# General Specifications

# EJX115A Low Flow Transmitter



**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 protocol type is also available. All EJX series models in their standard configuration, with the exception of the Fieldbus type, are certified by TÜV as complying with SIL 2 for safety requirement.



Refer to GS 01C25T02-01EN for Fieldbus communication type marked with "\."

#### SPAN AND RANGE LIMITS

| Capsule | Differential Pressure<br>Span                       | Water<br>Equivalent<br>Flow I/min | Air<br>Equivalent<br>Flow NI/min |
|---------|-----------------------------------------------------|-----------------------------------|----------------------------------|
| F       | 1 to 5 kPa<br>{100 to 500 mmH <sub>2</sub> O}       | 0.016 to 5.0                      | 0.44 to 140                      |
| М       | 2 to 100 kPa<br>{200 to 10000 mmH <sub>2</sub> O}   | 0.022 to 23.0                     | 0.63 to 635                      |
| н       | 20 to 210 kPa<br>{2000 to 21000 mmH <sub>2</sub> O} | 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 communication type, use calibrated range instead of span in the following specifications.

# **Specification Conformance**

EJX series ensures specification conformance to at least +3 $\sigma$ .



## Reference Accuracy of Calibrated Span

(includes terminal-based linearity, hysteresis, and repeatability)

| Measurement span        |          | F                               |
|-------------------------|----------|---------------------------------|
| Reference               | X≤span   | ±0.04% of Span                  |
| accuracy                | 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               | X≤span   | ±0.04% of Span                    |
| accuracy                | X > span | ±(0.002+0.0019 URL/span)% of Span |
| X                       |          | 5 kPa (20 inH <sub>2</sub> O)     |
| URL (upper range limit) |          | 100 kPa (400 inH2O)               |

| Measurem                | ent span | Н                                 |
|-------------------------|----------|-----------------------------------|
| Reference               | X≤span   | ±0.04% of Span                    |
| accuracy                | X > span | ±(0.005+0.0049 URL/span)% of Span |
| Х                       |          | 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 | Reference accuracy × 50 Square root output (%) |

#### 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)  |
| Н       | ±(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  |
| н       | ±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 10 years

# Power Supply Effects(Output signal code D and E) ±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 peak to peak 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 peak to peak 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 inH<sub>2</sub>O) 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 and E)

Analog output status at ČPU 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%,<br>21.6mA or more   | Holds to a                    |               |  |
|                | /C1 | -2.5%,<br>3.6mA or less   | specified value<br>within the | Normal autout |  |
| Option<br>Code | /C2 | -1.25%,<br>3.8mA or less  | output range from 3.6mA to    | Normal output |  |
|                | /C3 | 103.1%,<br>20.5mA or more | 21.6mA                        |               |  |

#### **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 unavailable 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.

## 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."

#### **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) "\0"

Applicable for Output signal code E 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 and E) User-configurable 10-segment signal characterizer for 4 to 20 mA output.

# Status Output (optional, output signal code D and E)

One transistor contact output (sink type) to output the status of user configurable high/low alarm for differential pressure/static pressure.

Contact rating: 10.5 to 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 communication type are certified by TÜV in compliance with the following standards; IEC 61508: 2000; Part1 to Part 7 Functional Safety of Electrical/electronic/programmable electronic related systems; SIL 2 capability for single transmitter use, SIL 3 capability for dual transmitter use.

## 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

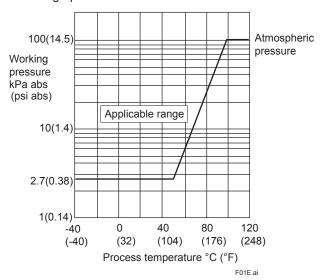


Figure 1. Working Pressure and Process Temperature

# Supply & Load Requirements

(Output signal code D and E. Optional features or approval codes may affect electrical requirements.)

With 24 V DC supply, up to a  $550\Omega$  load can be used. See graph below.

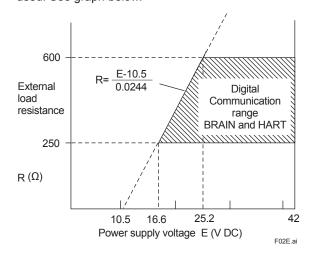


Figure 2. Relationship Between Power Supply Voltage and External Load Resistance

## 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 and E)

0 to  $1290\Omega$  for operation

250 to  $600\Omega$  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 k $\Omega$ or more at 2.4 kHz.

# EMC Conformity Standards C€ . ♥ N200

EN61326-1 Class A, Table2 (For use in industrial locations) EN61326-2-3

#### European Pressure Equipment Directive 97/23/EC Sound Engineering Practice (for all capsules)

## 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 with polyurethane, mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent), or ASTM CF-8M Stainless Steel

#### **Degrees of Protection**

IP66/IP67, NEMA4X

#### **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>

Power Distributor: Refer to GS 01B04T01-02E or GS 01B04T02-02E

BRAIN TERMINAL: Refer to GS 01C00A11-00E

#### < Reference >

- Teflon; Trademark of E.I. DuPont de Nemours & Co.
- 2. Hastelloy; Trademark of Haynes International Inc.
- 3. HART; Trademark of the HART Communication Foundation.
- 4. FOUNDATION Fieldbus; Tradmark of Fieldbus Foundation.

Other company names and product names used in this material are registered trademarks or trademarks of their respective owners.

# < Measurement Range (Approximate Value) >

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

# ■ MODEL AND SUFFIX CODES

| Model                       | Suffix C                          | odes | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
|-----------------------------|-----------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--|
| EJX115A                     | Low flow transmitter              |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| Output<br>signal            | -D                                |      | 4 to 20 mA DC with digita                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | al communication (BRAIN pro<br>al communication (HART pro<br>OUNDATION Fieldbus protocc<br>I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tocol)                                                                                                                  |  |
| Measurement span (capsule   |                                   |      | 1 to 5 kPa (4 to 20 inH <sub>2</sub> O<br>2 to 100 kPa (8 to 400 inH <sub>2</sub> O<br>20 to 210 kPa (80 to 840                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | H <sub>2</sub> O)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                         |  |
| Wetted parts<br>material *2 | S                                 |      | Capsule: Hastelloy C-276<br>Capsule gasket: Teflon-c<br>Drain/Vent plug: 316 SST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Cover flange and process connector: ASTM CF-8M# Capsule: Hastelloy C-276 (Diaphragm)# F316L SST or 316L SST (Others)# Capsule gasket: Teflon-coated 316L SST Drain/Vent plug: 316 SST# Orifice: 316 SST# Manifold: F316 SST# Spacer: 316 SST# Orifice gasket: PTFE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                         |  |
| Process connections         |                                   |      | Rc1/2 female<br>1/2 NPT female                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| Bolts and nuts              | J                                 |      | B7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | [For Process connector]<br>B7<br>316L SST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | [For Manifold]<br>316L SST<br>316L SST                                                                                  |  |
| Installation                | -3<br>-6<br>-7<br>-8              |      | Vertical piping, right side<br>Vertical piping, left side h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | rnside<br>e                                                                                                             |  |
| Amplifier hous              | 3                                 |      | Cast aluminum alloy<br>Cast aluminum alloy with<br>ASTM CF-8M stainless s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | n corrosion resistance proper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ties*7                                                                                                                  |  |
| Electrical conr             | > 2<br>4<br>5<br>7<br>9<br>A<br>C |      | 1/2 NPT female, two electrica M20 female, two electrica G1/2 female, two electrica 1/2 NPT female, two electrica M20 female, two electrica G1/2 female, two electrica 1/2 NPT female, two | cal connection without blind partical connections without blad connections without blind partical connections and a blind partical connections and a blind plad connections and a BUS all connections and a SUS at connections and a SUS at connections and a SUS all connections are all connections and a SUS all connections and a SUS all connections are | ind plugs<br>plugs<br>lug* <sup>4</sup><br>d plug* <sup>4</sup><br>ug* <sup>4</sup><br>16 blind plug<br>S316 blind plug |  |
| Integral indica             | E                                 |      | Digital indicator<br>Digital indicator with the r<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | range setting switch*1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                         |  |
| Mounting brace              | ket                               | B    | 304 SST 2-inch pipe mou<br>316 SST 2-inch pipe mou                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | unting, flat type (for horizonta<br>unting, L type (for vertical pip<br>unting, flat type (for horizonta<br>unting, L type (for vertical pip                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ing)<br>al piping)                                                                                                      |  |
| _                           |                                   | -N   | Always -N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| _                           |                                   | 00   | Always 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| _                           |                                   | N    | Always N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
|                             |                                   | N    | Always N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| <u> </u>                    |                                   |      | Always 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |  |
| Optional Code               | es                                |      | /□ Optional specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                         |  |

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

- Not applicable for output signal code F.
- \*2: \( \Delta \) 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.

- Not applicable for electrical connection code 0, 5, 7 and 9.
- Material of a blind plug is aluminum alloy or 304 SST. Cast version of 316 SST. Equivalent to SCS14A. \*4:
- \*5:
- \*6: Hastelloy C-276 or ASTM N10276.
- Not applicable for electrical connection code 0, 5, 7, 9 and A. Content rate of copper in the material is 0.03% or less and content rate of iron is 0.15% or less.

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.

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

| Item                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Code |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Factory Mutual<br>(FM) | FM Explosionproof Approval *1 Applicable Standard: FM3600, FM3615, FM3810, ANSI/NEMA 250 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 (NEMA 4X) "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED." Temperature class: T6, Amb. Temp.: –40 to 60°C (–40 to 140°F) *3                                                                                                                                                                                                                                                                                                                            | FF1  |
|                        | FM Intrinsically safe Approval *1*2 Applicable Standard: FM3600, FM3610, FM3611, FM3810 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 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 Enclosure: "NEMA 4X", Temp. Class: T4, Amb. Temp.: –60 to 60°C (–75 to 140°F) *3 Intrinsically Safe Apparatus Parameters [Groups A, B, C, D, E, F and G] Vmax=30 V, Imax=200 mA, Pmax=1 W, Ci=6 nF, Li=0 μH [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 Applicable Standard: EN 60079-0, EN 60079-1, EN 60079-31 Certificate: KEMA 07ATEX0109 X II 2G, 2D Ex d IIC T6T4 Gb, Ex tb IIIC T85°C Db IP6X Degree of protection: IP66/IP67 Amb. Temp. (Tamb) for gas-proof: 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) Max. process Temp. for gas-proof (Tp): T4; 120°C (248°F), T5; 100°C (212°F), T6; 85°C (185°F) Max. surface Temp. for dust-proof: T85°C (Tamb: -30 to 75°C, Tp: 85°C) *3                                                                                                                                                                                                        | KF22 |
|                        | ATEX Intrinsically safe Approval *1*2 Applicable Standard: EN 60079-0, EN 60079-11, EN 60079-26, EN 61241-11 Certificate: DEKRA 11ATEX0228 X II 1G, 2D Ex ia IIC T4 Ga, Ex ia IIIC T85°C T100°C T120°C Db Degree of protection: IP66/IP67 Amb. Temp. (Tamb) for EPL Ga: –50 to 60°C (–58 to 140°F) Maximum Process Temp. (Tp) for EPL Ga:120°C Electrical data: Ui=30 V, Ii=200 mA, Pi=0.9 W, Ci=27.6 nF, Li=0 μH Amb. Temp. for EPL Db: –30 to 60°C *3 Max. surface Temp. for EPL Db: T85°C (Tp: 80°C), T100°C (Tp: 100°C), T120°C (Tp: 120°C)                                                                                                                                                                         | KS21 |
|                        | Combined KF22, KS21 and Type n *1*2 Type n Applicable Standard: EN 60079-0, EN 60079-15 II 3G Ex nL IIC T4 Gc, Amb. Temp.: –30 to 60°C (–22 to 140°F) *3 Ui=30 V DC, Ci=10 nF, Li=0 µH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | KU22 |

| Item                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Code |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Canadian<br>Standards<br>Association<br>(CSA) | CSA Explosionproof Approval *1 Certificate: 2014354 Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.0.5, C22.2 No.25, C22.2 No.30, C22.2 No.94, C22.2 No.60079-0, C22.2 No.60079-1, C22.2 No.61010-1-04 Explosion-proof for Class I, Groups B, C and D. Dustignition-proof for Class II/III, Groups E, F and G. When installed in Division 2, "SEAL NOT REQUIRED" Enclosure: NEMA 4X, Temp. Code: T6T4 Ex d IIC T6T4 Enclosure: IP66/IP67 Max.Process Temp.: T4;120°C(248°F), T5;100°C(212°F), T6; 85°C(185°F) Amb.Temp.: -50 to 75°C(-58 to 167°F) for T4, -50 to 80°C(-58 to 176°F) for T5, -50 to 75°C(-58 to 167°F) for T6 *3 Process Sealing Certification Dual Seal Certified by CSA to the requirement of ANSI/ISA 12.27.01 No additional sealing required Primary seal failure annunciation: at the zero adjustment screw                                                                                                                                                                                                                                                                                                                             | CF1  |
|                                               | CSA Intrinsically safe Approval *1*2 Certificate: 1606623 [For CSA C22.2] Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.61010-1 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 III, Division 2, Groups F & G, Class III, Division 1 Enclosure: NEMA 4X, Temp. Code: T4 Amb. Temp.: –50 to 60°C(–58 to 140°F) *3 Electrical Parameters: [Intrinsically Safe] Vmax=30V, Imax=200mA, Pmax=0.9W, Ci=10nF, Li=0 μH [Nonincendive] Vmax=30V, Ci=10nF, Li=0 μH [For CSA E60079] Applicable Standard: CAN/CSA E60079-0, CAN/CSA E60079-11, CAN/CSA E60079-15, IEC 60529:2001-02 Ex ia IIC T4, Ex nL IIC T4 Enclosure: IP66/IP67 Amb. Temp.: –50 to 60°C(–58 to 140°F) *3, Max. Process Temp.: 120°C(248°F) Electrical Parameters: [Ex ia] Ui=30V, Ii=200mA, Pi=0.9W, Ci=10nF, Li=0 μH [Ex nL] Ui=30V, Ci=10nF, Li=0 μH Process Sealing Certification Dual Seal Certification Dual Seal Certification Pulance Applicable Standard: at the zero adjustment screw | CS1  |
|                                               | Combined CF1 and CS1 *1*2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CU1  |
| IECEX<br>Scheme                               | IECEx Flameproof Approval *1 Applicable Standard: IEC 60079-0:2004, IEC60079-1:2003 Certificate: IECEx CSA 07.0008 Flameproof for Zone 1, Ex d IIC T6T4 Enclosure: IP66/IP67 Max.Process Temp.: T4;120°C(248°F), T5;100°C(212°F), T6; 85°C(185°F) Amb.Temp.: –50 to 75°C(–58 to 167°F) for T4, –50 to 80°C(–58 to 176°F) for T5, –50 to 75°C(–58 to 167°F) for T6 *3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SF2  |
|                                               | IECEx Intrinsically safe, type n and Flameproof Approval *1*2 Intrinsically safe and type n Applicable Standard: IEC 60079-0:2000, IEC 60079-11:1999, IEC 60079-15:2001 Certificate: IECEx CSA 05.0005 Ex ia IIC T4, Ex nL IIC T4 Enclosure: IP66/IP67 Amb. Temp.: –50 to 60°C(–58 to 140°F) *3, Max. Process Temp.: 120°C(248°F) Electrical Parameters: [Ex ia] Ui=30V, Ii=200mA, Pi=0.9W, Ci=10nF, Li=0 μH [Ex nL] Ui=30V, Ci=10nF, Li=0 μH Flameproof Applicable Standard: IEC 60079-0:2004, IEC60079-1:2003 Certificate: IECEx CSA 07.0008 Flameproof for Zone 1, Ex d IIC T6T4 Enclosure: IP66/IP67 Max.Process Temp.: T4;120°C(248°F), T5;100°C(212°F), T6; 85°C(185°F) Amb.Temp.: –50 to 75°C(–58 to 167°F) for T4, –50 to 80°C(–58 to 176°F) for T5, –50 to 75°C(–58 to 167°F) for T6°3                                                                                                                                                                                                                                                                                                                                                                       | SU2  |

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

# **■ OPTIONAL SPECIFICATIONS**

| Item                                       |                                                                                       | Description                                                                                                                                                                                                                        |                                                                                                      |     |     |    |
|--------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----|-----|----|
| 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*7                                                                                                                                                                                                        |                                                                                                      |     |     |    |
| 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)                                                                                                                                                  |                                                                                                      |     |     |    |
| Lightning protector                        |                                                                                       | Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.) Allowable current: Max. 6000 A (1×40 µs), Repeating 1000 A (1×40 µs) 100 times Applicable Standards: IEC 61000-4-4, IEC 61000-4-5 |                                                                                                      |     |     |    |
| Status output*2                            |                                                                                       | Transistor output (sink type) Contact rating: 10.5 to 30 V DC, 120 mA DC(max ) Low level: 0 to 2 V DC                                                                                                                              |                                                                                                      |     |     |    |
| Oil-prohibited                             | duse                                                                                  | Degrease cleansing treatment                                                                                                                                                                                                       |                                                                                                      |     |     |    |
|                                            |                                                                                       | Degrease cleansing treatment and fluorinated oilfilled capsule.  Operating temperature –20 to 80°C( –4 to 176°F)                                                                                                                   |                                                                                                      |     |     |    |
| Oil-prohibited                             |                                                                                       | Degrease cleansing and dehydrating treatment                                                                                                                                                                                       |                                                                                                      |     |     |    |
| dehydrating treatment                      |                                                                                       | Degrease cleansing and dehydrating treatment with fluorinated oilfilled capsule.  Operating temperature –20 to 80°C( –4 to 176°F)                                                                                                  |                                                                                                      |     |     |    |
| Capsule fill fl                            | uid Fluorinated oil filled in capsule Operating temperature –20 to 80°C( –4 to 176°F) |                                                                                                                                                                                                                                    |                                                                                                      | K3  |     |    |
| Calibration units*3                        |                                                                                       | P calibration (psi unit)                                                                                                                                                                                                           |                                                                                                      |     |     | D1 |
|                                            |                                                                                       | bar calibration (bar unit) (See Table for Span and Range Limits.)                                                                                                                                                                  |                                                                                                      |     | D3  |    |
|                                            |                                                                                       | M calibration (kgf/cm² unit)                                                                                                                                                                                                       |                                                                                                      |     |     | D4 |
| Gold-plated                                | diaphragm*14                                                                          | Surface of isolating diaphragms are gold plated, effective for hydrogen permeation.  Overpressure effects for M and H capsules: ±0.06% of URL                                                                                      |                                                                                                      | A1  |     |    |
| Long vent*4                                |                                                                                       | Total length: 119 mm (standard: 34 mm); Total length when combining with option code K1, K2, K5, and K6: 130 mm. Material: 316 SST                                                                                                 |                                                                                                      | U1  |     |    |
| 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                                                                                                                                                                                                               | Failure alarm down-scale: Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less. |     | C2  |    |
|                                            |                                                                                       | Output signal limits:<br>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.    |     | С3  |    |
| Wired tag pla                              | ate                                                                                   | 316 SST tag plate wired onto transmitter                                                                                                                                                                                           |                                                                                                      | 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                                                                                                                                                                   |                                                                                                      |     |     |    |
| Advanced dia                               | agnostics*12                                                                          | Multi-sensing process monitoring • Impulse line blockage detection *13 • Heat trace monitoring                                                                                                                                     |                                                                                                      |     | DG6 |    |
| Material certi                             | ificate*11                                                                            | Cover flange, Process connector, Manifold, Orifice, and Spacer                                                                                                                                                                     |                                                                                                      | M12 |     |    |
| Pressure test/<br>Leak test certificate*10 |                                                                                       | Test Pressure: 16 MPa (2300 psi)  Nitrogen(N2) Gas <sup>+9</sup> Retention time: one minute                                                                                                                                        |                                                                                                      |     | T12 |    |

- Not applicable with color change option.
- \*1: \*2: \*3: Check terminals cannot be used when this option code is specified. Not applicable for output signal code F.
- 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.
- Applicable for vertical impulse piping type (Installation code 2, 3, 6, or 7).

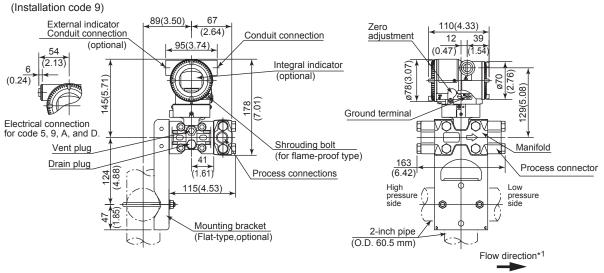
  Applicable for output signal codes D and E. The hardware error indicates faulty amplifier or capsule. Also see 'Ordering Information'.
- \*5: \*6: \*7:
- Not applicable for amplifier housing code 2 and 3.
- 316 or 316L SST. The specification is included in amplifier code 2.
- \*9: Pure nitrogen gas is used for oil-prohibited use (option codes K1, K2, K5, and K6).
- \*10: \*11: The unit on the certificate is always Pa unit regardless of selection of option code D1, D3 or D4. Material traceability certification, per EN 10204 3.1B.
- \*12: Applicable only for output signal code -E.
- \*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 applicable for measurement span code F.

# ■ DIMENSIONS (Measurement span code M and H)

Unit: mm (approx.inch)

#### • Vertical Impulse Piping Type Process connector downside (Installation code 7) Process connector upside (Installation code 6) Electrical connection for code 5, 9, A, and D. 242(9.53) 178(7.01) 242(9.53) 97(3.82) Flow direction\*1 129(5.08) 178(7.01) Manifold [2 97 129(5.08) 163(6.42) (3.82)12 52 2.05 63 (1.54)External indicator Conduit connection (0.47)(2.48)97(3.82) (optional) 231(9.09) 58(2.28) Integral indicator 4 1.6.1 46(5.75) (optional) 58(2.28) 231(9.09) 95(3.7 14 1.61 97(3.82) Conduit connection High pressure side Zero adjustment (O 0 Process connections Ground terminal Shrouding bolt 52 (2.48) (for flame-proof type) Vent/Drain plugs Mounting bracket 2-inch pipe (O.D. 60.5 mm) (L-type,optional)

# • Horizontal Impulse Piping Type



- \*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, or K6 is selected, add 15 mm (0.59 inch) to the value in the figure.

F03E.ai

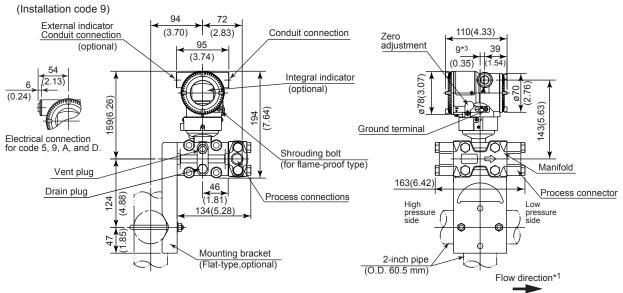
# ■ DIMENSIONS (Measurement span code F)

Unit: mm (approx.inch)

# • Vertical Impulse Piping Type

Process connector upside (Installation code 6) Process connector downside (Installation code 7) Electrical connection for code 5, 9, A, and D. 256(10.08) 194(7.64) 97 143(5.63) 256(10.08) Flow direction\*1 (3.82) Manifold 194(7.64) 143(5.63) (3.82) 63 Process connections (2.48)(0.35)(1.54)External indicator Conduit connection 102(4.02) (optional) 242(9.53) 64(2.53 64 (18: 56(6.14) (3.74) 64(2.53) 242(9.53) 102(4.02) Conduit connection High pressure side Low Integral indicator pressure side (O) Process connections (optional) 52 Zero adjustment Vent/Drain plugs (2.48) Ground terminal Shrouding bolt 2-inch pipe (O.D. 60.5 mm) (for flame-proof type) Mounting bracket (L-type,optional)

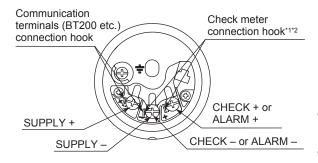
# • Horizontal Impulse Piping Type



- \*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, or K6 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.

F04E.ai

# • Terminal Configuration



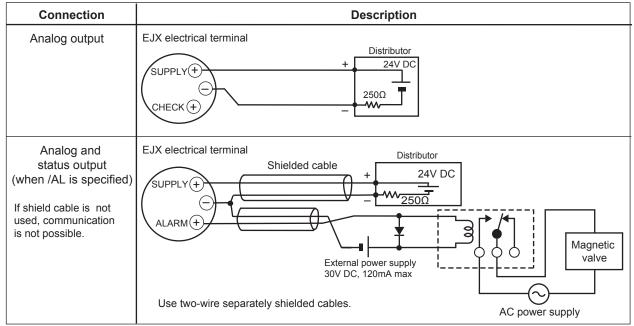
# • Terminal Wiring

| SUPPLY               | +       | Power supply and output terminal                                                                |
|----------------------|---------|-------------------------------------------------------------------------------------------------|
| CHECK<br>or<br>ALARM | + - + - | External indicator (ammeter) terminal or Status contact output terminal (when /AL is specified) |
| ÷                    |         | Ground terminal                                                                                 |

- \*1: When using an external indicator or check meter, the internal resistance must be 10Ω or less. A check meter or indicator cannot be connected when /AL option is specified.
- \*2: Not available for fieldbus communication type.

F05E.ai

# • Wiring Example for Analog Output and Status Output



F06E.ai

Table 1. Calibration Units

| Measurement Span and Range |       | Optional Code                   |                  |                                  |  |
|----------------------------|-------|---------------------------------|------------------|----------------------------------|--|
|                            |       | D1 ( psi Unit ) D3 ( bar Unit ) |                  | D4 ( kgf/cm <sup>2</sup> Unit )  |  |
| F                          | Span  | 4 to 20 inH2O                   | 10 to 50 mbar    | 100 to 500 mmH <sub>2</sub> O    |  |
| 「                          | Range | 0 to 40 inH2O                   | 0 to 100 mbar    | 0 to 1000 mmH <sub>2</sub> O     |  |
| М                          | Span  | 8 to 400 inH2O                  | 20 to 1000 mbar  | 200 to 10000 mmH <sub>2</sub> O  |  |
|                            | Range | 0 to 400 inH2O                  | 0 to 1000 mbar   | 0 to 10000 mmH <sub>2</sub> O    |  |
| Н                          | Span  | 80 to 830 inH2O                 | 200 to 2100 mbar | 2000 to 21000 mmH <sub>2</sub> O |  |
|                            | Range | 0 to 830 inH2O                  | 0 to 2100 mbar   | 0 to 21000 mmH <sub>2</sub> O    |  |

# < Ordering Information > "◊" Specify the following when ordering

- 1. Model, suffix codes, and option codes
- 2. Calibration range and units
  - 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.'
- 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)
  For BRAIN communication type, specify upto 16 letters. The specified letters will be written in the amplifier memory and engraved on the tag plate. For HART communication type, specify software tag (up to 8 letters) to be written on the amplifier memory and Tag number(up to 16 letters) to be engraved on the tag plate seperately.
- Other factory configurations (if required)
   Specifying option code CA or CB will allow further configuration at factory. Following are configurable items and setting range.

[/CA : 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 : For BRAIN communication type]

- 1) Software damping in second (0.00 to 100.00)
- 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 <sub>2</sub> O, mmH <sub>2</sub> O(68°F), mmAq*2, mmWG*2, mmHg, Pa, hPa*2, kPa, MPa, mbar, bar, gf/cm <sup>2</sup> , kgf/cm <sup>2</sup> , inH <sub>2</sub> O, inH <sub>2</sub> O(68°F), inHg, ftH <sub>2</sub> O, ftH <sub>2</sub> O(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.<br>Measuring high pressure side.                                                                                                                                                                                                                                           |

- \*1: To specify these items at factory, option code CA or CB 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   |