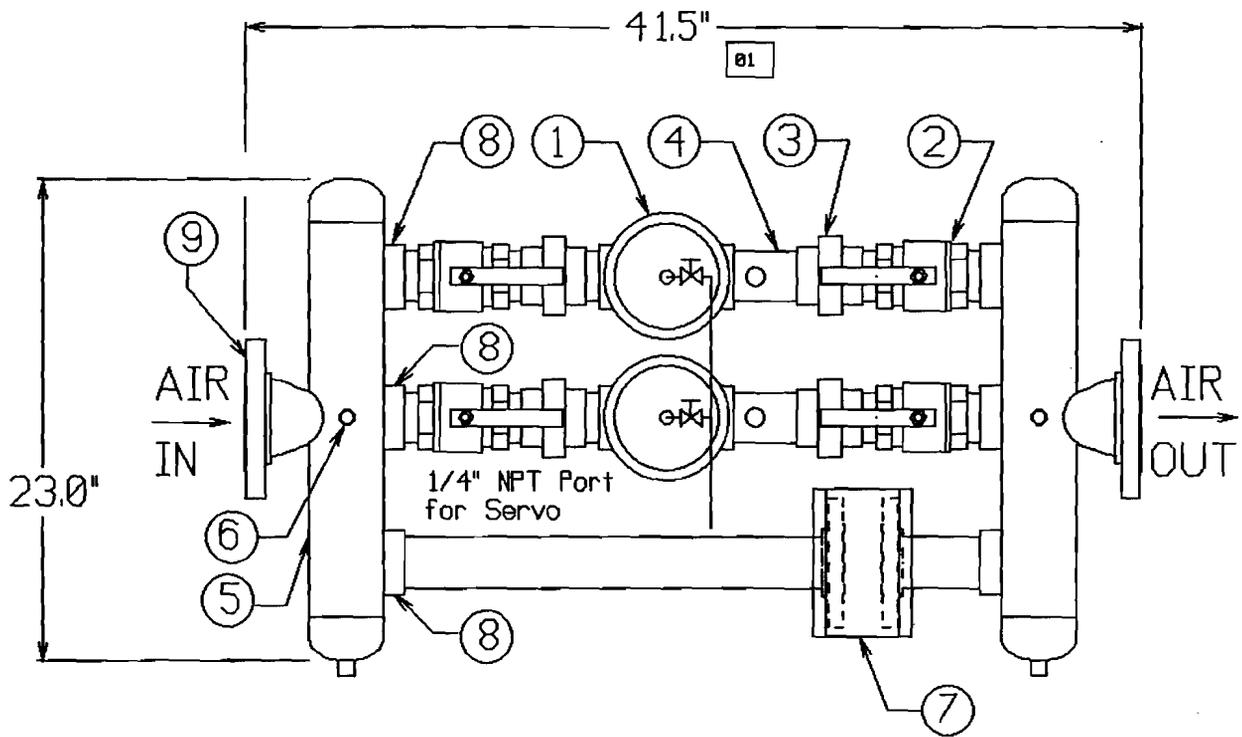
ServMatic test points F, G should read 0-5 VDC for Digital Adjustment setting 00.0-99.9%. Test points S, G should read the same as F, G. Clean, repair or replace.

Control modules are stuck open, relieving excessive air.

Check modules for contamination. Clean, repair, or replace.

IV. TROUBLE-SHOOTING GUIDE (Cont.)

SYMPTOMS	CAUSE	REMEDY
C. Low I/C discharge pressure in alarm mode.	<u>Auto bypass</u> valve is closed.	Check if bypass solenoid is open and/or energized. Repair or replace bypass solenoid. Bypass valve is sticking to its seat. Clean, repair, or replace bypass valve. Bypass actuator is defective. Repair or replace bypass actuator.
D. Control modules exhaust excessive air while I/C in the alarm mode.	Check valves are leaking.	Check valves for contamination. Clean, repair, or replace.
	Control modules are stuck open.	Check modules for contamination. Clean, repair, or replace.
E. No I/C control panel power.	Fuse is blown.	Replace
	Disconnect is defective (if option included).	Repair or replace
F. Unstable discharge pressure.	Inlet air pressure is within 4 psig of discharge air pressure set point.	Increase inlet air pressure and/or decrease discharge air pressure set point.
	Pneumatic "servo" control line and/or fittings are leaking. This line should be bubble tight.	Check for leak from ServMatic circuit board to each control module. Repair leak.
	ServMatic is defective. (see ServMatic drawing).	ServMatic test points F, G should read 0-5 VDC for Digital Adjustment setting 00.0-99.9%. Test points S, G should read the same as F, G. Clean, repair or replace.
	Control modules are contaminated and/or have torn or cracked o-rings.	Clean, repair, or replace (Note: for CF1600 control module, replace o-ring 130-21.)



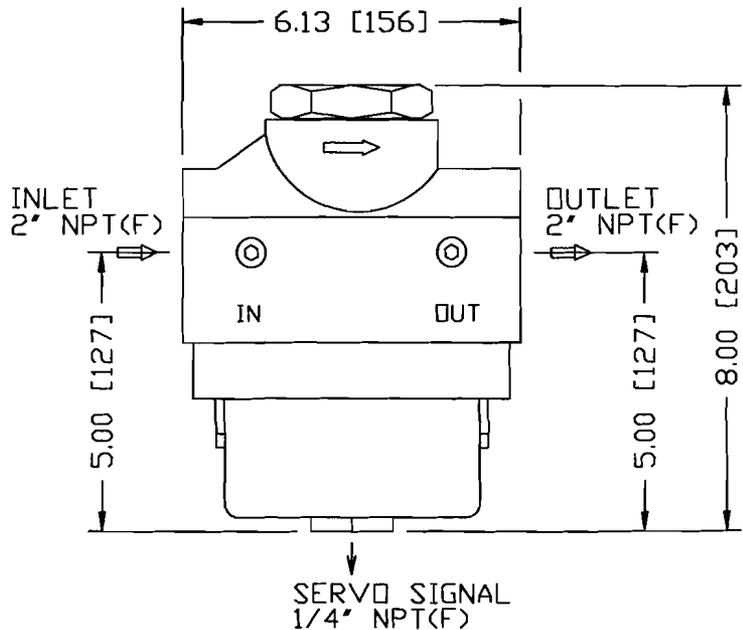
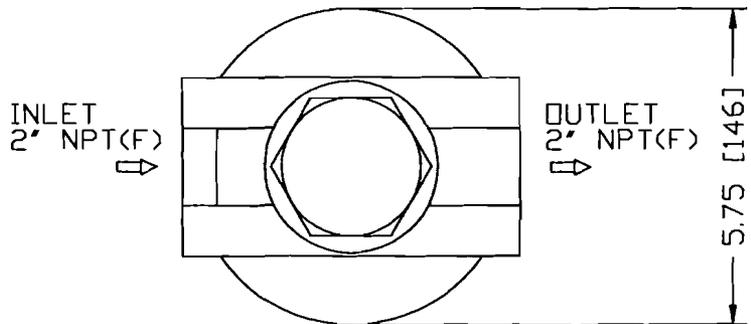
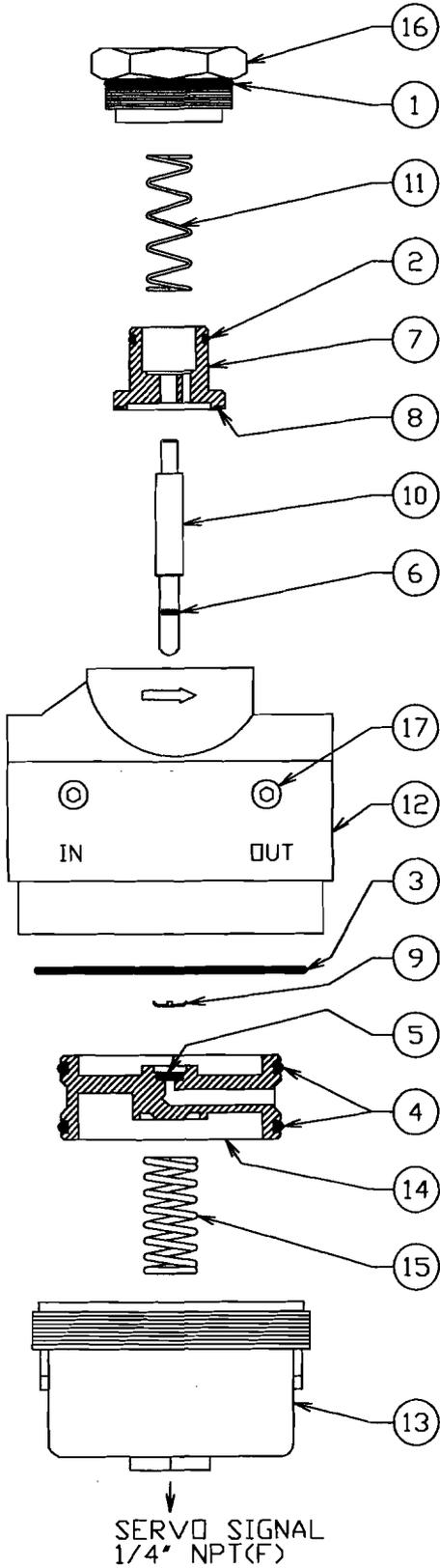
1. 2" Control Module
2. 2" Ball Valve
3. 2" Union
4. 2" Check Valve
5. 3" Header
6. 1/4" NPT Coupling
7. 2" Butterfly Valve
8. 2" Half Coupling
9. 3" 150# R.F. Flange

Note:

1. Depth: 15"
2. Approximate Weight: 170 LBS.
3. All Dimensions Are In Inches

UNLESS OTHERWISE SPECIFIED TOLERANCES		JOB NO.		E3-2C2A2 WELDED Intermediate Control	
DIMENSIONS ...	$\pm 1/41\text{in}$	Ø1	ADJUSTED DIMENSIONS AS BUILT	DJM	3-2-95
ANGLE	$\pm 1^\circ$	REV	DESCRIPTION	BY	DATE
 PROJECTION THIRD ANGLE		THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR BE USED IN WHOLE OR IN PART, AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PRIOR PERMISSION FROM PNEUMATECH INC.		SCALE -	APRVD BY: <i>MSR</i>
				DATE 11-18-93	DRAWN BY: DJM
				DRAWING NO. HDA-1146	REV. 01

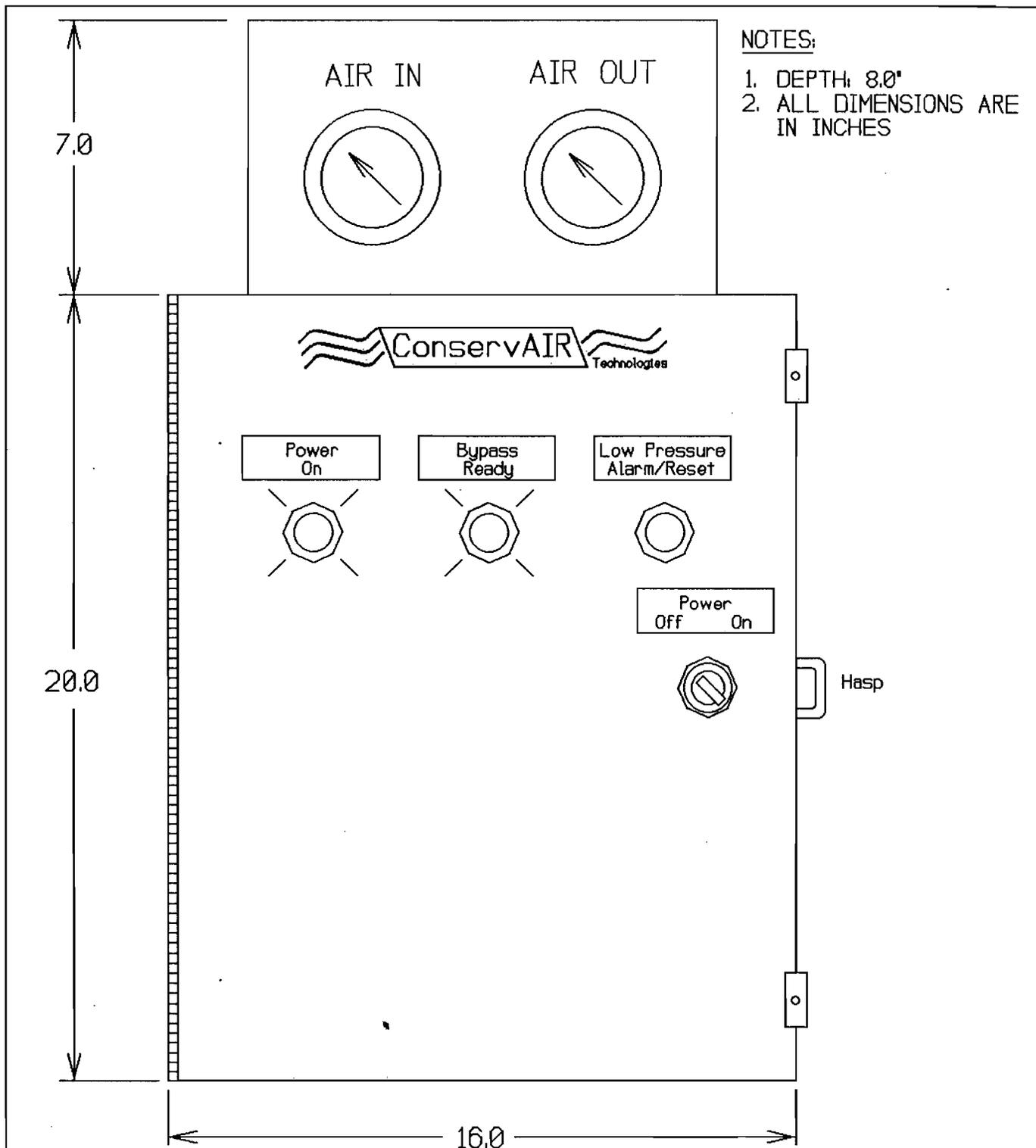
KEY	DESCRIPTION	SUB-ASSEMBLY	QTY	
1.	O-RING 2-1/8 ID x 1/8W	C-116 VALVE O-RING KIT	1	
2.	O-RING 1-1/4 ID x 1/8W		1	
3.	O-RING 5 ID x 1/8W		1	
4.	O-RING 3-7/8 ID x 3/16W		2	
5.	O-RING 1/4 ID x 1/8W		C-115 VALVE REPAIR KIT	1
6.	O-RING 1/4 ID x 1/16W			1
7.	VALVE	1		
8.	VALVE SEAT	1		
9.	RETAINING RING	1		
10.	VALVE STEM		1	
11.	VALVE SPRING		1	
12.	HEAD		1	
13.	DOME (TEFLON COATED)		1	
14.	PISTON		1	
15.	BIAS SPRING		1	
16.	CAP (TEFLON COATED)		1	
17.	ALLEN PLUG		4	



NOTES:

- LUBRICATE DOME WITH PARKER O-LUBE PRIOR TO AND AFTER INSTALLATION OF PISTON.
- ALL DIMENSIONS ARE IN INCHES

 PROJECTION THIRD ANGLE	UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS ± 0.005 IN ANGLES ± 0.005 IN	DO NOT SCALE ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	CF-1600 ASSEMBLY DRAWING		 THOMSON
	THIS DRAWING & SPECIFICATIONS ARE THE PROPERTY OF PNEUMATECH INC. AND MAY NOT BE COPIED, REPRODUCED, OR USED IN WHOLE OR IN PART AS A BASIS FOR DESIGN, MANUFACTURE, OR SALE WITHOUT PRIOR PERMISSION FROM PNEUMATECH INC.	REVISIONS NO. 1 DATE 2-19-88 BY [signature]	CHECKED BY [signature] DATE [signature]	DRAWN BY [signature] DATE [signature]	



NOTES:

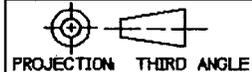
- 1. DEPTH: 8.0"
- 2. ALL DIMENSIONS ARE IN INCHES

NEMA 12 ENCLOSURE WITH HINGED DOOR AND LOCKABLE HASP

UNLESS OTHERWISE SPECIFIED TOLERANCES DIMENSIONS ... +/- 1/41in ANGLE ... +/- 4mm +/- 1°

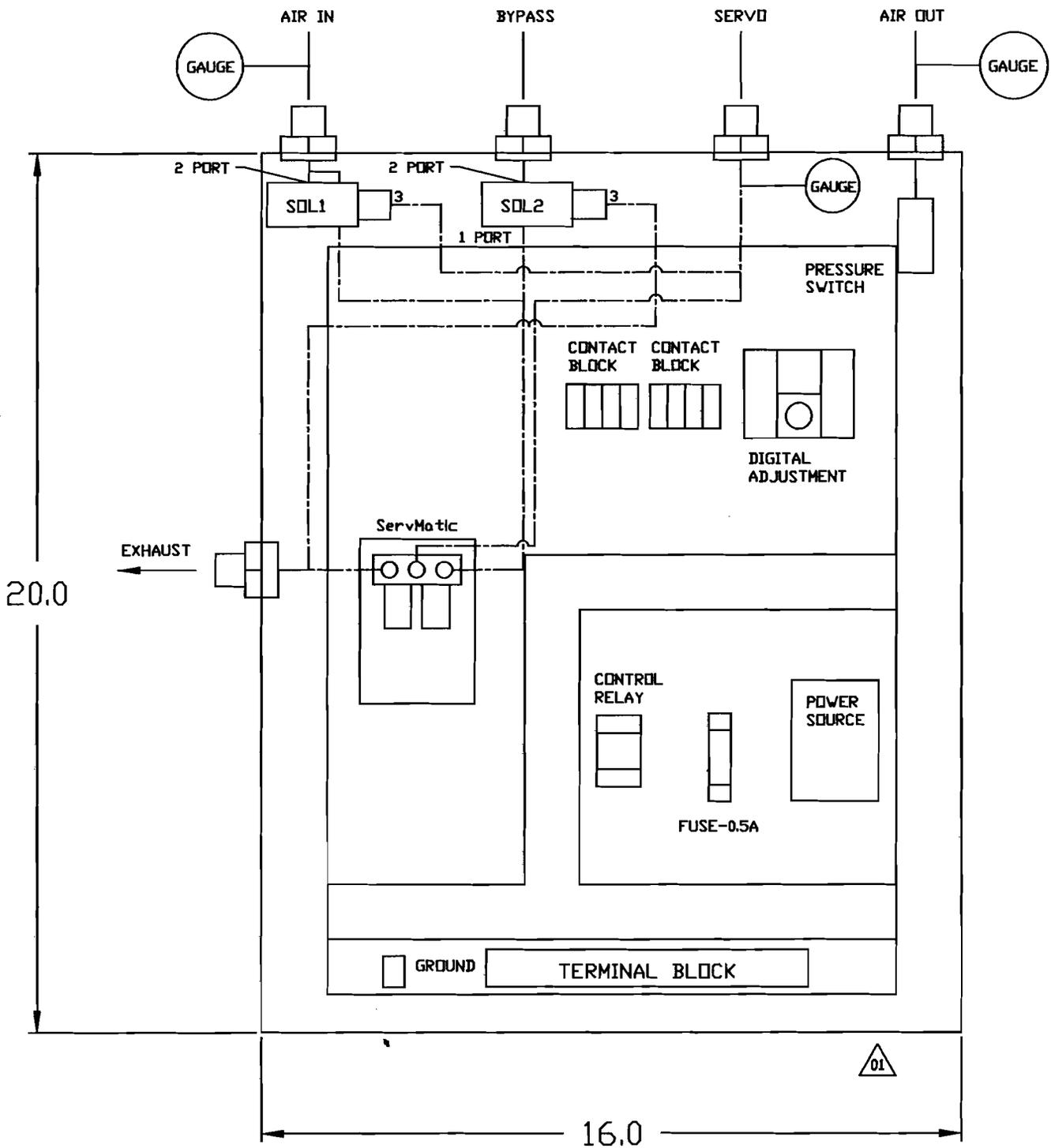
REV	DESCRIPTION	BY	DATE
02	REMOVED NOTE FROM PANEL	DJM	6-4-97
01	CHANGED POWER ON / OFF LABEL	DJM	11-29-93

LOW PRESSURE CONTROL PANEL ARRANGEMENT



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SCALE -	APRVD BY: <i>BL</i>	DRAWING NO. PA-1008	REV. 02
DATE 8-24-92	DRAWN BY: BL		



SOL1 - SERVO SOLENOID VALVE
 SOL2 - BYPASS SOLENOID VALVE

NEMA 12 ENCLOSURE WITH HINGED DOOR
 AND LOCKABLE HASP

 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS	IN IMP SCALE ALL DIMENSIONS ARE TO DIMENSION LINES UNLESS OTHERWISE SPECIFIED	ServMatic Auto Bypass Layout		
		DATE: 03/20/04 DRAWN BY: [Signature] CHECKED BY: [Signature]	PART NO: PD-1032 REV: 04	

