

Nitra NCP1 Series

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



Ordering Information

NCP1 Series I/P Transducers			
Part Number	Input	Output Range	
		psig	bar
NCP1-20-315N	4-20 mA	3-15	0.2-1.0
NCP1-20-327N	4-20 mA	3-27	0.2-1.9
NCP1-20-630N	4-20 mA	6-30	0.4-2.0
NCP1-20-260N	4-20 mA	2-60*	0.14-4.0
NCP1-20-3120N	4-20 mA	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.	NCP1-20-315N	NCP1-20-327N	NCP1-20-630N	NCP1-20-260N	NCP1-20-2130N
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)	18 min - 100 max (1.2 min - 6.7 max)	30 min - 100 max (2.0 min - 6.7 max)	33 min - 100 max (2.2 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	0.05 scfm (1.4 NI/min) midrange typical			0.07 scfm (2 NI/min) midrange typical	
Flow Capacity	4.5 scfm (127 NI/min) at 25 psig (1.7 BAR) supply 12.0 scfm (340 NI/min) at 100 psig (6.8 BAR) supply			20.0 scfm (566 NI/min) at 150 psig (10.5 BAR) supply	
Exhaust Capacity	2 scfm (56.6 NI/min) at 5 psig (2.4 BAR) above 20 psig (1.3 BAR) setpoint			7 scfm (198 NI/min) at 10 psig (0.7 BAR) above 20 psig (1.3 BAR) setpoint	
Temperature Limits	-20°F to +140°F (-30°C to +60°C)				
Impedance	180 Ohms	220 Ohms	220 Ohms	225 Ohms	260 Ohms
Performance Specifications					
Linearity	<± 0.75% of span			<± 1.5% of span typical, ± 2.0% max.	
Hysteresis and Repeatability	< 1.0% of span; < 0.5% of span			< 0.5% of span; < 0.5% of span	
Supply Pressure Sensitivity	<± 0.1% of span per psig (<± 0.15% of span per 0.1 BAR)			<± 0.04% of span per 1.0 psig (0.07 BAR)	
Physical Specifications					
Pneumatic Port Sizes	1/4" NPT female				
Media	Oil free, clean dry air filtered to 40 micron				
Electrical Connections	Conduit 1/2" NPT female with 12" wire leads				
Mounting	Direct or bracket (bracket included)				
Housing	Chromate-treated aluminum with epoxy paint. NEMA 4X (IP65)				
Elastomers	Buna-N				
Trim	Stainless steel; brass; zinc-plated steel				
Weight	2.1 lbs. (0.94 kg)				
Approvals	FM (Haz-Loc)**				

* Can be recalibrated to provide 3-9 psig or 9-15 psig for split ranging applications.

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

1. DESCRIPTION and INSTALLATION

1.1 Description

1.1.1 The NITRA NCP1 Series converts a current input signal to a linearly proportional pneumatic output pressure. This versatile instrument is designed for control applications that require a high degree of reliability and repeatability at an economical cost.

1.2 Principle of Operation

1.2.1 The NITRA NCP1 Series is a force balance device in which a coil is suspended in the field of a magnet by a flexure. Current flowing through the coil generates axial movement of the coil and flexure. The flexure moves towards the nozzle and creates back pressure which acts as a pilot pressure to an integral booster relay. Input signal increases cause proportional output pressure increases.

Zero and Span are calibrated by turning adjust screws on the front face of the unit. Adjustment of the zero screw repositions the nozzle relative to the flexure. The span adjustment is a potentiometer that controls the amount of current through the coil.

1.3 Mounting

1.3.1 Unit may be pipe, panel, or bracket mounted. Mounting may be at any angle, though may require field adjustment. High external vibration may cause output fluctuations. Mounting in a vibration-free area is recommended.

1.4 Pneumatic Connections

1.4.1 The 1/4" NPT supply and output ports are marked "IN" and "OUT" respectively on the base of the unit. Clean all pipe lines to remove contamination before installation. If thread sealer is required, use a tape type that is compatible with the media. Liquid or paste type thread sealer is not recommended.

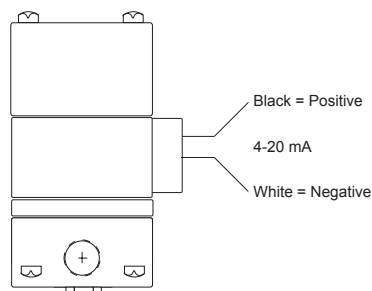
Clean dry instrument quality air must be used. To insure optimum performance supply pressure should be regulated. To provide stable inlet pressure and prevent contamination of the internal section of the transducer the use of an Instrument Air Filter Regulator is recommended.

The two unmarked ports on the base of the unit are gauge ports but may be used as alternative output ports. Any unused ports must be plugged.

WARNING The I/P transducer enclosure contains aluminum and is considered to constitute a potential risk of ignition by impact or friction and must be taken into account during installation.

1.5 Electrical Connections

1.5.1 Electrical connections are made to the black and white leads extending out from the 1/2" NPT conduit fitting.



2. OPERATION

2.1 Calibration

2.1.1 Zero and Span should always be checked after mounting. If unit is calibrated in a vertical position and then mounted at an angle, readjustment of the zero is necessary. To calibrate use the following procedure:

1. Open protective covers to expose zero and span adjustment screws.
2. Connect the recommended air supply to the inlet of the transducer and an accurate pressure gauge to the outlet.
3. Connect the electrical input and set the input signal to 4mA.
4. 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

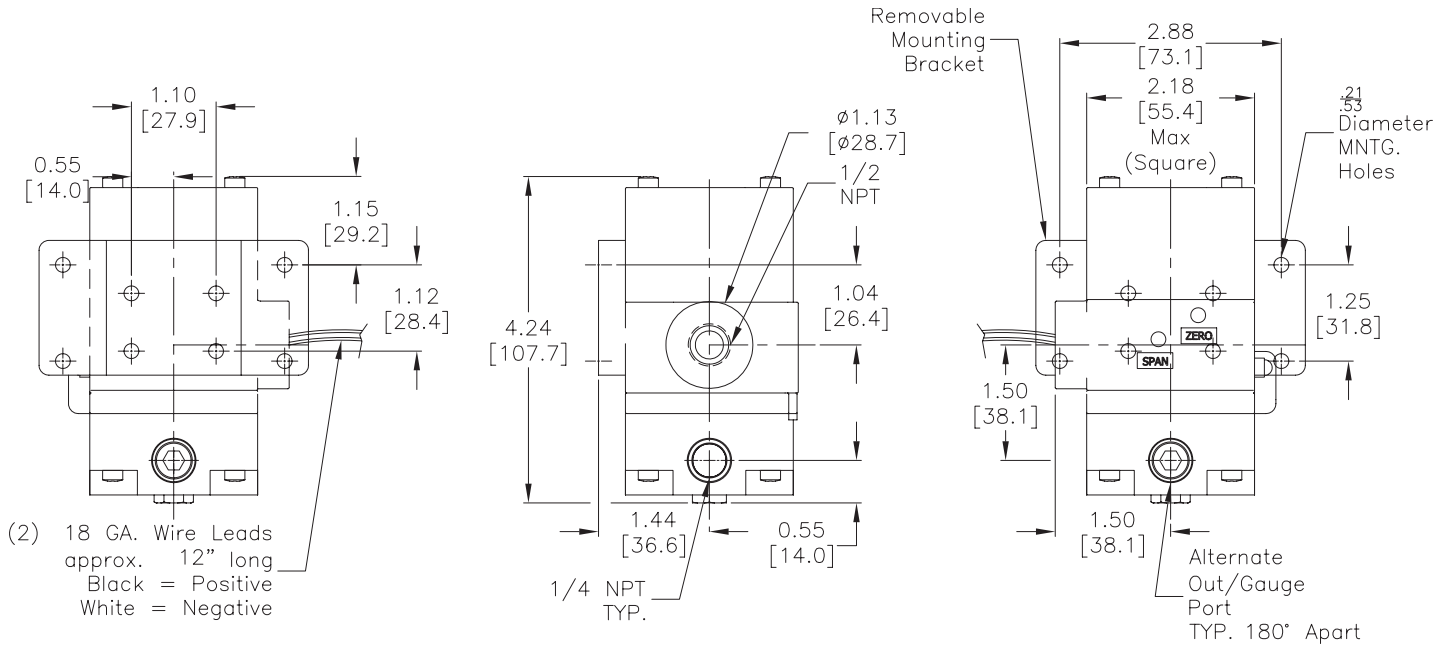
If unable to achieve output during calibration process, follow the steps outlined in 4.1.4 to clean the orifice. Then turn zero adjustment screw counter clockwise for up to 30 revolutions, until output pressure rises.

5. Increase electrical input signal to 20mA.
6. Observe the output pressure. If necessary adjust the span screw until reaching maximum output pressure setting.

NOTE For I/P (current) input models turn span screw counter clockwise to increase pressure, clockwise to decrease pressure.

7. The Zero and Span adjustments are interactive. After adjusting the span it will be necessary to recheck the zero. Repeat steps 3-6 until both end points are at the required values.

2.2 Dimensional Drawings (Dimensions are inches [mm])



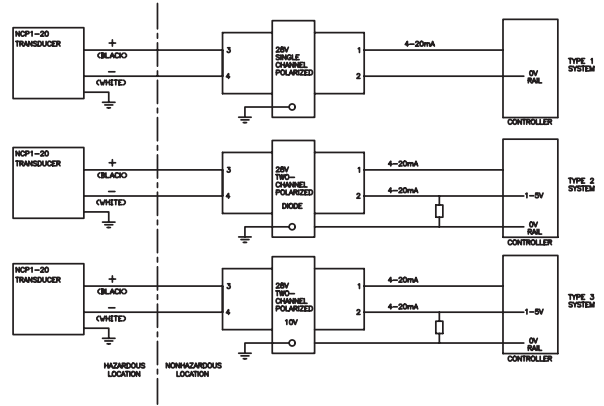
3. APPROVALS

3.1 Intrinsically Safe Operation



NOTES:

1. INSTALLATION TO BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, NFPA 70, ARTICLE 504, AND ANSI/ISA RP 12.6.
2. APPARATUS CONNECTED TO THE SYSTEM SHALL NOT USE OR GENERATE VOLTAGE GREATER THAN 250 V.
3. INSTALL INTRINSICALLY SAFE BARRIERS IN ACCORDANCE WITH BARRIER INSTRUCTIONS.
4. FACTORY MUTUAL APPROVED AS INTRINSICALLY SAFE FOR CLASS I, II, AND III, DIVISION 1, GROUPS C, D, E, F, AND G, WHEN INSTALLED AS SHOWN. UNITS WITH 'D' OPTION ARE FACTORY MUTUAL APPROVED AS INTRINSICALLY SAFE FOR CLASS I DIVISION 1, GROUPS C, D WHEN INSTALLED AS SHOWN.
5. FACTORY MUTUAL APPROVED AS NONINCENDIVE FOR CLASS I, DIVISION 2, GROUPS A, B, C, AND D, AND SUITABLE FOR CLASS II, DIVISION 2, GROUP F, G AND CLASS III, DIVISION 1 AND 2. UNITS WITH 'D' OPTION ARE FACTORY MUTUAL APPROVED AS NONINCENDIVE FOR CLASS I DIVISION 2, GROUPS A,B,C,D WHEN INSTALLED AS SHOWN. BARRIERS ARE NOT REQUIRED FOR NONINCENDIVE RATING. MAX V=30 VDC.
6. CAUTION: SUBSTITUTION OF COMPONENTS MAY VOID FACTORY MUTUAL APPROVAL.
7. AMBIENT TEMPERATURE RANGE: -30° C TO 60° C.
8. FACTORY MUTUAL APPROVED AS INTRINSICALLY SAFE FOR CLASS I, II, AND III, DIVISION 1, GROUPS C, D, E, F, AND G WHEN USED ASSOCIATED APPARATUS. THE LINEAR BARRIER PARAMETERS MUST MEET THE FOLLOWING REQUIREMENTS:
 $V_{oc} \text{ or } V_t < V_{max}; C_a > C_i + C_{cable}$
 $I_{sc} \text{ or } I_t < I_{max}; L_a > L_i + L_{cable}$
 ENTITY PARAMETERS FOR MODEL NCP1-20-__
 $V_{max}=30V$ $C_i=0$
 $I_{max}=125mA$ $L_i=0mH$
 C_i IS CAPACITANCE CONTRIBUTED BY THE TRANSDUCER.
 L_i IS INDUCTANCE CONTRIBUTED BY THE TRANSDUCER.
9. FOR NEMA 4X OPTION, ADD W TO THE MODEL NUMBER. ONLY THE STANDARD 1/2NPT CONDUIT IS SUITABLE FOR NEMA 4X INSTALLATIONS.
10. MODELS WITH NEMA 4X OPTION ARE FACTORY MUTUAL APPROVED FOR INDOOR/OUTDOOR USE PER THE REQUIREMENTS OF NEMA 4X AS DESCRIBED IN THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION STANDARD NO. 250 "ENCLOSURES FOR ELECTRICAL EQUIPMENT, 1000 VOLTS MAX."



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NCP1-20-□	OUTPUT PRESSURE	OPTIONS
	315	3-15 PSIG W NEMA 4X
	327	3-27 PSIG
	630	6-30 PSIG
	260	2-60 PSIG
	3120	3-120 PSIG

HAZARDOUS LOCATION UNITS:
 INTRINSICALLY SAFE:
 CLASS I, II, III, DIV. 1, GROUPS C, D, E, F, & G
 NON-INCENDIVE
 CLASS I, DIV. 2, GROUPS A, B, C, D
 SUITABLE FOR:
 CLASS II, DIV. 2, GROUPS F,G
 CLASS III, DIV. 1 & 2

REVISIONS		REVISIONS		BY AUTOMATION DIRECT	
NO.	DATE	BY	NO.	DATE	BY
6			1		
7			2		
8			3		
9			4		
10			5		

'IS' INTERCONNECTION DIAGRAM
 NCP1-20-** INTRINSICALLY SAFE

DRAWN BY	EVA	SCALE	NONE	MATERIAL
CHECKED		DATE	2/3/2017	DRAWING NO.
TRACED		APP'D		531-990-085

4. MAINTENANCE

NOTE

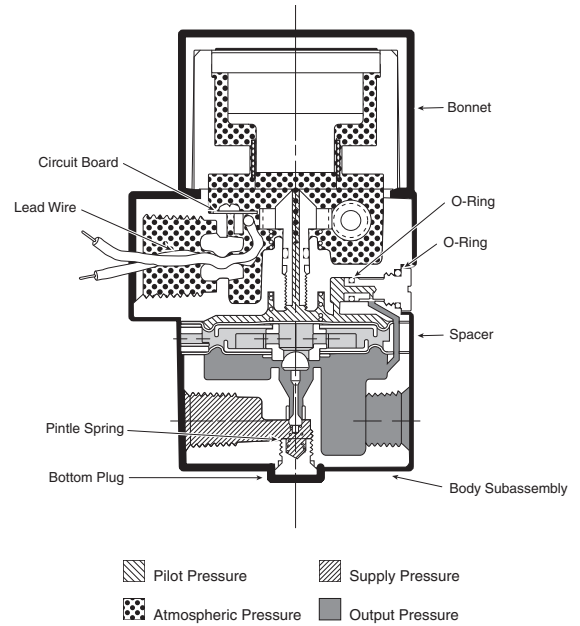
Under normal circumstances, no maintenance should be required.

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, unscrew and remove orifice assembly (large silver screw head located above the out port). Then unplug orifice by using a wire that has a smaller diameter than 0.015 in. (0.38 mm). Use compressed air to blow out any loose particles inside the orifice assembly. Screw orifice assembly back into unit.

5. TROUBLESHOOTING

Problem	Look For	Solution
No output or low output	Zero adjustment Supply pressure too low	Reset zero (2.1) Increase supply pressure (see specs)
Unstable / low output	Electrical connection Clogged orifice	Check connection/signal (1.5.1) Clean orifice (3.1.3)
Erratic operation	Liquid/contamination in air supply	Clean air supply (1.4.4)
Works in reverse	Pressure goes down when signal is increased	Reverse input wires (1.5.1)
Output equals supply pressure	Improper pneumatic connections	Insure that supply is connected to "IN" port and output is connected to "OUT" port (1.4.1)



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.**