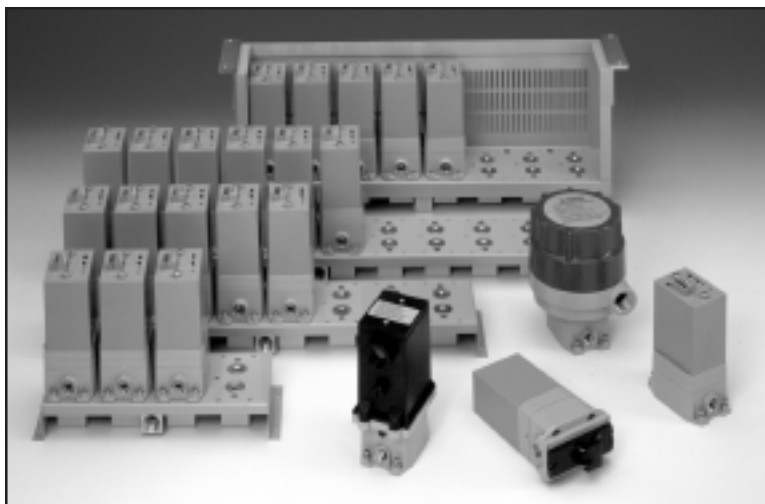


Instructions and Operating Manual

SERIES X55-600

I TO P TRANSDUCERS



 **RONAN**

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WARRANTY

Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship under normal conditions of use and service, and will repair or replace any component found to be defective, on its return, transportation charges prepaid, within one year of its original purchase. This warranty carries no liability, either expressed or implied, beyond our obligation to replace the unit which carries the warranty.

1.0 GENERAL DESCRIPTION

The Ronan Model X55-600 I to P Transducer accepts a 4-20 or 10-50 mA control signal input and provides a regulated pressure output. The input current range is selectable by a switch located on the top of the module.

The input pressure may be in the range of 20 to 120 psig and at least 5 psig above the maximum output pressure. The Model X55-600 utilizes solid-state technology and output pressure sensing to provide a high degree of accuracy. A closed loop feedback system is utilized to condition the mA input current into a voltage which is applied to one input of a control comparator. The comparator output causes the control voltage on a piezo-ceramic beam to bend the beam in a manner that results in, more or less, back pressure on a balanced diaphragm and spring valve control assembly. As the output pressure responds to a change in the input signal, it is sensed by a pressure sensor whose electrical output is conditioned and applied to the second input of the control comparator. When this pressure feedback signal is equal to the conditioned input signal, the output pressure has changed to the desired value and the system remains in this state until the input mA signal is changed to a new value.

The piezo-ceramic beam is a very delicate device designed for extremely small movements in proportion to the signal applied. Attempting to deflect the beam manually will result in a damaged or broken beam, which is not covered under warranty.

Other switch-operated controls located at the top of the module are a DIR/REV (direct/reverse) switch and a SPLIT/FULL switch. The DIR/REV switch, in the REV position, inverts the output signal with respect to the

input signal, i.e., when the input signal increases toward full scale, the output pressure decreases toward the zero value. The SPLIT/FULL switch, when in the SPLIT position, causes a full scale change in the output pressure for a 50% change of the normal input span, e.g., a 3-15 psig output change in response to a 4-12 or 12-20 mA input change.

2.0 SPECIFICATIONS

Air Consumption: 0.002 SCFM.

Supply Pressure Effect: None.

Supply Pressure: 5-120 psi (min. = output +5 psi.)

Loop Voltage Drop: <6 VDC (at 4-20 mA input).

Output Ranges: 3-15, 3-27, 6-30, 0-60, 0-100 psi. For other zero based and high output pressure ranges contact Ronan.

Accuracy: $\pm 0.20\%$ of span includes linearity, hysteresis, and repeatability.

Zero and Full Scale Adjustability: $> \pm 12\%$ of span.

Input Range: 4-20, 10-50 (switch selectable), 0-10 Vdc available - contact Ronan.

Operating Modes: Direct, reverse, or split range (switch selectable)

Mounting Position Effect: None.

Vibration Effects: $< \pm 1.0\%$ of span at ± 1.0 g's from 5-2 KHz.

RFI/EMI Effects: $< 0.8\%$ of range with 5 Watt transmitter at 1 meter (20 to 500 MHz).

Shock Effects: $\pm 3\%$ of span at 30 g's.

Operating Temp.: -20 to +150°F (-11 to 65°C).

Temperature Drift: 0.01% of span per °F from 30 to 150°F (.025% below 30°F).

Feed Flow (Output) Capacity: 3.0 SCFM at 20 psi supply, 10.5 SCFM at 100 psi supply.

Bleed Flow (Exhaust) Capacity: 3 SCFM (20 SCFM optional).

Pneumatic Connections: 1/4" MPT

Electrical Connection: Screw compression (#30 to #16 awg. wire).

Weight, Sizes & Ratings:

Model	X55-600-GP	X55-600-N4	X55-600-Ex
Rating	General Purpose	NEMA4	Exp. Proof
Weight	1.5 lbs.	1.75 lbs.	3.0 lbs.
Size(in.)	3x2x5.2"	3.8x2.3x6.8"	4x4x5.4"

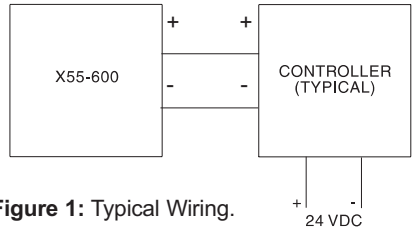
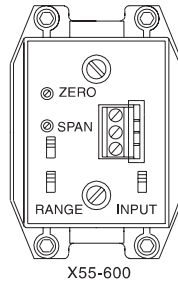


Figure 1: Typical Wiring.

3.0 INSTALLATION

3.1 Electrical Connections

The Electrical connections are made to screw terminals located at the top of the module (See Figure 1). The “+” and “-” terminals are identified on the top cover. If the NEMA 4 watertight cover is used, the wire entry is through a 1/2-14 NPT female conduit opening.

Remove the top cover of the watertight enclosure for access to the screw terminals. The explosion-proof enclosure also utilizes a 1/2-14 female conduit opening for wire entry. The wires are then routed internally to the “+” and “-” terminals (See Figure 1).

3.2 Pneumatic Connections;

General Purpose, NEMA 4 and Explosion-Proof Models

Connect the supply pressure tubing to the 1/4-18 NPT female inlet labeled

“IN”. A dry, clean and filtered air supply in the range of 20 to 120 psig is required (at least 5 psig over the maximum output). The regulated pressure output is via the 1/4-18 NPT female outlet labeled OUT. The output piping should be 1/4" pipe or 3/8" tubing. On NEMA 4 and explosion-proof models, position air vent covers to prevent water from entering the unit.

It is extremely important that the X55-600 air supply is clean (oil and dirt free) and dry (moisture free). It is recommended that Ronan's X55-77-4, or a similar quality filter/preregulator, be installed with every I to P. Unit malfunctions due to dirt or moisture damage are not covered under warranty.

3.3 Manifold Mounted Models

The manifold mounted transducers share a single 3/8-18 NPT female inlet while having individual 1/4-18 NPT female outlet fittings. A dry, clean and filtered air supply is necessary for operation of the I to P transducers. It is not necessary to use all of the positions in a manifold chassis as each position is equipped with manual shutoff valves.

4.0 OPERATION

4.1 Input Selector Switch

The input selector switch, accessible at the top of the module, allows the module to be set to either a 4-20 mA or 10-50 mA input range. The two positions of this switch are so labeled.

4.2 Split/Full Range Selector Switch

The SPLIT/FULL range selector switch, accessible at the top of the module, allows the module to be set either to the normal full range or to a split range

of 4-12 mA or 12-20 mA input. In the split range operating mode, a full output span will be obtained with one half of the normal input span applied.

4.3 Rev/Dir Switch

When in the REV position, this switch causes the relationship of the output to the input to be the inverse of normal, or DIR operation. That is, when the input increases from zero toward full scale, the output decreases from full scale toward zero. When this switch is in the DIR position, the output increases proportionally to an increase in the input.

Action	Range	4-20 mA	10-50 mA	3-15 psig	3-27 psig	6-30 psig
Direct Acting	Full Range	4-20	10-50	3-15	3-27	6-30
Reverse Acting	Full Range	4-20	10-50	15-3	27-3	30-6
Direct Acting	Split Range	4-12	10-30	3-15	3-27	6-30
		4-11	10-29	3-15	3-27	6-30
		12-20	30-50	3-15	3-27	6-30
		13-20	31-50	3-15	3-27	6-30
Reverse Acting	Split Range	4-12	10-30	15-3	27-3	30-6
		4-11	10-29	15-3	27-3	30-6
		12-20	30-50	15-3	27-3	30-6
		13-30	31-50	15-3	27-3	30-6

Table 2: Split Ranging and Reverse Acting.

5.0 CALIBRATION

Should calibration be required, use the following procedure. NOTE: if one of the front panel switches is changed to a new position, the calibration procedure will need to be performed. A clockwise rotation of the ZERO or SPAN control will result in an increase in the pressure output.

1. Connect the recommended air supply to the air inlet fitting and a pressure gauge to the air outlet.
2. Connect an mA calibration signal to the electrical input terminals. Set the mA input to the 0% value (4 mA for 4-20 mA input range).
3. Observe the output pressure. If necessary adjust the top accessible ZERO control for the correct pressure output.
4. Set the mA input signal to the full scale value. (20.00 mA for a 4-20 mA input).
5. Observe the output pressure. If necessary, adjust the top accessible SPAN control for the correct pressure output.
6. Repeat steps 2 through 5.

NOTE: When switching to or from REV or SPLIT, the zero adjustment may need to be turned several rotations before the affect is seen in the output pressure.

6.0 TROUBLESHOOTING

6.1 Pneumatic

1. Ensure that the supply pressure is between 20 and 120 psig and at least 5 psig over the maximum output pressure.

2. Ensure that there are no air leaks at all fittings.
3. Check the zero and span per Section 5 (Calibration).
4. Check to see if the input filter is obstructed (seated in the air input fitting). Replacements are available from Ronan.
5. It is extremely important that the X55-600 air supply is clean (oil and dirt free) and dry (moisture free). It is highly recommended that Ronan's X55-77-4, or a similar quality filter/preregulator be installed with every I to P. Unit malfunctions due to dirt or moisture damage are not covered under warranty.
6. The piezo-ceramic beam is a very delicate device designed for extremely small movements in proportion to the signal supplied. Attempting to deflect the beam manually will result in a damaged or broken beam, which is not covered under warranty.

6.2 Electrical

1. Check the position of the function switches to ensure that they are in the correct position. Most application call for the INPUT, RANGE, and REV/DIR switches to be in their 4-20 FULL and DIR positions respectively.
2. Check that the mA input leads are connected in the proper polarity.
3. The voltage across the mA input terminals with a mA signal applied should be approximately 5.5 Vdc.

7.0 SETTING THE OUTPUT FOR LOSS OF POWER

Ronan Model X55-600 I/P's are factory calibrated to drop below 3 psi upon loss of power (i.e. 0 mA). If for any reason this does not occur, or if you want the unit to drive upscale on loss of power, please follow the procedure below:

1. Connect a mA current calibrator to the I/P \pm input terminals and a pneumatic measurement device to the I/P output.
2. With the air supply on, cycle the unit up/down (4/20 mA) a couple times. Check to see that the zero and span are set to your requirements. If not, adjust the zero and span or consult section 5.0 of the Ronan X55-600 Instruction and Operating Manual.
3. From the 4 mA position, switch the calibrator current output to zero. Note the I/P pneumatic output.
4. From the 20 mA position, switch the calibrator current output to zero. Note the I/P pneumatic output.
5. Compare the zero mA outputs you read to the figures in the following chart: If the outputs noted in steps 3 and 4 were outside these figures, and you want the unit to drop below 3 psi on power failure,¹ you should calibrate the zero mA pressure as follows.
6. Remove the calibrator wires and remove the gray plastic cover held with the two Phillips head screws. The cover is immediately visible on GP and manifold-mount units. Explosion-proof units first require removal of the red top of the explosion-proof housing. NEMA 4 units

Regulated Input	4 mA to Zero	20 mA to Zero
20 psi	2.2 to 2.6	2.3 to 2.8
30 psi	2.1 to 2.5	2.2 to 2.7
40 psi	2.0 to 2.3	2.0 to 2.5
50 psi	1.8 to 2.1	1.8 to 2.3
60 psi	1.7 to 2.0	1.8 to 2.2
70 psi	1.6 to 1.9	1.7 to 2.1
80 psi	1.5 to 1.9	1.6 to 2.0
90 psi	1.4 to 1.9	1.5 to 2.0
100 psi	1.3 to 1.9	1.3 to 1.9
110 psi	1.2 to 1.8	1.2 to 1.8
120 psi	1.2 to 1.8	1.2 to 1.8

Table 1.

- require the removal of the four 7/64 Allen head screws holding the black cover to the grey metal base.
7. Using Figure 1, locate the 0 mA "Air Pin."
 8. Reattach the calibrator wires, recycle the input 4 to 20 to 4 mA then switch to zero. If the output is outside the recommended range in Table 1, carefully adjust the air pin clockwise to increase or counterclockwise to decrease the setting to within the recommended range using a 1/4 or 5/16 flat blade screwdriver. On explosion-proof or units mounted very close together, an offset ratcheting screwdriver is required (Sears Craftsman model 4117 or equal).
 9. Next, again cycle the input 4 to 20 to 4 to 20, then switch to zero. If the output is outside the recommended range in step 5, carefully adjust the air pin clockwise

¹ If you want the unit to go to a different setting on power failure such as upscale, please contact Ronan for exact instructions on setting this.

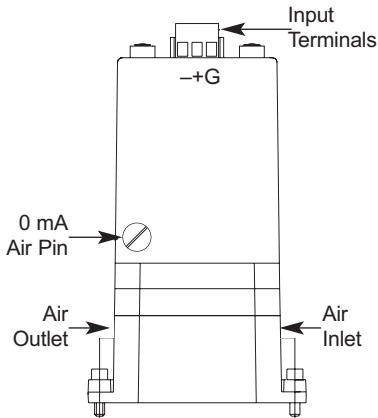


Figure 1.

to increase or counterclockwise to decrease the setting to within the recommended range.

10. Repeat steps eight and nine until satisfied.
11. Remove calibration wires. Reinstall gray cover from step 6.
12. Reattach calibration wires and do one final zero/span and power failure check.
13. Reattach field wiring, NEMA 4, explosion-proof covers (if appropriate).

Air Quality Recommendations

Poor air quality is one of the causes of premature functional problems with pneumatic and electro-pneumatic equipment.

- 1) Water in the supply air is a natural occurrence. When the air cools in pipes, etc., the moisture condenses and becomes liquid water. This water will

eventually cause corrosion damage to the I/P.

Coalescing filters is an inexpensive way to help prevent I/P malfunctions or failures. These filters remove particles and moisture from air lines.

- 2) Oil in the supply air usually is from the main compressor. Oil can clog the small nozzles and disturb the normal operation of the I/P-converter. The result is poor control or in the worst case, failure.
- 3) Particles in the air usually occur because of corrosion. Dirt and particles can block the small nozzles of the I/P converter.

To ensure normal operations, we recommend that a water separator and a 5 micrometer filter are mounted as close to the I/P as possible. If oil is present, an oil separator should be installed as well.

We recommend that the working air is clean, dry and free of moisture, water, oil, particles and other contaminants, in accordance with the international standard ISA S7.3-181.

8.0 ORDERING INFORMATION

I TO P MODULES

MODEL	DESCRIPTION
X55-600-GP-() - SM	General Purpose Surface Mount
X55-600-GP-() - DIN	General Purpose DIN Rail-Mount
X55-600-GP-() - M	General Purpose Manifold Mount (without base)
X55-600-GP-() - D2	General Purpose 35 mm Rail-mount
X55-600-GP-() - SM	NEMA 4 Surface Mount
X55-600-GP-() - DIN	NEMA 4 DIN Rail-mount
X55-600-GP-() - D2	NEMA 4 35 mm Rail-Mount
X55-600-GP-() - SM	Explosion Proof Surface Mount

1 = 3-15 PSI, 2 = 3-27 PSI, 3 = 6-30 PSI

MANIFOLD CHASSIS

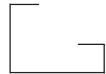
MODEL	DESCRIPTION
X55-600-SMC-4	Surface Mount Manifold Chassis with manual shutoff
X55-600-SMC-8	Surface Mount Manifold Chassis with manual shutoff
X55-600-SMC-10	Surface Mount Manifold Chassis with manual shutoff
X55-600-RM-8	8 position, 19" Rack Mount Manifold Chassis with manual shutoff

ACCESSORIES

MODEL	DESCRIPTION
X55-600-UMB	Universal Mounting Bracket (Use with Surface Mount Units only)
X55-600-UMB-SS	Universal Mounting Bracket (304 Stainless Steel)
X55-600-PMB	2" Pipe Mount Bracket (Use with Surface Mount Units only)
X55-600-PMB-SS	2" Pipe Mount Bracket (304 Stainless Steel)
X55-77-4	Filter/Preregulator
X55-0-30	Pressure Gauge (0-30 PSI)
X55-0-60	Pressure Gauge (0-60 PSI)
X55-600-MF-D1	Universal Mounting Bracket (Use with Surface Mount Units only)
X55-600-MF-D2	Conversion Kit, SM or Standard DIN to 35 mm DIN
D1-32x15	32 mm x 15 mm "G" Style Rail, per foot
D2-35x7.5	35 mm 7.5 mm "u" Style Rail, per foot
D2-35x15	35 mm x 15 mm "U" Style Rail, per foot
X55-600-SS TAG	Stainless Steel Tag

DIN RAIL STYLES

32 mm x 15 mm



"G" RAIL

35 mm 7.5 mm



"u" RAIL

35 mm x 15 mm



"U" RAIL

ORDERING INFORMATION

X55-600 - GP - () - SM

Surface Mount

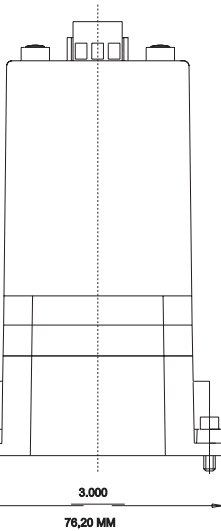
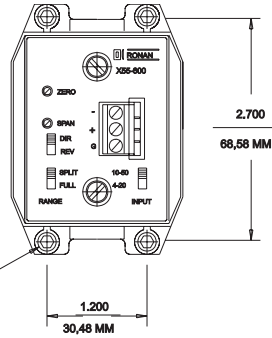
Output Range

1 = 3-15 psig

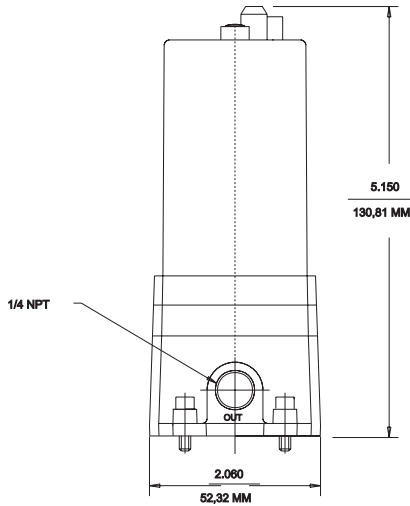
2 = 3-27 psig

3 = 6-30 psig

General Purpose



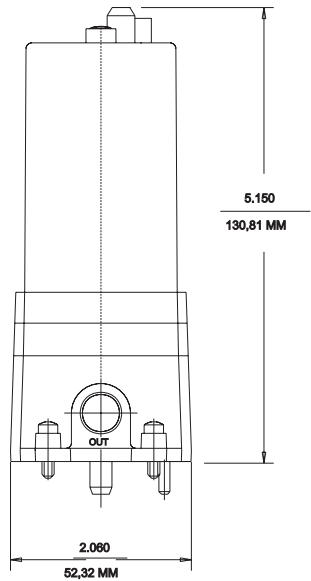
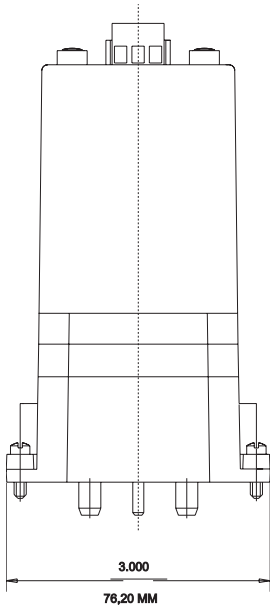
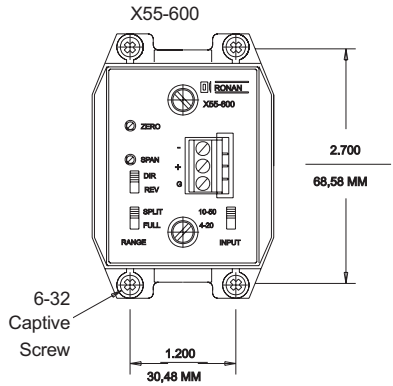
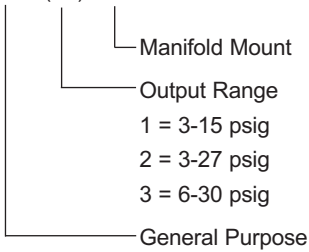
(4) 8-32 cap screws
supplied loose.



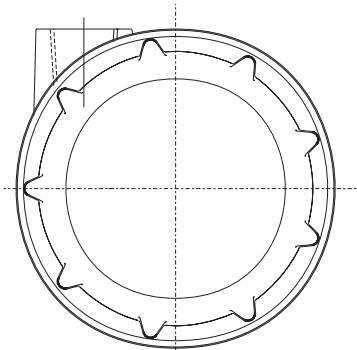
OUTLINE DRAWING
GENERAL PURPOSE SURFACE
MOUNT TRANSDUCER

ORDERING INFORMATION

X55-600 - GP - () - M

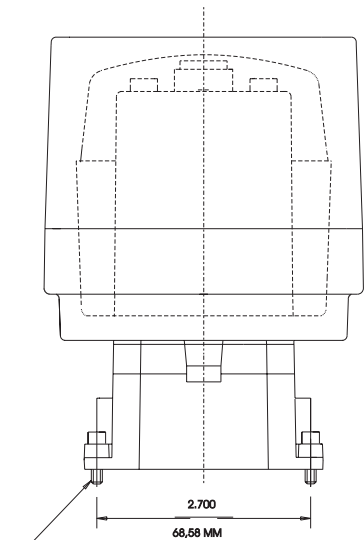
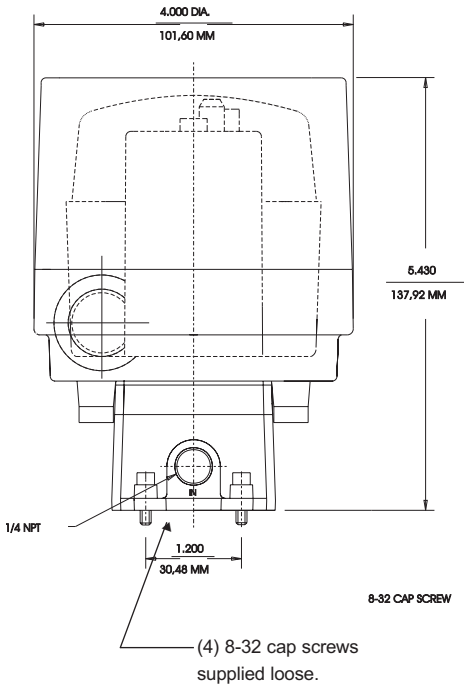
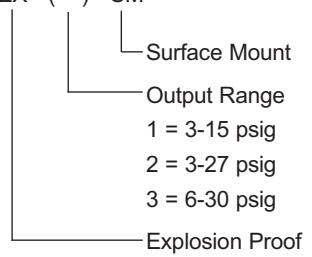


OUTLINE DRAWING
GENERAL PURPOSE
MANIFOLD MOUNT TRANSDUCER



ORDERING INFORMATION

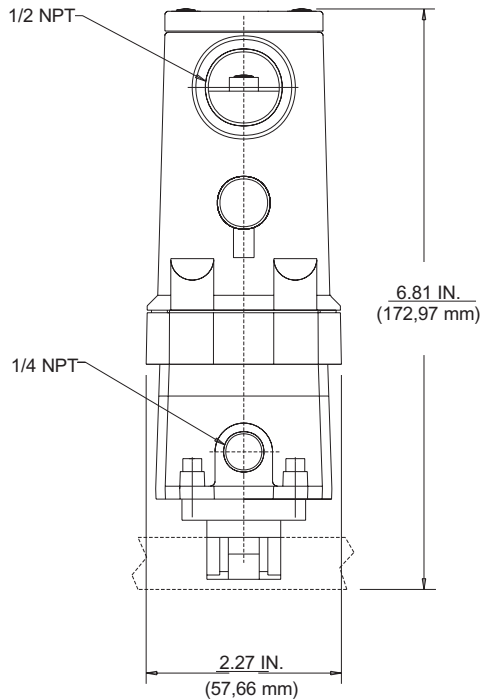
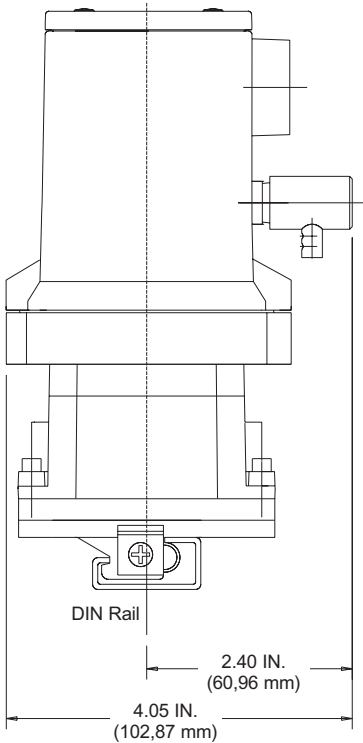
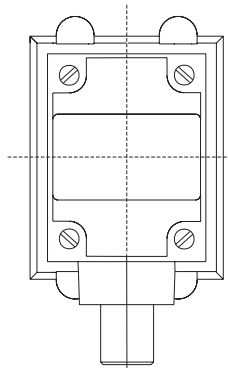
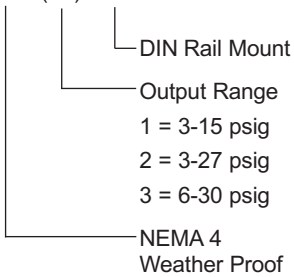
X55-600 - EX - () - SM



OUTLINE DRAWING
EXPLOSION PROOF TRANSDUCER

ORDERING INFORMATION

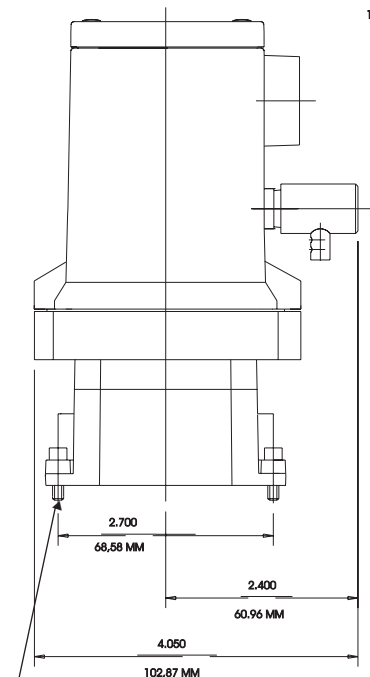
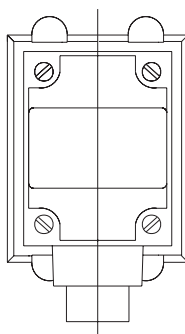
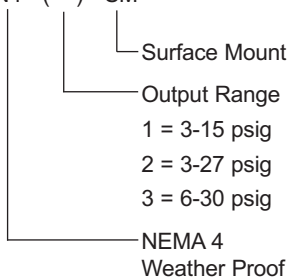
X55-600 - N4 - () - DIN



**OUTLINE DRAWING
NEMA 4 32MM
DIN RAIL MOUNT TRANSDUCER**

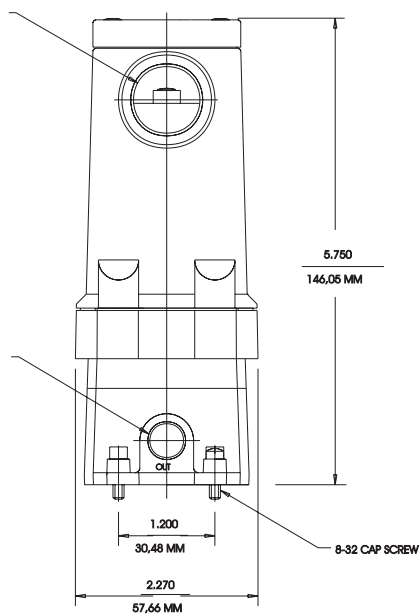
ORDERING INFORMATION

X55-600 - N4 - () - SM



(4) 8-32 cap screws
supplied loose.

1/2 NPT

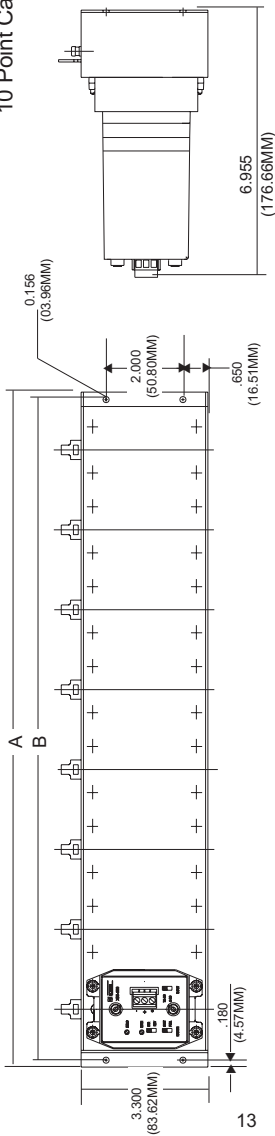


OUTLINE DRAWING
NEMA 4 SURFACE MOUNT
TRANSDUCER

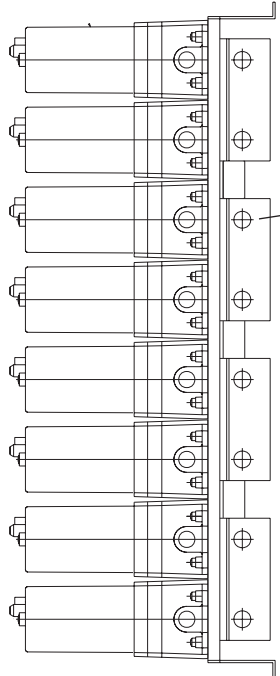
ORDERING INFORMATION

X55-600 - SMC - ()

4 point Capacity
8 point Capacity
10 Point Capacity



Supply Air = 3/8⊕ NPT
Output Air = 1/4⊕ NPT

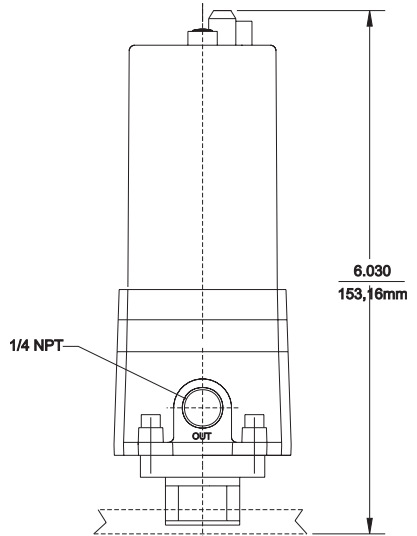
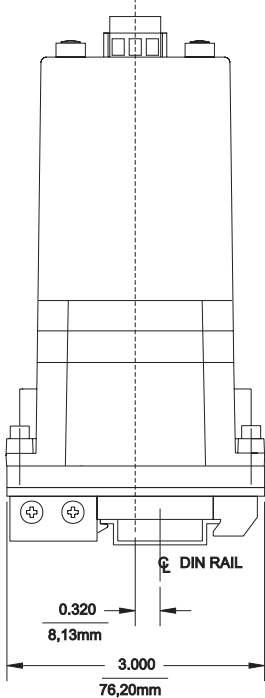
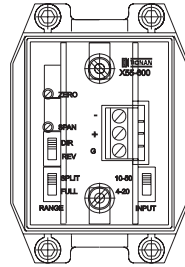
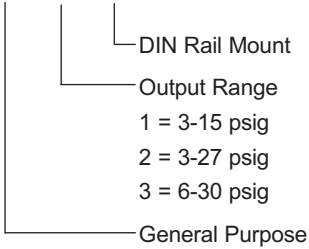


NO POINTS	DIM. A		DIM. B	
	IN	MM	IN	MM
4	9.260	234.95	8.670	220.61
8	17.670	446.28	17.210	437.13
10	21.730	551.94	21.370	542.80

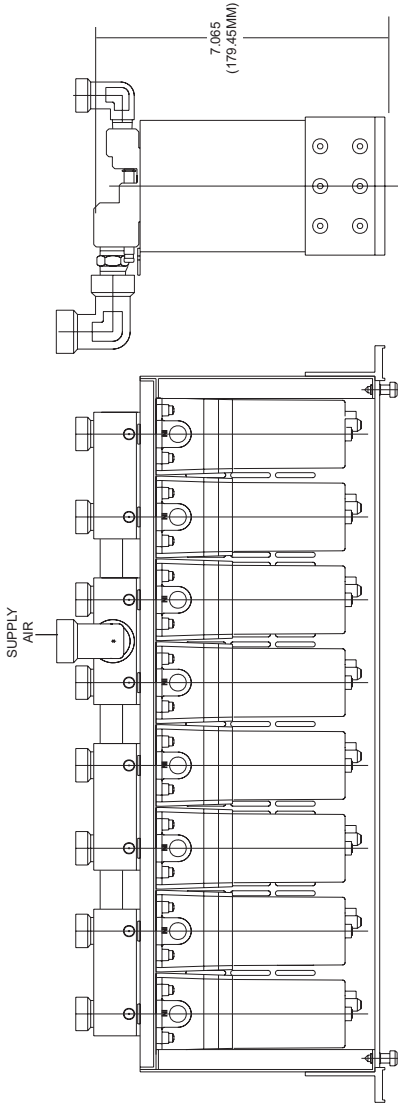
OUTLINE DRAWING
SURFACE MOUNT MANIFOLD

ORDERING INFORMATION

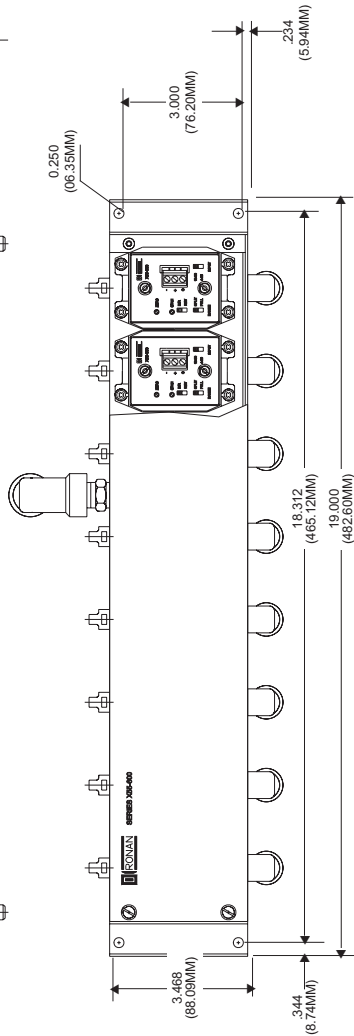
X55-600 - GP - () - DIN



OUTLINE DRAWING
GENERAL PURPOSE 35MM
DIN RAIL MOUNT
TRANSDUCER

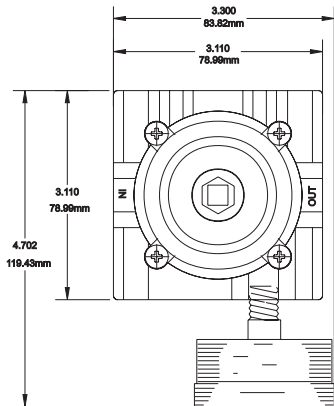


Supply Air = 3/8⊕ NPT
 Output Air = 1/4⊕ NPT



ORDERING INFORMATION
 X55-600 - RM - 8

OUTLINE DRAWING
 RACK MOUNT-8
 MANIFOLD



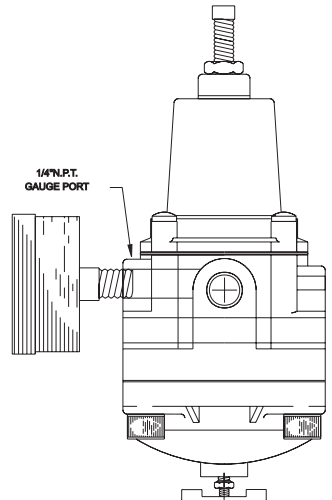
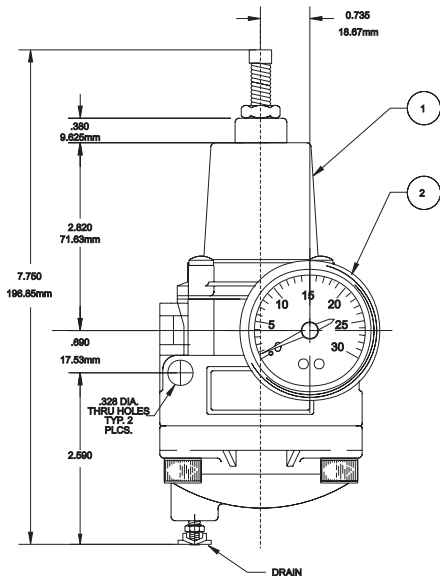
ORDERING INFORMATION

Filter Regulator = X55 - 77 - 4

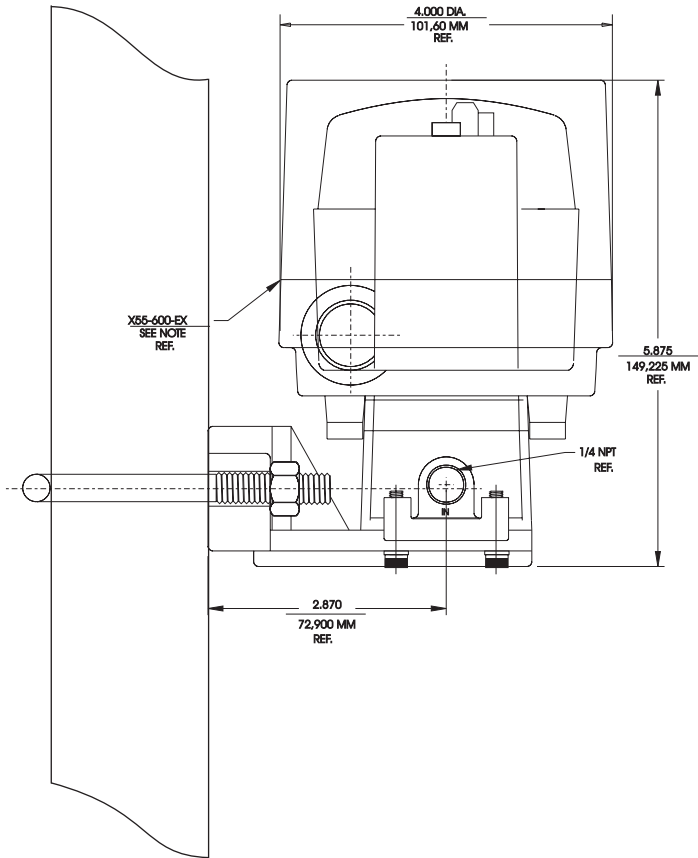
Output Gauge = X55 - 0 - 30

Input Gauge = X55 - 0 - 60

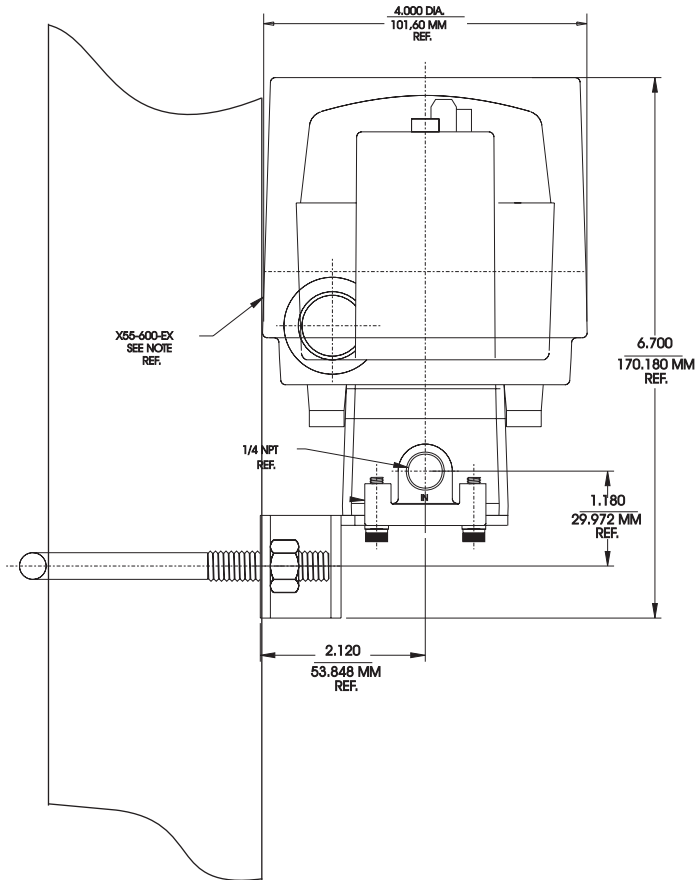
(Input Gauge not shown)



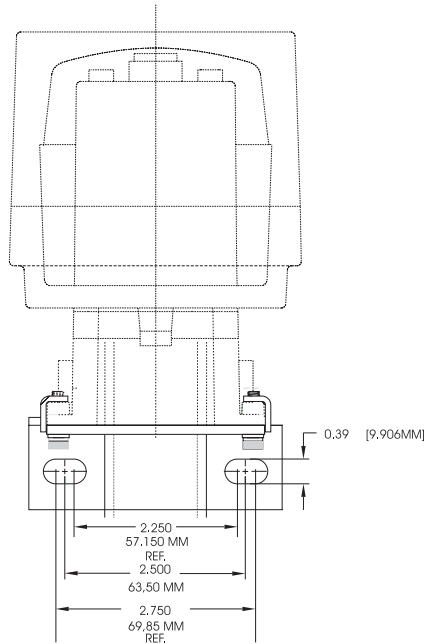
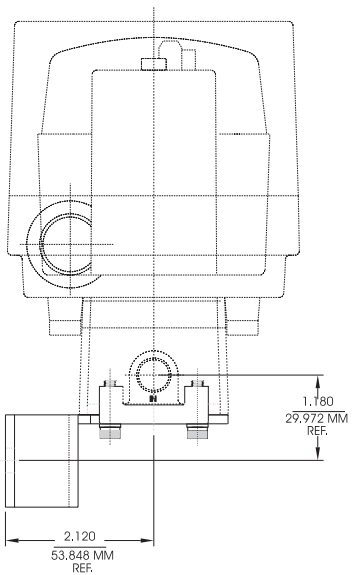
OUTLINE DRAWING
PREREGULATOR & GAUGE ASSEMBLY



OUTLINE DRAWING
2" DIAMETER PIPE MOUNT BRACKET



OUTLINE DRAWING
2" DIAMETER PIPE MOUNT BRACKET



X55-600-UMB
X55-600-UMB-SS (STAINLESS STEEL)
MOUNTING BRACKET

Instructions and Operating Manual

SERIES X55-600

I TO P TRANSDUCERS

Addendum

Effective March 2004



INSTALLATION IN HAZARDOUS ENVIRONMENTS




The X55 I/P transducers are approved by independent testing agencies for installation in areas as marked on a particular X55-600 model's label and as indicated below. The X55-600's shall operate safely when installed and connected per installation instructions shown in section 3.0 of this manual and when operated within the parameters shown in specification section 2.0 of this manual.

Category and Code Marking for Model X55-600-EX:

Explosion Proof:

CSA or Factory Mutual Class I, II, III; Division 1, Groups B, C, D, E, F, G

Explosion Proof and Flame Proof:

  **EEx ia IIC T4 (-20°C ≤ Ta ≤ +80°C)**
 **Sira 03ATEX1074X**
II 1G **Li=0 Ci=0.002uF Ui=29.5V li=104mA Pi=0.767W**

When used in explosive atmospheres, the X55-600-EX installation must be per local agency building codes. When the X55-600 is being operated in a hazardous environment with live circuits, the cover on the X55-600, and covers on any associated electrical junction boxes in the area, must remain tightly closed. Under all circumstances, where an explosive atmosphere may be present, power to the X55-600 should be turned OFF before removing the cover or disconnecting the wiring.

Category and Code Marking for Model X55-600-EX, -N4, -GP and X55-600-MI-EX

Intrinsically Safe:

X55-600-EX, -N4, -GP

CSA or Factory Mutual Class I; Division 1, Groups A, B, C, D
Per Ronan installation drawing No. X55B115

X55-600-MI-EX

EEx ia T4 (T_{amb} = 80°C)

When installed per local agency building codes using Intrinsic Safety barriers with Entity parameters properly matched to those listed below.
Ui = 29.5 V; li = 0 mA; Li = 0; Ci = 0.0002 F; Pi = 0.767 W

When used in explosive atmospheres, the X55-600 Intrinsically Safe installation must be per local agency building codes using either properly grounded zener diode (passive) I.S. barriers, or active (isolation) barriers with properly matched Entity Parameters. The X55-600's can be serviced in the field, with covers removed, providing that all tools and test equipment used is also rated as intrinsically safe for the particular area classification.

Division 2:

X55-600-EX, -N4, -GP

CSA or Factory Mutual Class I; Division 2, Groups A, B, C, D

When used in areas where an explosive atmosphere may be present, the X55-600 installation must be per local agency building codes. The X55-600's can be serviced in the field, with covers removed.



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X55-600 / Rev. 5

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Printed in U.S.A.