

February 2018

► Description

These 2-wire (loop-powered) I/P transmitters accept a current signal (such as 4-20mA) from a DCS, PLC or PC-based control system. They convert the current signal to a pneumatic signal (3-15psig, 0.2-1bar, 20-100kPa, etc.) to provide precise, proportional control of valves, actuators and other pneumatically-controlled devices.

The economical IPH² (Type 4X) is watertight, dust-protected, and resistant to corrosion and chemicals. In addition to meeting Type 3X/4X requirements, the IPX² can be installed in explosion-proof environments.

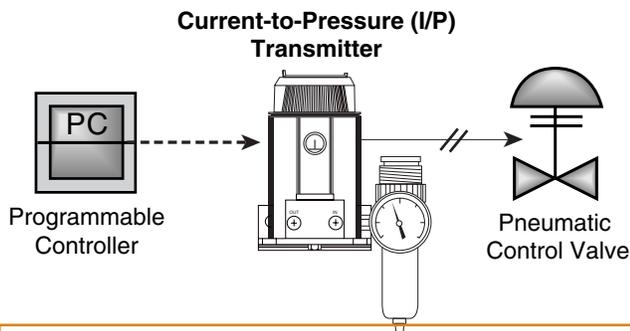
Both units are available with an optional coalescing filter/regulator that combines an air filter and miniature supply line regulator with a pressure gauge that reads in both psig and bars.

Approved for Use with Natural Gas

Special design, construction and materials allow the model **IPX² with the -NG1 or -NG2 option** to be used with natural gas as its pneumatic supply (commonly referred to as sweet gas consisting of up to 20ppm of H₂S).

Meets the US Environmental Protection Agency (EPA) requirement for the oil and gas industry (New Source Performance Standards Subpart OOOO, EPAHQAR20100505)*.

Figure 1. I/P transmitters accept a current input and convert it to a proportional pneumatic control signal.



Certifications

ANZEx



Check the listing on Page 4 for full certification details.



Compact, rugged, and highly accurate, the IPH² (right) and IPX² (top) are ideal for installation in harsh field environments.

► Features

- **Wide variety of input and output choices.** Available with 4-20mA or split range inputs, and 22 direct and reverse output ranges. Reverse output is switch selectable on IPX². Custom ranges are also available.
- **Low air consumption and high output volume.** The IPH² and IPX² output as much as 300SCFH and consume as little as 0.08SCFM.
- **Accurate and stable.** Featuring exceptional ±0.25% of span accuracy and six-month stability, they are ideal for precise applications in difficult to access locations.
- **Immune to supply pressure variation.** Maintain incredible accuracy even when the supply pressure fluctuates between 20 and 40psig.
- **Removable electronics module.** In abnormal conditions where a liquid “slug” is present in the air/gas supply of the IPX², the electronics module can be removed to aid in recovery by allowing accumulated liquid to drain more effectively.
- **Clog Resistant Filtered Nozzle and Orifice.** A larger orifice, combined with an easily replaceable internal filter protects against clogging caused by debris.
- **RFI/EMI protection.** Special circuit and enclosure designs protect against the harmful effects of radio frequency and electromagnetic interference.

*Maximum natural gas bleed rate is less than 6SCFH with a 3-15psi output and 17psi natural gas supply.

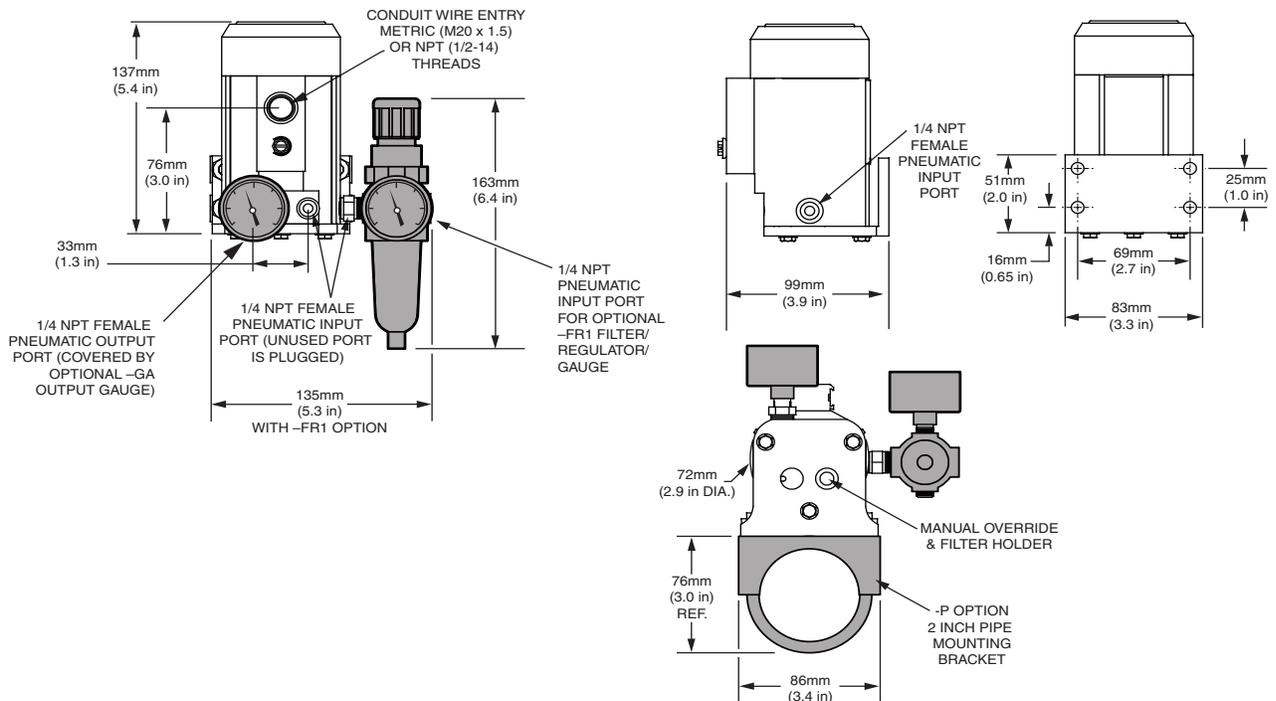
IPH² & IPX²

Type 4X & Explosion-Proof
Current-to-Pressure (I/P) Transmitters

► Specifications

<p>Performance Accuracy: <math>\pm 0.25\%</math> of span including the combined effect of linearity, hysteresis and repeatability (between 0 and 3psig output, error will not exceed $\pm 1.0\%$ of span)</p> <p>Stability: Not to degrade from stated accuracy for six months</p> <p>Step Response: <math>< 0.2</math> seconds into 100ml load (6 in³) from 10% to 90% of span; Not guaranteed below 3psig output</p> <p>Supply Pressure Effect: Negligible from 20-40psig, steady pressure</p> <p>Air Capacity: 5.0SCFM minimum (20psig supply, 0psig output)</p> <p>Relief Capacity: 2.5SCFM minimum (15psig output)</p> <p>Air Supply: Instrument air only, 20-40psig</p> <p>Gas Supply with -NG1 or -NG2 Option: 17-40psig. Same cleanliness as instrument air. H₂S not to exceed 20ppm</p> <p>Maximum Input: 80psig without damage for units with output pressure rating of >15psig; 45psig without damage for units with output pressure rating of ≤ 15psig</p>	<p>Performance (Continued) Voltage Drop: 5V, maximum</p> <p>Air Consumption (Dead-ended): At 3-15psig output 20psig supply, average steady state consumption* of 4.7SCFH (min 4.2SCFH@ 3psig, max 5.2SCFH@15psig); 40psig supply, max 9SCFH @15psig output; 40psig supply, max 10SCFH @30psig output</p> <p>Natural Gas Consumption (Dead-ended): At 3-15psig output 20psig supply, average steady state consumption* of 5.7SCFH, (min 5.1SCFH@ 3psig, max 6.2SCFH@15psig); 17psig supply, max 5.9SCFH @15psig output; 40psig supply, max 12SCFH @30psig output;</p> <p>Mounting Position Effect: Negligible, unit can be mounted in any position; refer to user manual for special conditions of use with natural gas supply or outdoor environments.</p>	<p>Ambient Conditions Operating & Storage Range: -40°C to +85°C (-40°F to +185°F)</p> <p>Ambient Temperature Effect: <math>\pm 0.025\%</math> of span/°C, maximum from -20°C to 80°C; <math>\pm 0.1\%</math> of span/°C, maximum</p> <p>RFI/EMI Effect: <math>\pm 0.25\%</math> of span change at in field strengths of 10V/m@ frequencies of 20-1000MHz</p> <p>Vibration Effect: Meets ANSI/ISA-75 13.01-1996 (R2007) 5.3.5 as follows: 5-15Hz, 2mm peak-to-peak; 15-150Hz, 1g; 150-2000Hz, 0.5g</p> <p>Relative Humidity: 0-100%, non-condensing</p> <p>Adjustment Zero & Span: Screw adjusts zero or span by $\pm 10\%$ minimum, non-interactive</p> <p>Weight IPH²: 1.14kg (2.5 lbs) IPX²: 2.4kg (5.3 lbs)</p> <p style="text-align: right;">*Average flow rate determined at 9 psig output</p>
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Figure 2. IPH² Dimensional Diagram



IPH² & IPX²

Type 4X & Explosion-Proof
Current-to-Pressure (I/P) Transmitters

► Ordering Information

Unit	Input	Output*	Supply Pressure**	Options	Housing
IPH ² Type 4X Current-to- Pressure Transmitter	4-20MA 4-12MA 12-20MA into 250 ohms maximum Custom ranges also available.	0-20PSIG	25PSI	-FR1 Coalescing filter, miniature supply line regulator and pressure gauge that reads 0-60psig and 0-4bars -GA1 Output gauge (reads in 0-30psig and 0-2bars) -VTD Standard Factory Calibration with NIST Test Data Report IPX² ONLY: -NG1 IPX ² Type 4X unit equipped with electrical wire seal fitting assembly for using Natural Gas (sweet gas consisting of up to 20ppm H ₂ S) as the pneumatic supply (not available with -FR1 and -GA1 options). Refer to Figure 4 for position. -NG2 IPX ² Type 4X unit equipped with electrical wire seal fitting assembly for using Natural Gas (sweet gas consisting of up to 20ppm H ₂ S) as the pneumatic supply (not available with -FR1 and -GA1 options). Refer to Figure 4 for position. -CAN cCSA approved for Intrinsically-Safe, Explosion Proof, Non-Incendive and General Locations. Includes warnings in French and English. For Canadian institutions only. -ISA ANZEx approved Intrinsically Safe and Type n Note: The standard IPX ² tag includes approval markings for Canada, Europe and US with warnings in English only.	IPH² ENCLOSURES: WDNS Aluminum body with PBT polyester cover; NPT pneumatic and NPT electrical entry ports WDNA Aluminum body with aluminum cover; NPT pneumatic and NPT electrical entry ports WDMS Aluminum body with PBT polyester cover; M20 x 1.5 metric, pneumatic and electrical entry ports WDMA Aluminum body with aluminum cover; M20 x 1.5, pneumatic and metric electrical entry ports IPX² ENCLOSURES: EXI Explosion-proof housing with ½-inch NPT, female threaded entry port for connecting the input wiring conduit EXIM* Explosion-proof housing with M20 x 1.5 metric, female threaded entry port for connecting the input wiring conduit NC** Replacement electronics module without enclosure <small>* Not available with the -NG Option. ** Replacement or spare electronic modules must be ordered for specific output ranges (i.e. a 3-15PSIG electronics module cannot be field calibrated for 6-30PSIG). Replacement electronic modules are only available for IPX² units with S/Ns greater than 2321590. P suffix indicates enclosure comes equipped with base plate and U-bolts for mounting on a 2-inch pipe (i.e. EXIP).</small>
		3-15PSIG	20PSI		
		3-16.6PSIG	22PSI		
		3-18PSIG	23PSI		
		3-27PSIG	32PSI		
		6-30PSIG	35PSI		
		.2-1BAR	1.4BAR		
		20-100KPA	140KPA		
		.2-1KGCM2	1.4KGCM2		
		.02-.10MPA	.14MPA		
		Reverse Output†: (IPX ² only)			
		20-0PSIG	25PSI		
		17-1PSIG	22PSI		
		15-3PSIG	20PSI		
		16.6-3PSIG	22PSI		
		18-3PSIG	23PSI		
		27-3PSIG	32PSI		
30-6PSIG	35PSI				
1-.2BAR	1.4BAR				
100-20KPA	140KPA				
1-.2KGCM2	1.4KGCM2				
.10-.02MPA	.14MPA				
<small>*The unit's output must match the supply pressure to its right. **Supply Pressure is typically 5psi (0.3bar) higher than output pressure. †On loss of mA input, the output will go to 0 PSI out.</small>					
IPX ² Explosion- Proof and Type 3X* Current- to-Pressure Transmitter		20-0PSIG	25PSI		
		17-1PSIG	22PSI		
		15-3PSIG	20PSI		
		16.6-3PSIG	22PSI		
		18-3PSIG	23PSI		
		27-3PSIG	32PSI		
		30-6PSIG	35PSI		
		1-.2BAR	1.4BAR		
		100-20KPA	140KPA		
		1-.2KGCM2	1.4KGCM2		
<small>*Type 4X for -NG1 and NG2 options</small>					

When ordering, specify: Unit / Input / Output / Supply Pressure / Options [Housing]
Model number example: IPH2 / 4-20MA / 3-15PSIG / 20PSI / -FR1 [WDNA]
 IPX2 / 4-20MA / .2-1BAR / 1.4BAR / -NG1 [EXI]
 IPX2 / 4-20MA / .2-1BAR / 1.4BAR / -NG1 [NC]

IPH² & IPX²

Type 4X & Explosion-Proof
Current-to-Pressure (I/P) Transmitters

Certifications (IPH² and IPX²)

ANZEx TestSafe/ANZEx Scheme

Type n (IPX²: Air only)

Ex nA IIC T6@55°C

Intrinsically-Safe

Ex ia IIC T4@85°C /T5@70°C



CE Conformant – EMC Directive 2014/30/EU

EN61326-1

Environmental Protection:

IPH² Type 4X

IPX² (-Air), Type 3X & IP56

IPX² (-NG), Type 4X & IP66

Certifications (IPX² only)



Canadian Standards Association (CSA)

Non-Incendive, Type n (Air only)

Class I, Division 2, Groups A, B, C & D

Ex nA IIC

Temperature Codes: T4/T5/T6

T4@85°C/T5@70°C/T6@55°C

Maximum Operating Ambient

Intrinsically-Safe

Class I, Divisions 1 & 2, Groups A, B, C & D

Class II, Divisions 1 & 2, Groups E, F & G

Class III, Divisions 1 & 2

Ex ia IIC; Zone 0, AEx ia IIC T4/T4A/T5

Explosion/Flame Proof

Class I, Division 1, Groups A, B, C & D

Class II, Divisions 1 & 2, Groups E, F, & G

Class III, Divisions 1 & 2

Ex d IIC; Zone 1, AEx d IIC T4/T4A/T5

Temperature Codes: T4/T4A/T5

T4@85°C/T4A@70°C/T5@55°C

Maximum Operating Ambient



SIRA/ATEX Directive 2014/34/EU

Intrinsically-Safe

⊗ II 1G Ex ia IIC T4 Ga

Ta = -40°C to +85°C

MII/ATEX Directive 2014/34/EU

Type n (Air only)

⊗ II 3G Ex nA IIC T6

SIRA/ATEX Directive 2014/34/EU

Flame-Proof (Air only)

⊗ II 2 G Ex d IIC T4 Gb

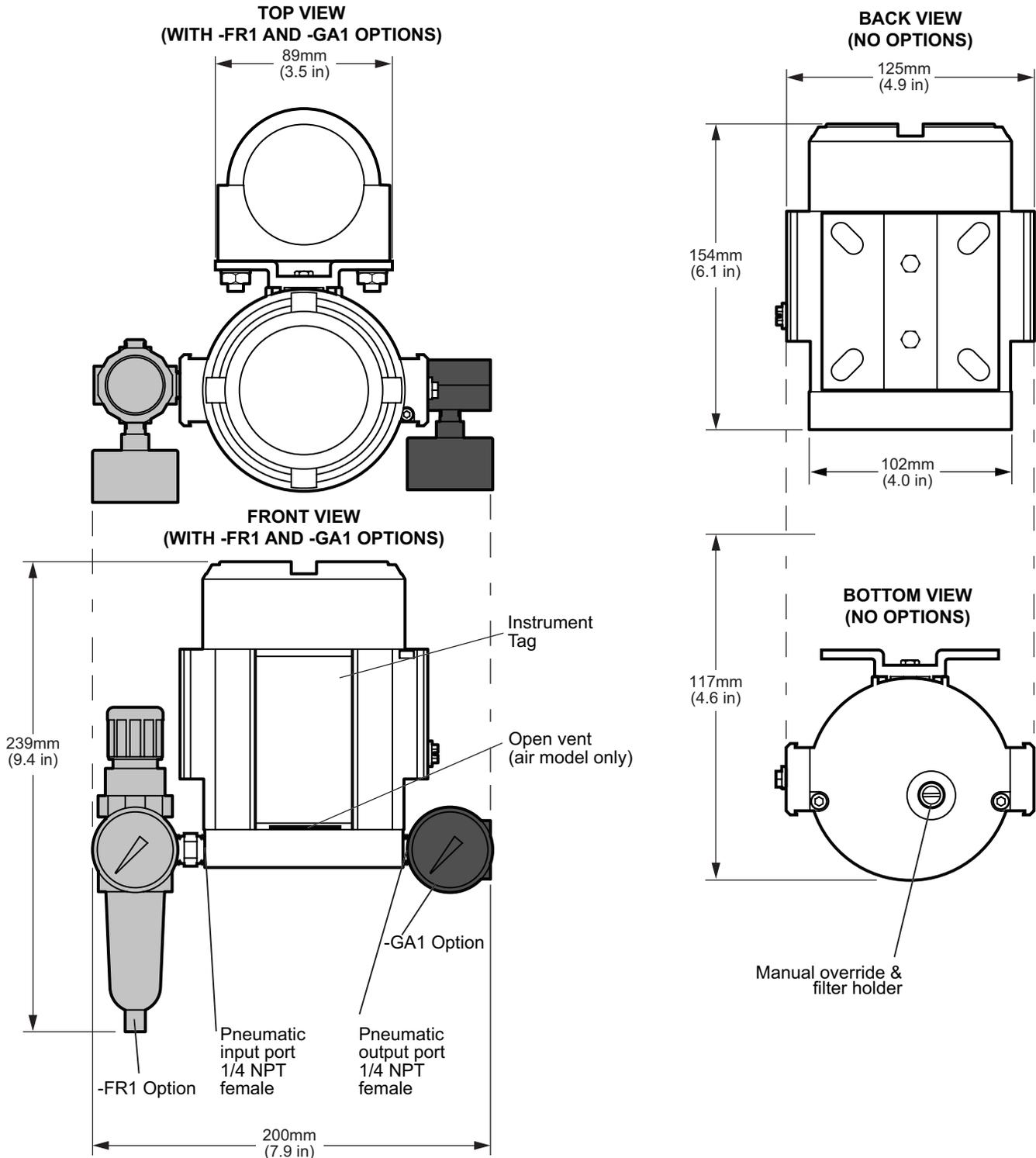
⊗ II 2 D Ex tb IIIC, T127°C Db

Ta = -40°C to +85°C

IPH² & IPX²

Type 4X & Explosion-Proof
Current-to-Pressure (I/P) Transmitters

Figure 3. IPX² Dimensional Diagram



IPH² & IPX²

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Figure 4. IPX² with -NG1 & -NG2 Option Dimensional Diagram

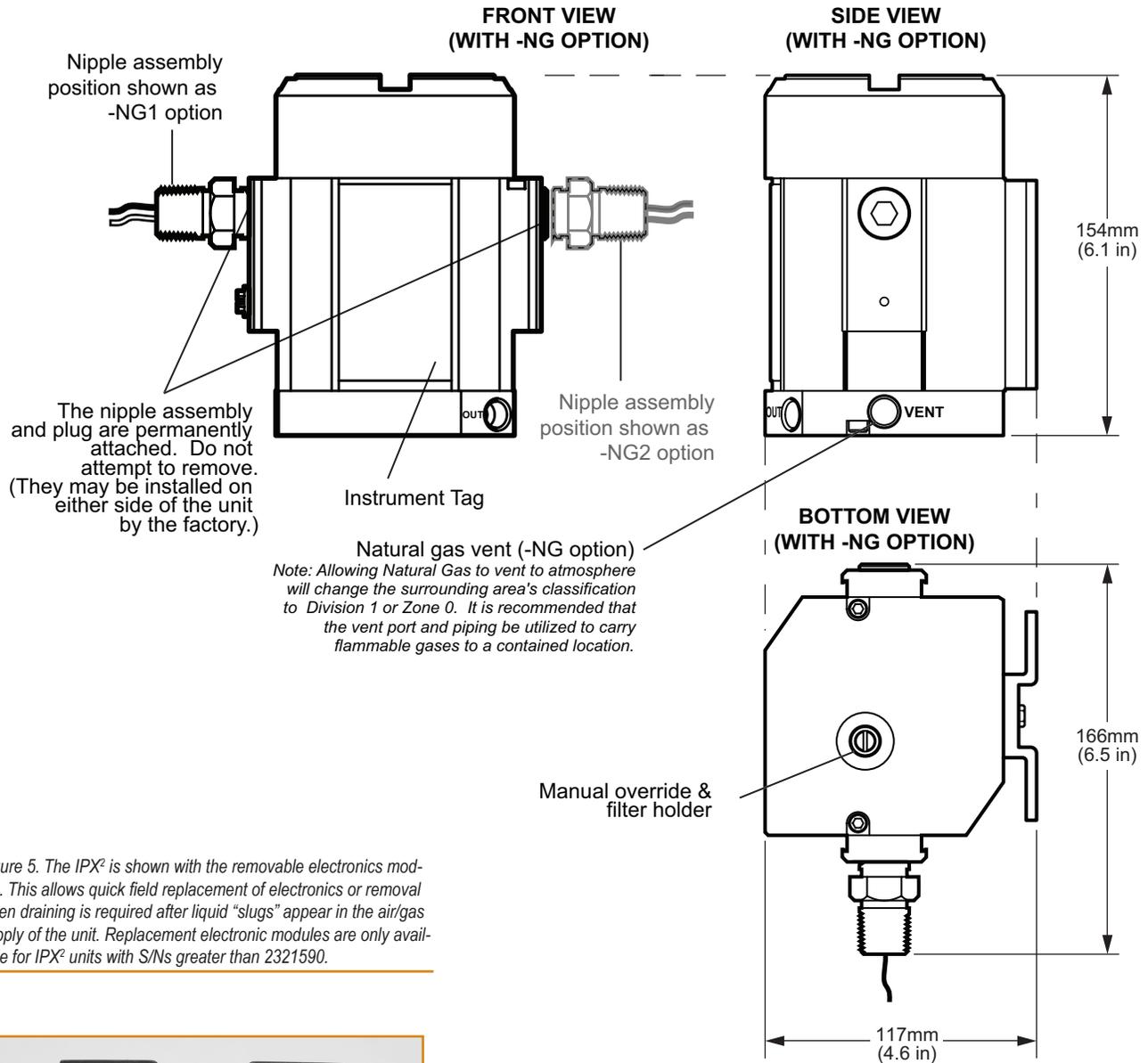


Figure 5. The IPX² is shown with the removable electronics module. This allows quick field replacement of electronics or removal when draining is required after liquid "slugs" appear in the air/gas supply of the unit. Replacement electronic modules are only available for IPX² units with S/Ns greater than 2321590.



Current-to-Pressure Product Solutions

IPT² DIN-style Current-to-Pressure Transmitter



The high-performance IPT² Current-to-Pressure (I/P) DIN-style Transmitter converts a current signal to a pneumatic signal so that an electronic-based system such as a DCS, PLC, or PC can control a pneumatic actuator, valve, or damper drive. Available models accept a wide range of current inputs (4-20mA, 4-12mA, and 12-20mA) and provide a proportional pneumatic signal (3-15psig, 0.2-1 Bar, 20-100kPA, etc.).

Features:

- 22 direct and reverse output ranges
- Low air consumption and high output volume
- High accuracy and fast response
- Immune to supply pressure variation
- Clog-resistant design, clean start up
- RFI/EMI protection

IPF Field-Mounted Current-to-Pressure Transmitter



The rugged IPF Field-Mounted Current-to-Pressure Transmitter is designed specifically for installation in harsh environments. The two-wire IPF accepts a 4-20mA or 10-50mA input. It converts the input to a 3-15psig, 0.2-1bar, 15-3psig or 1-0.2bar pneumatic output signal, or to a wide variety of other commonly used pneumatic outputs and is available with an optional coalescing filter/regulator that combines both an air filter and a miniature supply line regulator.

Features:

- Polyetherimide thermoplastic housing designed to meet NEMA 4X, IP55 requirements
- High technology sensor is insensitive to shock and vibration
- RFI/EMI protection

IPH² & IPX²

Type 4X & Explosion-Proof
Current-to-Pressure (I/P) Transmitters

Current-to-Pressure Product Solutions

PIT, PIF & PIX Pressure-to-Current Transmitters



This rugged and reliable family of pressure-to-current transmitters provide an economical solution when a pneumatic device must interface with a data acquisition control system, controller, recorder, or other electronic instrument. Compact, yet powerful, these units accept a pneumatic signal (3-15 psig, 0.2-1 bar, 3-27 psig, etc.) and accurately convert it to a proportional 4-20mA (or 10-50mA) output.

Features:

- Control Room and Field Mounting with a wide variety of housings
- Perform with exceptional accuracy ($\pm 0.2\%$ of span) even in unstable environments
- Self-sealing pneumatic connection allows disconnection with no air loss

PIH Field-Mount Pressure-to-Current Transmitter



The durable PIH Pressure-to-Current Transmitter provides an economical solution for any process that requires a rugged instrument capable of interfacing a pneumatic device with a data acquisition/control system, controller, recorder, or other electronic instrument. This compact yet powerful unit accepts most pneumatic signals (3-15 psig, 0.2-1 bar, 3-27 psig, etc.) and accurately converts them to a proportional 4-20mA output.

Features:

- Water tight, dust-tight, and resistant to corrosion and chemicals
- High-technology sensor allows the PIH to perform with exceptional accuracy in unstable environments
- RFI/EMI protection
- Reverse Output Option



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