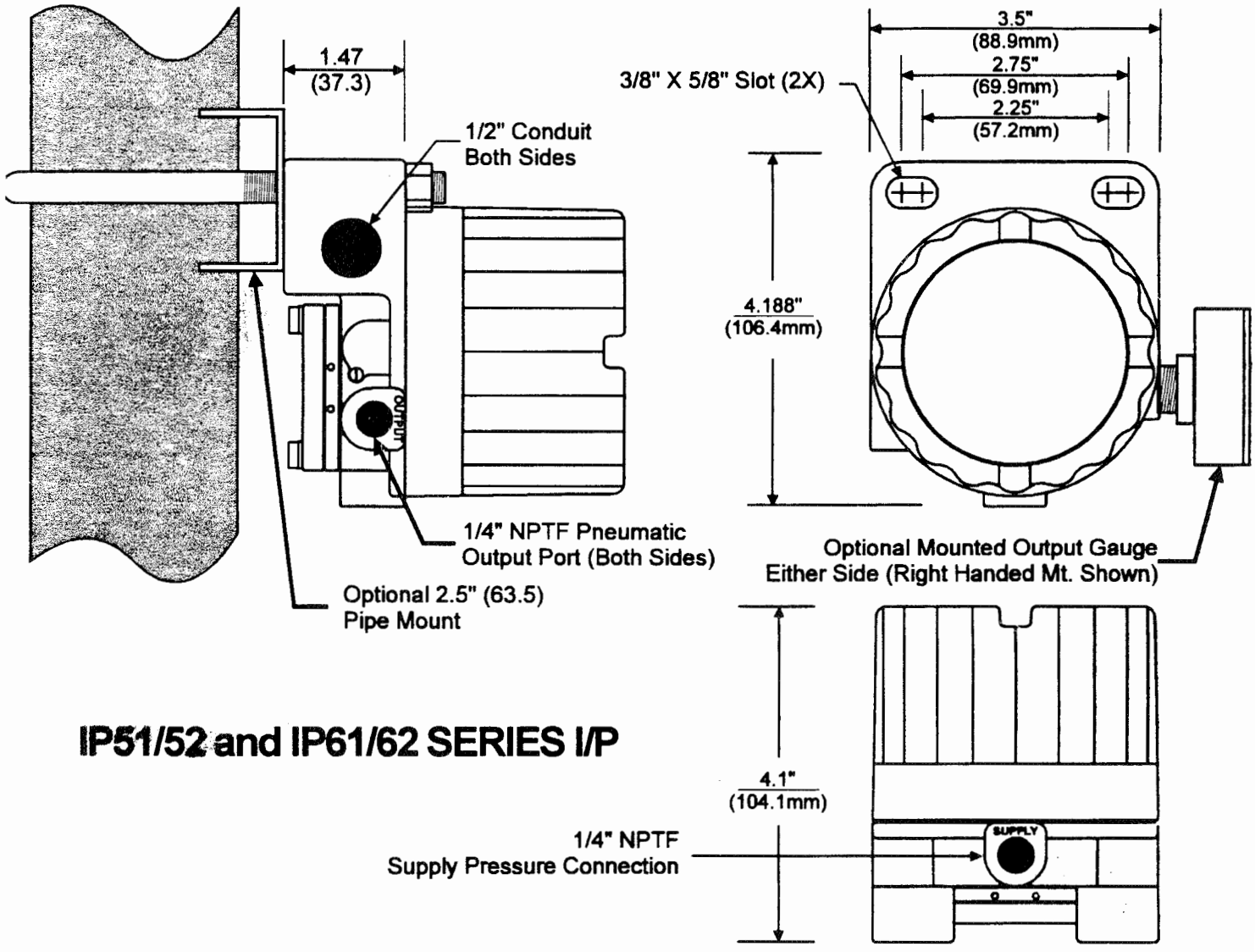
TECHNICAL MANUAL

INSTALLATION / INSTRUCTIONS / TROUBLESHOOTING

CURRENT TO PRESSURE TRANSDUCER

IP51 SERIES I/P, "Intrinsically Safe, & NEMA 4X"
IP52 SERIES I/P, "NEMA 4X"
IP61 SERIES I/P, "Intrinsically Safe, Explosionproof, Dust Ignitionproof & NEMA 4X"
IP62 SERIES I/P, "Explosionproof, Dust Ignitionproof & NEMA 4X"



IP51/52 and IP61/62 SERIES I/P

Eurotherm Controls
741-F Miller Drive
Leesburg, VA 20175-8993
703-443-0000 • info@eurotherm.com

invensys EUROTHERM

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DANGER, WARNING, CAUTION and NOTE Statements:

DANGER • **Refers to conditions or hazards which could result in serious personal injury or death.**

WARNING • **Refers to conditions or hazards which could result in personal injury.**

CAUTION • **Refers to conditions or hazards which could result in equipment or property damage.**

NOTE • **Alerts you to facts or special instructions.**

All DANGER, WARNING, AND CAUTION NOTICES MUST BE COMPLIED WITH IN FULL

SPECIFICATIONS

Input	4-20mA or 10-50mA
Output	3-27, 3-15psig
Accuracy	+/- 0.15% of Span(3-15 &1-7 PSI OUTPUT) +/- .25% OF SPAN (3-27 & 6-30 PSI OUTPUT)
Repeatability	+/- 0.05% of Span
Deadband	0.02% of Span
Stability/Reproducibility	0.5% of Span / 6 Months
Position Effect	Not Measurable
Vibration Effect	<0.25% from 1-200Hz/1g
Frequency Response	-3db at 5 Hz (per ISA-S26.4.3.1 Configuration A)
Loop Load	3.8Vdc +5 ohms (195 ohm load at 20mA)
Operating Current	3.7mA min. 200mA max. continuous at 120oF Half cycle 70 amp 1/120 sec. at 68oF
Supply Pressure	Minimum of 3 psig and maximum of 10 psig above the maximum calibrated output (except for a 1-17 psig output which will be 35 psig)
Supply Pressure Effect	Not measurable within the recommended supply pressure range
Output Capacity	4.0 SCFM (Supply and Exhaust characteristics are balanced to within +/- 10%)
Air Consumption	0.04 SCFM Steady State Average (0.06 SCFM Maximum)
Operating Temperature	-40o to 150o F (-40o to 66o C)
Temperature Effect	+/-0.02% /oF of Span (Range 0oF to 150oF), or +/-0.04% / oF of Span (Range of -40oF to 150oF)
RFI-EMI Effect	Per SAMA PMC 33.1 standard (b), (c) 20 to 100MHz, Class 3 effect on zero & span less than 1%
Operational Modes	Direct, Reverse, and/or Split-Range (field-selectable, no additional parts needed).
Failure Mode	Transducer Always Fails In The Direct Mode Regardless Of Mode Selection
Enclosure	Internally purged NEMA 4X. Cast Aluminum with powder coat epoxy
Electrical Safety	Factory Mutual Approved / CSA Intrinsically Safe & Explosion Proof Operation. See Sections 1.5.0 and 1.6.0 for approval details.
Weight	2.5 lbs

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INTRODUCTION

The Action Instruments IP51/52 (General Purpose, NEMA 4X) and IP61/62 (Explosionproof, Dust Ignition-proof, NEMA 4X) Series of I/P Transducers represent a "New Generation" in pneumatic signal conversion. They utilize a unique "State Of The Art", solid state current-to-pressure convertor ("E-Pi") that uses minimal electrical energy and air consumption to produce accurate, precise output pressure signals. Because there are no moving parts, the unit will operate reliably for many years when installed properly. The IP51/52 and IP61/62 I/P's were designed for ease of installation and operation.

This manual is intended as a guide for those customers who desire more in-depth explanations and service instructions.

1. INSTALLATION

1.1. PRE-INSTALLATION REQUIREMENTS

1.1.1 **Environment:** Suitable for installations in the following locations:

1. IP51 I/P (4-20mA input):
   - IP51: Intrinsically Safe Operation in Hazardous Locations Outdoors (NEMA 4X & CSA.ENC.4)
2. IP52 I/P (10-50mA input):
   - NEMA 4X and CSA.ENC.4.
3. IP61 I/P (4-20mA input)::
   - Intrinsically Safe Operation and Explosion Proof Installation in Hazardous Locations Outdoors (NEMA 4X & CSA.ENC.4).
4. IP62 I/P (10-50mA input):
   - Explosion Proof Installation in Hazardous Locations Outdoors (NEMA 4X & CSA.ENC.4)
5. See Sections 1.5.0 and 1.6.0 for Factory Mutual and Canadian Standards approvals.

DANGER • **All Wiring must be made in accordance with all local and national codes appropriate to the area in which the instrument is installed.**

1.1.2 **Temperature:** Ambient temperature must match specifications

1.1.3 **Mounting/Attitude:** No Restrictions

1.1.4 **Electrical Input:** 4-20mAdc or (10-50mAdc) current source (specify when ordering). It is suggested that shielded wire be used to make electrical connections and shielding be attached to ground screw. (See Dimensional Drawings on Cover.) Insulate shield from current source device.

1.1.5 **Air Supply:** Clean, dry and oil free instrument air within acceptable pressure range for calibrated output.

NOTE
- **The air line should be purged of all debris, oil and water. A 43 micron external filter is strongly recommended.**
- **Failures attributable to instrument air supply contamination are not covered by the warranty.**
- **If supply pressure is not within acceptable range, a regulator should be installed (consult factory).**
- **Supply pressure should be 20 (+/- 2) for a 3-15 psig output, and 35 (+/- 2) for a 3-27 psig output.**

CAUTION • **This instrument vents to atmosphere. The use of supply gas other than air can create a hazardous environment.**

1.2. MOUNTING

1.2.1 The IP51/52 & IP61/62 Series I/P's housing has been designed for mounting to a standard valve yoke (2.25" bolt spacing) or a 2 1/2" (6.4cm) pipe.

1.2.2 See Dimensional Drawings on Front and Back Cover.

1.3. PNEUMATIC CONNECTIONS

1.3.1 One (1) 1/4" FNPT port is provided for supply air connections. A filter screen is also supplied with each unit to be placed in the supply port before the connection is made.

1.3.2 Two (2) 1/4" FNPT ports are provided for pneumatic output connections. Either port may be used and one may be used for the mounting of an output gauge. If no gauge is installed, the unused port must be plugged with the pipe plug included with the unit.

1.3.3 See Dimensional Drawings on Front and Back Cover.

NOTE
- **Before connecting pneumatics, blow out lines thoroughly.**
- **Soap test all joints and fittings for leaks.**

CAUTION
- **DO NOT USE PIPE THREAD TAPES ON PNEUMATIC PIPING.**

1.4. ELECTRICAL CONNECTIONS

1.4.1 The IP51/52 & IP61/62 Series I/P's are supplied with two (2) 1/2" FNPT electrical conduit connections. The unused connection requires the insertion of a 1/2" FNPT pipe plug.

1.4.2 A two (2) position "Screw-Cage Clamp" terminal block is supplied for 22-12 AWG wire. Wire should be stripped approximately 1/4" before insertion. The Terminals are labeled "+" and "-" on E-Pi Label.

1.4.3 A Test Jack Option (# P901) is available on the IP51/52. This Option is standard on the IP61/62. (See Section 3.2 for installation and use of the Test Jack)

1.4.4 See Dimensional Drawings on Cover and Figure 1

NOTE
- **Observe polarity: Reverse polarity will not damage the unit, but unit will not operate.**

CAUTION
- **Conduit should be connected to prevent condensation from collecting in the instrument.**

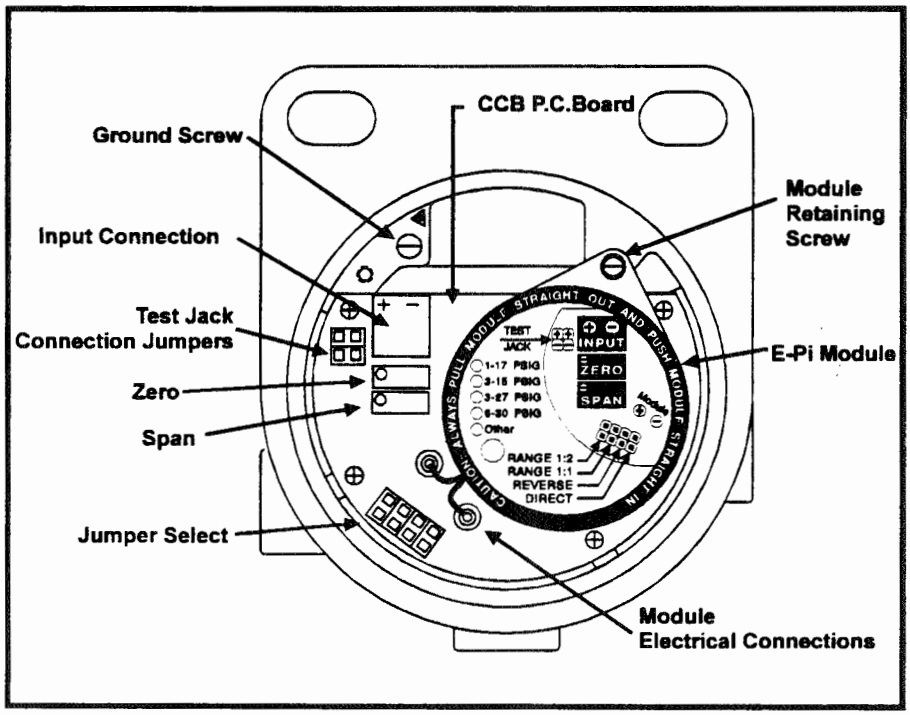


Figure 1 - PCB Connections

1.5. FACTORY MUTUAL RESEARCH CORPORATION

- **INTRINSICALLY SAFE INSTALLATION - IP51 AND IP61 MODELS (4-20 MA ONLY)**
  Intrinsically Safe Operation for Class I, II and III, Division 1, Applicable Groups A, B, C, D, E, F, and G;
  Nonincendive for Class I, Division 2, Groups A, B, C, and D;
  Suitable for Class II, Division 2 Groups F and G:
  Suitable for Class III, Division 2
  Hazardous Locations Outdoors (NEMA 4X) per entity requirements when installed per Action Instruments drawing in Figure 2.
- **EXPLOSION PROOF / DUST IGNITIONPROOF INSTALLATION - IP61 AND IP62 MODELS ONLY**
  Explosion Proof for Class I, Division 1 and 2, Applicable Groups B, C, and D Hazardous Locations Outdoors (NEMA 4X).
  Dust Ignitionproof for Class II, Division 1 and 2, Applicable Groups E, F, and G Hazardous Locations Outdoors (NEMA 4X).

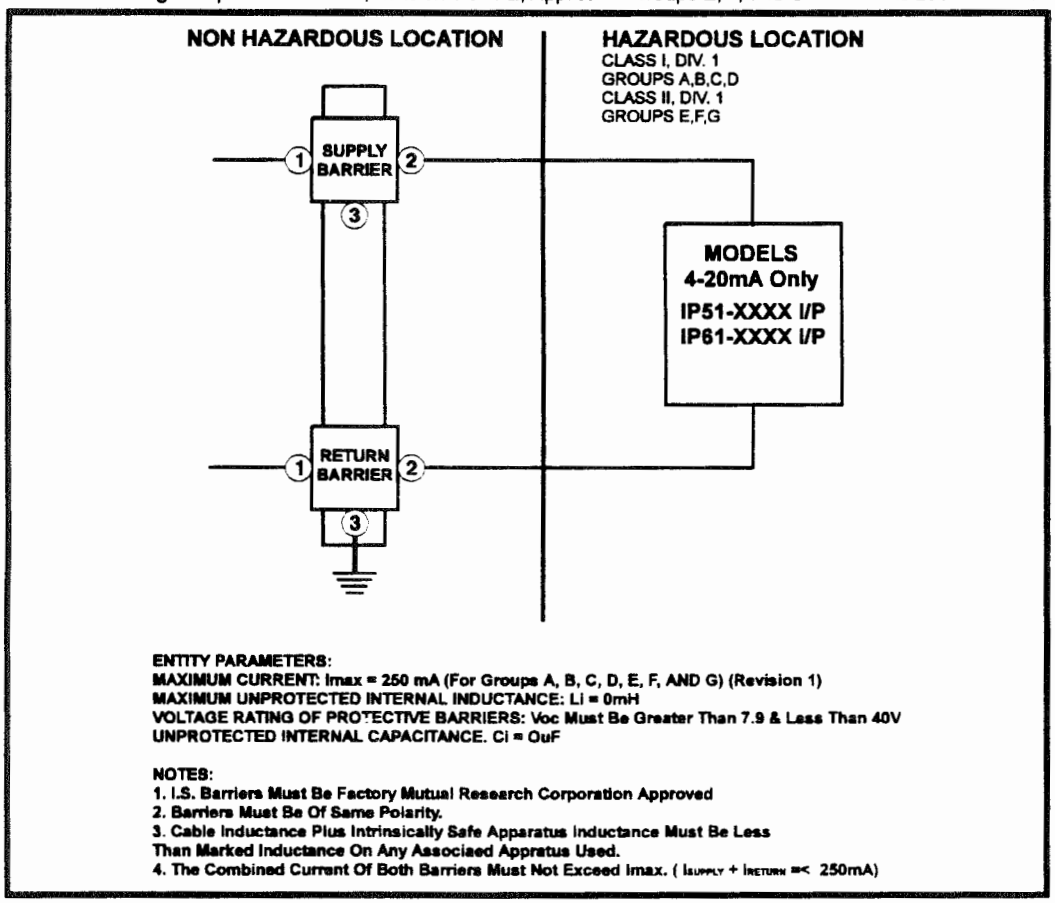


Figure 2 - Factory Mutual I.S. Installation Drawing

1.6. CANADIAN STANDARDS ASSOCIATION

- **IP51 SERIES I/P TRANSDUCER (4-20mA)**
  Intrinsically Safe / Securite Intrinseque: Class I, Groups A, B, & Class II, Groups E, F, G, & Class III, Input of 4-20mA, outputs of 3-15 and 3-27psig, Temp Code T3C, Intrinsically Safe when connected to CSA Certified Safety Barriers rated 31.5V max., 463 ohms min. CSA.ENC.4 Outdoors
  Intrinsically Safe / Securite Intrinseque: Class I, Groups C, D & Class II, Groups E, F, G & Class III, Input of 4-20mA, outputs of 3-15 and 3-27 psig, Temp Code T3C, Intrinsically Safe when connected to CSA Certified Safety Barriers rated 28V ma, 120 ohms min. CSA.Enc.4 outdoors.
  Class I, Division 2, Groups A, B, C, & D: Inputs 4-20mA or 10-50mA, outputs 3-15, 3-27 psig without Safety Barriers. CSA.ENC.4 Outdoors.
- **IP61 SERIES I/P TRANSDUCER (4-20 mA)**
  Intrinsically Safe / Securite Intrinseque: Class I, Groups A, B, & Class II, Groups E, F, G, & Class III, Input of 4-20mA, outputs of 3-15 and 3-27 psig, Temp Code T3C, Intrinsically Safe when connected to CSA Certified Safety Barriers rated 31.5V max., 463 ohms min. CSA.ENC.4 Outdoors
  Intrinsically Safe / Securite Intrinseque: Class I, Groups C, D & Class II, Groups E, F, G & Class III, Input of 4-20mA, outputs of 3-15 and 3-27psig, Temp Code T3C, Intrinsically Safe when connected to CSA Certified Safety Barriers rated 28V ma, 120 ohms min. CSA.Enc.4 outdoors.
- **IP61/62 SERIES I/P TRANSDUCER**
  Explosionproof: Class I, Groups B, C, D & Class II, Groups E,F,G & Class III & Class I, Division 2, Groups A,B,C,D Hazardous Locations Outdoors, CSA.Enc.4 Outdoors

Warning: Substitution Of Components May Impair Intrinsic Safety / Division 2
Advertissement: La Substitution De Composants Peut Compromettre La Securite Intrinseque / Division 2
Caution / Attention: Open Circuit Before Removing Cover. Ouvrir Le Circuit Avant D'Enlever Le Couvercle

2. OPERATION

A block diagram outlining the operation of the IP51/52 & IP61/62 is shown in Figure 3. The electric to pneumatic conversion takes place in the "E-Pi" valve. A conditioned 4-20mA input signal provides an electric current to the coil of the "E-Pi".

This creates a magnetic field which magnetizes the valve. The magnetization is proportional to the input current signal and positions the membrane/button relative to the valve seat. The pneumatic output (back pressure) is thereby modulated relative to the input current. Further conditioning of the pneumatic output is achieved with a volume booster.

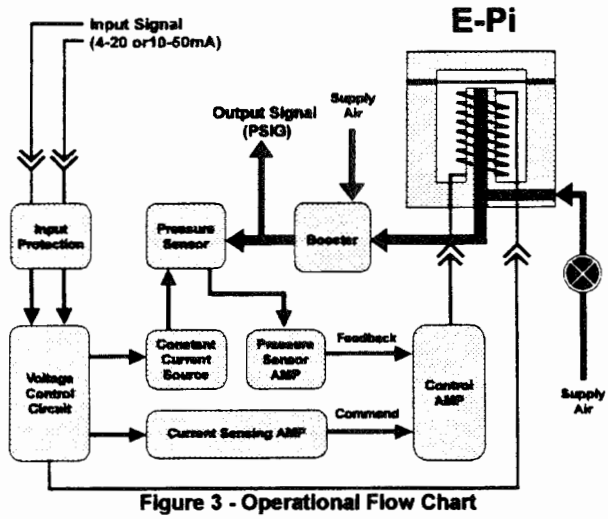


Figure 3 - Operational Flow Chart

Final conditioning of the boosted pneumatic output signal is achieved by actually measuring the output with a pressure sensor. This signal is then compared with the current to the "E-Pi" to achieve the exact pneumatic output relative to the 4-20mA (10-50mA) current input.

2.1. PROGRAMMING DIRECT, REVERSE OR SPLIT RANGE

2.1.1 **Programming is selectable via internal jumpers located on the circuit board. To access, remove the Cover. A label located on the E-Pi Module shows the location and position of these jumpers. See Figure 4.**

2.1.2 **To Select desired operating mode, plug in jumpers according to Table 1 on Page 6.**

NOTE
- **It is recommended that mode selection be accomplished prior to final inspection**
- **When switched from direct to reverse or into split range, the span will remain within +/- 1%**

CAUTION
- **TRANSDUCER FAILS IN DIRECT MODE REGARDLESS OF OPERATING MODE SELECTED**

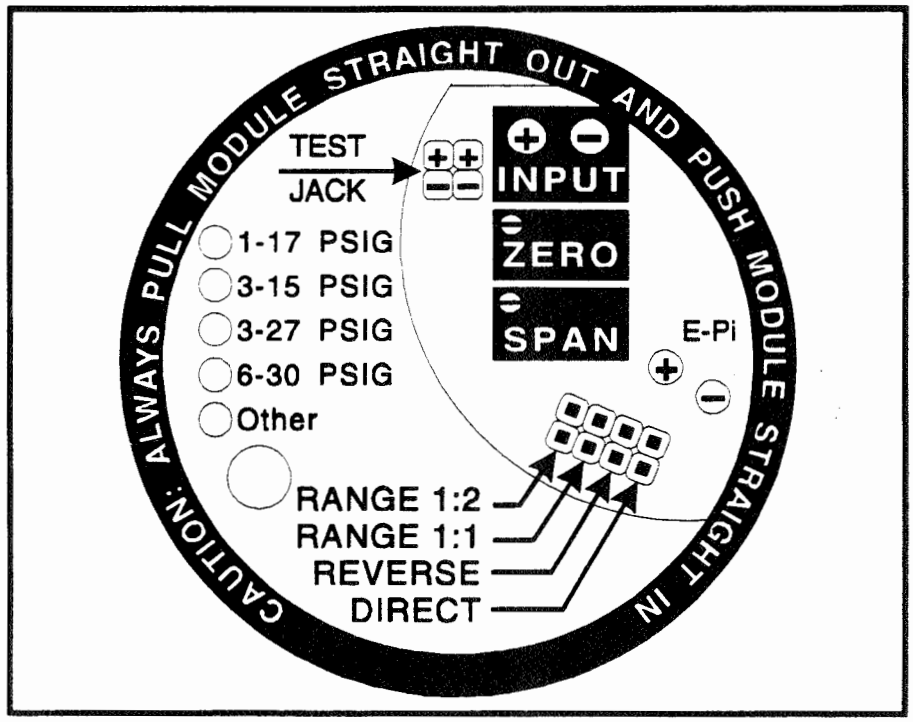


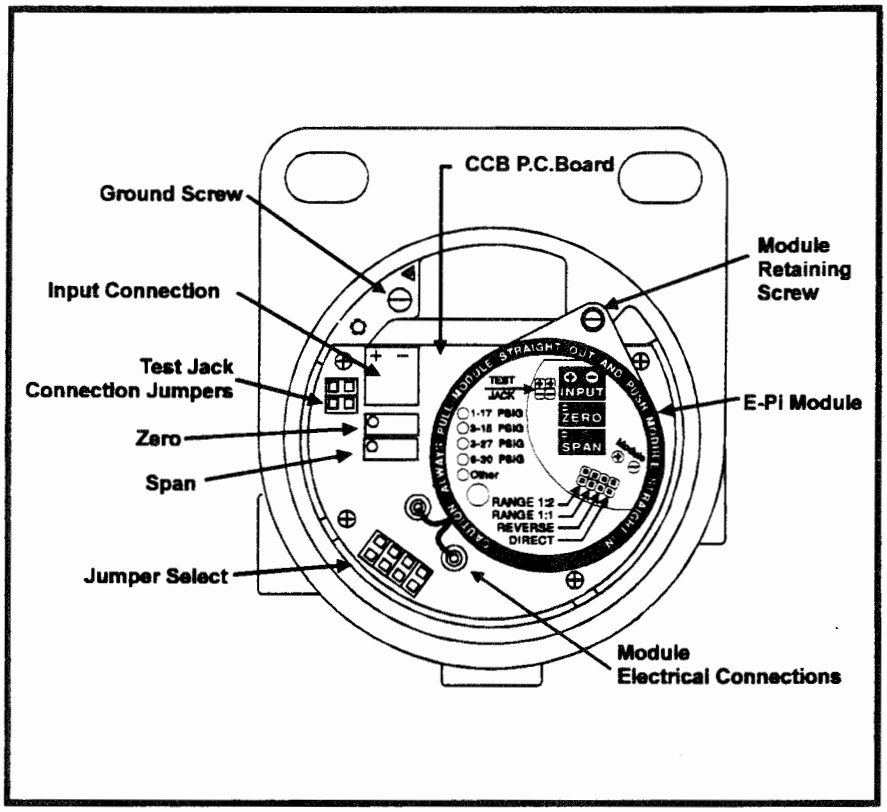
Figure 4 - Jumper Selection

Direct,Reverse and Split Range

Table 1 describes the jumper selections that are necessary for different inputs and outputs.

Output

The Output of a IP51/52 or IP61/62 can be changed by replacing the E-Pi Module and adjusting the supply pressure. Shown below is the part number of the E-Pi module that you will need to achieve the desired outputs and the necessary supply pressure.



OUTPUT	INPUT*	SUPPLY	DIRECT	REVERSE	RANGE 1:1	RANGE 1:2	ADJUST
3-15 PSIG	4-20 or 10-50mA	20 PSIG	4		4		ZERO
3-15 PSIG	4-12 or 10-30mA	20 PSIG	4			4	ZERO
3-15 PSIG	12-20 or 30-50mA	20 PSIG	4			4	ZERO
15-3 PSIG	4-20 or 10-50mA	20 PSIG		4	4		ZERO
15-3 PSIG	4-12 or 10-30mA	20 PSIG		4		4	ZERO
15-3 PSIG	12-20 or 30-50mA	20 PSIG		4		4	ZERO
3-27 PSIG	4-20 or 10-50mA	35 PSIG	4			4	ZERO
27-3 PSIG	4-20 or 10-50mA	35 PSIG		4		4	ZERO

Table 1 - As Ordered and Denoted by Model Number

UNITS WITH OUTPUT RANGES OF 3-27 PSIG

- Units with output ranges of 3-27 psig must be programmed for 1:2 mode to achieve output range.
- Split ranging is not possible on these units, but Reverse mode can be utilized.
- Units factory calibrated for 3-27 psig can be converted to a 3-15 psig output range by changing mode selection from 1:2 to 1:1 and recalibrating (reducing the supply pressure to 20 psig may cause the pneumatic ZERO to drop, so try the unit at 35 psig supply first).

2.1.3 PREVENTION OF VALVE OPERATION OVERLAP

There is adequate adjustment of span and zero to put a dead spot in the output to prevent valve operation overlap in split range. Table 2 shows the values. (If valve overlap is desired, there is also adequate adjustment of span and zero to provide a margin of overlap).

Mode	Input(mA)	Output(psig)	Adjustment
Direct, 1:2	4-11	3-15	Zero & Span
	13-20	3-15	Zero & Span
Reverse, 1:2	4-11	15-3	Zero & Span
	13-20	15-3	Zero & Span

Table 2 - Valve Operation Overlap

3. CALIBRATION and USING THE TEST JACK

DANGER • **DO NOT REMOVE COVER IN HAZARDOUS AREA WHEN THE INSTRUMENT IS POWERED.**

3.1. Calibration

3.1.1 **Make all Pneumatic hookups, plugging all unused ports.**

3.1.2 **Provide a supply pressure that is a minimum of 3 psig greater than the desired output.**

3.1.3 **Connect a high accuracy pressure indicator to the output port.**

3.1.4 **Connect a current source to the Positive (+) and Negative (-)** terminals of the terminal block.

3.1.5 The IP51/52 & IP61/62 can be calibrated using the "Test Jack". See Section 3.2

3.1.6 Input 0% of calibrated range and adjust the ZERO for 0% of the desired output.

3.1.7 Input 100% of calibrated range and adjust the SPAN for 100% of the desired output.

3.1.8 Repeat steps 3.1.6 and 3.1.7 until no further adjustments are necessary.

3.2. Using the Test Jack Feature (Jack Plug Option)

The TEST JACK is standard on the IP61/62 Series of I/P and is available as an option on the IP51/52 Series of I/P's. It can be installed in the IP51/52 easily in the field.

3.2.1 Installation of the TEST JACK Feature.

1. Make sure all power is disconnected. Remove the Cover from the I/P.
2. Locate and remove the **TEST JACK** Connection Jumpers. See Figure 4 and Figure 5
3. Locate and remove the PCB Mounting screw in the lower left hand corner of the PCB. See Figure 5.
4. Connect the **TEST JACK** to the PCB at the Test Jack Connections as shown in Figure 5.
5. Fasten the **TEST JACK** down with the enclosed screws and washers. One screw will mount in the hole vacated by the screw removed in step 3. The other screw will mount in the tapped hole located below the ground screw.
6. Unit is now ready for operation.

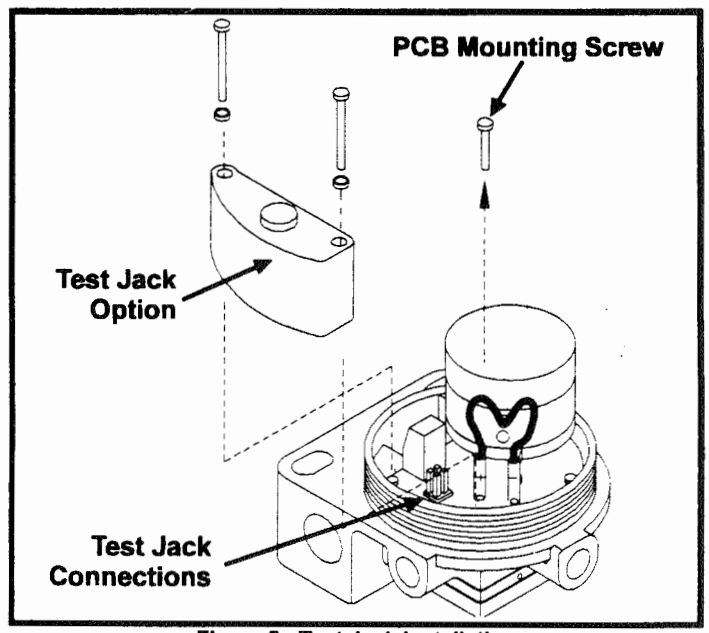


Figure 5 - Test Jack Installation

3.2.2 Calibration / Operation with the TEST JACK

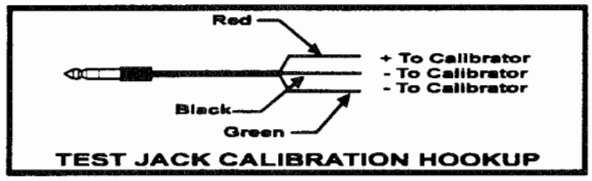


Figure 6 - Calibration

1. Remove the Cover.
2. Connect the **RED** wire of the Jack Plug to the positive (+) lead of the current calibrator.
3. Connect the **BLACK** and **GREEN** wires of the Jack Plug to the negative (-) lead of the current calibrator.
4. Insert the Jack Plug into the TEST JACK.
5. The current calibrator is now the input signal source.
6. To calibrate, repeat steps 3.1.6 and 3.1.7 until no further calibration is necessary.
7. Removing the Jack Plug will return operation of the unit back over to the original current source.

3.2.3 Monitoring with the TEST JACK

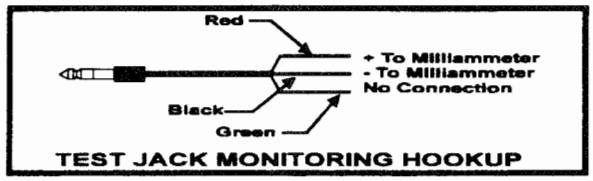


Figure 7 - Calibration

1. Remove the Cover.
2. Connect the **RED** wire of the Jack Plug to the negative (-) lead of the ammeter.
3. Connect the **BLACK** wire of the Jack Plug to the positive (+) lead of the ammeter.
4. Insert the Jack Plug into the TEST JACK.
5. Use the ammeter to monitor the input current loop.

3.2.4 **IMPORTANT:** Inserting the test jack without connecting a calibrator or ammeter will interrupt the loop power signal.

4. E-PI PLUG-IN-MODULE

With the IP51/52 and IP61/62 I/P's, Action Instruments has introduced the innovative *"E-Pi Plug-In-Module"*. This feature not only allows the user to solve the majority of field service issues without having to disconnect tubing, wiring or recalibrating, but to do so with a minimum of down time.

Important Notes:

- When removing or installing the E-Pi Plug-In-Module, Always Push Straight In or Pull Straight Out. Damage or breakage may occur if module is pulled out at an angle
- Once removed, the E-Pi Plug-In-Module can be discarded or refurbished and used as a spare part. See Section 4.2.
- It is not necessary to shut off the air supply to the I/P, but you should be aware that the output signal will be lost during the replacement process.
- Removing the E-Pi Plug-In-Module with the air supply still operating creates a situation where particles that may have accumulated from a contaminated air supply can be blown out. Service technicians should be cautioned.
- Always make sure that the E-Pi Plug-In-Module you are putting in the unit matches the range (3-15, 3-27 psig) of the unit. No damage will occur, but unit will not operate properly. Each E-Pi Module is marked as to the range.
- If a replacement E-Pi Plug-In-Module has been in storage for a long period of time or handled poorly, it may be necessary to apply a lubricant to the O-Rings (Dow 111 or equivalent).

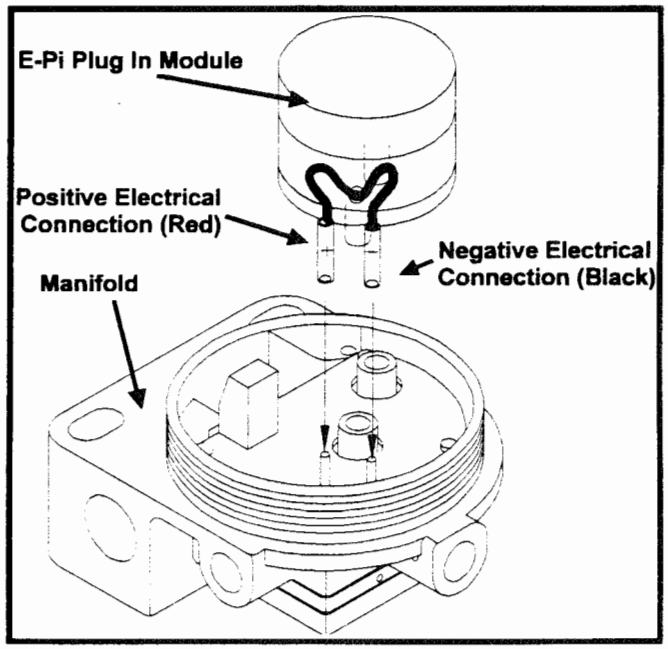


Figure 8 - E-Pi Plug-In-Module

4.1. E-Pi Plug-In-Module Removal and Replacement

4.1.1 Remove the Cover.

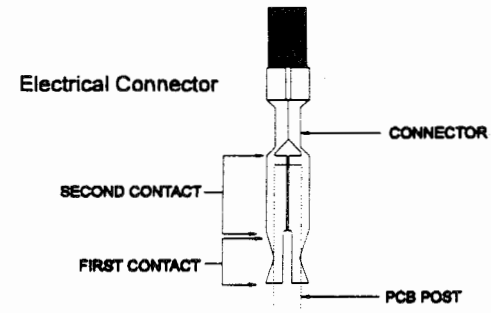
4.1.2 Locate and loosen the Module retaining captive screw from the manifold. The module is designed such that the screw should not have to be removed from the plastic piece.

4.1.3 Grab the E-Pi firmly and pull it from the manifold. **Pull STRAIGHT Out of the manifold.**

4.1.4 Align the replacement E-Pi Module with the pneumatic and electrical connections and press firmly back into the manifold. **Always Push STRAIGHT Down.** Tighten down the retaining screw.

4.1.5 Electrical connections are a "Two" point contact system. The contact occurs when the connector is pushed on to the PCB male pins. The "Second" occurs as the barrel of the connector is pushed further onto the pin. It may be necessary to use needle nose pliers to make the second connection. If so grip the connector firmly above the barrel section and push "Straight" down.

4.1.6 Unit should operate without the need to recalibrate.



E-PI "Two" Contact Electrical Connection

4.2. Fixed Orifice Replacement

4.2.1 Use fixed orifice replacement kit #SA45-8002-00

4.2.2 Remove the E-Pi module from the manifold. See section 4.1

4.2.3 See figure 10. Try pulling the fixed orifice out of the supply leg with needle nose pliers. If this is possible skip step 4.2.4 and go to step 4.2.5

4.2.4 Turn the E-Pi over and remove the four (4) screws holding the E-Pi to the plastic module. It is not necessary to disconnect the wires from the module. do not discard O-rings. Push the fixed orifice out of the leg with a small diameter wire.

4.2.5 Choose a corresponding color fixed orifice from the orifice replacement kit. Press this orifice, **"TAPERED END FIRST"** into supply leg as far as it will go (approximately 1/32" will stick out of the leg).

4.2.6 Reassemble the E-Pi and the plastic module (if necessary). The E-Pi module is now ready for use.

4.3. E-Pi Module Cleaning and Repair

4.3.1 The E-Pi Module can be cleaned and serviced to remove contaminants. Review Figure 9.

4.3.2 Remove the E-Pi Module from the manifold. See section 4.1.

4.3.3 Locate and loosen the three (3) set screws from the E-Pi top. It is not necessary to remove them. Do not discard.

4.3.4 Carefully remove the E-Pi top.

4.3.5 Carefully remove the Metal Membrane. Hold the membrane by the edge. **Do Not Bend or Deform.** Note: The Metal Membrane is marked with a "T". This mark should always be oriented away from the E-Pi base.

4.3.6 With "Alcohol Based" (or equivalent) contact cleaner, insert the "STRAW" into the small holes in the bottom of the E-Pi module and the E-Pi seat and spray. Allow cleaner to air dry. Note: It is also acceptable to use clean, instrument quality air (30 psi) if oil is not the problem, to blow out the E-Pi.

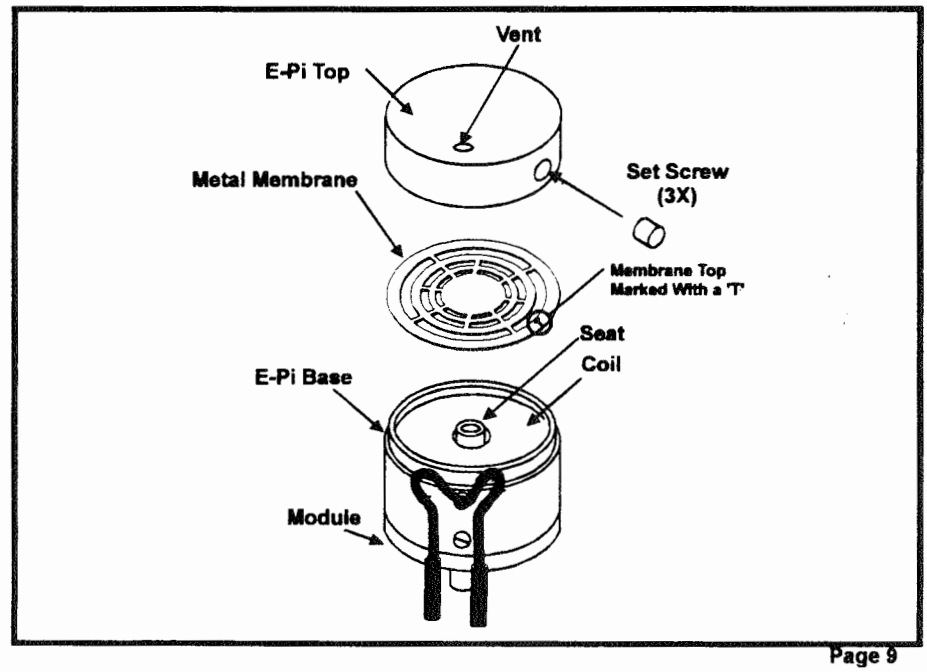


Figure 9 - E-PI Assembly

4.3.7 With "Alcohol Based" (or equivalent) contact cleaner, spray off both sides of the Metal Membrane. Allow cleaner to air dry. It should not be necessary to touch the membrane. Place the Metal Membrane on the E-Pi base (side with the "T" marked on it away from the E-Pi Base).

4.3.8 With "Alcohol Based" (or equivalent) contact cleaner, spray off the top. Allow cleaner to air dry. (Top can also be wiped dry with a lint free cloth).

4.3.9 Reassemble the E-Pi by applying downward pressure to the E-Pi top while tightening the three set screws.

4.3.10 Store unit in a plastic bag until needed.

5. MAINTENANCE AND REPAIRS

The IP51/52 & IP61/62 Series of I/P's have been designed using solid state "E-Pi" valve technology. As such, there are no moving parts on which routine maintenance can be performed. However, routine maintenance should be performed on both the supply air filtration and the pneumatic and electrical connections.

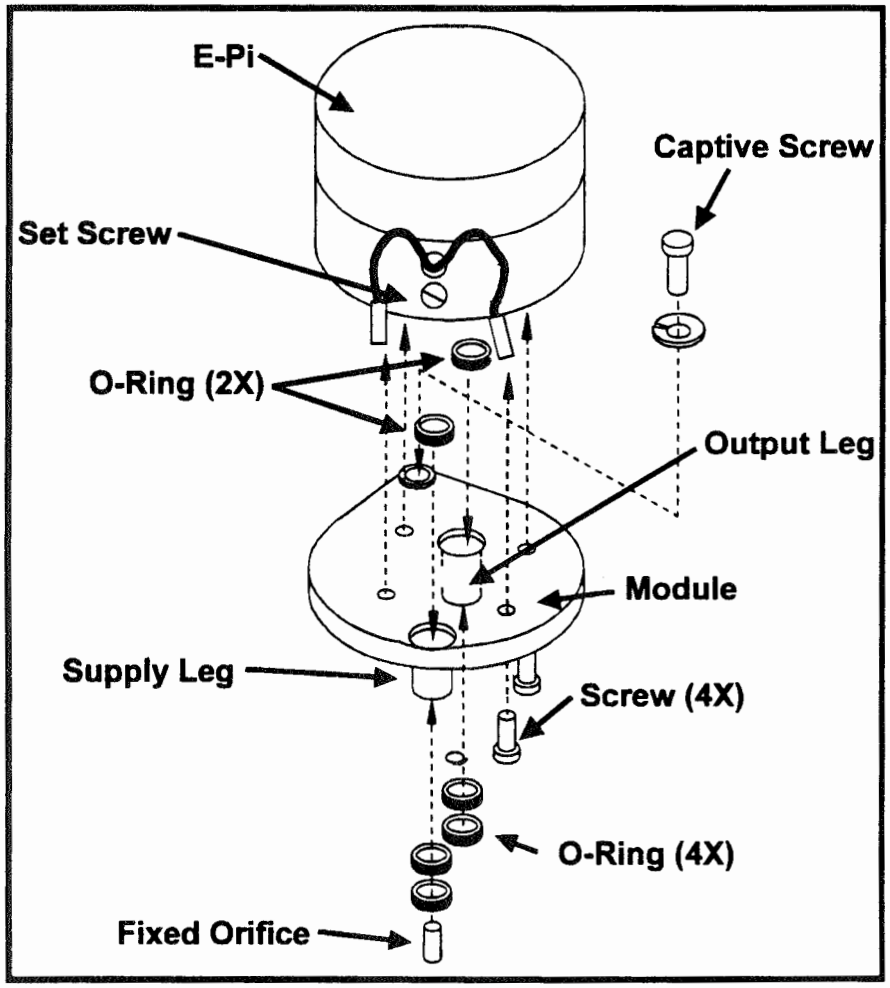


Figure 10 - E-Pi Plug-In-Module Assembly

5.1. EXTERNAL FILTRATION

5.1.1 Failures due to instrument supply air contamination are not covered by original equipment warranty.

5.1.2 Applying heavily oil and/or water laden instrument air will cause premature loading of the unit's final filter and decay the supply air pressure thus causing the loss of unit output.

5.1.3 Poor quality instrument air can result in unit failure. It is recommended that a coalescent, oil efficient, 5 micron filter be placed upstream of each unit where oil and/or water laden instrument air is suspected.

5.1.4 It is good practice on any instrument air system to provide proper filtration off the compressor for the removal of oil and water. Proper filtration will insure long term proper operation with minimal maintenance.

5.2. SUPPLY PRESSURE REGULATION

5.2.1 Maintain supply air at pressures required by output range; 20 (+/-2) psig for the 3-15 psig range and 35 (+/-2) psig for the 3-27 psig range. See Table 1, Page 6.

5.2.2 Although the IP51/52 & IP61/62 Series of I/P's should not be damaged by excessive supply pressure, elevated zero levels may result. The maximum supply pressure is 10 psig above the maximum calibrated range.

5.2.3 A filter regulator is available. P.N.# P902

5.3. CONTROL CIRCUIT BOARD (CCB) REPLACEMENT

5.3.1 Refer to Figure 11.

NOTE • **This procedure can be done in the field but caution should be taken to insure no contaminates enter the unit.**

5.3.2 Cut off air supply.

5.3.3 Remove the Cover.

5.3.4 Remove the E-Pi Plug-In-Module. See Section 4.1.

5.3.5 Disconnect Input Leads.

5.3.6 If a Jack Plug is present remove this from the CCB. See Section 3.2.

5.3.7 Remove four (4) screws holding the CCB in the manifold. Do Not Discard.

5.3.8 Remove the CCB.

NOTE • **Your replacement CCB should have an O-Ring around the pressure sensor mounted to the CCB. Another O-Ring is in the recessed hole where the pressure sensor plugs in. Do not discard or lose this.**

5.3.9 Mount the new CCB by reversing the above steps.

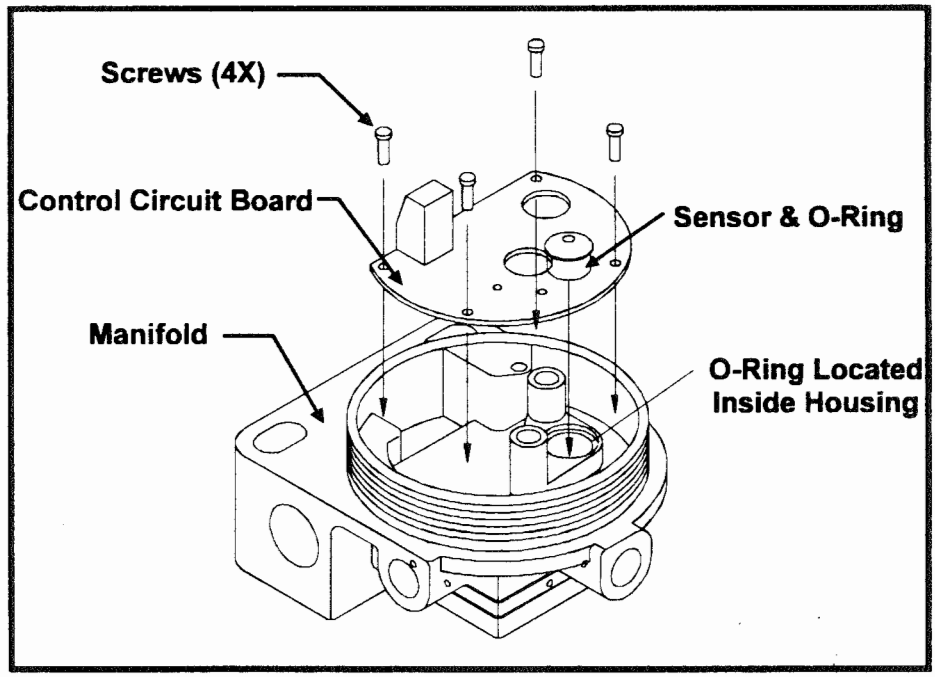


Figure 11 - CCB Assembly

5.4. FACTORY REPAIRS

5.4.1 In the unlikely event the IP51/52 or IP61/62 I/P should fail, the unit can be returned to the factory for warranty repair if the warranty period has not expired.

5.4.2 Repairs for the IP51/52 and IP61/62 in or out of warranty are done on a repair/exchange basis.

5.4.3 All units returned for repair must be authorized before receipt at the factory. Call the Order Entry Department at 1-800-767-5726 or arrange returns through your local Action Instruments Sales Representative.

6. ACCESSORIES AND SPARE PARTS

Model Number	Description	Notes
P901	Test Jack and Plug (Standard on IP61/62)	See Section 3.2
P902	FAS2022 Filter Regulator	With Supply Gauge
P903	Output Gauge, 0-30 PSI 1/4" CBM	2 Inch
P905	Valve Mount Kit	
P906	2.5 Inch Pipe Adapter	
P915	E-Pi Module, 3-15 PSI for IPXX-3000	See Section 4.0
P927	E-Pi Module, 3-27 PSI for IPXX-2000	See Section 4.0
P930	E-Pi Module, 6-30 PSI for IPXX-4000	See Section 4.0

7. TROUBLESHOOTING GUIDE

PROBLEM	LOOK FOR	SOLUTION	SEE SECTION
Output Pressure Is 0 Psig	- Instrument Supply Not Applied	Check Air Supply	1.1.5, 5.2.1
	- E-Pi Failure	Replace E-Pi Module	4.0
Output Remains Between 1-2 Psi With Increase Of Input	- Input Leads Are Reversed	Reverse Input Leads	1.4
	- Faulty Internal Connections	Check Internal Connections	1.4
	- Circuit Board Failure	Replace Circuit Board	5.3
Unit Will Not Zero Down To 3 Psi	- Oil Contamination In E-Pi	Replace Or Clean E-Pi	4.0
	- E-Pi Failure	Replace Or Clean E-Pi	4.0
Output Signal Fails Below Calibrated Zero Level, 1-2.5 Psi	- Input Current Loop Is Open	Check Input Loop	
	- Loss Of Loop Power	Check Input Loop	
	- Open Input Loop Due To	Check Input For Overcurrent &	

Test: *Disconnect E-Pi Leads from Circuit board and measure the resistance across the coil. A reading of 0 ohm indicates an open coil.*

Instr. Protection Circuit Breakdown — Replace Circuit Board

Test: *Disconnect power and E-Pi Leads from Circuit board. Connect current calibrator to power leads and connect ammeter to E-Pi leads. Input 4mA and ammeter should read 3.5mA. 0mA = Failure.*

	- No Power	Disconnect/Reset Connectors	1.4
	- E-Pi Coil Is Open	Replace E-Pi Module	4.0
	- Circuit Board Failure	Replace Circuit Board	5.3
Output Signal Fails To 0 Psig	- Instrument Air Has Failed	Check Supply Air	1.1.5, 5.2.1

Test: *: Disconnect positive (+) E-Pi lead from module. Connect ammeter in series with lead and pin. Input 20 mA. If full-scale output is not achieved approximately 3.5mA should be measured. 3mA indicates circuit board failure.*

Unit Will Not Go To Full Scale With Full Scale Input	- E-Pi Is Contaminated	Replace/clean E-Pi Module	4.0
	- Circuit Board Failure	Replace Circuit Board	5.3
	- Leak In Tubing	Check Tubing	1.3
Will Not Split Range	- Circuit Board Failure	Replace Circuit Board	5.3
	- Bad Connection	Check Connections & Jumpers	1.4
Operates In 1:1 Only	- Circuit Board Failure	Replace Circuit Board	5.3
	- Bad Connection	Check Connections & Jumpers	5.3, 2.1
Output Goes To Full Scale With No Input	- E-Pi Is Contaminated	Replace/Clean E-Pi Module	4.0

8. EXPLODED VIEW

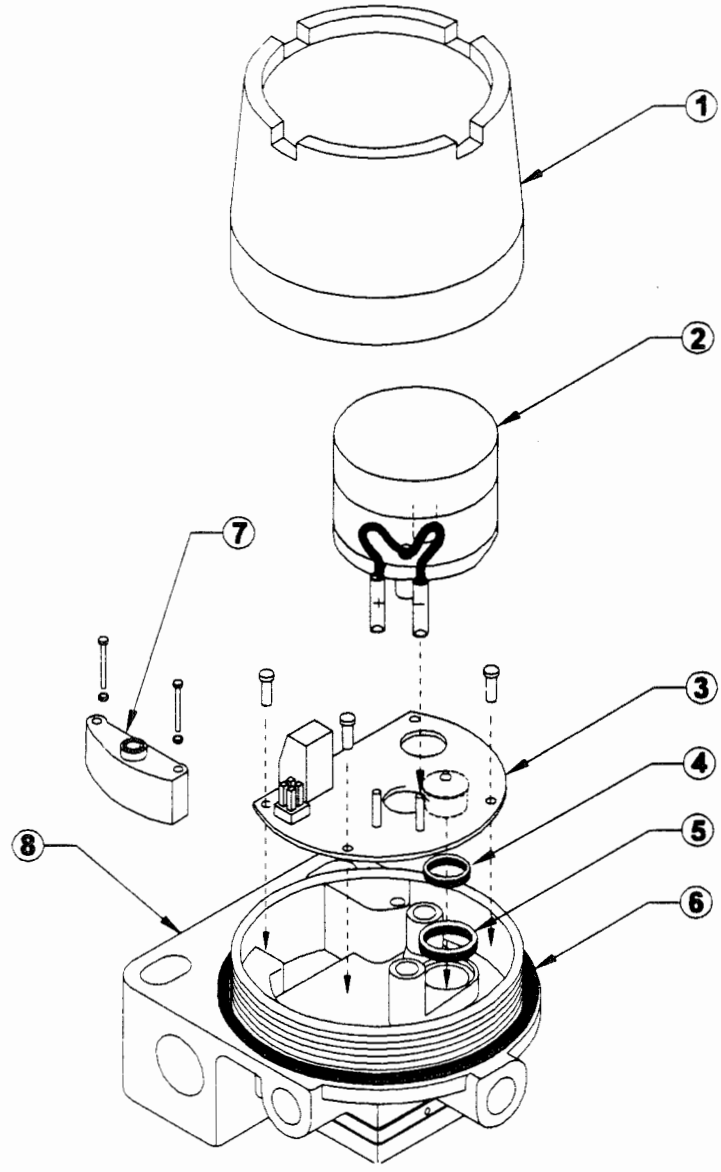
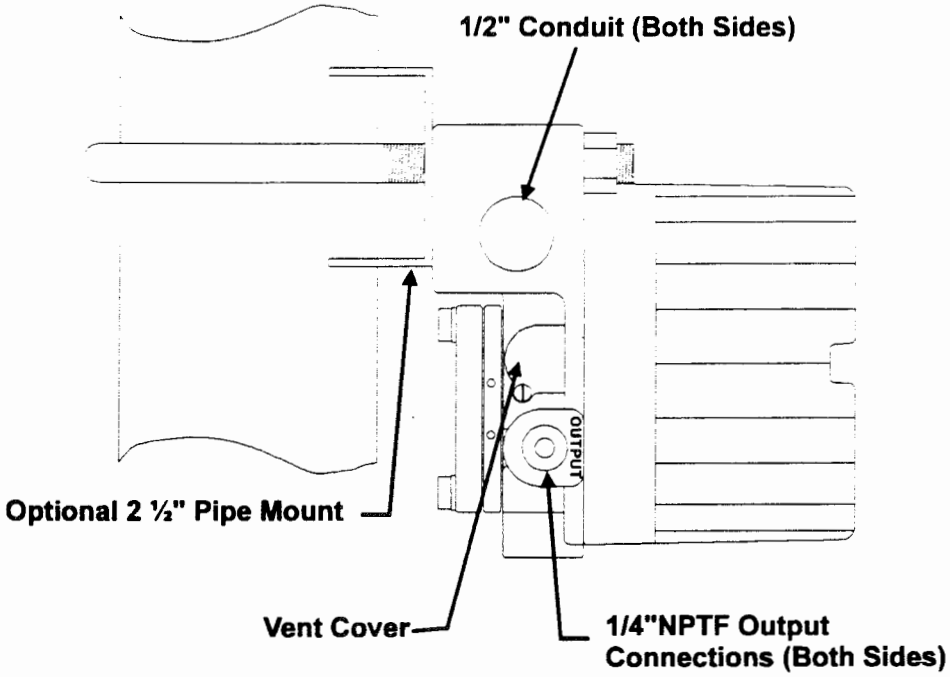
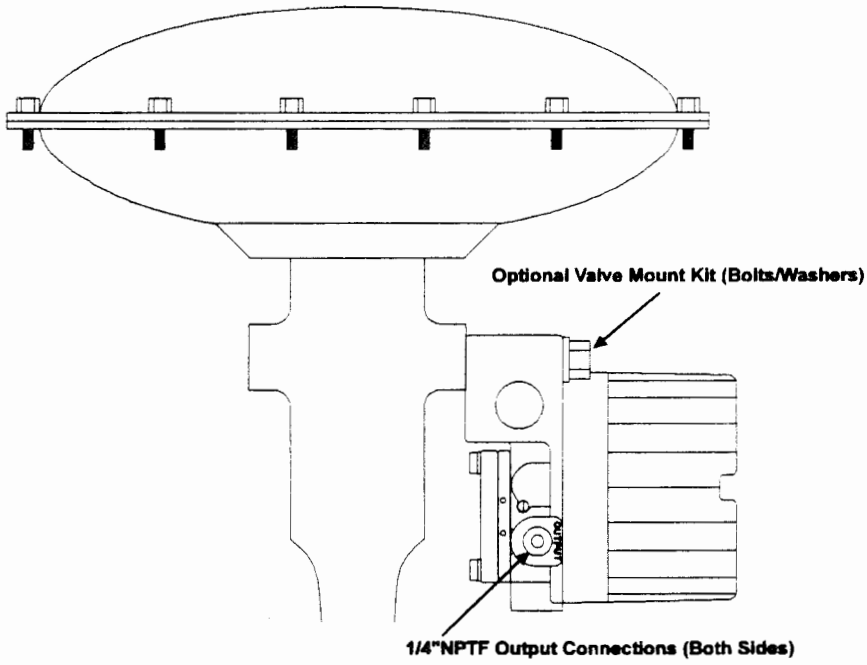


Figure 12 - Exploded View Showing Major Components

ITEM	DESCRIPTION
1	Die Cast Cover (Black Or Green)
2	E-Pi Module (Denote Range)
3	Control Circuit Board (Denote Input)
4	Sensor O-Ring
5	Sensor / Manifold O-Ring
6	Cover / Manifold O-Ring
7	Booster Assembly (Denote Model Number)
8	Test Jack Option



Series IP51/52/61/62
Pipe Mounted



I/P Mounted To Control Valve

Series IP51/52/61/62
Valve Mounted

Eurotherm Controls
741-F Miller Drive
Leesburg, VA 20175-8993
703-443-0000 • info@eurotherm.com

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