

General Specifications

GS 01C31J03-11EN

EJA438E/Z
Diaphragm Sealed
Gauge Pressure Transmitter
(Inner Diaphragm type)

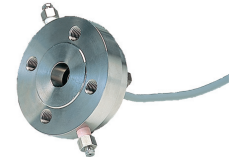


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Diaphragm seal is used to prevent process medium from entering directly into the pressure-sensing assembly of the pressure transmitter, it is connected to the transmitter using capillary filled with fill fluid. Inner diaphragm type can be installed to small size frange which is 1 inch, 3/4 inch or 1/2 inch. And the performance is the same as 2 inch, because it is used the daiaphragm size same as 2 inch. EJA438E Diaphragm Sealed Gauge Pressure Transmitters can be used to measure liquid, gas, or steam pressure. EJA438E outputs a 4 to 20 mA DC signal corresponding to the measured pressure. It also features quick response, remote setup and monitoring via BRAIN or HART communications, and diagnostics and optional status output for pressure high/low alarm. The multi-sensing technology provides the advanced diagnostic function to detect such abnormality as an impulse line blockage. Foundation Fieldbus, PROFIBUS PA and 1 to 5 V DC with HART (Low Power) protocol types are also available.



Flange connection type



Adapter connection type

STANDARD SPECIFICATIONS

Refer to GS 01C31T02-01EN for Fieldbus communication type and GS 01C31T04-01EN for PROFIBUS PA communication type for the items marked with “◇”.

SPAN AND RANGE LIMITS

Measurement Span and Range		MPa	psi (/D1)	bar (/D2)	kgf/cm ² (/D4)
A*1	Span	0.06 to 3.5	8.6 to 500	0.6 to 35	0.6 to 35
	Range	-0.1 to 3.5	-14.5 to 500	-1 to 35	-1 to 35
B*1	Span	0.46 to 16	67 to 2300	4.6 to 160	4.6 to 160
	Range	-0.1 to 16	-14.5 to 2300	-1 to 160	-1 to 160

*1: Measurement range is within the flange rating.

PERFORMANCE SPECIFICATIONS

Zero-based calibrated span, linear output, wetted parts material code S□, fill fluid code B, and capillary length of 5 m.

For Fieldbus communication and PROFIBUS PA types, use caribrated range instead of span in the following specifications.

Specification Conformance

EJA-E series ensures specification conformance to at least ±3σ.

Reference Accuracy of Calibrated Span

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

Measurement span		A	B
Reference accuracy	X ≤ span	±0.2% of Span	
	X > span	±(0.16+0.004 URL/Span)% of Span	
X		0.35 MPa (50 psi)	1.6 MPa (230 psi)
URL (upper range limit)		3.5 MPa (500 psi)	16 MPa (2300 psi)

Ambient Temperature Effects per 50°C (122°F) Change

Capsule	A and B	
Zero shift	±(0.2+0.42× $\frac{X}{A}$)%	
Total shift	±1.4%	A ≥ X
	±(0.85+0.55× $\frac{X}{A}$)%	A < X

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'A' is the highest value among the absolute values of lower range value (LRV) and upper range value (URV), and the span value in calibration range.

Power Supply Effects (Output signal code D and J)

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

Response Time (All capsules) “◇”

200 ms (approximate value at normal temperature)
When software damping is set to zero and including dead time of 45 ms (nominal)

FUNCTIONAL SPECIFICATIONS

Output “◇”

For 4 to 20 mA HART / BRAIN (Output signal code D and J)

Two wire 4 to 20 mA DC output with digital communications. 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 conform to NAMUR NE43 can be pre-set by option code C2 or C3.

For 1 to 5 V HART (Output signal code Q)

Three or four wire low power 1 to 5 V DC output with HART, linear or square root programmable. HART protocol are superimposed on the 1 to 5 V DC signal. Output range: 0.9 V to 5.4 V DC

Failure Alarm**For 4 to 20 mA HART / BRAIN (Output signal code D and J)**

Output status at CPU failure and hardware error;
Up-scale: 110%, 21.6 mA DC or more (standard)
Down-scale: -5%, 3.2 mA DC or less

For 1 to 5 V HART (Output signal code Q)

Analog output status at CPU failure and hardware error;

Up-scale: 110%, 5.4 V DC or more (standard)
Down-scale: -5%, 0.8 V DC or less

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 “◇”

Pressure: 45 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 range-setting 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 three of the following variables periodically;
Pressure in %, scaled pressure, measured pressure. See also “Factory Setting.”

Local Parameter Setting**(Output signal code D, J and Q)**

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

Self Diagnostics

CPU failure, hardware failure, configuration error, process alarm for pressure or capsule temperature. User-configurable process high/low alarm for pressure is also available.

Signal Characterizer**(Output signal code D, J and Q)**

User-configurable 10-segment signal characterizer for 4 to 20 mA output.

Capillary Fill Fluid Density Compensation**(Output signal code D, J and Q)**

Compensation of the zero shift by the ambient temperature effect on the capillary tube.

SIL Certification

EJA-E series transmitters except Fieldbus, PROFIBUS PA and 1-5V DC with HART (Low Power) communication types are certified in compliance with the following standards;
IEC 61508: 2010;
Functional Safety of Electrical/electronic/programmable electronic related systems; SIL 2 capability for single transmitter use, SIL 3 capability for dual transmitter use.
Reliability Data different depending on hardware and software revision.
For details, refer to Functional Safety Data Sheet. (Document number: TI 01C25A05-01EN or TI 01C25A05-21EN for option code SLT)
The document can be downloaded from the website of Yokogawa.
(Website address: <https://www.yokogawa.com/solutions/products-platforms/field-instruments/>)

□ NORMAL OPERATING CONDITION

(Optional features or approval codes may affect limits.)

Ambient Temperature Limits

-40 to 60°C (-40 to 140°F)
-30 to 60°C (-22 to 140°F) with LCD display
(Note : The ambient temperature limits must be within the fill fluid operating temperature range, see table 1.)

Process Temperature Limits

See table 1.

Ambient Humidity Limits

0 to 100% RH

Working Pressure Limits

See table 1.

For atmospheric pressure or below, see figure 1-1, 1-2, 1-3, and 1-4.

Table 1. Process temperature, Ambient temperature, and Working pressure

	Code	Process temperature* ¹	Ambient temperature* ²	Working pressure	Specific gravity* ³
Silicone oil (general use)	A	-10 to 250°C (14 to 482°F)	-10 to 60°C (14 to 140°F)	2.7 kPa abs (0.38 psi abs) to flange rating pressure	1.07
Silicone oil (general use)	B	-30 to 180°C (-22 to 356°F)	-15 to 60°C (5 to 140°F)		0.94
Fluorinated oil (oil-prohibited use)	D	-20 to 120°C (-4 to 248°F)	-10 to 60°C (14 to 140°F)	51 kPa abs (7.4 psi abs) to flange rating pressure	1.90 to 1.92
Ethylene glycol (low temperature use)	E	-50 to 100°C (-58 to 212°F)	-40 to 60°C (-40 to 140°F)	100 kPa abs (atmospheric pressure) to flange rating pressure	1.09
Silicone oil (high temp. and high vacuum use)	1	-10 to 250°C (14 to 482°F)	-10 to 50°C (14 to 122°F)	0.013 kPa abs (0.0019 psi abs) to flange rating pressure	1.07
Silicone oil (high vacuum use)	4	-10 to 100°C (14 to 212°F)	-10 to 50°C (14 to 122°F)		1.07

*1: See figure 1-1, 1-2, 1-3, and 1-4 'Working Pressure and Process Temperature.'

*2: This ambient temperature is the transmitter ambient temperature.

*3: Approximate values at a temperature of 25°C (77°F)

Note: The differential pressure transmitter should be installed at least 600 mm below the high pressure (HP) process connection. However, this value (600 mm) may be affected by ambient temperature, operating pressure, fill fluid or material of the wetted diaphragm.

Contact YOKOGAWA when the transmitter can not be installed at least 600 mm below the HP process connection.

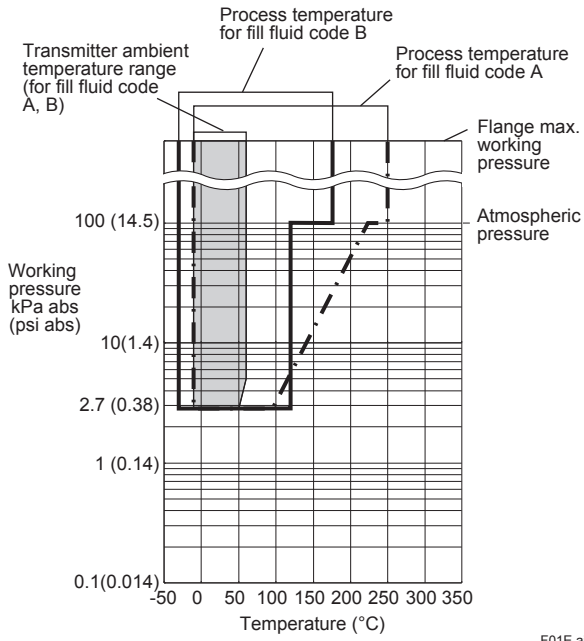


Figure 1-1. Working Pressure and Process Temperature (Fill fluid: silicone oil for general use)

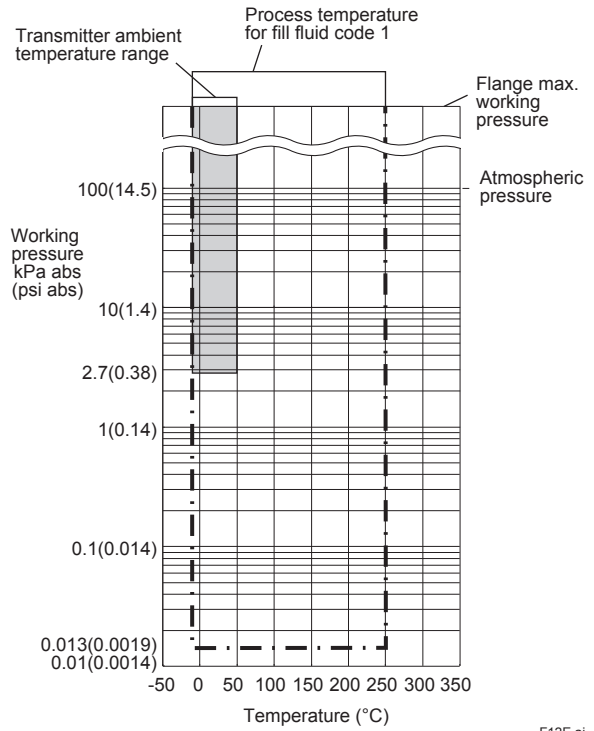


Figure 1-3. Working Pressure and Process Temperature (Fill fluid: silicone oil for high temp. and high vacuum use)

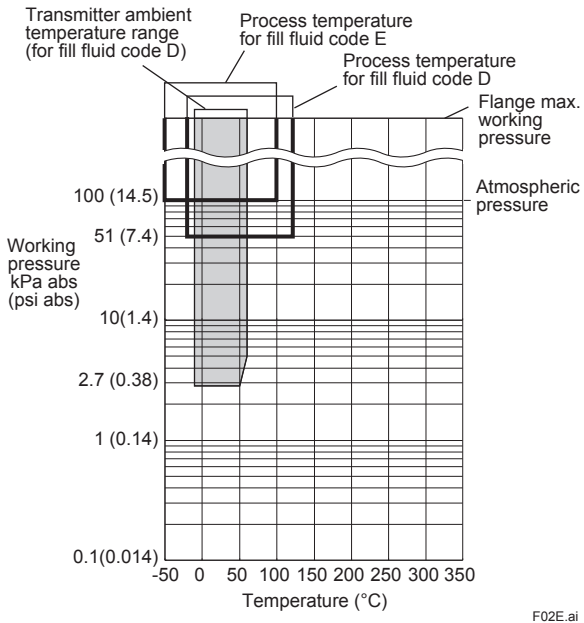


Figure 1-2. Working Pressure and Process Temperature (Fill fluid: fluorinated oil for oil-prohibited use and ethylene glycol for low temperature use)

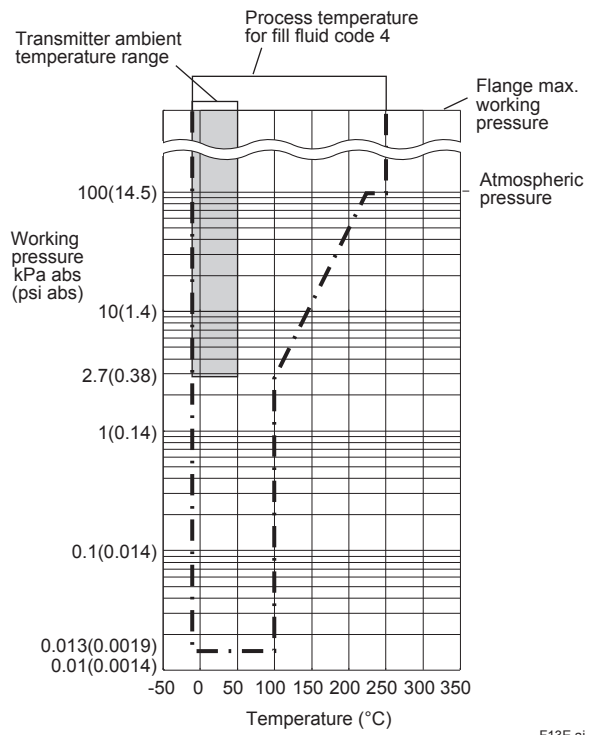


Figure 1-4. Working Pressure and Process Temperature (Fill fluid: silicone oil for high vacuum use)

Supply & Load Requirements
(Output signal code D and J. Optional features or approval codes may affect electrical requirements.)

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

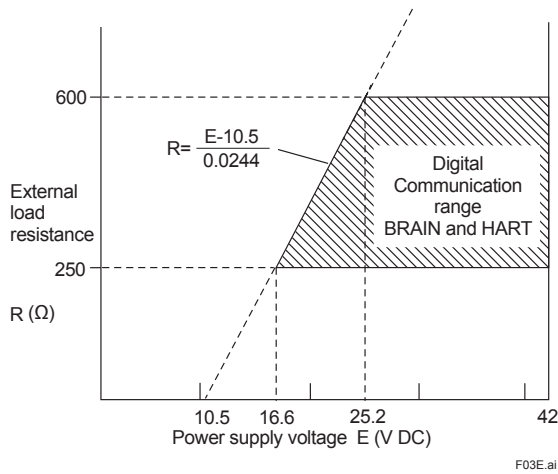


Figure 2. Relationship Between Power Supply Voltage and External Load Resistance (Output signal code D and J)

Supply Voltage “◇”

For 4 to 20 mA HART / BRAIN (Output signal code D and J)

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

For 1 to 5 V HART (Output signal code Q)

Power supply :
 9 to 28 V DC for general use and flame proof type.
 Power Consumption :
 0.96 mA to 3 mA, 27 mW

Load for 4 to 20 mA HART / BRAIN (Output signal code D and J)

0 to 1290Ω for operation
 250 to 600Ω for digital communication

Output Load for 1 to 5 V HART (Output signal code Q)

1 MΩ or greater (meter input impedance)
 Note that with three-wire connection, the cable length may affect the measurement accuracy of the output signal.

Communication Requirements “◇” (Approval codes may affect electrical requirements.)

BRAIN

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

Load capacitance
 0.22 μF or less

Load inductance
 3.3 mH or less

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

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

European Pressure Equipment Directive 2014/68/EU
 Sound Engineering Practice

EU RoHS Directive
 EN IEC 63000

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

□ PHYSICAL SPECIFICATIONS

Process connections
 See the following table.

Table 2. Flange size and rating

Process connection style	Size	Flange
Adapter connection type	1/2-inch	JIS 10K, 20K, 40K
	3/4-inch	ANSI Class 150, 300, 600
	1-inch	JPI Class 150, 300, 600
Flange connection type	1/2-inch	JIS 10K, 20K, 40K
	3/4-inch	ANSI Class 150, 300, 600
	1-inch	JPI Class 150, 300, 600

Gasket Contact Surface
 See the following table.

Table 3. Gasket contact surface

Flange		JIS/JPI		ANSI	
Wetted parts material code		SA, SD	WA, WD	SA, SD	WA, WD
Gasket contact Surface	Serration*1	—	—	●	●
	Flat (No serration)	●	●	●	●

● : Applicable, — : Not applicable
 *1: ANSI B16.5

Electrical Connections
 See “MODEL AND SUFFIX CODES.”

Transmitter Mounting
 2-inch pipe mounting

Wetted Parts Material

Diaphragm seal
Diaphragm and other wetted parts
 Refer to “MODEL AND SUFFIX CODES.”
Vent / Drain plugs
 316 SST
Flange Material
 Refer to “MODEL AND SUFFIX CODES.” (It means the material of adapter or pipe with flange)
 Gasket for transmitter side
 316L SST with PTFE Teflon coating

Non-wetted Parts Material

Transmitter body section:

Cover flange

ASTM CF-8M

Cover flange bolting

B7 carbon steel, 316L SST or 660 SST

Housing

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

Coating of housing

[for aluminum housing]

Polyester resin powder coating

Mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent)

[for option code /P□ or /X2]

Epoxy and polyurethane resin solvent coating

Degrees of protection

IP66/IP67, Type 4X

Cover O-rings

Buna-N, fluoro-rubber (optional)

Name plate and tag

316 SST

Diaphragm seal section:

Capillary tube

316 SST

Protection tube

304 SST PVC-sheathed

(Max. operating temperature of PVC, 100°C (212°F))

Fill fluid

See table 1.

In case of Adapter connection type

Stud bolt... B7

Nut 304 SST

Weight

Inner diaphragm, adapter connection type: 5.8 kg (12.8 lbs)

(1/2-inch ANSI Class150 flange, capillary length 5 m; without integral indicator and mounting bracket.)

< Related Instruments > “◇”

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

BRAIN TERMINAL: Refer to GS 01C00A11-00E

< Reference >

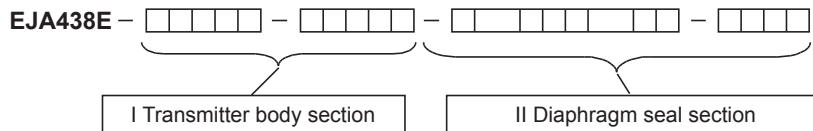
- Teflon; Trademark of E.I. DuPont de Nemours & Co.
- Hastelloy; Trademark of Haynes International Inc.
- HART®: Registered trademark of FieldComm Group.
- FOUNDATION Fieldbus; Trademark of FieldComm Group.
- *DPsharp* **EJA™**; Registered trademark of Yokogawa Electric Corporation.
- FieldMate; Registered trademark of Yokogawa Electric Corporation.
- PROFIBUS; Registered trademark of Profibus Nutzerorganisation e.v., Karlsruhe, Germany.

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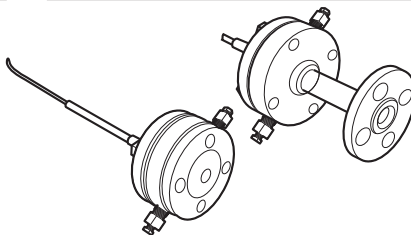
MODEL AND SUFFIX CODES

• Instruction

The model and suffix codes for EJA438E consist of two parts; a transmitter body section (I) and a diaphragm seal section (II). This specification sheet introduces these two parts separately. The transmitter body section is shown in one table, and the diaphragm seal section specifications are listed according to the process connection style. First select the model and suffix codes of transmitter body section and then continue on one of the diaphragm seal section.



See Page 7



Inner diaphragm,
Adapter connection type ... See Page 8
Inner diaphragm,
Flange connection type ... See Page 9

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OPTIONAL SPECIFICATIONS (For Explosion Protected type) “◇”

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

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

Item	Description	Code
Factory Mutual (FM)	FM Explosionproof Approval *1 Applicable Standard: FM3600, FM3615, FM3810, NEMA 250, ANSI/UL 61010-1, ANSI/UL 61010-2-30 Explosionproof for Class I, Division 1, Groups B, C and D, Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G, in Hazardous locations, indoors and outdoors (Enclosure: Type 4X) “FACTORY SEALED, CONDUIT SEAL NOT REQUIRED.” Temperature class: T6, Amb. Temp.: -40 to 60°C (-40 to 140°F)	FF1
	FM Intrinsically safe Approval **3 Applicable Standard: FM 3600, FM 3610, FM 3611, FM 3810, ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-61010-1, NEMA 250 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: Type 4X, Temp. Class: T4, Amb. Temp.: -60 to 60°C (-75 to 140°F) 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 **3	FU1
ATEX	ATEX Flameproof Approval **3 Applicable Standard: EN IEC 60079-0, EN 60079-1, EN 60079-31 Certificate: KEMA 07ATEX0109 X II 2 G Ex db IIC T6...T4 Gb, II 2 D Ex tb IIIC T85°C Db 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) Process Temp. for gas-proof (Tp): T4; -50 to 120°C (-58 to 248°F), T5; -50 to 100°C (-58 to 212°F), T6; -50 to 85°C (-58 to 185°F) Max. surface Temp. for dust-proof: T85°C (Tamb: -30 to 75°C, Tp: -30 to 85°C) *2	KF22
	ATEX Intrinsically safe Approval **3 Applicable Standard: EN IEC 60079-0, EN 60079-11 Certificate: DEKRA 11ATEX0228 X II 1 G Ex ia IIC T4 Ga, II 2 D 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 *2 Max. surface Temp. for EPL Db: T85°C (Tp: 80°C), T100°C (Tp: 100°C), T120°C (Tp: 120°C)	KS21
	Multiple types of protection (KF22, KS21 or Intrinsically safe Ex ic) **3 Applicable Standard: EN IEC 60079-0, EN 60079-11 II 3 G Ex ic IIC T4 Gc, Amb. Temp.: -30 to 60°C (-22 to 140°F) *2 Ui=30 V, Ci=27.6 nF, Li=0 µH	KU22

Item	Description	Code
Canadian Standards Association (CSA)	<p>CSA Explosionproof Approval *1 Certificate: 2014354 Applicable Standard: C22.2 No. 25, C22.2 No. 30, CAN/CSA-C22.2 No. 94, CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-2-030, CAN/CSA-C22.2 No. 60079-0, CAN/CSA-C22.2 No. 60079-1, CAN/CSA-C22.2 No. 60529 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: Type 4X, Temp. Code: T6...T4 Ex d IIC T6...T4 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 *2 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</p>	CF1
	<p>CSA Intrinsically safe Approval **3 Certificate: 1606623 [For Division System] Applicable Standard: C22.2 No.0, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.61010-1, C22.2 No.61010-2-030 Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1, Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III, Division 1 Enclosure: Type 4X, Temp. Code: T4 Amb. Temp.: -50 to 60°C(-58 to 140°F) *2 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 Zone System] Applicable Standard: CAN/CSA-C22.2 60079-0, CAN/CSA-E60079-11, CAN/CSA-E60079-15, CAN/CSA-C22.2 No.60529 Ex ia IIC T4, Ex nL IIC T4 Enclosure: IP66/IP67 Amb. Temp.: -50 to 60°C(-58 to 140°F) *2, Max. Process Temp.: 120°C(248°F) Electrical Parameters: [Ex ia] Ui=30V, li=200mA, Pi=0.9W, Ci=10nF, Li=0 µH [Ex nL] Ui=30V, Ci=10nF, Li=0 µH 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</p>	CS1
	<p>Combined CF1 and CS1 **3</p>	CU1
IECEx	<p>IECEx Flameproof Approval *1 Applicable Standard: IEC 60079-0, IEC60079-1 Certificate: IECEx CSA 07.0008 Flameproof for Zone 1, Ex d IIC T6...T4 Gb 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</p>	SF2
	<p>IECEx Intrinsically safe and Flameproof Approval **3 Intrinsically safe Ex ia Certificate: IECEx DEK 11.0081X Applicable Standard: IEC 60079-0, IEC 60079-11 Ex ia IIC T4 Ga Enclosure: IP66/IP67 Amb. Temp.: -50 to 60 °C(-58 to 140 °F), Max. Process Temp.: 120 °C(248 °F) Electrical Parameters: Ui=30 V, li=200 mA, Pi=0.9 W, Ci=27.6 nF, Li=0 µH Intrinsically safe Ex ic Certificate: IECEx DEK 13.0061X Applicable Standard: IEC 60079-0, IEC 60079-11 Ex ic IIC T4 Gc IP code: IP66 Amb. Temp.: -30 to 60°C(-22 to 140°F) *2, Max. Process Temp.: 120°C(248°F) Electrical Parameters: Ui=30V,Ci=27.6 nF, Li=0 µH Flameproof Certificate: IECEx CSA 07.0008 Applicable Standard: IEC 60079-0, IEC60079-1 Flameproof for Zone 1, Ex d IIC T6...T4 Gb 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</p>	SU21

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

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

■ OPTIONAL SPECIFICATIONS

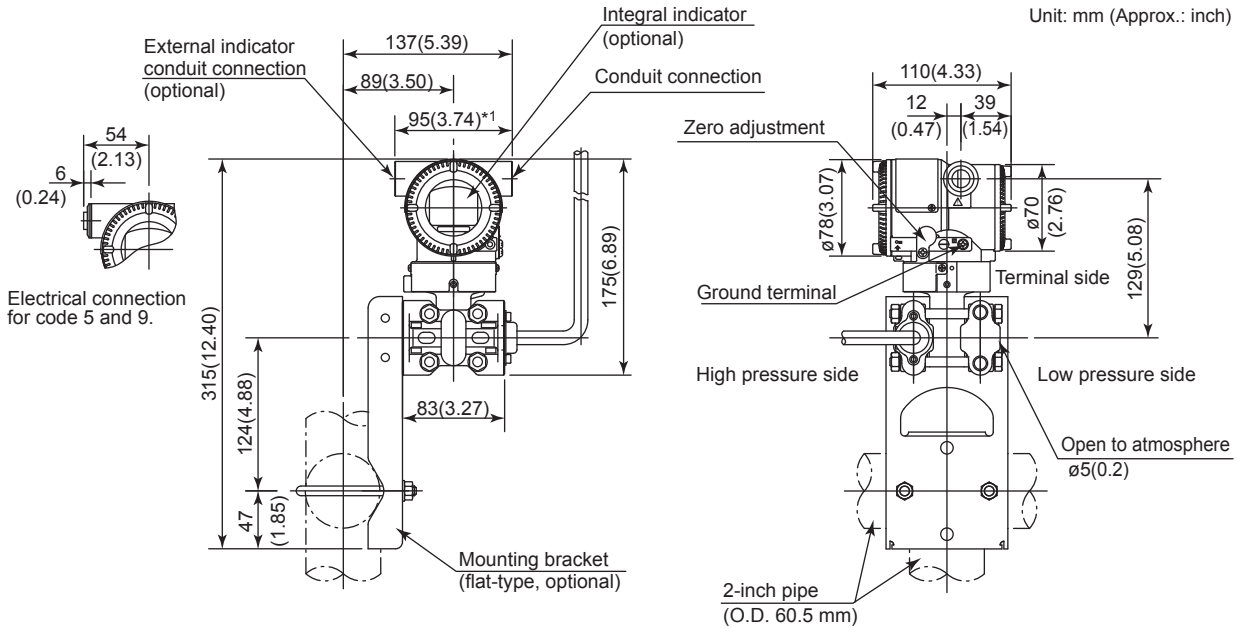
Item		Description	Code		
Painting	Color change	Amplifier cover only*1	P□		
		Amplifier cover and terminal cover, Munsell 7.5 R4/14	PR		
	Coating change	Anti-corrosion coating*2	X2		
316 SST exterior parts		316 SST zero-adjustment screw and setscrews*3	HC		
Fluoro-rubber O-ring		All O-rings of amplifier housing. Lower limit of ambient temperature: -15°C (5°F)	HE		
Lightning protector		Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.) 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	A		
Oil-prohibited use		Degrease cleansing treatment	K1		
Oil-prohibited use with dehydrating treatment		Degrease cleansing treatment and dehydrating treatment	K5		
Calibration units *4	P calibration (psi unit)		(See table for Span and Range Limits.)	D1	
	bar calibration (bar unit)			D3	
	M calibration (kgf/cm ² unit)			D4	
Operating temperature correction *5		Adjusting range : 80°C to Maximum temperature of specified fill fluid.	R		
Capillary without PVC sheaths		When ambient temperature exceeds 100°C, or use of PVC is prohibited	V		
Output limits and failure operation *6	Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less for 4 to 20 mA output type, and -5%, 0.8V DC or less for 1 to 5 V output type.		C1		
	NAMUR NE43 Compliant Output signal limits: 3.8 mA to 20.5 mA *11	Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less.	C2		
		Failure alarm up-scale : Output status at CPU failure and hardware error is 110%, 21.6 mA or more.	C3		
Gold-plated diaphragm		Inside of isolating diaphragms (fill fluid side) are gold plated, effective for hydrogen permeation.	A1		
Wired tag plate		316 SST tag plate wired onto transmitter (Tag No.: Maximum. 16 characters.)	N4		
Data configuration at factory *7	Data configuration for HART communication type	Software damping, Descriptor, Message	CA		
	Data configuration for BRAIN communication type	Software damping	CB		
Material certificate	Adapter (Flange), Block		Adapter connection type	M2A	
	Adapter (Flange), Block, Bolt for Block, Stud bolt and nut, Bolt and nut for cover flange			M8A	
	Flange, Base, Block, Pipe		Flange connection type	M2D	
	Flange, Base, Block, Pipe, Bolt for block, Bolt and nut for cover flange			M8D	
Pressure test/ Leak test Certificate *8	For A-Capsule	[Flange rating]	[Test pressure]	Nitrogen Gas *9 Retention time: one minute	
		JIS 10K	2 MPa (290 psi)		T51
		JIS 20K, 40K	3.5 MPa (500 psi)		T53
		ANSI/JPI Class 150	3 MPa (430 psi)		T52
	For B-Capsule	ANSI/JPI Class 300, 600	3.5 MPa (500 psi)		T53
		JIS 10K	2 MPa (290 psi)		T51
		JIS 20K	5 MPa (720 psi)		T54
		JIS 40K	10 MPa (1450 psi)		T57
		ANSI/JPI Class 150	3 MPa (430 psi)		T52
		ANSI/JPI Class 300	8 MPa (1160 psi)		T56
		ANSI/JPI Class 600	16 MPa (2300 psi)		T58
		Long Vent	For inner diaphragm use only. Total length: 119 mm (standard: 34 mm); Total length when combining with option code K1, K2, K5, and K6: 130 mm. Material: 316 SST		U2
High pressure-proof structure*10		High pressure-proof structure for ANSI/JPI class 600 flange.	HP		
Parameter list*12		List of setting and adjustment parameters	YP		

*1: Not applicable for amplifier housing code **2** and **3**.
 *2: Not applicable with color change option. Not applicable for amplifier housing code **2**.
 *3: 316 or 316L SST. The specification is included in amplifier housing code **2**.
 *4: The unit of MWP (Max. working pressure) on the name plate of a housing is the same unit as specified by option code **D1**, **D3**, and **D4**.
 *5: Specify the process operating temperature for zero correction. Example: Zero correction by process temperature 90°C.
 *6: Applicable for output signal code **D** and **J**. The hardware error indicates faulty amplifier or capsule.

- *7: Also see 'Ordering Information.'
- *8: The unit on the certificate is always MPa regardless of selection of option code **D1**, **D3**, or **D4**.
- *9: Dry nitrogen gas is used for oil-prohibited use (option code **K1** and **K5**.)
- *10: In case where flange rating code **A4** (ANSI class 600) or **P4** (JPI class 600) is selected, It must be selected optional code **/HP** (High pressure-proof structure).
- *11: The 1 to 5 V voltage output corresponding to 4 to 20 mA current output is applied to output signal code Q which is non-compliant to NAMUR NE43.
- *12: Applicable for output signal code D and J.

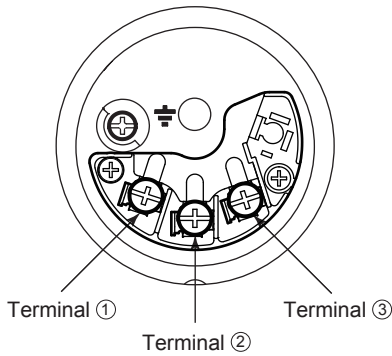
DIMENSIONS

<Transmitter body section>



*1: When electrical connection code 7 or C is selected, a blind plug is protruded upto 8 mm (0.31 inch) from the conduit connection.

Terminal Configuration



Terminal Wiring for 4 to 20 mA output, FOUNDATION Fieldbus and PROFIBUS PA communication types

SUPPLY	+	①	Power supply and output terminals
	-	②	
CHECK	+	③	External indicator (ammeter) terminals*2*3
	-	②	
			⏏ Ground terminal

*2: When using an external indicator or check meter, the internal resistance must be 10 Ω or less.

*3: Not available for FOUNDATION Fieldbus and PROFIBUS PA communication types.

Terminal Wiring for 1 to 5 V output

SUPPLY	+	①	Power supply terminals
	-	②	
VOUT	+	③	1 to 5 V DC with HART communication terminals
	-	②	
			⏏ Ground terminal

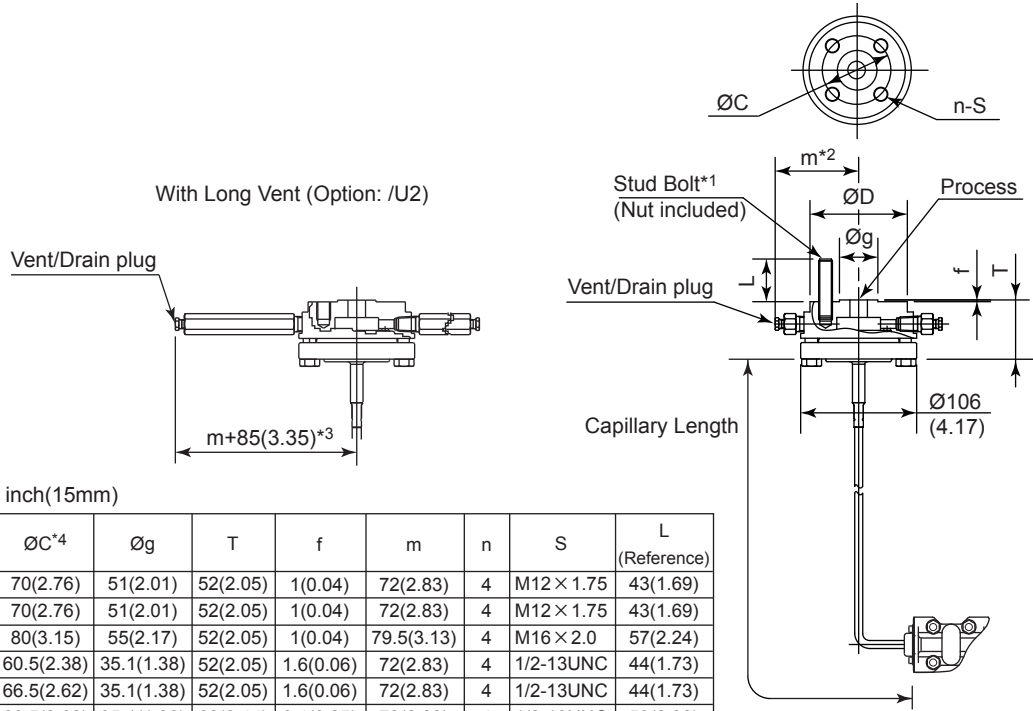
Three or four wire connection. For four wire connection, both supply and signal lines use SUPPLY - terminal.

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<Diaphragm seal section>

• Adapter connection type

Unit: mm (Approx.: inch)



Process Flange Size: 1/2 inch(15mm)

Flange rating	ØD	ØC*4	Øg	T	f	m	n	S	L (Reference)
JIS 10K	95(3.74)	70(2.76)	51(2.01)	52(2.05)	1(0.04)	72(2.83)	4	M12 × 1.75	43(1.69)
JIS 20K	95(3.74)	70(2.76)	51(2.01)	52(2.05)	1(0.04)	72(2.83)	4	M12 × 1.75	43(1.69)
JIS 40K	115(4.53)	80(3.15)	55(2.17)	52(2.05)	1(0.04)	79.5(3.13)	4	M16 × 2.0	57(2.24)
ANSI class 150	88.9(3.50)	60.5(2.38)	35.1(1.38)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
ANSI class 300	95.3(3.75)	66.5(2.62)	35.1(1.38)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
ANSI class 600	95.3(3.75)	66.5(2.62)	35.1(1.38)	62(2.44)	6.4(0.25)	72(2.83)	4	1/2-13UNC	59(2.32)
JPI class 150	89(3.50)	60.5(2.38)	35.1(1.38)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
JPI class 300	95(3.74)	66.5(2.62)	35.1(1.38)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
JPI class 600	95(3.74)	66.5(2.62)	35.1(1.38)	62(2.44)	6.4(0.25)	72(2.83)	4	1/2-13UNC	59(2.32)

Process Flange Size: 3/4 inch(20mm)

Flange rating	ØD	ØC*4	g	T	f	m	n	S	L (Reference)
JIS 10K	100(3.94)	75(2.95)	56(2.20)	52(2.05)	1(0.04)	72(2.83)	4	M12 × 1.75	43(1.69)
JIS 20K	100(3.94)	75(2.95)	56(2.20)	52(2.05)	1(0.04)	72(2.83)	4	M12 × 1.75	43(1.69)
JIS 40K	120(4.72)	85(3.35)	60(2.36)	52(2.05)	1(0.04)	82(3.23)	4	M16 × 2.0	57(2.24)
ANSI class 150	98.6(3.88)	69.9(2.75)	42.9(1.69)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
ANSI class 300	117.3(4.62)	82.6(3.25)	42.9(1.69)	52(2.05)	1.6(0.06)	80.7(3.18)	4	5/8-11UNC	51(2.01)
ANSI class 600	117.3(4.62)	82.6(3.25)	42.9(1.69)	62(2.44)	6.4(0.25)	80.7(3.18)	4	5/8-11UNC	67(2.64)
JPI class 150	99(3.90)	69.8(2.75)	42.9(1.69)	52(2.05)	1.6(0.06)	72(2.83)	4	1/2-13UNC	44(1.73)
JPI class 300	117(4.61)	82.6(3.25)	42.9(1.69)	52(2.05)	1.6(0.06)	80.7(3.18)	4	5/8-11UNC	51(2.01)
JPI class 600	117(4.61)	82.6(3.25)	42.9(1.69)	62(2.44)	6.4(0.25)	80.7(3.18)	4	5/8-11UNC	67(2.64)

Process Flange Size: 1 inch(25mm)

Flange rating	ØD	ØC*4	Øg	T	f	m	n	S	L (Reference)
JIS 10K	125(4.92)	90(3.54)	67(2.64)	52(2.05)	1(0.04)	84.5(3.33)	4	M16 × 2.0	57(2.24)
JIS 20K	125(4.92)	90(3.54)	67(2.64)	52(2.05)	1(0.04)	84.5(3.33)	4	M16 × 2.0	57(2.24)
JIS 40K	130(5.12)	95(3.74)	70(2.76)	52(2.05)	1(0.04)	87(3.43)	4	M16 × 2.0	57(2.24)
ANSI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	52(2.05)	1.6(0.06)	76(2.99)	4	1/2-13UNC	44(1.73)
ANSI class 300	124(4.88)	88.9(3.50)	50.8(2.00)	52(2.05)	1.6(0.06)	84(3.31)	4	5/8-11UNC	51(2.01)
ANSI class 600	124(4.88)	88.9(3.50)	50.8(2.00)	62(2.44)	6.4(0.25)	84(3.31)	4	5/8-11UNC	67(2.64)
JPI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	52(2.05)	1.6(0.06)	76(2.99)	4	1/2-13UNC	44(1.73)
JPI class 300	124(4.88)	88.9(3.50)	50.8(2.00)	52(2.05)	1.6(0.06)	84(3.31)	4	5/8-11UNC	51(2.01)
JPI class 600	124(4.88)	88.9(3.50)	50.8(2.00)	62(2.44)	6.4(0.25)	84(3.31)	4	5/8-11UNC	67(2.64)

*1: Stud bolts and nuts are attached for n pcs.

*2: In case of oil-prohibited use or oil-prohibited use with dehydrating treatment, 15mm added.

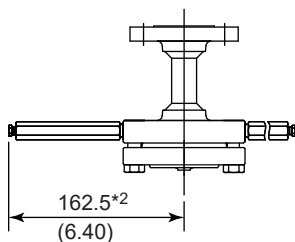
*3: In case of oil-prohibited use or oil-prohibited use with dehydrating treatment, 11mm added.

*4: This value is the same as flange standards. Actual value might be added 1mm(0.04inch) because the commercial gaskets can be used.

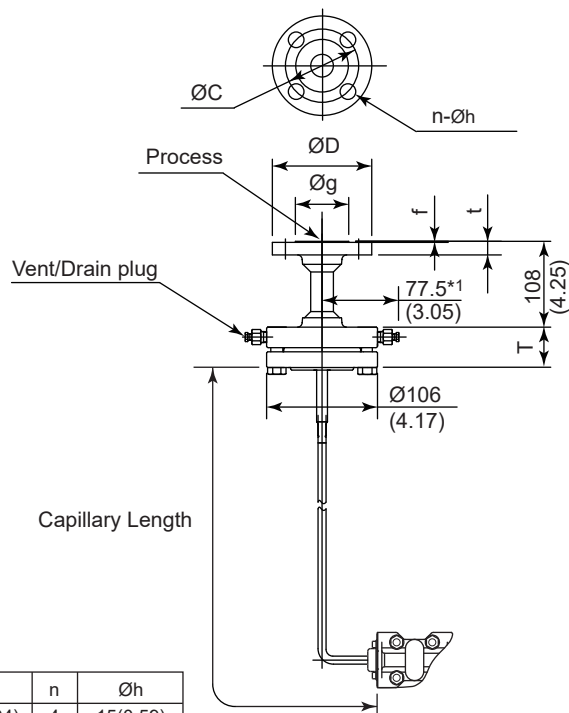
● Flange connection type

Unit: mm (Approx.: inch)

With Long Vent (Option: /U2)



- *1: In case of oil-prohibited use or oil-prohibited use with dehydrating treatment, 15mm added.
- *2: In case of oil-prohibited use or oil-prohibited use with dehydrating treatment, 11mm added.



Process Flange Size: 1/2 inch(15mm)

Flange rating	ØD	ØC	Øg	T	t	f	n	Øh
JIS 10K	95(3.74)	70(2.76)	51(2.01)	42(1.65)	12(0.47)	1(0.04)	4	15(0.59)
JIS 20K	95(3.74)	70(2.76)	51(2.01)	42(1.65)	14(0.55)	1(0.04)	4	15(0.59)
JIS 40K	115(4.53)	80(3.15)	55(2.17)	42(1.65)	20(0.79)	1(0.04)	4	19(0.75)
ANSI class 150	88.9(3.50)	60.5(2.38)	35.1(1.38)	42(1.65)	11.2(0.44)	1.6(0.06)	4	15.7(0.62)
ANSI class 300	95.3(3.75)	66.5(2.62)	35.1(1.38)	42(1.65)	14.3(0.56)	1.6(0.06)	4	15.7(0.62)
ANSI class 600	95.3(3.75)	66.5(2.62)	35.1(1.38)	57(2.24)	20.7(0.81)	6.4(0.25)	4	15.7(0.62)
JPI class 150	89(3.50)	60.5(2.38)	35.1(1.38)	42(1.65)	11.2(0.44)	1.6(0.06)	4	16(0.63)
JPI class 300	95(3.74)	66.5(2.62)	35.1(1.38)	42(1.65)	14.3(0.56)	1.6(0.06)	4	16(0.63)
JPI class 600	95(3.74)	66.5(2.62)	35.1(1.38)	57(2.24)	20.7(0.81)	6.4(0.25)	4	16(0.63)

Process Flange Size: 3/4 inch(20mm)

Flange rating	ØD	ØC	Øg	T	t	f	n	Øh
JIS 10K	100(3.94)	75(2.95)	56(2.20)	42(1.65)	14(0.55)	1(0.04)	4	15(0.59)
JIS 20K	100(3.94)	75(2.95)	56(2.20)	42(1.65)	16(0.63)	1(0.04)	4	15(0.59)
JIS 40K	120(4.72)	85(3.35)	60(2.36)	42(1.65)	20(0.79)	1(0.04)	4	19(0.75)
ANSI class 150	98.6(3.88)	69.9(2.75)	42.9(1.69)	42(1.65)	12.7(0.50)	1.6(0.06)	4	15.7(0.62)
ANSI class 300	117.3(4.62)	82.6(3.25)	42.9(1.69)	42(1.65)	15.8(0.62)	1.6(0.06)	4	19.1(0.75)
ANSI class 600	117.3(4.62)	82.6(3.25)	42.9(1.69)	57(2.24)	22.2(0.87)	6.4(0.25)	4	19.1(0.75)
JPI class 150	99(3.90)	69.8(2.75)	42.9(1.69)	42(1.65)	12.7(0.50)	1.6(0.06)	4	16(0.63)
JPI class 300	117(4.61)	82.6(3.25)	42.9(1.69)	42(1.65)	15.8(0.62)	1.6(0.06)	4	19(0.75)
JPI class 600	117(4.61)	82.6(3.25)	42.9(1.69)	57(2.24)	22.2(0.87)	6.4(0.25)	4	19(0.75)

Process Flange Size: 1 inch(25mm)

Flange rating	ØD	ØC	Øg	T	t	f	n	Øh
JIS 10K	125(4.92)	90(3.54)	67(2.64)	42(1.65)	14(0.55)	1(0.04)	4	19(0.75)
JIS 20K	125(4.92)	90(3.54)	67(2.64)	42(1.65)	16(0.63)	1(0.04)	4	19(0.75)
JIS 40K	130(5.12)	95(3.74)	70(2.76)	42(1.65)	22(0.87)	1(0.04)	4	19(0.75)
ANSI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	42(1.65)	14.3(0.56)	1.6(0.06)	4	15.7(0.62)
ANSI class 300	124(4.88)	88.9(3.50)	50.8(2.00)	42(1.65)	17.6(0.69)	1.6(0.06)	4	19.1(0.75)
ANSI class 600	124(4.88)	88.9(3.50)	50.8(2.00)	57(2.24)	24(0.95)	6.4(0.25)	4	19.1(0.75)
JPI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	42(1.65)	14.3(0.56)	1.6(0.06)	4	16(0.63)
JPI class 300	124(4.88)	88.9(3.50)	50.8(2.00)	42(1.65)	17.6(0.69)	1.6(0.06)	4	19(0.75)
JPI class 600	124(4.88)	88.9(3.50)	50.8(2.00)	57(2.24)	24(0.95)	6.4(0.25)	4	19(0.75)

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< Ordering Information > “◇”

Specify the following when ordering

1. Model, suffix codes, and option codes
2. Calibration range and units:
 - 1) Calibration range can be specified with range value specifications up to 5 digits (excluding any decimal point) for low or high range limits within the range of -32000 to 32000. When reverse range is designated, specify LRV as greater than URV.
 - 2) Specify only one unit from the table, 'Factory setting.'
3. 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.
4. HART PROTOCOL

When output signal code is "J", specify the HART protocol revision "5" or "7".
5. TAG NO (if required)

Specified characters (up to 16 characters for BRAIN, 22 characters for HART, or 16 characters for /N4 tag) are engraved on the stainless steel tag plate fixed on the housing.
6. SOFTWARE TAG (for HART only. if required)

Specified characters (up to 32 characters) are set as "Tag" (the first 8 characters) and "Long tag"^{*1} (32 characters) in the amplifier memory. Use alphanumeric capital letters.
When the "SOFTWARE TAG" is not specified, specified "TAG NO" is set as "Tag" (the first 8 characters) and "Long tag"^{*1} (22 characters) in the amplifier memory.
^{*1}: applicable only when HART 7 is selected.
7. Other factory configurations (if required)

Specifying option code /CA or /CB will allow further configuration at factory. Following are configurable items and setting range.
[/CA : For HART communication type]
1) Descriptor(upto 16 characters)
2) Message (upto 30 characters)
3) Software damping (0.00 to 100.00 s)
[/CB : For BRAIN communication type]
1) Software damping (0.00 to 100.00 s)
8. Process fluid temperature for zero compensation (When /R is specified)

< Factory Setting > “◇”

Tag Number	As specified in order
Software damping ^{*1}	'2.00 s' or as specified in order
Calibration range lower range value	As specified in order
Calibration range upper range value	As specified in order
Calibration range units	Selected from mmH ₂ O, mmH ₂ O(68°F), mmAq ^{*2} , mmWG ^{*2} , mmHg, Pa, hPa ^{*2} , kPa, MPa, mbar, bar, gf/cm ² , kgf/cm ² , inH ₂ O, inH ₂ O(68°F), inHg, ftH ₂ O, ftH ₂ O (68°F) or psi. (Only one unit can be specified)
Display setting	Designated value specified in order, absolute value. (% or user scaled value.)

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

< Material Cross Reference >

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

<Information on EU WEEE Directive>

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

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