MOORE INDUSTRIES WORLDWIDE

IPH² & IPX²

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

December 2016

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.

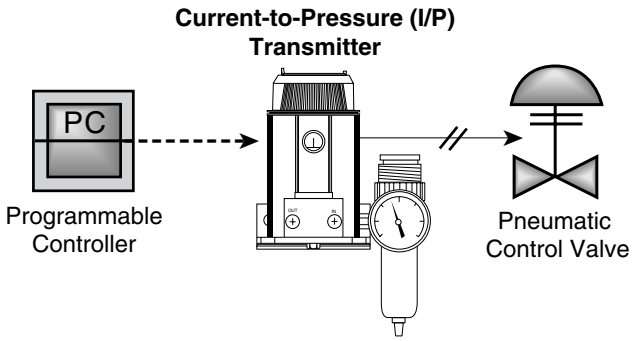
Both units are available with an optional coalescing filter/regulator that combines an air filter and miniature supply line regulator with a pressure gauge that reads in both psig and bars.

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 H_2S).

Meets the US Environmental Protection Agency (EPA) requirement for the oil and gas industry (New Source Performance Standards Subpart OOOO, EPAHQQAR20100505)*.

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

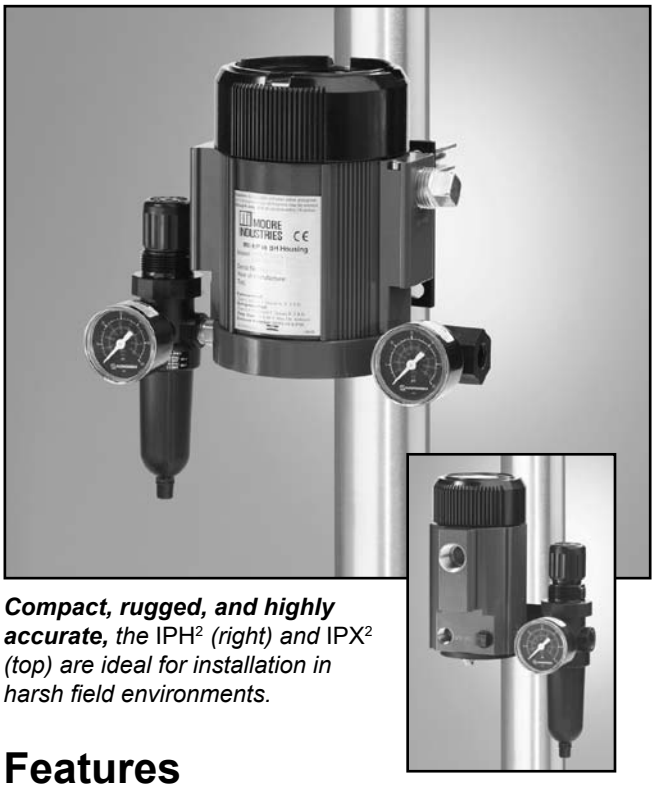


Certifications

ANZEx

Check the listing on Page 4 for full certification details.

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



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.

170-710-06M

IPH² & IPX²

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

Specifications

Performance

Accuracy: <±0.25% of span including the combined effect of linearity, hysteresis and repeatability (between 0 and 3psig output, error will not exceed ±1.0% of span)
Stability: Not to degrade from stated accuracy for six months
Step Response: <0.2 seconds into 100ml load (6 in^3) from 10% to 90% of span; Not guaranteed below 3psig output
Supply Pressure Effect: Negligible from 20-40psig, steady pressure
Air Capacity: 5.0SCFM minimum (20psig supply, 0psig output)
Relief Capacity: 2.5SCFM minimum (15psig output)
Air Supply: Instrument air only, 20-40psig
Gas Supply with -NG1 or -NG2 Option: 17-40psig. Same cleanliness as instrument air. H_2S not to exceed 20ppm
Maximum Input: 80psig without damage for units with output pressure rating of >15psig; 45psig without damage for units with output pressure rating of ≤ 15psig

Performance (Continued)

Voltage Drop: 5V, maximum
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
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;
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.

Ambient Conditions

Operating & Storage Range: -40°C to +85°C (-40°F to +185°F)
Ambient Temperature Effect: <±0.025% of span/°C, maximum from -20°C to 80°C; <±0.1% of span/°C, maximum
RFI/EMI Effect: <±0.25% of span change at in field strengths of 10V/m@ frequencies of 20-1000MHz
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
Relative Humidity: 0-100%, non-condensing

Adjustment

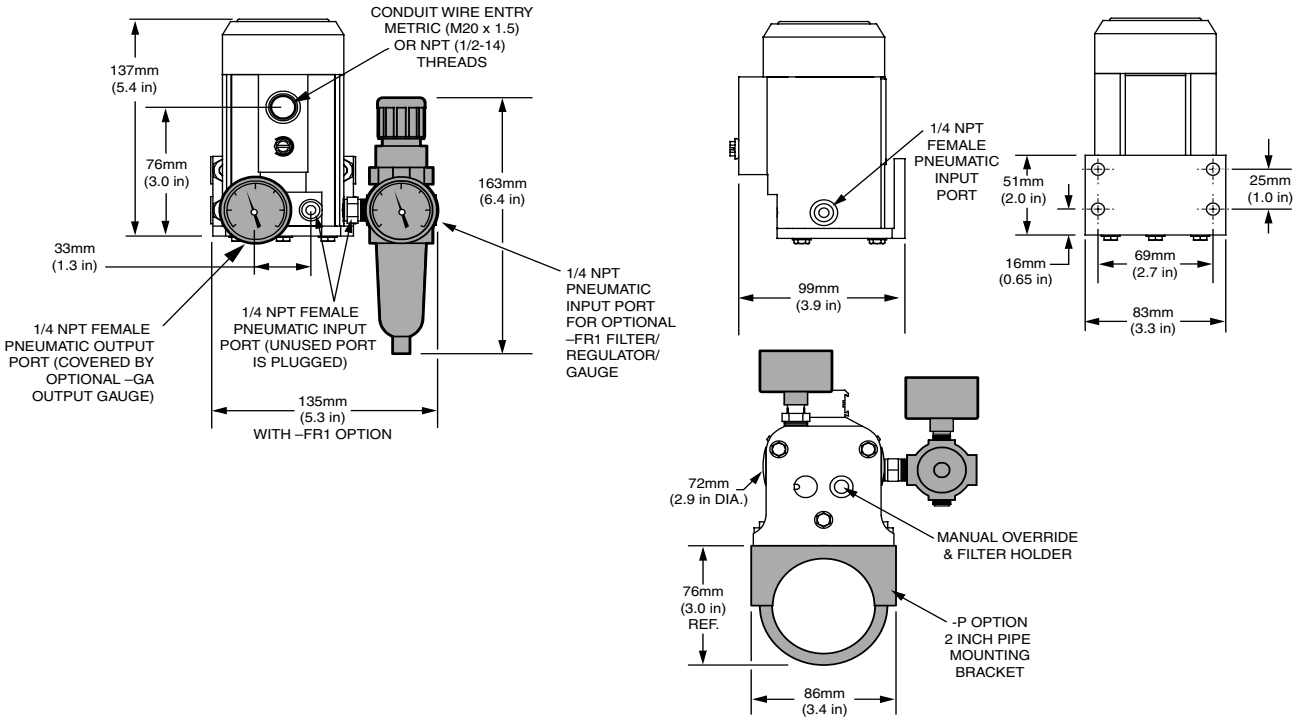
Zero & Span: Screw adjusts zero or span by ±10% minimum, non-interactive

Weight

IPH²: 1.14kg (2.5 lbs)
IPX²: 2.4kg (5.3 lbs)

*Average flow rate determined at 9 psig output

Figure 2. *IPH² Dimensional Diagram*



Ordering Information

Unit	Input	Output*	Supply Pressure**	Options	Housing
IPH² 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	**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
		1-17PSIG	**22PSI**		
		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†: (**IPX²** only)		**IPX² ONLY:** **-NG1** IPX² Type 4X unit equipped with electrical wire seal fitting assembly for using Natural Gas (sweet gas consisting of up to 20ppm H2S) as the pneumatic supply (not available with -FR1 and -GA1 options). Refer to Figure 4 for position. **-NG2** IPX² Type 4X unit equipped with electrical wire seal fitting assembly for using Natural Gas (sweet gas consisting of up to 20ppm H2S) 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 IPX² tag includes approval markings for Canada, Europe and US with warnings in English only.	
IPX² Explosion-Proof and Type 3X* Current-to-Pressure Transmitter		**20-0PSIG**	**25PSI**		**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 * 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. EXI**P**).
		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**		
		*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.			
*Type 4X for -NG1 and NG2 options					

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]

Certifications (IPH² and IPX²)

ANZEx **TestSafe/ANZEz 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 (IPX²only)

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

Figure 3. *IPX² Dimensional Diagram*

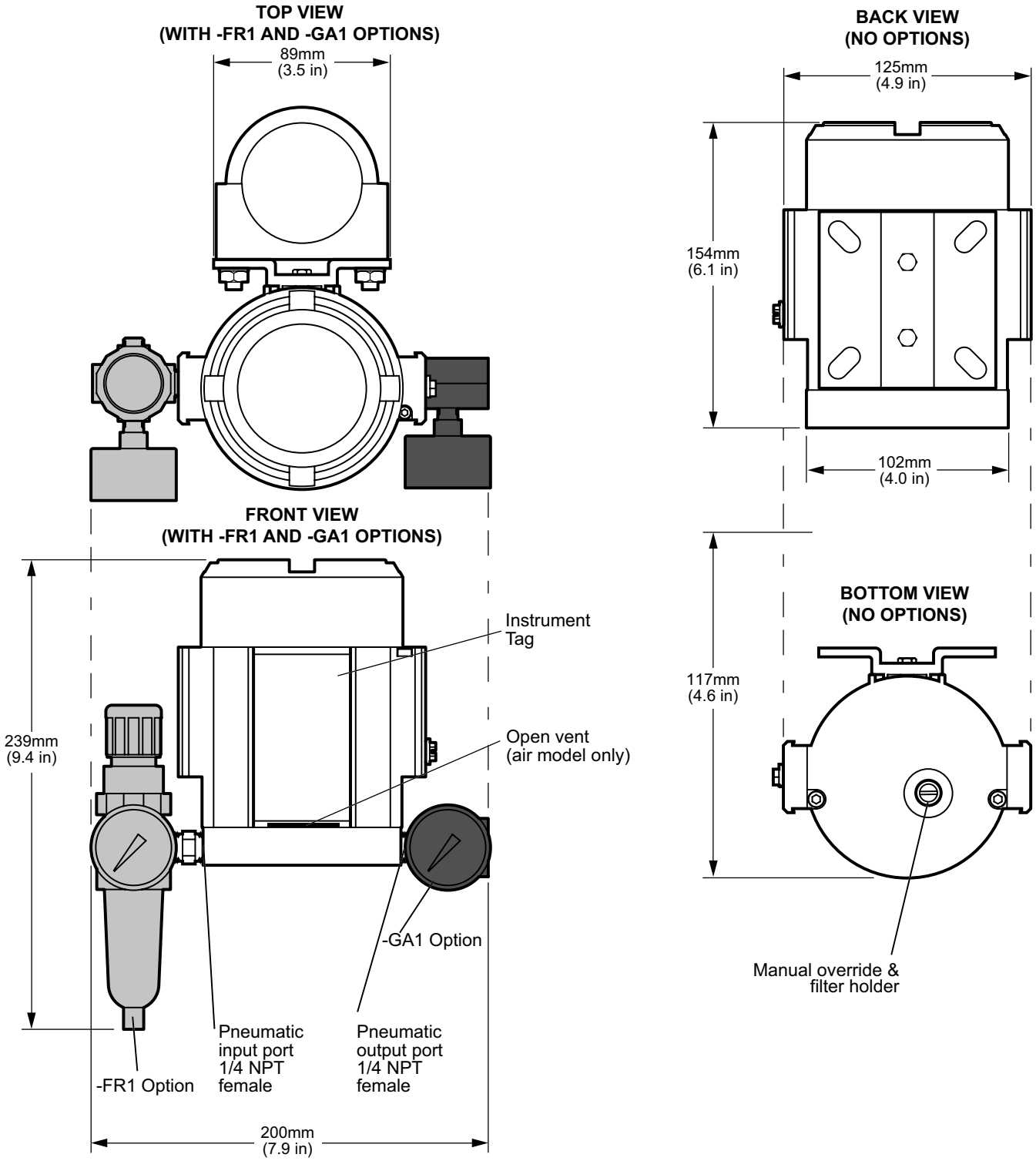


Figure 4. *IPX² with -NG1 & -NG2 Option Dimensional Diagram*

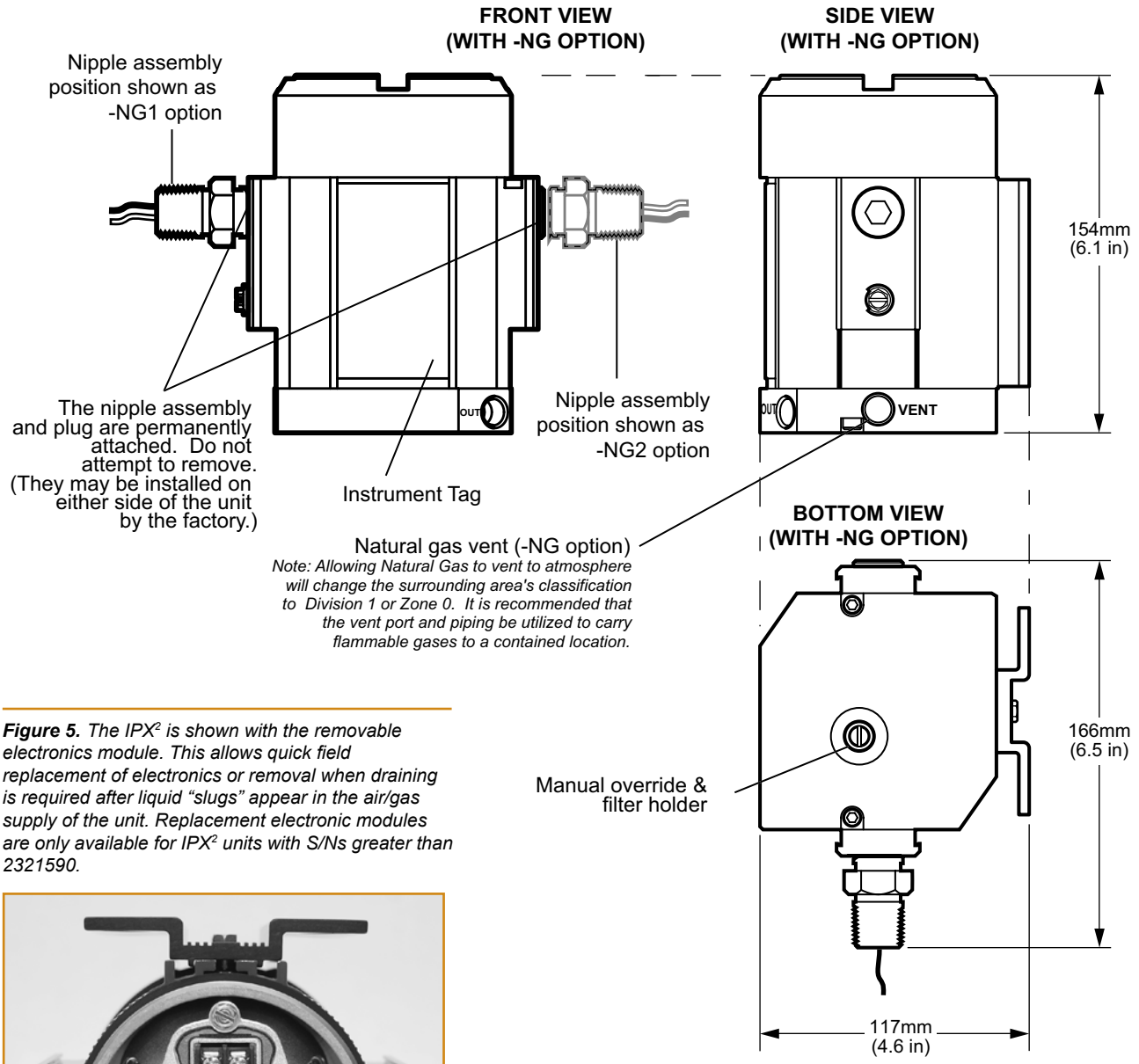


Figure 5. *The IPX² is shown with the removable electronics module. This allows quick field replacement of electronics or removal when draining is required after liquid "slugs" appear in the air/gas supply of the unit. Replacement electronic modules are only available for IPX² units with S/Ns greater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