# General Specifications

EJX115A
Low Flow Transmitter

DPharp EJX™

**GS 01C25K01-01EN** [Style: S1]

*The low flow transmitter EJX115A is a differential pressure transmitter assembled with an integral orifice and excellent for very low flow measurement. It outputs a 4 to 20 mA DC signal corresponding to the measured flow. Its highly accurate and stable sensor can also measure the static pressure which can be shown on the integral indicator or remotely monitored via BRAIN or HART communications. Other key features include quick response, remote set-up using communications, diagnostics and optional status output for pressure high/low alarm. The multi-sensing technology provides the advanced diagnostic function to detect such abnormalities as an impulse line blockage or heat trace breakage. FOUNDATION Fieldbus and PROFIBUS PA protocol types are also available. All EJX series models in their standard configuration, with the exception of the Fieldbus and PROFIBUS types, are certified as complying with SIL 2 for safety requirement.*



## ■ STANDARD SPECIFICATIONS

Refer to GS 01C25T02-01EN for Fieldbus communication type and GS 01C25T04-01EN for PROFIBUS PA communication type for the items marked with "◊."

### □ SPAN AND RANGE LIMITS

| Capsule | Differential Pressure Span | Water Equivalent Flow l/min | Air Equivalent Flow Nl/min |
|---|---|---|---|
| F | 1 to 5 kPa {100 to 500 mmH2O} | 0.016 to 5.0 | 0.44 to 140 |
| M | 2 to 100 kPa {200 to 10000 mmH2O} | 0.022 to 23.0 | 0.63 to 635 |
| H | 20 to 210 kPa {2000 to 21000 mmH2O} | 0.07 to 33.0 | 2.0 to 910 |

### □ PERFORMANCE SPECIFICATIONS

[Integral Orifice]
Accuracy±5% of span
Refer to TI 01C20K00-01E for conditions.
[Differential Pressure Transmitter]
Zero-based calibrated span, linear output, wetted parts material code S and silicone oil, unless otherwise mentioned.
For Fieldbus and PROFIBUS PA communication types, use calibrated range instead of span in the following specifications.

**Specification Conformance**
EJX series ensures specification conformance to at least ±3σ.

**Reference Accuracy of Calibrated Span**
(includes terminal-based linearity, hysteresis, and repeatability)

| Measurement span | | F |
|---|---|---|
| Reference accuracy | X ≤ span | ±0.04% of Span |
| | X > span | ±(0.015+0.01 URL/span)% of Span |
| X | | 2 kPa (8 inH2O) |
| URL (upper range limit) | | 5 kPa (20 inH2O) |

| Measurement span | | M |
|---|---|---|
| Reference accuracy | X ≤ span | ±0.04% of Span |
| | X > span | ±(0.002+0.0019 URL/span)% of Span |
| X | | 5 kPa (20 inH2O) |
| URL (upper range limit) | | 100 kPa (400 inH2O) |

| Measurement span | | H |
|---|---|---|
| Reference accuracy | X ≤ span | ±0.04% of Span |
| | X > span | ±(0.005+0.0049 URL/span)% of Span |
| X | | 70 kPa (280 inH2O) |
| URL (upper range limit) | | 500 kPa (2000 inH2O) |

**Square Root Output Accuracy**
The square root accuracy is a percent of flow span.

| Output | Accuracy |
|---|---|
| 50% or Greater | Same as reference accuracy |
| 50% to Dropout point | $\frac{\text{Reference accuracy} \times 50}{\text{Square root output (\%)}}$ |

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**Ambient Temperature Effects per 28°C (50°F) Change**

| Capsule | Effect |
|---|---|
| F | ±(0.055% Span+0.18% URL) |
| M | ±(0.04% Span+0.009% URL) |
| H | ±(0.04% Span+0.0125% URL) |

**Static Pressure Effects per 6.9 MPa (1000 psi) Change**

**Span Effects**

F, M and H capsules

±0.075% of span

**Effect on Zero**

| Capsule | Effect |
|---|---|
| F | ±0.1% URL |
| M | ±0.02% URL |
| H | ±0.028% URL |

**Overpressure Effects**

Overpressure condition: up to maximum working pressure

M and H capsules

±0.03% of URL

**Stability (All normal operating condition, including overpressure effects)**

M and H capsules

±0.1% of URL per 15 years

**Power Supply Effects(Output signal code D, E and J)**

±0.005 % per Volt (from 21.6 to 32 V DC, 350Ω)

**Vibration Effects**

Amplifier housing code 1 and 3:

Less than 0.1% of URL when tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10-60 Hz, 0.21 mm displacement/60-2000 Hz 3 g)

Amplifier housing code 2:

Less than ±0.1% of URL when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10-60 Hz 0.15mm displacement /60-500 Hz 2g)

**Mounting Position Effects**

Rotation in diaphragm plane has no effect. Tilting up to 90 degree will cause zero shift up to 0.4 kPa (1.6 in$H_2O$) which can be corrected by the zero adjustment.

**Response Time (Differential pressure) "◊"**

M and H capsules: 90 ms

F capsule: 150 ms

When amplifier damping is set to zero and including dead time of 45 ms (nominal)

**Static Pressure Signal Range and Accuracy (For monitoring via communication or on indicator. Includes terminal-based linearity, hysteresis, and repeatability)**

**Range**

Upper Range Value and Lower Range Value of the statice pressure can be set in the range between 0 and Maximum Working Pressure(MWP). The upper range value must be greater than the lower range value. Minimum setting span is 0.5 MPa(73 psi). Measuring either the pressure of high pressure side or low pressure side is user-selectable.

**Accuracy**

Absolute Pressure

1MPa or higher: ±0.2% of span

Less than 1 MPa: ±0.2%×(1 MPa/span) of span

Gauge Pressure Reference

Gauge pressure reference is 1013 hPa (1 atm)

Note: Gauge pressure variable is based on the above fixed reference and thus subject to be affected by the change of atomospheric pressure.

## □ FUNCTIONAL SPECIFICATIONS

**Output "◊"**

Two wire 4 to 20 mA DC output with digital communications, linear or square root programmable. BRAIN or HART FSK protocol are superimposed on the 4 to 20 mA signal.

Output range: 3.6 mA to 21.6 mA

Output limits conforming to NAMUR NE43 can be pre-set by option code C2 or C3.

**Failure Alarm (Output signal code D, E and J)**

Analog output status at CPU failure and hardware error;

Up-scale: 110%, 21.6 mA DC or more (standard)

Down-scale: −5%, 3.2 mA DC or less

Analog output status at process abnormality (Option code /DG6);

The result of process abnormality detected by the advanced diagnostic function can be reflected to an analog alert status. The following three setting modes are available.

| | | Mode | | |
|---|---|---|---|---|
| | | Burnout | Fall back | Off |
| Standard | | 110%, 21.6mA or more | Holds to a specified value within the output range from 3.6mA to 21.6mA | Normal output |
| Option Code | /C1 | -2.5%, 3.6mA or less | | |
| | /C2 | -1.25%, 3.8mA or less | | |
| | /C3 | 103.1%, 20.5mA or more | | |

**Damping Time Constant (1st order)**

Amplifier damping time constant is adjustable from 0.00 to 100.00 s by software and added to response time.

Note: For BRAIN protocol type, when amplifier software damping is set to less than 0.5 s, communication may occasionally be unavailble during the operation, especially while output changes dynamically. The default setting of damping ensures stable communication.

**Update Period "◊"**

Differential pressure: 45 ms

Static pressure: 360 ms

**Zero Adjustment Limits**

Zero can be fully elevated or suppressed, within the lower and upper range limits of the capsule.

**External Zero Adjustment**

External zero is continuously adjustable with 0.01% incremental resolution of span. Re-range can be done locally using the digital indicator with rangesetting switch.

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**Integral Indicator (LCD display, optional) "◊"**
5-digit numerical display, 6-digit unit display and bar graph.
The indicator is configurable to display one or up to four of the following variables periodically.;
Measured differential pressure, differential pressure in %, scaled differential pressure, measured static pressure. See also "Factory Setting."

**Local Parameter Setting (Output signal code D, E, and J)**
Parameter configuration by the external zero adjustment screw and push button (Integral indicator code E) offers easy and quick setup for parameters of Loop test, Tag number, Unit, LRV, URV, Damping, Output mode (linear/square root), Display out 1, and Re-range by applying actual pressure (LRV/URV) and Device Information.

**Burst Pressure Limits**
**(Differential pressure transmitter part)**
69 MPa (10,000 psi) for Measurement span M and H.
47 MPa (6,800 psi) for Measurement span F.

**Self Diagnostics**
CPU failure, hardware failure, configuration error, and over-range error for differential pressure, static pressure and capsule temperature.
User-configurable process high/low alarm for differential pressure and static pressure is also available, and its status can be output when optional status output is specified.

**Advanced Diagnostics (optional) "◊"**
Applicable for Output signal code E, J and F.
- Impulse line blockage detection
  The impulse line condition can be calculated and detected by extracting the fluctuation component from the differential pressure and static pressure signals. The EJX115A detects the impulse line abnormality particularly which side of impulse line is plugged.
- Heat trace monitoring
  The change of the flange temperature calculated by using the two temperature sensors built in the EJX enables to detect the heat trace breakage or the abnormal temperature due to the failure.

**Signal Characterizer (Output signal code D, E and J)**
User-configurable 10-segment signal characterizer for 4 to 20 mA output.

**Status Output (optional, output signal code D, E and J)**
One transistor contact output (sink type) to output the status of user configurable high/low alarm for differential pressure/static pressure.
Contact rating: 30 V DC, 120 mA DC max.
Refer to 'Terminal Configuration' and 'Wiring Example for Analog Output and Status Output.'

**SIL Certification**
EJX series transmitters except Fieldbus and PROFIBUS PA communication types are certified in compliance with the following standards;
IEC 61508: 2010;
Functional Safety of Electrical/electronic/programmable electronic related systems; SIL 2 capability for single transmitter use, SIL 3 capability for dual transmitter use.
Reliability Data different depending on hardware and software revision.
For details, refer to Functional Safety Data Sheet. (Document number: TI 01C25A05-01EN or TI 01C25A05-21EN for option code SLT )
The document can be downloaded from the website of Yokogawa.
(Website address: https://www.yokogawa.com/solutions/products-platforms/field-instruments/)

## □ NORMAL OPERATING CONDITION (Optional features or approval codes may affect limits.)

**Ambient Temperature Limits**
−40 to 85°C (−40 to 185°F)
−30 to 80°C (−22 to 176°F) with LCD display

**Process Temperature Limits**
−40 to 120°C (−40 to 248°F)

**Ambient Humidity Limits**
0 to 100% RH

**Working Pressure Limits (Silicone oil)**

**Maximum Pressure Limits**
All capsules 16 MPa (2300 psi)

**Minimum Pressure Limit**
See graph below

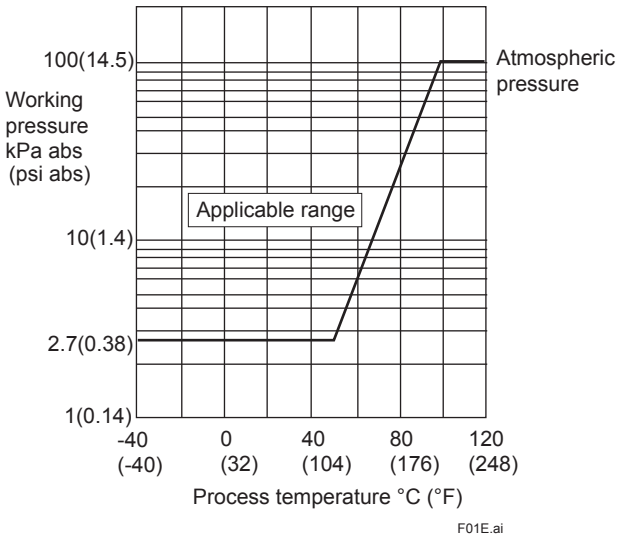



**Figure 1. Working Pressure and Process Temperature**

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**Supply & Load Requirements**
**(Output signal code D, E and J. Optional features or approval codes may affect electrical requirements.)**
With 24 V DC supply, up to a 550Ω load can be used. See graph below.

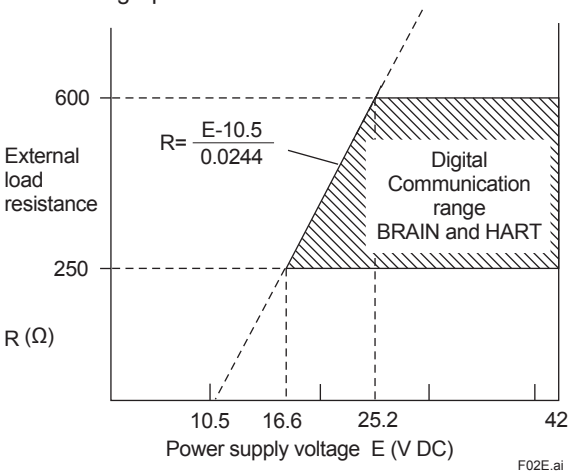



**Figure 2. Relationship Between Power Supply Voltage and External Load Resistance**

**Supply Voltage "◊"**
10.5 to 42 V DC for general use and flameproof type.
10.5 to 32 V DC for lightning protector (option code /A.)
10.5 to 30 V DC for intrinsically safe, type n, or non-incendive.
Minimum voltage limited at 16.6 V DC for digital communications, BRAIN and HART

**Load (Output signal code D, E and J)**
0 to 1290Ω for operation
250 to 600Ω for digital communication

**Communication Requirements "◊"**
(Approval codes may affect electrical requirements.)

**BRAIN**

**Communication distance**
Up to 2 km (1.25 miles) when using CEV polyethylene-insulated PVC-sheathed cables. Communication distance varies depending on type of cable used.

**Load capacitance**
0.22 µF or less

**Load inductance**
3.3 mH or less

**Input impedance of communicating device**
10 kΩ or more at 2.4 kHz.

**EMC Conformity Standards**
EN 61326-1 Class A, Table2
EN 61326-2-3, EN 61326-2-5 (for fieldbus)

**European Pressure Equipment Directive 2014/68/EU**
Sound Engineering Practice (for all capsules)

**EU RoHS Directive**
EN IEC 63000

**Safety Requirement Standards**
EN 61010-1, C22.2 No.61010-1
- Installation category: I (Anticipated transient overvoltage 330 V)
- Pollution degree: 2
- Indoor/Outdoor use

## □ PHYSICAL SPECIFICATIONS

**Wetted Parts Materials**

**Diaphragm, Cover Flange, Process Connector, Capsule Gasket, Vent/Drain Plug, Manifold, Orifice, Spacer, and Orifice gasket**
Refer to "MODEL AND SUFFIX CODES."

**Process Connector Gasket**
PTFE Teflon
Fluorinated rubber for option code N2 and N3

**Non-wetted Parts Materials**

**Bolting**
B7 carbon steel or 316L SST

**Housing**
- Low copper cast aluminum alloy
- Low copper cast aluminum alloy with corrosion resistance properties (copper content ≤ 0.03%, iron content ≤ 0.15%) (optional)
- ASTM CF-8M Stainless steel (optional)

**Coating of housing**
[for aluminum housing]
Polyester resin powder coating
Mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent)
[for option code /P□ or /X2]
Epoxy and polyurethane resin solvent coating

**Degrees of protection**
IP66/IP67, Type 4X

**Cover O-rings**
Buna-N, fluoro-rubber (optional)

**Name plate and tag**
316 SST

**Fill fluid**
Silicone, fluorinated oil (optional)

**Weight**
[Installation code 7, 8 and 9]
4.5 kg (9.9 lb) for measurement span code M and H without integral indicator, mounting bracket, and process connector.
5.4 kg (11.9 lb) for measurement span code F without integral indicator, mounting bracket, and process connector.
Add 1.5 kg (3.3 lb) for Amplifier housing code 2.

**Connections**
Refer to "MODEL AND SUFFIX CODES."
Process connection of cover flange: IEC61518

**< Related Instruments>**
FieldMate Versatile Device Management Wizard: Refer to GS 01R01A01-01E.
BRAIN TERMINAL: Refer to GS 01C00A11-00E
Power Distributor: Refer to GS 01B04T01-02E or GS 01B04T02-02E

**< Reference >**
1. DPharp EJX™ is a registered trademark of Yokogawa Electric Corporation.
2. FieldMate; Trademark of Yokogawa Electric Corporation.
3. Teflon; Trademark of E.I. DuPont de Nemours & Co.
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**< Measurement Range (Approximate Value) >**

| | Orifice Bore (mm) | F Capsule | M Capsule | H Capsule |
|---|---|---|---|---|
| Water Equivalent Maximum Flow Range l/min | 0.508 | 0.016 to 0.035 | 0.022 to 0.157 | 0.07 to 0.225 |
| | 0.864 | 0.046 to 0.102 | 0.066 to 0.46 | 0.21 to 0.67 |
| | 1.511 | 0.134 to 0.29 | 0.19 to 1.35 | 0.60 to 1.93 |
| | 2.527 | 0.36 to 0.80 | 0.52 to 3.6 | 1.65 to 5.2 |
| | 4.039 | 0.92 to 2.0 | 1.3 to 9.2 | 4.1 to 13.0 |
| | 6.350 | 2.3 to 5.0 | 3.3 to 23 | 10 to 33 |
| Air Equivalent Maximum Flow Range Nl/min | 0.508 | 0.44 to 0.981 | 0.63 to 4.4 | 1.98 to 6.4 |
| | 0.864 | 1.30 to 2.88 | 1.85 to 12.9 | 5.8 to 18.5 |
| | 1.511 | 3.7 to 8.22 | 5.3 to 37 | 16.7 to 54 |
| | 2.527 | 10.3 to 22 | 14.6 to 105 | 47 to 150 |
| | 4.039 | 25 to 55 | 36 to 255 | 113 to 370 |
| | 6.350 | 63 to 140 | 89 to 630 | 280 to 910 |

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## ■ MODEL AND SUFFIX CODES

| Model | Suffix Codes | Description |
|---|---|---|
| **EJX115A** | . . . . . | Low flow transmitter |
| Output signal | **-D** . . . . . | 4 to 20 mA DC with digital communication (BRAIN protocol) |
| | **-E** . . . . . | 4 to 20 mA DC with digital communication (HART 5 protocol) |
| | **-J** . . . . . | 4 to 20 mA DC with digital communication (HART 5 / HART 7 protocol) (Refer to GS 01C25T01-01EN) |
| | **-F** . . . . . | Digital communication (FOUNDATION Fieldbus protocol, refer to GS 01C25T02-01EN) |
| | **-G** . . . . . | Digital communication (PROFIBUS PA protocol, refer to GS 01C25T04-01EN) |
| Measurement span (capsule) | **F** . . . . . | 1 to 5 kPa (4 to 20 in$H_2O$) |
| | **M** . . . . . | 2 to 100 kPa (8 to 400 in$H_2O$) |
| | **H** . . . . . | 20 to 210 kPa (80 to 840 in$H_2O$) |
| Wetted parts material *1 | **S** . . . . . | Cover flange and process connector: ASTM CF-8M # *2*9<br>Capsule: Hastelloy C-276 (Diaphragm) # *3 F316L SST, 316L SST (Others) #<br>Capsule gasket: Teflon-coated 316L SST<br>Vent/Drain plug: 316 SST # Orifice: 316 SST #<br>Manifold: F316 SST # Spacer: 316 SST # Orifice gasket: PTFE |
| Process connections<br>▶ | **2** . . . . . | Rc1/2 female |
| | **4** . . . . . | 1/2 NPT female |
| Bolts and nuts material | | [For Cover flange] [For Process connector] [For Manifold] |
| | **J** . . . . . | B7 B7 316L SST |
| | **G** . . . . . | 316L SST 316L SST 316L SST |
| Installation | **-2** . . . . . | Vertical piping, right side high pressure, manifold upside |
| | **-3** . . . . . | Vertical piping, right side high pressure, manifold downside |
| | **-6** . . . . . | Vertical piping, left side high pressure, manifold upside |
| | **-7** . . . . . | Vertical piping, left side high pressure, and manifold downside |
| | **-8** . . . . . | Horizontal piping and right side high pressure |
| ▶ | **-9** . . . . . | Horizontal piping and left side high pressure |
| Amplifier housing | **1** . . . . . | Cast aluminum alloy |
| | **3** . . . . . | Cast aluminum alloy with corrosion resistance properties*4 |
| | **2** . . . . . | ASTM CF-8M stainless steel*5 |
| Electrical connection | **0** . . . . . | G1/2 female, one electrical connection without blind plugs |
| ▶ | **2** . . . . . | 1/2 NPT female, two electrical connections without blind plugs |
| | **4** . . . . . | M20 female, two electrical connections without blind plugs |
| | **5** . . . . . | G1/2 female, two electrical connections and a blind plug*6 |
| | **7** . . . . . | 1/2 NPT female, two electrical connections and a blind plug*6 |
| | **9** . . . . . | M20 female, two electrical connections and a blind plug*6 |
| | **A** . . . . . | G1/2 female, two electrical connections and a SUS316 blind plug |
| | **C** . . . . . | 1/2 NPT female, two electrical connections and a SUS316 blind plug |
| | **D** . . . . . | M20 female, two electrical connections and a SUS316 blind plug |
| Integral indicator | **D** . . . . . | Digital indicator*7 |
| | **E** . . . . . | Digital indicator with the range setting switch (push button)*8 |
| ▶ | **N** . . . . . | None |
| Mounting bracket | **B** . . . . . | 304 SST 2-inch pipe mounting, flat type (for horizontal piping) |
| | **D** . . . . . | 304 SST 2-inch pipe mounting, L type (for vertical piping) |
| | **J** . . . . . | 316 SST 2-inch pipe mounting, flat type (for horizontal piping) |
| | **K** . . . . . | 316 SST 2-inch pipe mounting, L type (for vertical piping) |
| | **P** . . . . . | 316 SST 2-inch pipe mounting, position adjustable L type (for vertical piping)*10 |
| ▶ | **N** . . . . . | None |
| — | **-N** . . . . . | Always -N |
| — | **00** . . . . . | Always 00 |
| — | **N** . . . . . | Always N |
| — | **N** . . . . . | Always N |
| — | **0** . . . | Always 0 |
| Optional Codes | | /☐ Optional specification |

The "▶" marks indicate the most typical selection for each specification.

*1: ⚠ Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids. Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150°C [302°F] or above). Contact Yokogawa for detailed information of the wetted parts material.

*2: Cast version of 316 SST. Equivalent to SCS14A.

*3: Hastelloy C-276 or ASTM N10276.

*4: Not applicable for electrical connection code 0, 5, 7, 9 and A.

*5: Not applicable for electrical connection code 0, 5, 7 and 9.

*6: Material of a blind plug; aluminum alloy for code 5 and 9, and SUS304 for code 7.

*7: Not applicable for output signal code G.

*8: Not applicable for output signal code F.

*9: Intergranular corrosion test passed according to ASTM A262 Practice E.

*10: For position adjustable bracket, refer to SD 01C25B14-01EN.

The '#'marks indicate the construction materials conform to NACE material recommendations per MR0175/ISO 15156. Please refer to the latest standards for details. Selected materials also conform to NACE MR0103.

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## ■ OPTIONAL SPECIFICATIONS (For Explosion Protected type) "◊"

For other agency approvals and marine approvals, please refer to GS 01C25A20-01EN.

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

| Item | Description | Code |
|---|---|---|
| Factory Mutual (FM) | FM Explosionproof Approval *1<br>Applicable Standard: FM3600, FM3615, FM3810, NEMA 250, ANSI/UL 61010-1, ANSI/UL 61010-2-30<br>Explosionproof for Class I, Division 1, Groups B, C and D, Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G, in Hazardous locations, indoors and outdoors (Enclosure: Type 4X)<br>"FACTORY SEALED, CONDUIT SEAL NOT REQUIRED."<br>Temperature class: T6, Amb. Temp.: –40 to 60°C (–40 to 140°F) | **FF1** |
| | FM Intrinsically safe Approval *1*2<br>Applicable Standard: FM 3600, FM 3610, FM 3611, FM 3810, ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-61010-1, NEMA 250<br>Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0, in Hazardous Locations, AEx ia IIC<br>Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division. 2, Groups F & G, Class I, Zone 2, Group IIC, in Hazardous Locations<br>Enclosure: Type 4X, Temp. Class: T4, Amb. Temp.: –60 to 60°C (–75 to 140°F)<br>Intrinsically Safe Apparatus Parameters<br>[Groups A, B, C, D, E, F and G] Vmax=30 V, Imax=200 mA, Pmax=1 W, Ci=6 nF, Li=0 µH<br>[Groups C, D, E, F and G] Vmax=30 V, Imax=225 mA, Pmax=1 W, Ci=6 nF, Li=0 µH | **FS1** |
| | Combined FF1 and FS1 *1*2 | **FU1** |
| ATEX | ATEX Flameproof Approval *1<br>Applicable Standard: EN IEC 60079-0, EN 60079-1, EN 60079-31<br>Certificate: KEMA 07ATEX0109 X<br>II 2 G Ex db IIC T6...T4 Gb, II 2 D Ex tb IIIC T85°C Db<br>Degree of protection: IP66/IP67<br>Amb. Temp. (Tamb) for gas-proof :<br>T4; –50 to 75°C (–58 to 167°F), T5; –50 to 80°C (–58 to 176°F), T6; –50 to 75°C (–58 to 167°F)<br>Process Temp. for gas-proof (Tp):<br>T4; –50 to 120°C (–58 to 248°F), T5; –50 to 100°C (–58 to 212°F), T6; –50 to 85°C (–58 to 185°F)<br>Max. surface Temp. for dust-proof: T85°C (Tamb: –30 to 75°C, Tp: –30 to 85°C) *3 | **KF22** |
| | ATEX Intrinsically safe Approval *1*2<br>Applicable Standard: EN IEC 60079-0, EN 60079-11<br>Certificate: DEKRA 11ATEX0228 X<br>II 1 G Ex ia IIC T4 Ga, II 2 D Ex ia IIIC T85°C T100°C T120°C Db<br>Degree of protection: IP66/IP67<br>Amb. Temp. (Tamb) for EPL Ga: –50 to 60°C (–58 to 140°F)<br>Maximum Process Temp. (Tp) for EPL Ga:120°C<br>Electrical data: Ui=30 V, Ii=200 mA, Pi=0.9 W, Ci=27.6 nF, Li=0 µH<br>Amb. Temp. for EPL Db: –30 to 60°C *3<br>Max. surface Temp. for EPL Db: T85°C (Tp: 80°C), T100°C (Tp: 100°C), T120°C (Tp: 120°C) | **KS21** |
| | Multiple types of protection (KF22, KS21 or Intrinsically safe Ex ic) *1*2<br>Applicable Standard: EN IEC 60079-0, EN 60079-11<br>II 3 G Ex ic IIC T4 Gc, Amb. Temp.: –30 to 60°C (–22 to 140°F) *3<br>Ui=30 V, Ci=27.6 nF, Li=0 µH | **KU22** |

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| Item | Description | Code |
|---|---|---|
| Canadian Standards Association (CSA) | CSA Explosionproof Approval *1<br>Certificate: 2014354<br>Applicable Standard: C22.2 No. 25, C22.2 No. 30, C22.2 No. 94.2, C22.2 No.213<br>CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-2-030, CAN/CSA-C22.2 No. 60079-0<br>CAN/CSA-C22.2 No. 60079-1, CAN/CSA-C22.2 No. 60529, ANSI/UL 122701<br>[For Explosion-proof]<br>Class I, Groups B, C and D.<br>Temperature Code: T6...T4<br>Process Temp.: T4; –50 to 120°C (–58 to 248°F), T5; –50 to 100°C (–58 to 212°F), T6; –50 to 85°C (–58 to 185°F)<br>Amb.Temp.: T4; –50 to 75°C (–58 to 167°F), T5; –50 to 80°C (–58 to 176°F), T6; –50 to 75°C (–58 to 167°F)<br>Enclosure: Type 4X<br>[For Flameproof]<br>Ex d IIC T6...T4<br>Process Temp.: T4; –50 to 120°C (–58 to 248°F), T5; –50 to 100°C (–58 to 212°F), T6; –50 to 85°C (–58 to 185°F)<br>Amb.Temp.: T4; –50 to 75°C (–58 to 167°F), T5; –50 to 80°C (–58 to 176°F), T6; –50 to 75°C (–58 to 167°F)<br>Enclosure: IP66/IP67<br>[For Dustignition-proof]<br>Class II/III, Groups E, F and G.<br>Temp. Code: T85°C<br>T85°C (Tamb: –30* to 75°C, Tp: –30* to 85°C) *−15 °C (When fluorinated rubber O-ring is specified)<br>Enclosure: Type 4X<br>Process seal:<br>Dual Seal with Annunciation<br>No additional sealing required<br>Primary seal failure annunciation: at the zero-adjustment screw. | **CF1** |
| | CSA Intrinsically safe Approval *1*2<br>Certificate: 1606623<br>[For Division System]<br>Applicable Standard: CAN/CSA C22.2 No.0, CSA C22.2 No.94.2, CSA C22.2 No.213, CAN/CSA C22.2 No.61010-1, CAN/CSA C22.2 No.61010-2-030<br>Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1, Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1<br>Enclosure: Type 4X, Temp. Code: T4 Amb. Temp.: –50 to 60°C(–58 to 140°F) *3<br>Electrical Parameters: [Intrinsically Safe] Vmax=30V, Imax=200mA, Pmax=0.9W, Ci=10nF, Li=0 µH<br>[Nonincendive] Vmax=30V, Ci=10nF, Li=0 µH<br>[For Zone System]<br>Applicable Standard: CAN/CSA C22.2 No.60079-0, CAN/CSA C22.2 No.60079-11, CAN/CSA E60079-15, CAN/CSA C22.2 No.60529<br>Ex ia IIC T4, Ex nL IIC T4 Enclosure: IP66/IP67<br>Amb. Temp.: –50 to 60°C(–58 to 140°F) *3, Max. Process Temp.: 120°C(248°F)<br>Electrical Parameters: [Ex ia] Ui=30V, Ii=200mA, Pi=0.9W, Ci=10nF, Li=0 µH<br>[Ex nL] Ui=30V, Ci=10nF, Li=0 µH<br>Process Sealing Certification<br>Dual Seal Certified by CSA to the requirement of ANSI/ISA-12.27.01<br>No additional sealing required<br>Primary seal failure annunciation: at the zero adjustment screw | **CS1** |
| | Combined CF1 and CS1 *1*2 | **CU1** |

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| Item | Description | Code |
|---|---|---|
| IECEx Scheme | IECEx Flameproof Approval *1<br>Applicable Standard: IEC 60079-0, IEC 60079-1, IEC 60079-31<br>Certificate: IECEx DEK 14.0046X<br>Enclosure: IP66/IP67<br>Ex db IIC T6...T4 Gb, Ex tb IIIC T85°C Db<br>Amb. Temp. (Tamb) for gas-proof :<br>T4; –50 to 75°C (–58 to 167°F), T5; –50 to 80°C (–58 to 176°F), T6; –50 to 75°C (–58 to 167°F)<br>Process Temp. for gas-proof (Tp):<br>T4; –50 to 120°C (–58 to 248°F), T5; –50 to 100°C (–58 to 212°F),<br>T6; –50 to 85°C (–58 to 185°F)<br>Max. surface Temp. for dust-proof: T85°C (Tamb: –30 to 75°C, Tp: –30 to 85°C) *3 | **SF22** |
| | IECEx Intrinsically safe and SF22 *1*2<br>Intrinsically safe Ex ia<br>Certificate: IECEx DEK 11.0081X<br>Applicable Standard: IEC 60079-0, IEC 60079-11<br>Ex ia IIC T4 Ga Enclosure: IP66/IP67<br>Amb. Temp.: –50 to 60°C(–58 to 140°F), Max. Process Temp.: 120°C(248°F)<br>Electrical Parameters: Ui=30V, Ii=200mA, Pi=0.9W, Ci=27.6nF, Li=0 µH<br>Intrinsically safe Ex ic<br>Certificate: IECEx DEK 13.0061X<br>Applicable Standard: IEC 60079-0, IEC 60079-11<br>Ex ic IIC T4 Gc IP code: IP66<br>Amb. Temp.: –30 to 60°C(–22 to 140°F) *3, Max. Process Temp.: 120°C(248°F)<br>Electrical Parameters: Ui=30V,Ci=27.6 nF, Li=0 µH<br>Flameproof<br>Refer to SF22 | **SU22** |

*1: Applicable for Electrical connection code 2, 4, 7, 9, C and D.
*2: Not applicable for option code /AL.
*3: Lower limit of ambient temperature is –15°C (5°F) when /HE is specified.

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## ■ OPTIONAL SPECIFICATIONS

| Item | | Description | | Code |
|---|---|---|---|---|
| Painting | Color change | Amplifier cover only *7 | | P□ |
| | | Amplifier cover and terminal cover, Munsell 7.5 R4/14 | | PR |
| | Coating change | Anti-corrosion coating *1 | | X2 |
| 316 SST exterior parts | | 316 SST zero-adjustment screw and setscrews *8 | | HC |
| Fluoro-rubber O-ring | | All O-rings of amplifier housing. Lower limit of ambient temperature: –15°C (5°F) | | HE |
| Lightning protector | | Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.)<br>Allowable current: Max. 6000 A (1×40 µs), Repeating 1000 A (1×40 µs) 100 times<br>Applicable Standards: IEC 61000-4-4, IEC 61000-4-5 | | A |
| Status output*2 | | Transistor output (sink type)<br>Contact rating: 30 V DC, 120 mA DC(max ) Low level: 0 to 2 V DC | | AL |
| Oil-prohibited use | | Degrease cleansing treatment | | K1 |
| | | Degrease cleansing treatment and fluorinated oilfilled capsule.<br>Operating temperature −20 to 80°C (−4 to 176°F) | | K2 |
| | | Degrease cleansing treatment | With certificates | K41 |
| | | Degrease cleansing treatment and fluorinated oilfilled capsule.<br>Operating temperature −20 to 80°C (−4 to 176°F) | With certificates | K42 |
| Oil-prohibited use with dehydrating treatment | | Degrease cleansing and dehydrating treatment | | K5 |
| | | Degrease cleansing and dehydrating treatment with fluorinated oilfilled capsule.<br>Operating temperature −20 to 80°C (−4 to 176°F) | | K6 |
| | | Degrease cleansing and dehydrating treatment | With certificates | K45 |
| | | Degrease cleansing and dehydrating treatment with fluorinated oilfilled capsule.<br>Operating temperature −20 to 80°C (−4 to 176°F) | With certificates | K46 |
| Capsule fill fluid | | Fluorinated oil filled in capsule<br>Operating temperature –20 to 80°C( –4 to 176°F) | | K3 |
| Calibration units*3 | | P calibration (psi unit) | (See Table for Span and Range Limits.) | D1 |
| | | bar calibration (bar unit) | (See Table for Span and Range Limits.) | D3 |
| | | M calibration (kgf/cm$^2$ unit) | (See Table for Span and Range Limits.) | D4 |
| Gold-plated diaphragm | | Surface of isolating diaphragms are gold plated, effective for hydrogen permeation.<br>Overpressure effects for M and H capsules: ±0.06% of URL | | A1 |
| Plug option | | Long vent*4: Total length: 119 mm (standard: 34 mm); Total length when combining with optional code K1, K2, K5, and K6: 130 mm. Material: 316 SST U1. | | U1 |
| | | Without vent and drain plugs | | UN |
| Output limits and failure operation*5 | | Failure alarm down-scale: Output status at CPU failure and hardware error is −5%, 3.2mA DC or less. | | C1 |
| | | NAMUR NE43 Compliant Output signal limits: 3.8 mA to 20.5 mA | Failure alarm down-scale: Output status at CPU failure and hardware error is −5%, 3.2 mA DC or less. | C2 |
| | | NAMUR NE43 Compliant Output signal limits: 3.8 mA to 20.5 mA | Failure alarm up-scale: Output status at CPU failure and hardware error is 110%, 21.6 mA or more. | C3 |
| Wired tag plate | | 316 SST tag plate wired onto transmitter (Tag No.: Maximum. 16 characters.) | | N4 |
| Data configuration at factory*6 | | Data configuration for HART communication type | Software damping, Descriptor, Message | CA |
| | | Data configuration for BRAIN communication type | Software damping | CB |
| | | Data configuration for HART communication type | Software damping, Descriptor, Message, External zero adjustment prohibition setting | CJ |
| | | Data configuration for BRAIN communication type | Software damping, External zero adjustment prohibition setting | CK |
| Advanced diagnostics*12 | | Multi-sensing process monitoring<br>• Impulse line blockage detection *13<br>• Heat trace monitoring | | DG6 |
| Material certificate*11 | | Cover flange, Process connector, Manifold, Orifice, and Spacer | | M12 |
| | | Cover flange, Process connector, Manifold, Orifice, Spacer, Bolt and nut for cover flange, bolt for process connector, Bolt for manifold, Diaphragm, Capsule body, Vent and Drain plug, Vent screw, Capsule gasket*15 | | MJ2 |

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| | | | |
|---|---|---|---|
| Calibration certificate | Text, Traceability | | **L4** |
| | Text, Traceability, Primary standards list | | **L5** |
| | Text, Traceability, Primary standards list, Calibration equipment list | | **L6** |
| | Text, Traceability, Primary standards list, Calibration equipment list, Calibration equipment certificate | | **L9** |
| Pressure test/ Leak test certificate*10 | Test Pressure: 16 MPa (2300 psi) | Nitrogen Gas*9 Retention time: one minute | **T12** |
| Parameter list*16 | List of setting and adjustment parameters | | **YP** |
| Additional blind plug*17*18 | Additional blind plug is attached to the conduit connection on both sides for storing transmitter | | **PP** |

*1: Not applicable with color change option.
*2: Check terminals cannot be used when this option code is specified. Not applicable for output signal code F and G.
*3: The unit of MWP (Max. working pressure) on the name plate of a housing is the same unit as specified by option codes D1, D3, and D4.
*4: Applicable for vertical impulse piping type (Installation code 2, 3, 6, or 7) .
*5: Applicable for output signal codes D, E and J. The hardware error indicates faulty amplifier or capsule.
*6: Also see 'Ordering Information'.
*7: Not applicable for amplifier housing code 2 and 3.
*8: 316 or 316L SST. The specification is included in amplifier code 2.
*9: Dry nitrogen gas is used for oil-prohibited use (option codes K1, K2, K5, K6, K41, K42, K45, and K46).
*10: The unit on the certificate is always Pa unit regardless of selection of option code D1, D3 or D4.
*11: Material traceability certification, per EN 10204 3.1B.
*12: Applicable only for output signal code E and J.
*13: The change of pressure fluctuation is monitored and then detects the impulse line blockage. See TI 01C25A31-01E for detailed technical information required for using this function.
*14: (Not used)
*15: Not applicable with option code UN.
*16: Applicable only for output signal code D, E and J.
*17: Not applicable for electrical connection codes 0, 2, and 4.
*18: When combined with electrical connection code 7 or C and explosion protection options (FF1, FU1, FU14, KF22, KU22, KU24, CF1, CU1, SF22, SU22, SU34, V1U1, NF21, PF23, UF1, GF12, GU12, GU14, BF21, BU21), the blind plug is shipped as an accessory.

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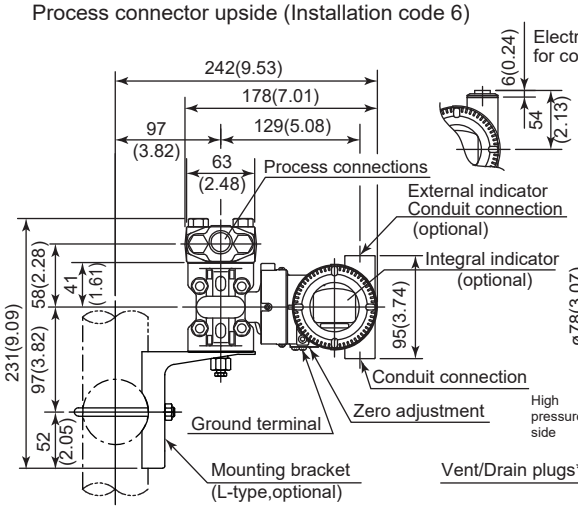
## ■ DIMENSIONS

Unit: mm (approx.inch)

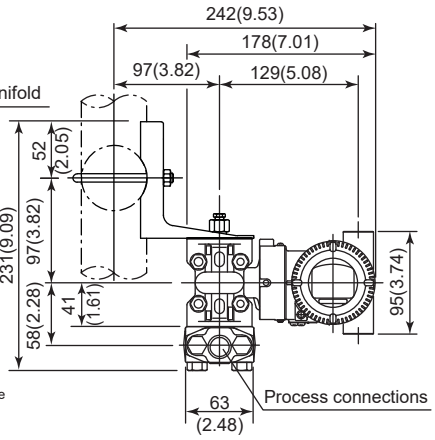
### Measurement Span Code: M, H

- Vertical Impulse Piping Type

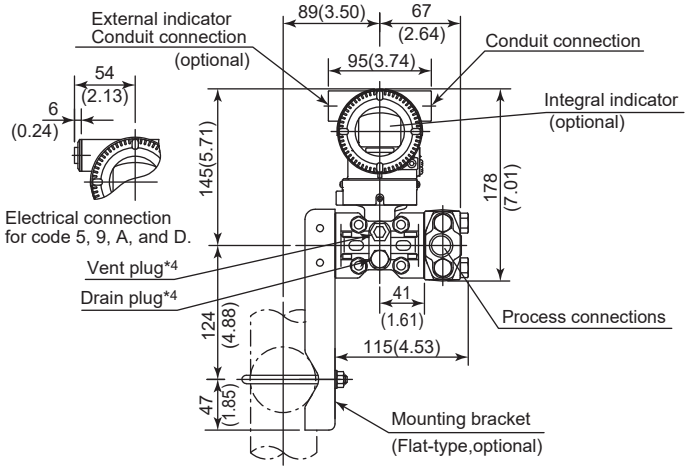
Process connector upside (Installation code 6)

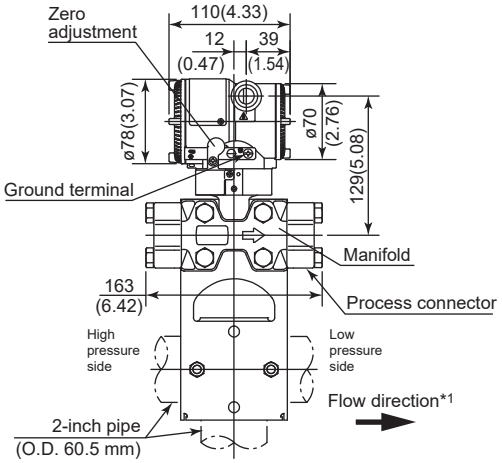



Process connector downside (Installation code 7)




- Horizontal Impulse Piping Type (Installation code 9)




*1: When Installation code 2, 3, or 8 is selected, the flow direction on above figure is reversed.
*2: When Option code K1, K2, K5, K6, K41, K42, K45, or K46 is selected, add 15 mm (0.59 inch) to the value in the figure.
*3: When electrical connection code 7 or C is selected, a blind plug is protruded up to 8 mm (0.31 inch) from the conduit connection.
*4: When option code UN is specified, Vent/Drain holes and plugs are not applicable.

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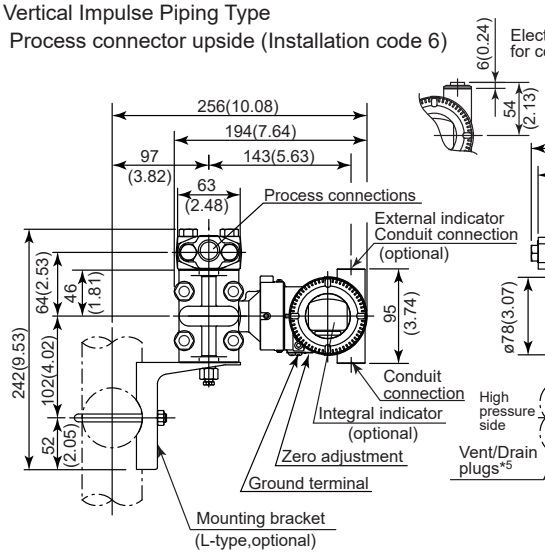
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Unit: mm (approx.inch)

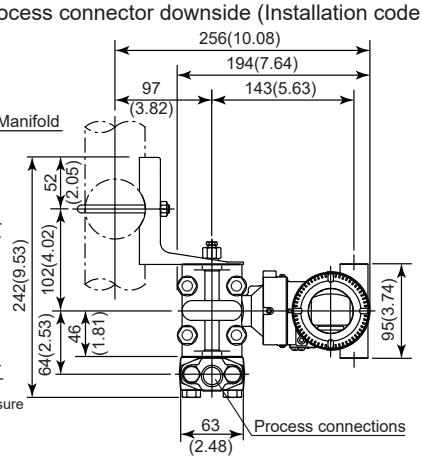
## Measurement Span Code F

- Vertical Impulse Piping Type

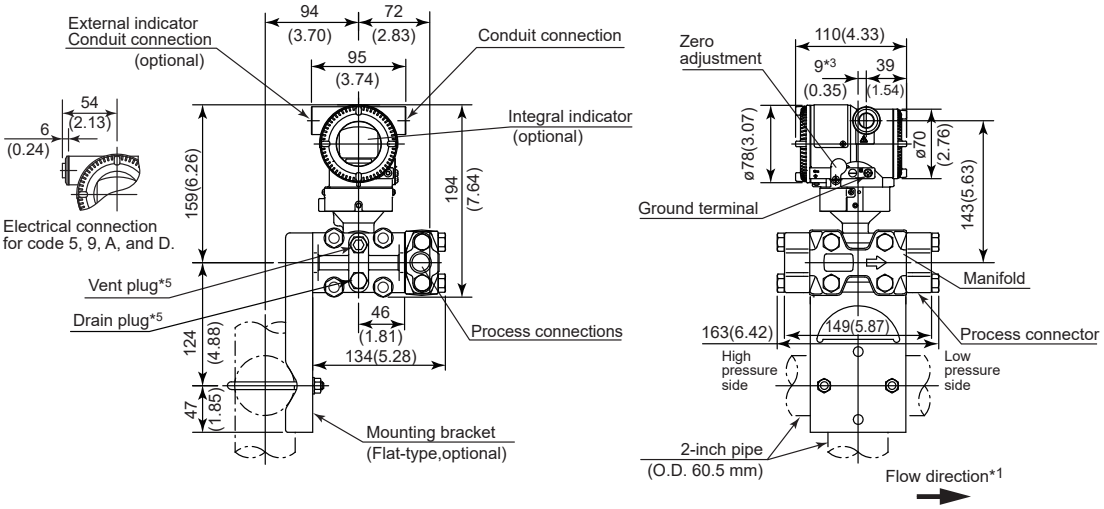
Process connector upside (Installation code 6)




Process connector downside (Installation code 7)




- Horizontal Impulse Piping Type (Installation code 9)

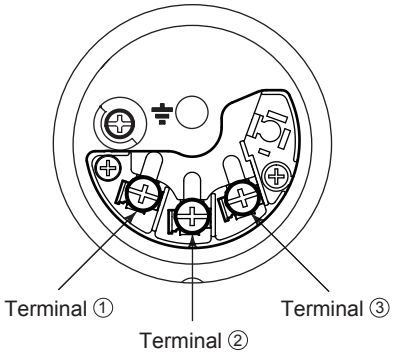



*1: When Installation code 2, 3, or 8 is selected, the flow direction on above figure is reversed.
(i.e. the arrow faces to the left [ ◀ ])
*2: When Option code K1, K2, K5, K6, K41, K42, K45, or K46 is selected, add 15 mm (0.59 inch) to the value in the figure.
*3: 15 mm (0.59 inch) when Installation code 2, 3 or 8 is selected.
*4: When electrical connection code 7 or C is selected, a blind plug is protruded up to 8 mm (0.31 inch) from the conduit connection.
*5: When option code UN is specified, Vent/Drain holes and plugs are not applicable.

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## ● Terminal Configuration



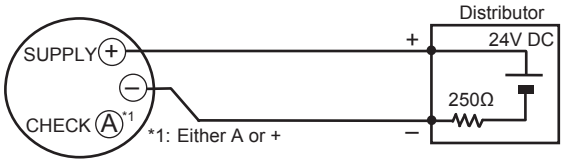
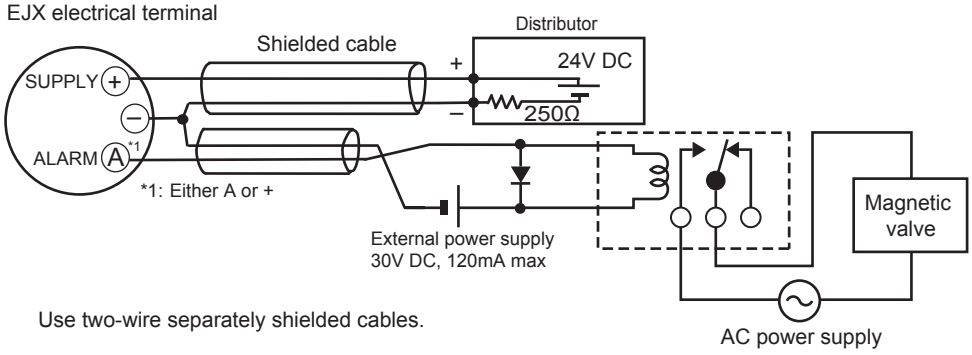

## ● Terminal Wiring

| | |
|---|---|
| SUPPLY + – | ① ② Power supply and output terminals |
| CHECK + – or ALARM + – | ③ ② External indicator (ammeter) terminals*1*2 or ③ ② Status contact output terminals*2 (when /AL is specified) |
| ⏚ | Ground terminal |

*1: When using an external indicator or check meter, the internal resistance must be 10 Ω or less. A check meter or indicator cannot be connected when /AL option is specified.
*2: Not available for FOUNDATION Fieldbus and PROFIBUS PA communication types.

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## ● Wiring Example for Analog Output and Status Output

| Connection | Description |
|---|---|
| Analog output | EJX electrical terminal<br> |
| Analog and status output (when /AL is specified)<br><br>If shield cable is not used, communication is not possible. | EJX electrical terminal<br><br>Use two-wire separately shielded cables. |

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**Table 1. Calibration Units**

| Measurement Span and Range | | Optional Code | | |
|---|---|---|---|---|
| | | D1 ( psi Unit ) | D3 ( bar Unit ) | D4 ( kgf/cm² Unit ) |
| F | Span | 4 to 20 inH₂O | 10 to 50 mbar | 100 to 500 mmH₂O |
| | Range | 0 to 40 inH₂O | 0 to 100 mbar | 0 to 1000 mmH₂O |
| M | Span | 8 to 400 inH₂O | 20 to 1000 mbar | 200 to 10000 mmH₂O |
| | Range | 0 to 400 inH₂O | 0 to 1000 mbar | 0 to 10000 mmH₂O |
| H | Span | 80 to 830 inH₂O | 200 to 2100 mbar | 2000 to 21000 mmH₂O |
| | Range | 0 to 830 inH₂O | 0 to 2100 mbar | 0 to 21000 mmH₂O |

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**< Ordering Information > "◊"**

Specify the following when ordering

For output signal code **–J**, refer to GS 01C25T01-01EN.

1. Model, suffix codes, and option codes
2. Calibration range and units
   1) Calibration range can be specified with range value specifications up to 5 digits (excluding any decimal point) for low or high range limits within the range of -32000 to 32000. When reverse range is designated, specify Lower Range Value(LRV) as greater than Upper Range Value(URV). When square root output mode is specified, LRV must be "0 (zero) ".
   2) Specify only one unit from the table, 'Factory setting.'
3. Select linear or square root for output mode.
   Note: If not specified, the instrument is shipped set for linear mode.
4. Display scale and units (for transmitters equipped with the integral indicator only)
   Specify either 0 to 100 % or 'Range and Unit' for engineering units scale:
   Scale range can be specified with range limit specifications up to 5 digits (excluding any decimal point) for low or high range limits within the range of -32000 to 32000. Unit display consists of 6-digit, therefore, if the specified scaling unit excluding '/' is longer than 6-characters , the first 6 characters will be displayed on the unit display.
5. Tag Number (if required)
   Specified characters (up to 16 characters for BRAIN, 22 characters for HART, or 16 characters for /N4 tag) are engraved on the stainless steel tag plate fixed on the housing.
6. SOFTWARE TAG (for HART only. If required)
   Specified characters (up to 32 characters) are set as "Tag" (the first 8 characters) and "Long tag"*1 (32 characters) in the amplifier memory. Use alphanumeric capital letters.
   When the "SOFTWARE TAG" is not specified, specified "TAG NO" is set as "Tag" (the first 8 characters) and "Long tag"*1 (22 characters) in the amplifier memory.
   *1: applicable only when HART 7 is selected.
7. Other factory configurations (if required) Specifying option code **/CA**, **/CB**, **/CJ** or **/CK** will allow further configuration at factory. Following are configurable items and setting range.
   [/CA, /CJ : For HART communication type]
   1) Descriptor (up to 16 characters)
   2) Message (up to 30 characters)
   3) Software damping in second (0.00 to 100.00)
   [/CB, /CK : For BRAIN communication type]
   1) Software damping in second (0.00 to 100.00)
8. Necessary data for orifice calculations (integral orifice flow specifications), or required values for orifice bore and differential pressure range. Refer to TI 01C20K00-01E for details.

**< Factory Setting > "◊"**

| | |
|---|---|
| Tag number | As specified in order |
| Software damping *1 | '2.00 s' or as specified in order |
| Output mode | 'Linear' unless otherwise specified in order |
| Display mode | 'Square root' |
| Calibration range lower range value | As specified in order |
| Calibration range upper range value | As specified in order |
| Calibration range unit | Selected from $mmH_2O$, $mmH_2O$(68°F), mmAq*2, mmWG*2, mmHg, Pa, hPa*2, kPa, MPa, mbar, bar, $gf/cm^2$, $kgf/cm^2$, $inH_2O$, $inH_2O$(68°F), inHg, $ftH_2O$, $ftH_2O$(68°F) or psi. (Only one unit can be specified.) |
| Display setting | Designated differential pressure value specified in order. (% or user scaled value.) |
| Static pressure display range | 0 to 16 MPa, absolute value. Measuring high pressure side. |

*1: To specify these items at factory, option code **/CA**, **/CB**, **/CJ** or **/CK** is required.
*2: Not available for HART protocol type.

**< Material Cross Reference >**

| ASTM | JIS |
|---|---|
| 316 | SUS316 |
| F316 | SUSF316 |
| 316L | SUS316L |
| F316L | SUSF316L |
| 304 | SUS304 |
| F304 | SUSF304 |
| 660 | SUH660 |
| B7 | SNB7 |
| CF-8M | SCS14A |

**< Information on EU WEEE Directive >**

EU WEEE (Waste Electrical and Electronic Equipment) Directive is only valid in the EU.

This instrument is intended to be sold and used only as a part of equipment which is excluded from WEEE Directive, such as large-scale stationary industrial tools, a large-scale fixed installation and so on, and, therefore, subjected to the exclusion from the scope of the WEEE Directive. The instrument should be disposed of in accordance with local and national legislation/regulations.

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