

Enterprise Control System Series Component Gauge Pressure Transmitter, IGP60G



The Foxboro® brand Enterprise Control System Series Component Gauge Pressure Transmitter, IGP60G, is a microprocessor-based smart transmitters that provides precise, reliable, measurement of gauge pressure and features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20 mA dc analog and digital signals according to the measured pressure. It can also execute two-way communications using HART protocol, thus facilitating self-diagnosis, range resetting, and automatic zero adjustment.

HIGH DEPENDABILITY

- ▶ Unique characterization and composite semi-conductor sensors realize high accuracy up to 0.04% F.S.
- ▶ Proven Sensor technology enables Long-term stability up to 0.1% of URL per 10-year period.
- ▶ A wide measuring range is available from a single model. This feature is highly effective in taking measurement over a wide range and reducing the need for inventory.
- ▶ Rangeability: 200 to 1 (17.5 to 3500 kPa).
- ▶ Two-way communication using HART protocol facilitates self-diagnosis, range resetting, automatic zero adjustment, and other operations.
- ▶ Complies with 89/336/EEC, 92/31/EEC, 93/68/EEC Electromagnetic Compatibility (EMC) Directive.
- ▶ Complies with FM Explosionproof and Dust Approvals, FM Intrinsically Safe Approval, and FM Nonincendive Approval.
- ▶ Complies with ATEX Flameproof and Dust, ATEX Intrinsic safety and Dust, and ATEX Type n and Dust Certifications.

OIL FREE FINISH

The transmitter is shipped with oil-free wetted parts.

EXTERNAL ZERO/SPAN ADJUSTMENT FUNCTION

The transmitter can be easily zero/span adjusted in the field.

EMC CONFORMITY

89/336/EEC, 92/31/EEC, 93/68/EEC

Electromagnetic Compatibility (EMC) Directive.

CONFORMANCE TO NON SI UNITS

Transmitter set can be delivered to any Non SI units as specified.

SAFETY TRANSMITTER

Select this option to be used as a component of Safety Instrument System (SIS).

IGP60G complies with IEC61508, certified according to Safety Integrity Level2 (SIL-2).

ALARM OUTPUT (CONTACT OUTPUT)

Contact output is prepared as alarm output when alarm (Output Alarm/Sensor Temp. Alarm) condition is detected. It can be set to Normally Open. (When alarm is detected, Contact ON).

PHYSICAL SPECIFICATIONS

Material	Description
Fill Fluid	Silicone oil for general purpose models Fluorine oil for oxygen and chlorine models
Transmitter Housing	Aluminum alloy
Meter Body Cover	SCS14A (Equivalent to 316 SST)
For Wetted Parts	
Adaptor Flange Option	SCS14A (Equivalent to 316 SST)
Center Body	316 SST (Diaphragm 316L SST) ASTM B575 (Equivalent to Hastelloy C-276)
Vents and Plugs	316 SST
Weight	Approximately 3.7 kg (Model IGP60G)

INSTALLATION

Material	Description
Electrical connection	1/2NPT internal thread, M20 internal thread
Grounding	Resistance 100 Ω max
Mounting	Can be installed on a 2-inch horizontal or vertical pipe (can be directly mounted on a process pipe)
Process connection	Rc1/4, 1/4NPT internal thread.

NOTE

Impact to transmitter can damage sensor module.

FUNCTIONAL SPECIFICATIONS

MEASURING SPAN / SETTING RANGE /
WORKING PRESSURE RANGE

Table 1. Span Limits for ECS Series Component Gauge Transmitter - IGP60G

Model Code	kPa	Psi	bar	mmHg	mmH ₂ O	inH ₂ O
IGP60G	17.5 and 3500	2.5 and 507.6	0.175 and 35	131 and 26252	1784 and 356900	70 and 14051

Table 2. Range Limits for ECS Series Component Gauge Transmitter - IGP60G

Model Code	kPa	Psi	bar	mmHg	mmH ₂ O	inH ₂ O
IGP60G	-100 and 3500	-14.5 and 507	-7510 and 35	-750 and 26252	-10197 and 356900	-401 and 14051

Table 3. Working Pressure Limits for ECS Series Component Gauge Transmitter - IGP60G

Model Code	kPa	Psi	bar	mmHg	mmH ₂ O	inH ₂ O
IGP60G	2 abs and 5250	0.29 and 761	0.02 and 52.5	15 and 39378	204 and 535351	8 and 21077

FUNCTIONAL SPECIFICATIONS (CONT.)

SUPPLY VOLTAGE AND LOAD RESISTANCE

17.9 to 42V dc. A load resistance of 250 Ω or more is necessary between loops. See Figure 1.

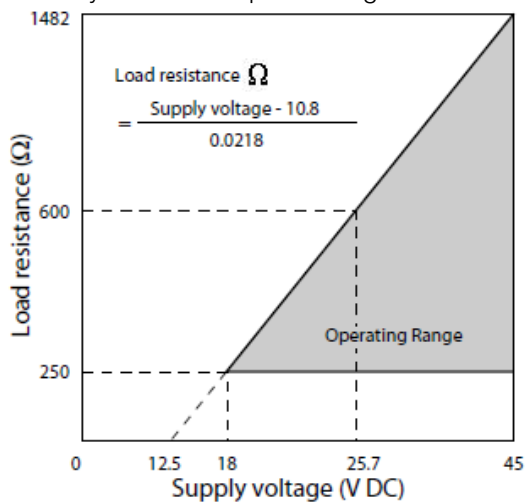


Figure 1. Supply Voltage vs. Load Resistance Characteristics

NOTE

For communication with HART communicator a load resistance of 250 Ω or more is necessary.

OUTPUT

Analog output (4 to 20 mA dc) with HART protocol

OUTPUT SIGNAL

3.6 to 21.6 mA

3.8 to 20.5 mA (NAMUR NE43 compliant)

FAILURE ALARM

Upper: 21.6 mA or more

Lower: 3.6 mA or less

BOLTS AND NUTS MATERIALS (FOR FASTENING METER BODY COVER)

304 SST

AMBIENT TEMPERATURE LIMITS

To know more about normal operating range operating limits, and transportation and storage conditions, see Table 4.

To know more about temperature ranges for wetted parts, see Table 4.

AMBIENT HUMIDITY LIMITS

5 to 100% RH

STABILITY AGAINST SUPPLY VOLTAGE CHANGE

$\pm 0.005\%$ FS/V

RESPONSE TIME

Below 100 msec (for model IGP60G, when damping time is set to 0 sec).

DAMPING TIME

0 to 128 sec

ZERO STABILITY

$\pm 0.1\%$ of URL per 10 year (model IGP60G)

LIGHTNING PROTECTION

Applicable Standards; IEC 61000-4-5

Peak value of current surge (80/20 μ second): 6000A

INDICATOR

The digital LCD indicator (optional) indicates engineering units and can be set freely between -99999 and 99999 (5 digits). For meter calibration, specify the following items when placing your order

- ▶ Meter calibration range
- ▶ Meter calibration unit
- ▶ Linear / Square-root for meter indication

Various kinds of data can be set using the HART® communicator.

FUNCTIONAL SPECIFICATIONS (CONT.)

Table 4. Temperature Limits

Models	Influence	Reference Operating Conditions	Normal Operating Range	Operative Limits	Storage and Transportation Limits
IGP60G	Process Connection temperature With Silicon Fill	23 ± 2°C (73 ± 3°F)	-40 to 110°C (-40 to 230°F)	-50 and 115°C (-58 and 239°F)	N/A
	With Fluorine Fill	23 ± 2°C (73 ± 3°F)	-20 to 75°C (-4 to 167°F)	-40 and 80°C (-40 and 176°F)	N/A
	Electronics Temperature Without LCD Indicator	23 ± 2°C (73 ± 3°F)	-40 to 85°C (-40 to 150°F) (c)	-50 and 93°C (-58 and 200°F)	-50 and 85°C (-58 and 185°F)
	With LCD Indicator	23 ± 2°C (73 ± 3°F)	-25 to 80°C (-13 to 176°F) (c)	-30 and 85°C (-22 and 180°F)	-50 and 85°C (58 and 185°F)
	Relative Humidity (a)	50 ± 30%	5 to 100%	5 and 100%	5 and 100% Noncondensing
	Supply Voltage-mA Output	24 ± 0.5 V dc	17.9 to 42 V dc	17.9 and 42 V dc	N/A
	Output Load-mA Output	250 Ω	0 to 1482 Ω	0 and 1482 Ω	N/A

(a) With topworks cover on and conduit entrances sealed

(b) -10 to 75°C (+14 to +176°F) for Fluorine fill fluid

(c) -40 to 80°C (-40 to +176°F) for Fluorine fill fluid

PERFORMANCE SPECIFICATIONS

Shown for each item are the percentage ratio for χ (kPa), which is the greatest value of either the upper range value (URV)⁽¹⁾, the lower range value (LRV)⁽²⁾, or the span.

Table 5. Reference Accuracy - Model IGP60G

Model	Attributes	Description
Model IGP60G (for regular type)	Reference Accuracy ^{(a),(b)}	$\pm 0.04\%$ (For $\chi \geq 350$ kPa {3.5 kgf/cm ² }) $\pm \left(0.008 + 0.032 \times \frac{350}{\chi} \right) \%$ (For $\chi < 350$ kPa {3.5 kgf/cm ² })
	Ambient Temperature Effect (Shift from the calibrated range) ^(a) Change of 30°C	Combined shift (Including zero and % span shifts): $\pm 0.15\%$ (For $\chi \geq 350$ kPa {3.5 kgf/cm ² }) $\pm \left(0.075 + 0.075 \times \frac{350}{\chi} \right) \%$ (For $\chi < 350$ kPa {3.5 kgf/cm ² })
Model IGP60G (for oxygen and chlorine service)	Reference Accuracy ^{(a),(b)}	$\pm 0.075\%$ (For $\chi \geq 1750$ kPa {17.5 kgf/cm ² }) $\pm 0.01\%$ (For $1750 \text{ kPa } \{17.5 \text{ kgf/cm}^2\} > \chi \geq 140 \text{ kPa } \{1.4 \text{ kgf/cm}^2\}$) $\pm \left(0.025 + 0.075 \times \frac{140}{\chi} \right) \%$ (For $\chi < 140$ kPa {1.4 kgf/cm ² })
	Ambient Temperature Effect (Shift from the calibrated range) ^(a) Change of 30°C	Combined shift (Including zero and % span shifts): $\pm 0.44\%$ (For $\chi \geq 350$ kPa {3.5 kgf/cm ² }) $\pm \left(0.19 + 0.25 \times \frac{350}{\chi} \right) \%$ (For $\chi < 350$ kPa {3.5 kgf/cm ² })

(a) Within a range of URV ≥ 0 and LRV ≥ 0 .

(b) Reference accuracy at calibrated condition, 25°C.

(1) URV denotes the process value for 100% (20 mA dc) output

(2) LRV denotes the process value for 0% (4 mA dc) output

ELECTRICAL SAFETY SPECIFICATIONS

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
ATEX flameproof and dust certifications; II 1/2 G Ex d IIC T6...T4	Temperature Class T6, $T_a = -30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$ T5, $T_a = -30^{\circ}\text{C}$ to $+80^{\circ}\text{C}$ T4, $T_a = -30^{\circ}\text{C}$ to $+80^{\circ}\text{C}$	A1
II 2 D Ex tD A21 IP6X T85 / T100 / T110°C	Maximum Surface Temperature T85°C, $T_a = -30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$ T100°C, $T_a = -30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$ T110°C, $T_a = -30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$	
ATEX intrinsically safety and dust certifications; II 1 G, Ex ia IIC II 1 D Ex iaD 20 IP66/67 T105°C II 2 D Ex tD 21 IP66/67 T85°C...T110°C	Temperature Class T4, $T_a = -30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ Maximum Surface Temperature T105°C, $T_a = -30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ T85°C, $T_a = -30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$ T100°C, $T_a = -30^{\circ}\text{C}$ to $+80^{\circ}\text{C}$ T110°C, $T_a = -30^{\circ}\text{C}$ to $+80^{\circ}\text{C}$	A2
ATEX protection type n; II 3 G Ex nL IIC	Temperature Class T4, $T_a = -30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$	A5
FM explosionproof dust approvals; Class I, Division 1, Groups A, B, C, and D; Class I, Zone 1, AEx d IIC and Dust-ignition proof for Class II and III, Division 1, Groups E, F, and G	Temperature Class T5, $T_a = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	F1
FM intrinsically safe for Class I, II, and III, Division 1, Groups A, B, C, D, E, F and G; Zone 0, AEx ia IIC	Temperature Class T4, $T_a = -40^{\circ}\text{C}$ to $+60^{\circ}\text{C}$	F2
FM non-incendive; Class I, II and III, Div 2, Groups A, B, C, D, E, F, and G	Temperature Class T4, $T_a = -40^{\circ}\text{C}$ to $+60^{\circ}\text{C}$	F5

MODEL CODE

<u>Description</u>	<u>Model</u>
Model IGP60G (Gauge Pressure Transmitter) Measuring Span: 2.5 to 500 psi (17.5 to 3500kPa)	IGP60G
Selection I	
<u>Output</u> 4 to 20mA (HART Communication)	B
<u>Fill Fluid</u> Silicone Fluorine (for Oxygen Service)	A H
<u>Cover Material</u> Process Cover: SCS14A, Vent/Drain Plugs: 316SST	A
<u>Wetted Surfaces Material</u> Meterbody: 316SST, Diaphragms: 316LSST Meterbody, Diaphragms: ASTM B575 (Equiv. to Hastalloy C)	A B
<u>Process Connections</u> 1/4 in NPT Internal Thread with 1/2 in NPT Adapter Flange 1/4 in NPT Internal Thread with Adapter Flange 1/4 in NPT Internal Thread w/o Adapter Flange	D E F
<u>Mounting (Process Installation)</u> Horizontal Piping, Front Connection	C
<u>Bolting</u> 304SST	B
Selection II	
<u>Electrical Connection</u> 1/2 NPT, Watertight M20, Watertight	-A -B
<u>Electrical Safety</u> None FM Explosionproof (b) FM Intrinsically Safe (b), (c) FM Nonincendive (b), (c) FM EX, IS, and NI (b), (c) ATEX Explosionproof ATEX Intrinsically Safe (c) ATEX Energy Limited CSA Explosionproof (b), (c) CSA Intrinsically Safe (b), (c)	XX F1 F2 F5 F6 A1 A2 A5 C1 C2
<u>Indicator</u> None With Indicator	X A
<u>Paint</u> Corrosion Proof	B

Model Code continued on next page

MODEL CODE (CONTINUED)

<u>Failure Alarm Configuration</u>	
Upper Limit of Output at Abnormal Condition	A
Lower Limit of Output at Abnormal Condition	B
<u>Mounting Bracket</u>	
None	X
Carbon Steel (Universal)	3
304 SST (Universal)	4
<u>Optional Selections</u>	
No Option	-XX
Adapters for Anticorrosion materials ^(g)	-A1
With External Zero Adjustment ^(d)	-A2
Long Vent / Drain Plug	-G4
Side Vent / Drain Plug (Top)	-G6
Side Vent / Drain Plug (Bottom)	-G7
Oil/ Water Free Finish	-K1
Oil Free Finish ^(e)	-K3
Safety Transmitter ^(f)	-Q1
NAMUR NE43 Compliant	-Q2
Alarm Output (Contact Output)	-Q7
Custom Calibration	-R1
Test Report	-T1
Mill Certificate	-T2
Traceability Certificate	-T4
NACE Certificate ^(h)	-T5
Non SI Unit	-W1
Example: IGP60G-BAAAECEB-AF2BBA3-A2Q7	

(a) Max working pressure is restricted to 10MPa when 304SST bolt/nut is selected.

(b) Not available at this time.

(c) Not available with Option "Q7"

(d) Not available with Indicator code X 'None'. Please select code A 'With Indicator'.

(e) No need to select when Fill Fluid code H 'For Oxygen Service' is selected.

(f) Not available with Option A2 'With External Zero Adjustment' or Option Q7 'Alarm Output'.

(g) Required with NACE Certificate (T4 Option) when flange adapters are selected.

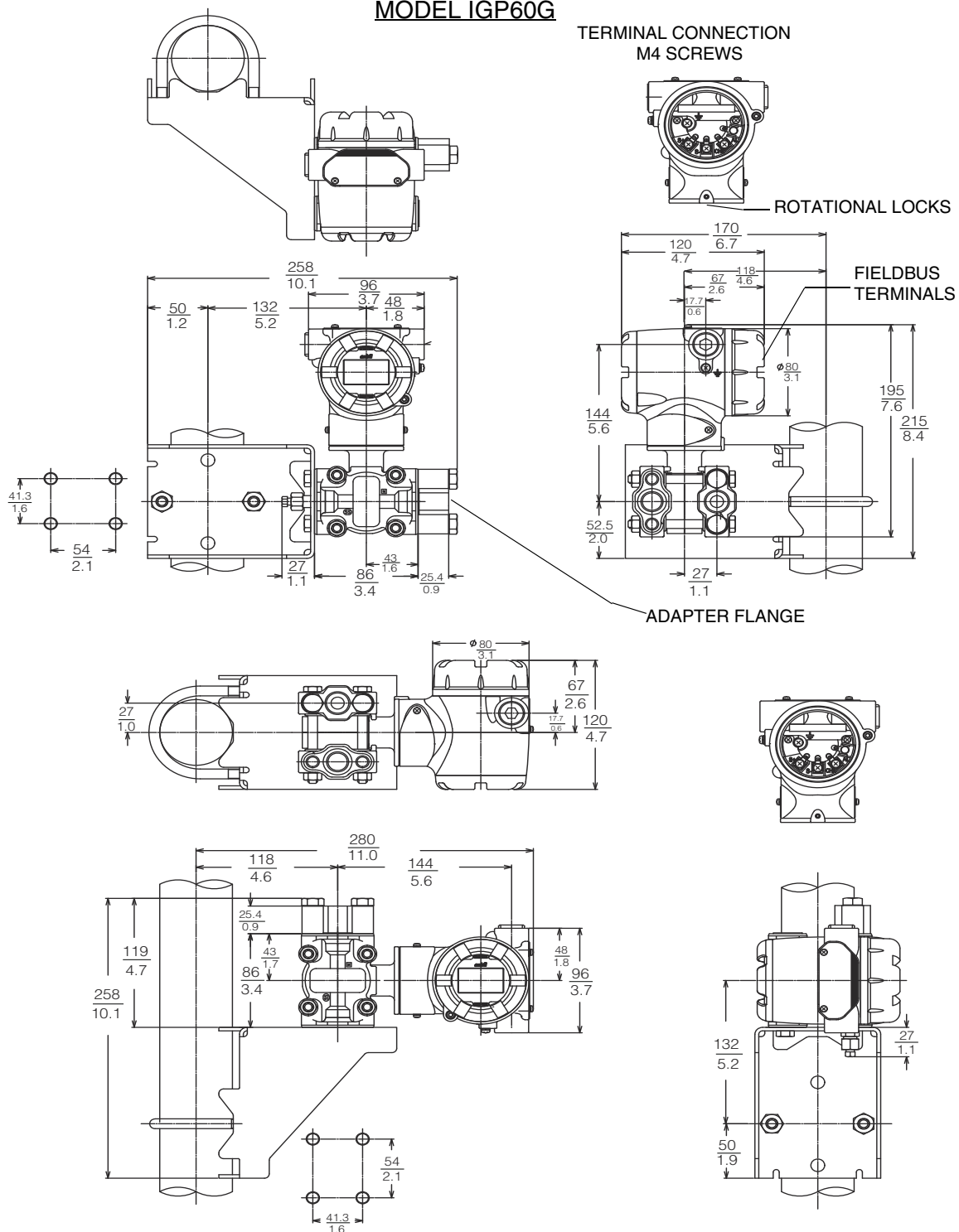
(h) Available with Meterbody Material code B "ASTM575" only.

MODEL IGP60G

– ROTATIONAL LOCKS

FIELD BUS TERMINALS

ADAPTER FLANGE



ORDERING INSTRUCTIONS

1. Model Number(s) as follows:
 - Transmitter only if pressure seals are not selected
 - Both transmitter and pressure seals if pressure seals are selected with traditional structure. See PSS 2A-1Z11 A.
2. Calibrated Pressure Range (using Allowable Pressure Units from the table below.

inH ₂ O	inHg	Pa	mbar	psia
ftH ₂ O	mmHg	kPa	bar	atm
mmH ₂ O		MPa	g/cm ²	
cmH ₂ O			kg/cm ²	

3. Configuration Data Form when Factory Calibration Option -C2 is specified.
4. If Option -S2 (SIL-Certified HART Transmitter) is selected, a copy of the certification can be provided by specifying AS Code CERT-L.
5. Options and Accessories not in Model Code (see PSS 2A-1Z9 E).
6. User Tag Data - Data Plate; 32 characters maximum. For additional tag data, specify Optional Supplemental Tag -T.
7. User Tag Data - Software (Database); 8 characters maximum (user configured).

OTHER M&I PRODUCTS

Invensys provides a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, positioners, temperature, controlling and recording. For a listing of these offerings, visit the Invensys Operations Management web site at:

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