

Nitra NCP2 Series

Electropneumatic Transducer (I/P) Installation, Operation and Maintenance Instructions



Ordering Information

NCP2 Series I/P Transducers				
Part Number	Input	Electrical Connection	Output Range	
			psig	bar
NCP2-20-315N	4-20 mA	1/2" female NPT with 12" wire leads	3-15	0.2-1.0
NCP2-20-327N	4-20 mA	1/2" female NPT with 12" wire leads	3-27	0.2-1.9
NCP2-20-630N	4-20 mA	1/2" female NPT with 12" wire leads	6-30	0.4-2.0
NCP2-20-260N	4-20 mA	1/2" female NPT with 12" wire leads	2-60*	0.14-4.0
NCP2-20-3120N	4-20 mA	1/2" female NPT with 12" wire leads	3-120*	0.2-8.0
NCP2-20-315D	4-20 mA	DIN 43650 Connector	3-15	0.2-1.0
NCP2-20-327D	4-20 mA	DIN 43650 Connector	3-27	0.2-1.9
NCP2-20-630D	4-20 mA	DIN 43650 Connector	6-30	0.4-2.0
NCP2-20-260D	4-20 mA	DIN 43650 Connector	2-60*	0.14-4.0
NCP2-20-3120D	4-20 mA	DIN 43650 Connector	3-120*	0.2-8.0

* Output shown is as calibrated at the factory. Large span adjustment capability allows recalibration to achieve output ranges from 3-35 psig (0.2-2.4 bar) with 2-60 psig unit to 3-145 psig (0.2-10 bar) with 3-120 psig unit.

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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

Part No.	NCP2-20-315N NCP2-20-315D	NCP2-20-327N NCP2-20-327D	NCP2-20-630N NCP2-20-630D	NCP2-20-260N NCP2-20-260D	NCP2-20-3120N NCP2-20-3120D
Functional Specifications					
Input	4-20 mA				
Outputs (psig - BAR)	3-15 (0.2-1.0)	3-27 (0.2-1.8)	6-30 (0.4-2.0)	2-60 (0.14-4.0)	3-120 (0.2-8.0)
Supply Pressure (psig - BAR)	20 min - 100 max (1.3 min - 6.7 max)	32 min - 100 max (2.1 min - 6.7 max)	35 min - 100 max (2.3 min - 6.7 max)	65 min - 150 max (4.3 min - 10.0 max)	125 min - 150 max (8.3 min - 10.0 max)
Air Consumption	0.03 scfm (0.9 NL/min) at mid range typical			0.07 scfm (2 NL/min) at mid range typical	
Flow Capacity	4.5 scfm (127 NL/min) at 25 psig (1.7 BAR) supply pressure 12.0 scfm (340 NL/min) at 100 psig (6.9 BAR) supply pressure			12.0 scfm (340 NL/min) at 100 psig (6.9 BAR) supply pressure	20.0 scfm (566 NL/min) at 150 psig (10.0 BAR) supply pressure
Exhaust Capacity	2 scfm (56.6 NL/min) at 5 psig (2.4 bar) above 20 psig (1.3 bar) setpoint			7 scfm (198 NL/min) at 10 psig (0.7 bar) above 20 psig (1.3 bar) setpoint	
Temperature Limits	-40°F to +158°F (-40°C to +70°C)				
Impedance	180 Ohms	240 Ohms	240 Ohms	245 Ohms	280 Ohms
Performance Specifications					
Linearity	<± 0.5% of span			<± 2.0% of span	
Hysteresis and Repeatability	< 0.5% of span			< 0.5% of span	
Supply Pressure Sensitivity	< 0.1% of span per 1.0 psig (0.07 BAR)			< 0.4% of span per 1.0 psig (0.07 BAR)	
Physical Specifications					
Pneumatic Port Sizes	1/4" NPT female				
Media	Clean, dry, oil-free, instrument air, filtered to 40 micron				
Electrical Connections	Conduit 1/2" NPT female with 12" wire leads (NCP2-20-xxxN) or DIN 43650 (NCP2-20-xxxD)				
Mounting	Direct, bracket (bracket included), optional 1-1/2" / 2" pipe mount kit (NCP2-P) or optional DIN rail mount kit (NCP2-D)				
Housing	Chromate-treated aluminum with epoxy paint. NEMA 4X (IP65)				
Elastomers	Buna-N				
Trim	Stainless steel; brass; zinc-plated steel				
Weight	1.3 lbs (0.59 kg)				
Approvals	CSA File # 269584, FM (Haz-Loc)*				

* To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

1. INSTALLATION

1.1 Pre-Installation Requirements

1.1.1 Environment: Suitable for installation in the following locations:

- Intrinsically safe operation in hazardous locations outdoors (NEMA 4X, CSA.ENC.4 & IP65)
- See section 3.1 for Factory Mutual (FM) and Canadian Standards (CSA).

DANGER All wiring must be made to all local and national codes appropriate to the area of installation.

1.1.2 Electrical Input: 4-20 mA DC current source

1.1.3 Air supply: Clean, dry, oil free instrument air filtered to 40 micron.

NOTE Clean all pipe lines to remove dirt and scale prior to installation. Failures attributable to instrument air supply contamination are not covered by the warranty.

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

1.2 Mounting

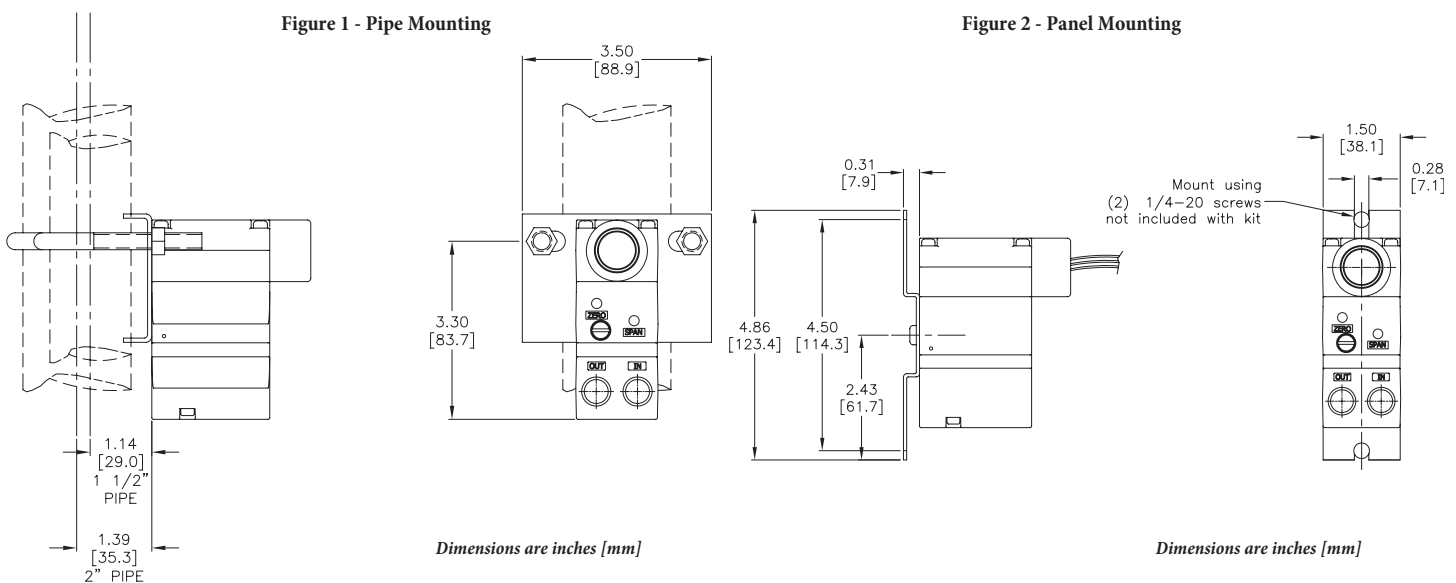
1.2.1 The NITRA NCP2 series comes with a standard mounting kit that enables panel or wall mounting of the unit. An accessory mount kit (NCP2-P) allows 1-1/2" or 2" pipe mounting.

1.2.2 With access to the rear of a panel, attach transducer using two 10-32 screws and the two threaded mounting screws on the back of the unit. With no access to the back of the panel, attach the bracket to the transducer using the two 10-32 holes on the back of unit and mount bracket to panel using four 10-32 screws (see figure 2).

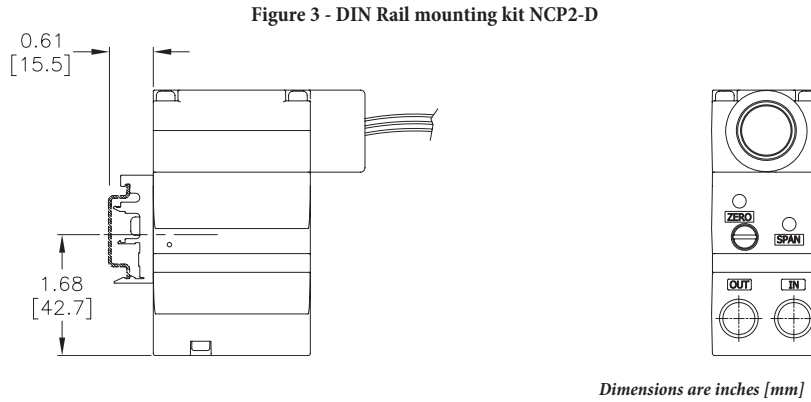
1.2.3 The NITRA NCP2 series can be mounted to a 1-1/2" or 2" pipe using the optional kit, AutomationDirect.com's part number NCP2-P. Use two 10-32 holes on the back of the unit to attach bracket to transducer. Then place U-bolt around pipe and through bracket. Place nuts on U-bolt and tighten (see figure 1).

1.2.4 Due to its light weight, the NITRA NCP2 series can also be mounted in line with support provided by the supply and output piping.

1.2.5 Because of it's small size, the NITRA NCP2 series can easily be mounted to a manifold.



1.2.6 The NITRA NCP2 series can be mounted to DIN-rail using the optional kit, AutomationDirect.com's part number NCP2-D. This will allow the transducer to mount to DIN 50045, 50035, 50022 rails (see figure 3).



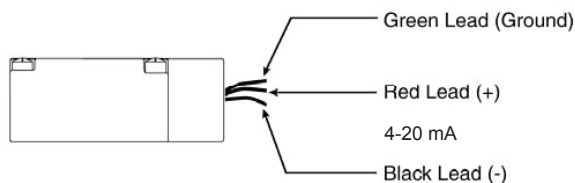
1.3 Pneumatic Connections

- 1.3.1 Clean all pipe lines to remove dirt and scale prior to installation.
- 1.3.2 Supply air must be filtered to 40 microns and free of moisture and lubricants.
- 1.3.3 Two (2) 1/4" NPT ports labeled IN are provided for supply air connections. Either port may be used. The unused port must be plugged with the pipe plug included with the unit.
- 1.3.4 Two (2) 1/4" NPT ports labeled OUT 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.
- 1.3.5 If thread sealer is required, use a tape type that is compatible with the media. Liquid or paste type thread sealer is not recommended.

1.4 Electrical Connections

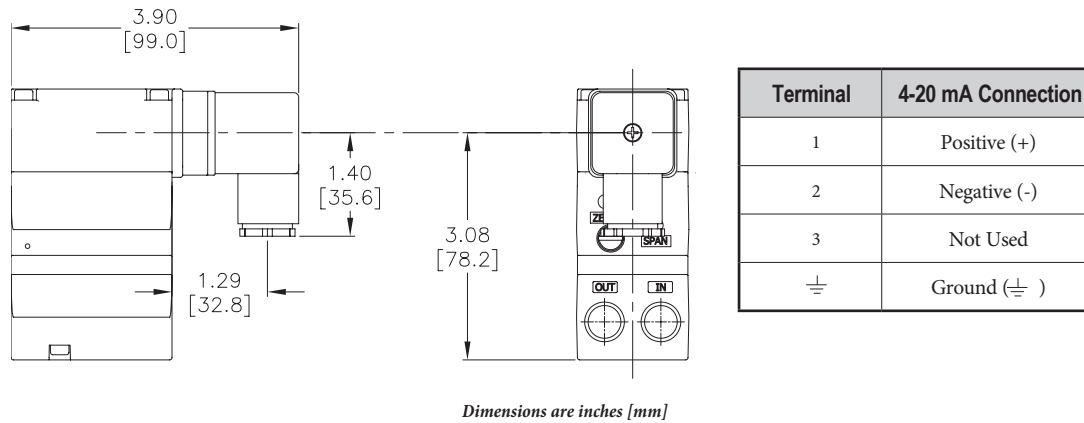
- 1.4.1 The NCP2 series are two wire devices (do not require a separate power source), plus a safety ground. The I/P unit requires a variable input current of 4-20 mA.
- 1.4.2 1/2" NPT conduit connection is made using 12" pigtail wire coming from unit. Electrical connections are made to the red (+) and black (-) leads. The green lead is furnished for case ground.

Figure 4 - 1/2" Conduit Connection



1.4.3 DIN 43650 Connector electrical connections are made as shown in figure 5.

Figure 5 - DIN 43650 Connections



2. OPERATION

2.1 Calibration

2.1.1 All units are shipped from the factory calibrated, direct acting.

NOTE

Factory calibration is susceptible to shift due to handling during transit. It is recommended that all units be recalibrated prior to use.

2.1.2 Though the units are shipped fully calibrated it is suggested that the user check the calibration to ensure that settings and operation match the application requirements.

NOTE

The unit must be calibrated in the plane it is mounted in.

NOTE

Repeated cycling of supply pressure may cause increased leakage and premature product failure.

2.1.3 Connect the recommended air supply to the inlet of the transducer and an accurate pressure gauge to the outlet.

2.1.4 Connect the electrical input and set the input signal to its minimum value of 4mA.

2.1.5 Observe the output pressure. If necessary, adjust the zero screw until reaching minimum output pressure setting. Turn zero screw counter clockwise to increase pressure, clockwise to decrease pressure.

NOTE

If unable to achieve output during the calibration process, follow the steps outlined in 4.1.4. to clean the orifice. Then turn the zero adjustment screw clockwise slowly and carefully until output pressure begins to respond.

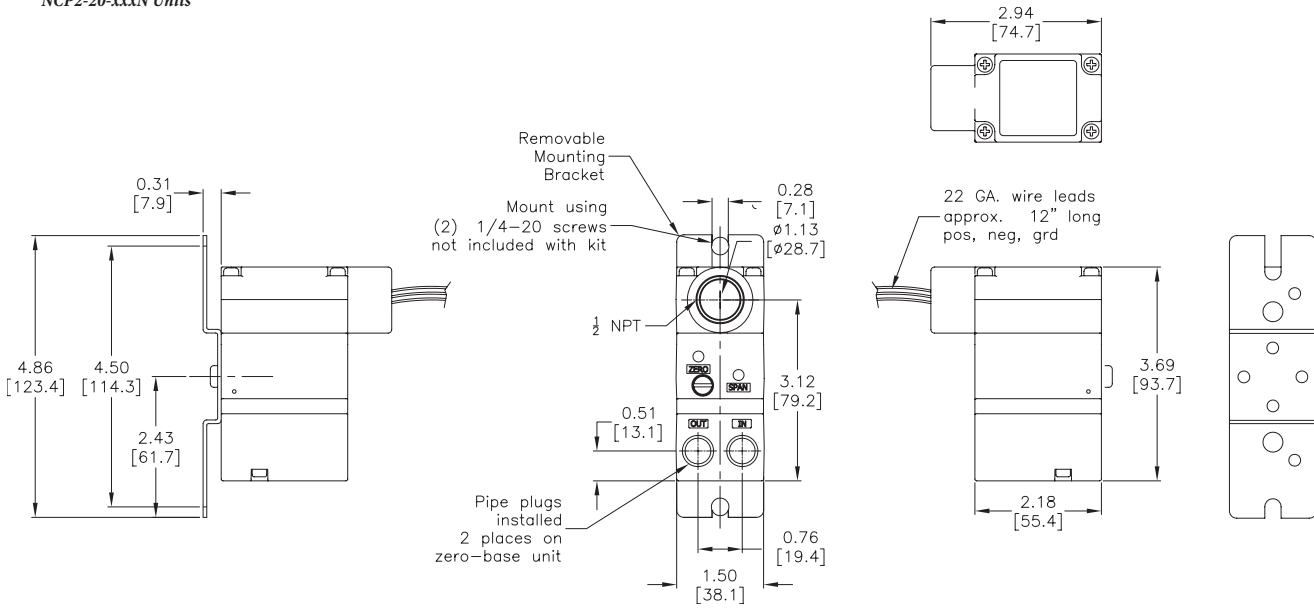
2.1.6 Increase electrical input signal to its maximum value of 20mA.

2.1.7 Observe the output pressure. If necessary, adjust the span screw until reaching maximum output pressure setting. Turn span screw counter clockwise to increase pressure, clockwise to decrease pressure.

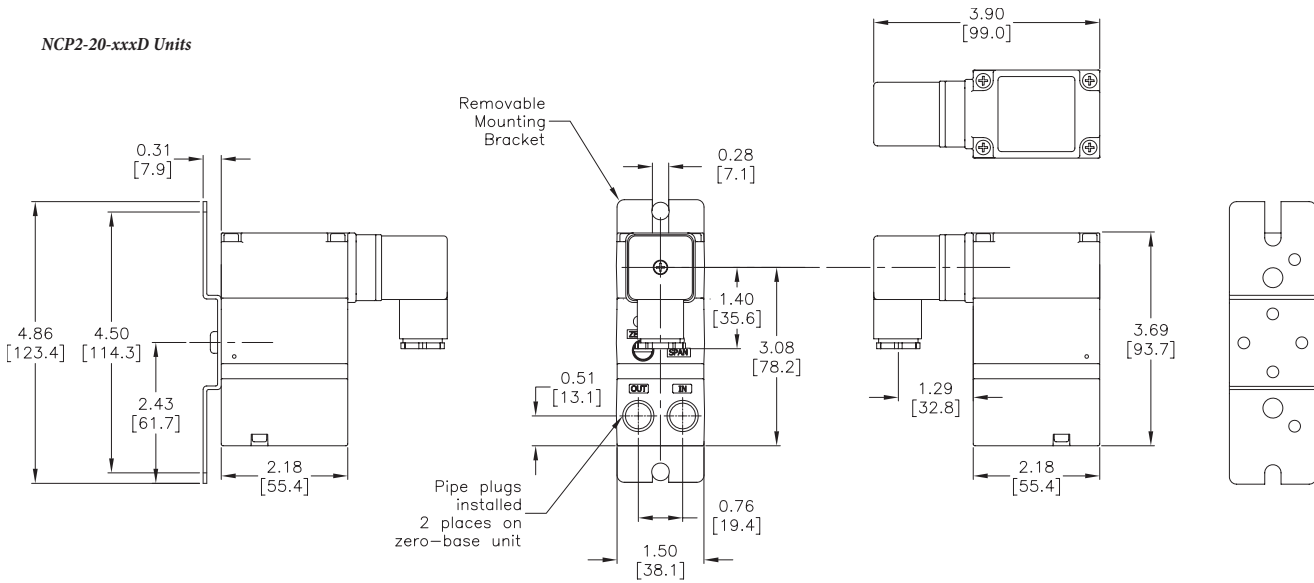
2.1.8 The Zero and Span adjustments are interactive. After adjusting the span it will be necessary to recheck the zero. Repeat the above steps until both end points are at the required values.

2.2 Dimensional Drawings (Dimensions are inches [mm])

NCP2-20-xxxN Units



NCP2-20-xxxD Units



See our Web site www.AutomationDirect.com for complete Engineering drawings.

3. APPROVALS

3.1 Factory Mutual Research Corporation (FM) & Canadian Standards (CSA) Approvals

Notes

- (North America) Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
- The IS Barriers or Equipment (Associated Apparatus) must be FM Approved and the configuration of associated Apparatus must be FM Approved and CSA certified under the Entity Concept. The Associated Apparatus may be installed within the Hazardous (Classified) location for which it is approved. The Associated Apparatus and hazardous location loop apparatus manufacturer's control drawings must be followed when installing this equipment. An AEx [Ib] Associated Apparatus is suitable only for connection to Class I, Zone 1, Hazardous (Classified) Locations and is not suitable for Class I, Zone 0, or Class I, Division 1 Hazardous (Classified) Locations.
- (US) Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and Article 500 of the National Electrical Code (ANSI/NFPA 70). (Canada) Installation should be in accordance with Section 18 of the Canadian Electrical Code.
- (North America) The connection option "N" is suitable for Type 4X installations. All others must be mounted in a suitable enclosure.
- The connection option "N" is suitable for Class I, II, and III, Division 2, Groups A, B, C, D, E, F, and G hazardous (classified) locations. Dust-tight conduit seal must be used when installed in Class II and Class III environments. The connection option "D" is suitable for Class I, Division 2, Groups A, B, C, and D hazardous (classified) locations. Transducers to be installed in accordance with the: (US) National Electrical Code(ANSI-NFPA 70) Division 2 hazardous (classified) location wiring techniques. (Canada) Canadian Electrical Code
- The Intrinsic Safety Entity concept allows the interconnection of two FM Approved intrinsically safe devices. The linear barrier parameters must meet the following requirements:
 $V_{oc} \text{ or } V_t < V_{max}$
 $I_{sc} \text{ or } I_t < I_{max}$
 $C_a > C_i + C_{cable}$
 $L_a > L_i + L_{cable}$
Entity Parameters for: MODELS NCP2-20-*
 $V_i (V_{max}) = 30 \text{ V}$
 $I_i (I_{max}) = 125 \text{ mA}$
 $P_i = 0.70 \text{ watts}$
 $C_i = 0 \mu\text{F}$
 $L_i = 0 \text{ mH}$
- No revision to this drawing is permitted without prior FM Approval/CSA Certification.

NCP2-20 TRANSUCER

+

(RED)

-

(BLACK)

GROUND

HAZARDOUS LOCATION

NONHAZARDOUS LOCATION

HAZARDOUS LOCATION UNITS:
 FM & CSA
 INTRINSICALLY SAFE:
 CLASS I, II, III, DIV. I, GROUPS C, D, E, F, & G
 MODELS NCP2-20-*N

CLASS I, DIV. I, GROUPS C & D
 MODELS NCP2-20-*D

SUITABLE FOR:
 CLASS I, DIV. 2, GROUPS A, B, C, D
 MODELS NCP2-20-*N
 NCP2-20-*D

SUITABLE FOR:
 CLASS II, III, DIV. 2, GROUPS F, G
 MODELS NCP2-20-*N

*= OUTPUT PRESSURE OPTION DOES NOT AFFECT RATING %= CONNECTION OPTION DOES NOT AFFECT RATING

NCP2-20-□ □

OUTPUT PRESSURE

315 3-15 PSIG

327 3-27 PSIG

630 6-30 PSIG

260 2-60 PSIG

3120 3-120 PSIG

CONNECTION

N 1/2 NPT CONDUIT

D DIN 43650 CONNECTOR

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TOLERANCES	REVISIONS			BY AUTOMATION DIRECT		
DECIMAL	NO.	DATE	BY			
XX ± .01	1			"IS" INTERCONNECTION DIAGRAM		
XXX ± .005				NCP2-20-** INTRINSICALLY SAFE		
FRACTIONAL	2			DRAWN BY	EVA	SCALE NONE MATERIAL SEE ABOVE
± 1/64	3			CHECKED		DATE 2/1/2017 DRAWING NO. 531-990-086
ANGULAR	4			TRACED		APP'D
± 1/4°	5					

4. MAINTENANCE

NOTE

Under normal circumstances, no maintenance should be required.

4.1 Instrument Air Filtration

- 4.1.1 Failures due to instrument supply air contamination are not covered by warranty.
- 4.1.2 Use of oil and/or water saturated instrument air can cause erratic operation.
- 4.1.3 Poor quality instrument air can result in unit failure. It is recommended that a filter regulator be placed upstream of each unit where oil and/or water laded instrument air is suspected.
- 4.1.4 If clean, dry air is not used the orifice can become blocked. To clean, first turn off supply air, then remove the screw located on the side of the unit above the "out" port. The orifice is a very small hole on the side of the screw. Unplug the orifice using a wire that has a smaller diameter than 0.012" (0.30mm). Replace screw tightly into unit.

5. TROUBLESHOOTING

Problem	Look For	Solution
No output or low output	Zero adjustment Supply pressure too low	Reset zero (2.2.2 and 2.2.3) Increase supply pressure (see specs)
Unstable / low output	Electrical connection Clogged orifice	Check connection/signal (1.4) Clean orifice (4.1.3)
Erratic operation	Liquid/contamination in air supply	Clean air supply (1.1.3)
Works in reverse	Pressure goes down when signal is increased	Reverse input wires (1.4.2)
Output equals supply pressure	Improper pneumatic connections	Insure that supply is connected to "IN" port and output is connected to "OUT" port (1.3.3, 1.3.4)

NOTE

If problems are not solved by troubleshooting procedures, contact AutomationDirect.com technical support for further assistance at 770-844-4200.

6. WARRANTY & DISCLAIMER

See AutomationDirect.com for latest Terms & Conditions

WARNING

These products are intended for use in industrial compressed-air systems only. Do not use these products where pressures and temperatures can exceed those listed under Specifications. **Not for oxygen service.**