

General Specifications

GS 01C25J03-11E

EJX438A/Z
Diaphragm Sealed
Gauge Pressure Transmitter
(Inner Diaphragm type)

DP^{harp} EJX™

[Style: S2]

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 range 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 diaphragm size same as 2 inch. EJX438A Diaphragm Sealed Gauge Pressure Transmitters can be used to measure liquid, gas, or steam pressure. EJX438A 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 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.

■ STANDARD SPECIFICATIONS

Refer to GS 01C25T02-01E for Fieldbus communication type marked with “◇”.

□ SPAN AND RANGE LIMITS

Measurement Span and Range	MPa	psi (/D1)	bar (/D2)	kgf/cm ² (/D4)
A*1	Span	0.035 to 3.5	5 to 500	0.35 to 35
	Range	-0.1 to 3.5	-14.5 to 500	-1 to 35
B*1	Span	0.16 to 16	23 to 2300	1.6 to 160
	Range	-0.1 to 16	-14.5 to 2300	-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 type, use calibrated range instead of span in the following specifications.

Specification Conformance

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

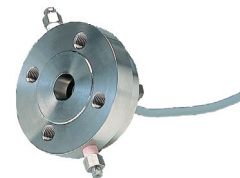
Reference Accuracy of Calibrated Span

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

Measurement span	A	B
Reference accuracy	$X \leq \text{span}$	$\pm 0.15\%$ of Span
	$X > \text{span}$	$\pm (0.1 + 0.005 \text{ URL/Span})\%$ 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)



Flange connection type



Adapter connection type

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

Capsule	Effect
A and B	$\pm (0.5\% \text{ Span} + 0.025\% \text{ URL})$

Power Supply Effects (Output signal code D and E)

$\pm 0.005\%$ per Volt (from 21.6 to 32 V DC, 350 Ω)

Response Time (All capsules) “◇”

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

□ FUNCTIONAL SPECIFICATIONS

Output “◇”

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.

Failure Alarm (Output signal code D and E)

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

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

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

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

Damping Time Constant (1st order)

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

Note: For BRAIN protocol type, when amplifier software damping is set to less than 0.5 sec, 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.”

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, and its status can be output when optional status output is specified.

Advanced Diagnostics (optional) “◇”

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 static pressure signal.

Signal Characterizer (Output signal code D and E)

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

Capillary Fill Fluid Density Compensation**(Output signal code D and E)**

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

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 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 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 and 1-2.

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

*1: See figure 1-1 and 1-2 ‘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.

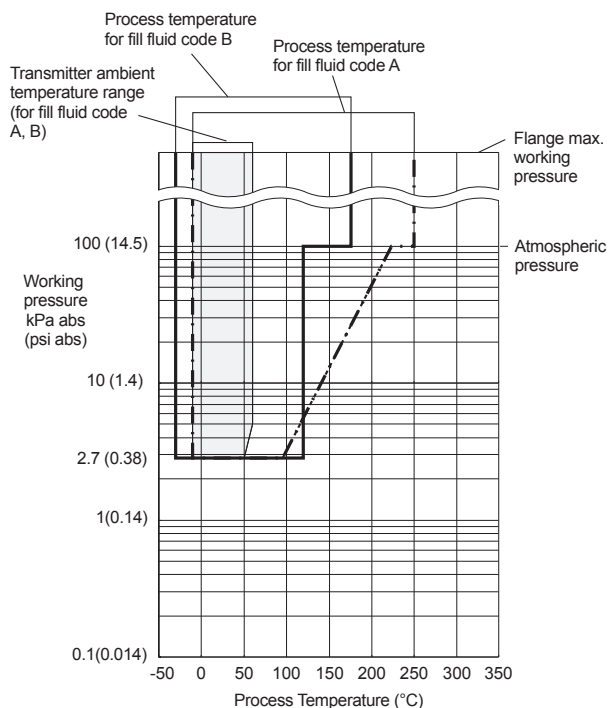


Figure 1-1. Working Pressure and Process Temperature (Fill fluid: silicone oil for general use)

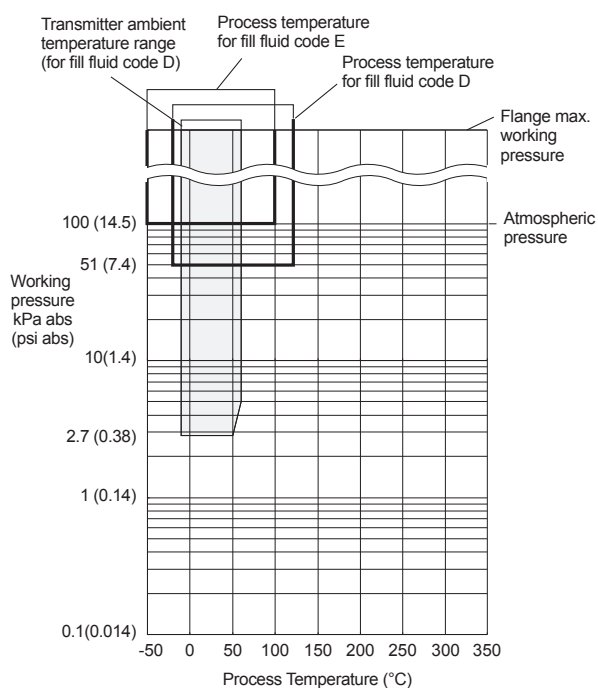


Figure 1-2. Working Pressure and Process Temperature (Fill fluid: fluorinated oil for oil-prohibited use and ethylene glycol for low temperature use)

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 Ω load can be used. See graph below.

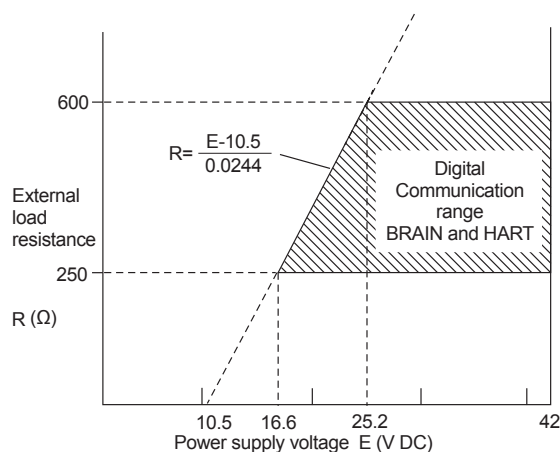


Figure 2. Relationship Between Power Supply Voltage and External Load Resistance

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 Ω for operation
250 to 600 Ω 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 μ F or less

Load Inductance

3.3 mH or less

Input Impedance of communicating device

10 k Ω or more at 2.4 kHz.

EMC Conformity Standards

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

EN61326-2-3

European Pressure Equipment Directive 97/23/EC Sound Engineering Practice

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

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... ASTM-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 >

1. 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; Trademark of Fieldbus Foundation.

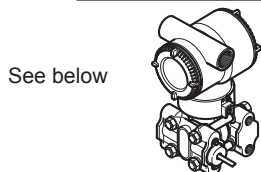
Other company names and product names used in this material are registered trademarks or trademarks of their respective owners.

- **Instruction**

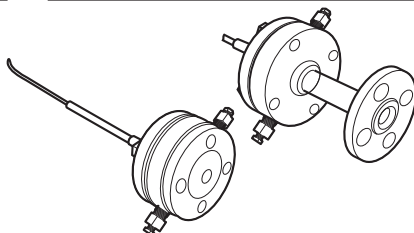
First select the model and suffix codes of transmitter body section and then continue on one of the diaphragm seal section.

I Transmitter body section

II Diaphragm seal section



See below

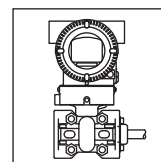


Inner diaphragm,
Adapter connection type . . . See Page 6

Inner diaphragm,
Flange connection type . . . See Page 7

F04F ai

EJX438A – – – –



E05F ai

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

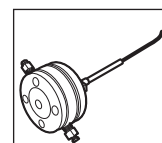
*1: Not applicable for output signal code **F**.

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

*3: Material of a blind plug is aluminum alloy or 304 SST.

*4: 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.

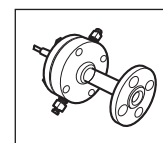
EJX438A- [] [] [] [] - [] [] [] [] - A []
6
7
1



Model	Suffix codes		Description			
EJX438A	-□□□□□-□□□□□□		Transmitter body section (I)			
Process connection style		-A		Inner Diaphragm, Adapter connection type		
Flange rating		J1		JIS 10K		
		J2		JIS 20K		
		J4		JIS 40K		
		A1		ANSI class 150		
		A2		ANSI class 300		
		A4		ANSI class 600*7		
		P1		JPI class 150		
		P2		JPI class 300		
P4		JPI class 600*7				
Process connection size (Process flange size)		6		1/2 inch (15 mm)		
		7		3/4 inch (20 mm)		
		1		1 inch (25 mm)		
Flange material*3		E		316 SST (Adapter material)*4		
Gasket contact surface*1		1		Serration (for ANSI flange only)		
		2		Flat (no serration)		
Wetted parts material*3		SA		[Diaphragm]	[Others]	
				316L SST	316 SST (include Adapter)*4	
				Hastelloy C-276 *5#	316 SST (include Adapter)*4#	
Flushing connection ring		0		None		
Extension		0		None		
Fill fluid		▶	-A	For general use (silicone oil)	[Process temperature] -10 to 250°C	[Ambient temperature] -10 to 60°C
			-B	For general use (silicone oil)	-30 to 180°C	-15 to 60°C
			-D	For oil-prohibited use (fluorinated oil)*2	-20 to 120°C	-10 to 60°C
			-E	For low temperature use (ethylene glycol)	-50 to 100°C	-40 to 60°C
			Capillary connection		B	
—		2		Always 2		
Capillary length*6			1	1 m	6 6 m	
			2	2 m	7 7 m	
			3	3 m	8 8 m	
			4	4 m	9 9 m	
			5	5 m	A 10 m	
Option codes and Tokuchu code			/□ Optional specification and /Z			

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.

EJX438A- - - D ⁶₇ -



Model	Suffix codes	Description
EJX438A	-□□□□-□□□□	Transmitter body section (I)
Process connection style	-D.....	Inner Diaphragm, Flange connection type
Flange rating	J1 J2 J4 A1 A2 A4 P1 P2 P4	JIS 10K JIS 20K JIS 40K ANSI class 150 ANSI class 300 ANSI class 600*7 JPI class 150 JPI class 300 JPI class 600*7
Process connection size (Process flange size)	6 7 1	1/2 inch (15 mm) 3/4 inch (20 mm) 1 inch (25 mm)
Flange material*3	D	316 SST (Flange and Pipe material)*4
Gasket contact surface*1	1 2	Serration (for ANSI flange only) Flat (no serration)
Wetted parts material*3	SD WD	[Diaphragm] [Others] 316L SST 316 SST*4 Hastelloy C-276*5# 316 SST*4#
Flushing connection ring	0	None
Extension	0	None
Fill fluid	▶ -A -B -D -E	[Process temperature] [Ambient temperature] For general use (silicone oil) -10 to 250°C -10 to 60°C For general use (silicone oil) -30 to 180°C -15 to 60°C For oil-prohibited use (fluorinated oil)*2 -20 to 120°C -10 to 60°C For low temperature use (ethylene glycol) -50 to 100°C -40 to 60°C
Capillary connection	B	Back of diaphragm seal unit
—	2	Always 2
Capillary length*6	1 2 3 4 5 6 7 8 9 A	1 m 2 m 3 m 4 m 5 m 6 m 7 m 8 m 9 m 10 m
Option codes and Tokuchu code		/ □ Optional specification and /Z

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 (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, and Class III, Division 1, 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
CENELEC ATEX	CENELEC ATEX (KEMA) Flameproof Approval * ¹ Applicable Standard: EN 60079-0, EN 60079-1, EN 61241-0, EN 61241-1 Certificate: KEMA 07ATEX0109 II 2G, 2D Exd IIC T4, T5, T6 Ex td A21 IP6X T85, T100, T120 Degree of protection : IP66 and 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) * ³ Max. process Temp.(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: –40 to 40°C, Tp:85°C), T100°C (Tamb: –40 to 60°C, Tp:100°C), T120°C (Tamb: –40 to 80°C, Tp:120°C) * ³	KF21
	CENELEC ATEX (KEMA) Intrinsically safe Approval * ^{1*2} Applicable Standard: EN 50014, EN 50020, EN 50284, EN 50281-1-1 Certificate: KEMA 03ATEX1544X II 1G, 1D EEx ia IIC T4 Degree of protection : IP66 and IP67 Amb. Temp.(Tamb) for gas-proof: –50 to 60°C (–58 to 140°F) * ³ Maximum Process Temp.(Tp) for gas-proof : 120°C Electrical data : Ui=30 V, Ii=200 mA, Pi=0.9 W, Ci=10 nF, Li=0 mH Max. surface Temp. for dust-proof : T85°C (Tamb: –40 to 60°C, Tp:80°C), T100°C (Tamb: –40 to 60°C, Tp:100°C), T120°C (Tamb: –40 to 60°C, Tp:120°C) * ³	KS2
	Combined KF21, KS2 and Type n * ^{1*2} Type n Applicable standard: EN60079-15 Referential standard: IEC60079-0, IEC60079-11 II 3G Ex nL IIC T4, Amb. Temp.: –50 to 60°C (–58 to 140°F) * ³ Ui=30 V DC, Ci=10 nF, Li=0 mH	KU21

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

Item	Description	Code
Canadian Standards Association (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: TYPE 4X, Temp. Code: T6...T4 Ex d IIC T6...T4 Enclosure: IP66 and 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.154, C22.2 No.213, C22.2 No.1010.1 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 II, Division 2, Groups E, F & G, Class III, Division 1 Enclosure: Type 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 [Nonincendive] Vmax=30V, Ci=10nF, Li=0 [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 and 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 [Ex nL] Ui=30V, Ci=10nF, Li=0 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	CS1
	Combined CF1 and CS1 *1*2	CU1
IECEx 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 T6...T4 Enclosure: IP66 and 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 and 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 [Ex nL] Ui=30V, Ci=10nF, Li=0 Flameproof Applicable Standard: IEC 60079-0:2004, IEC60079-1:2003 Certificate: IECEx CSA 07.0008 Flameproof for Zone 1, Ex d IIC T6...T4 Enclosure: IP66 and 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
Combination of approval	Combination of KU21, FU1 and CU1 *1*2	V1U

*1: Applicable for Electrical connection code **2, 4, 7, 9, C** and **D**.

*2: Not applicable for option code **/AL**.

*3: Lower limit of ambient temperature is -15°C (5°F) when **/HE** is specified.

■ OPTIONAL SPECIFICATIONS

Item		Description	Code	
Painting	Color change	Amplifier cover only* ⁶	P□	
		Amplifier cover and terminal cover, Munsell 7.5 R4/14	PR	
	Coating change	Anti-corrosion coating* ^{1*6}	X2	
316 SST exterior parts		316 SST zero-adjustment screw and setscrews* ⁸	HC	
Fluoro-rubber O-ring		All O-rings of amplifier housing. Lower limit of ambient temperature: -15°C (5°F)	HE	
Lightning protector		Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.) 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	
Status output * ⁷		Transistor output (sink type) Contact rating: 10.5 to 30 V DC, 120 mA DC (max) Low level: 0 to 2 V DC	AL	
Oil-prohibited use		Degrease cleansing treatment	K1	
Oil-prohibited use with dehydrating treatment		Degrease cleansing treatment and dehydrating treatment	K5	
Calibration units * ²	P calibration (psi unit)		D1	
	bar calibration (bar unit)		D3	
	M calibration (kgf/cm ² unit)		D4	
Operating temperature correction * ³		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 * ⁴	Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less.		C1	
	NAMUR NE43 Compliant Output signal limits : 3.8 mA to 20.5 mA	Failure alarm down-scale : Output status at CPU failure and hardware error is -5%, 3.2 mA DC or less.	C2	
		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	N4	
Data configuration at factory * ⁵	Data configuration for HART communication type		Software damping, Descriptor, Message	CA
	Data configuration for BRAIN communication type		Software damping	CB
Advanced diagnostics * ⁹		Multi-sensing process monitoring • Impulse line blockage detection * ¹⁰	DG6	
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

*1: Not applicable with color change option.

*2: 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**.

*3: Specify the process operating temperature for zero correction. Example: Zero correction by process temperature 90°C.

*4: Applicable for output signal code **D** and **E**. The hardware error indicates faulty amplifier or capsule.

*5: Also see 'Ordering Information.'

*6: Not applicable for amplifier housing code **2** and **3**.

*7: Check terminals cannot be used when this option is specified. Not applicable for output signal code **F**.

*8: 316 or 316L SST. The specification is included in amplifier code **2**.

*9: Applicable only for output signal code **-E**.

*10: 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.

Item		Description		Code	
Pressure test/ Leak test Certificate *1		[Flange rating]	[Test pressure]		
	For A-Capsule	JIS 10K	2 MPa (290 psi)	Nitrogen (N ₂) Gas *2 Retention time: one minute	T51
		JIS 20K, 40K	3.5 MPa (500 psi)		T53
		ANSI/JPI Class 150	3 MPa (430 psi)		T52
		ANSI/JPI Class 300, 600	3.5 MPa (500 psi)		T53
	For B-Capsule	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*3	High pressure-proof structure for ANSI/JPI class 600 flange.			HP	

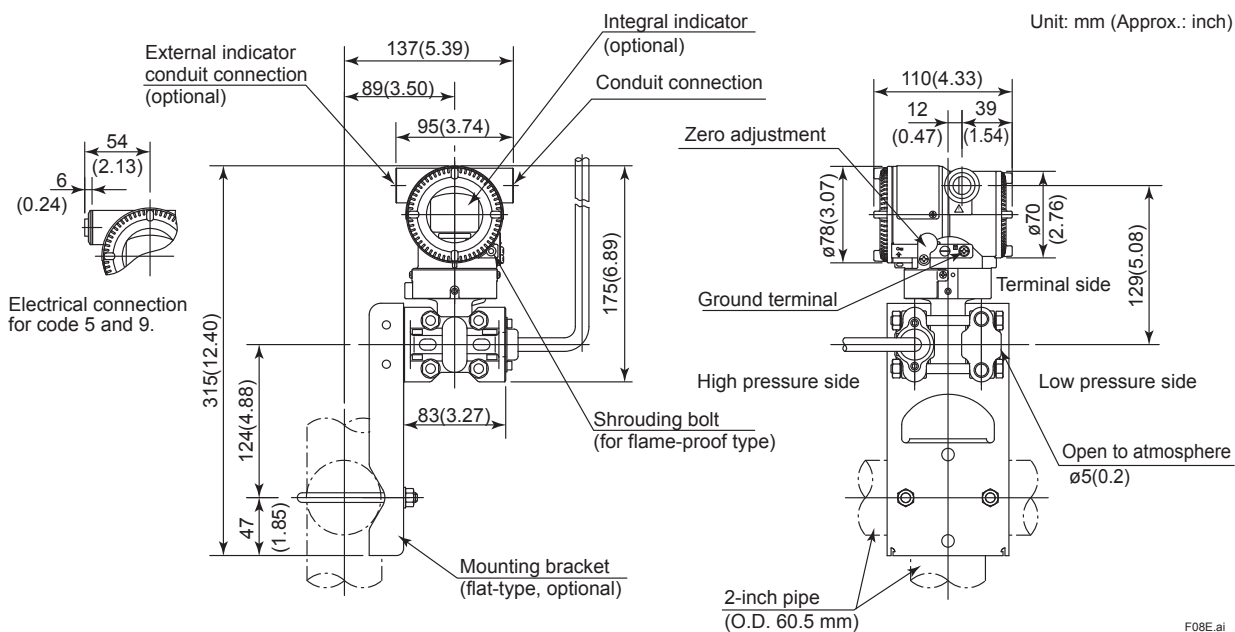
*1: The unit on the certificate is always MPa regardless of selection of option code **D1**, **D3**, or **D4**.

*2: Pure nitrogen gas is used for oil-prohibited use (option code **K1** and **K5**.)

*3: 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).

DIMENSIONS

<Transmitter body section>

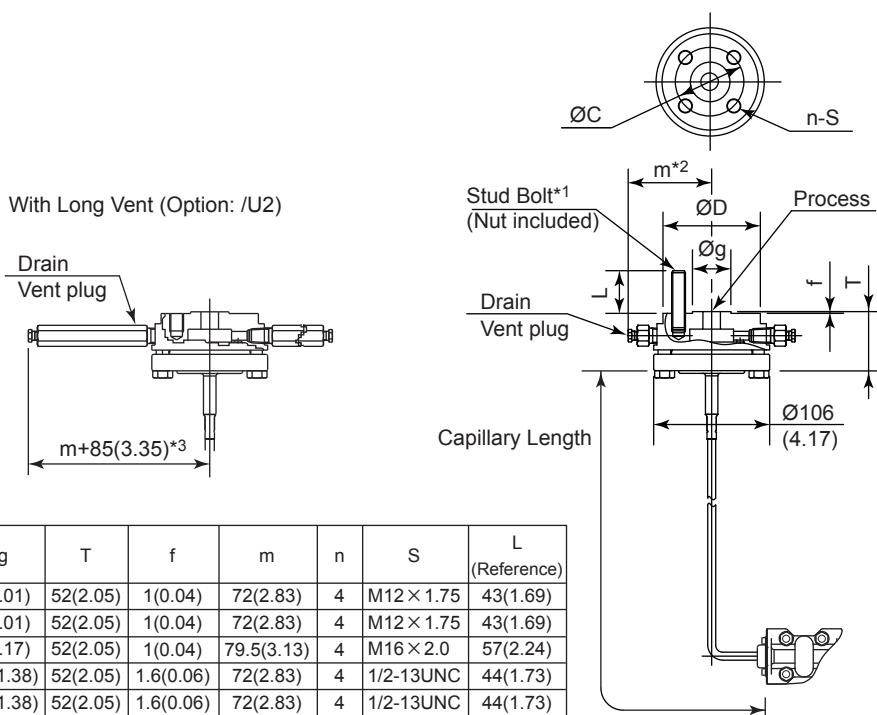


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<Diaphragm seal section>

• 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.

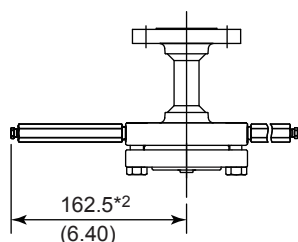
*4: This value is the same as flange standards. Actual value might be added 1mm(0.04inch) because the commercial gaskets can be used.

F09E.ai

- Flange connection type

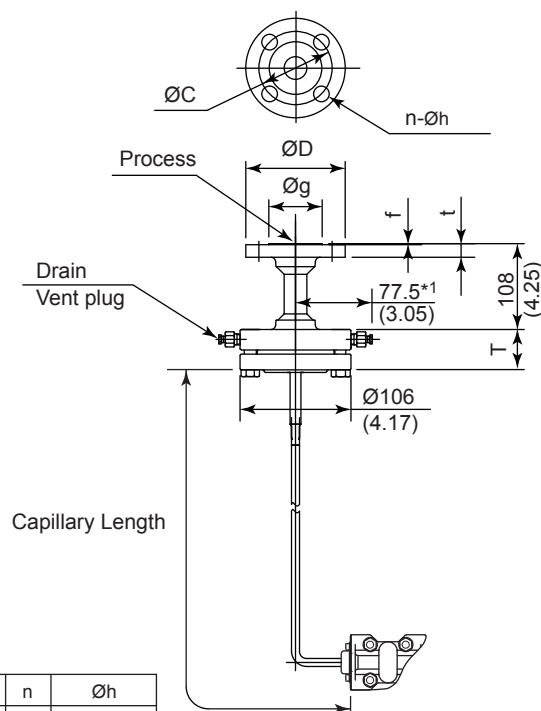
Unit: mm (Approx.: inch)

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)	39(1.54)	12(0.47)	1(0.04)	4	15(0.59)
JIS 20K	95(3.74)	70(2.76)	51(2.01)	39(1.54)	14(0.55)	1(0.04)	4	15(0.59)
JIS 40K	115(4.53)	80(3.15)	55(2.17)	39(1.54)	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)	39(1.54)	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)	39(1.54)	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)	60(2.36)	14.3(0.56)	6.4(0.25)	4	15.7(0.62)
JPI class 150	89(3.50)	60.5(2.38)	35.1(1.38)	39(1.54)	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)	39(1.54)	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)	60(2.36)	14.3(0.56)	6.4(0.25)	4	16(0.63)

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

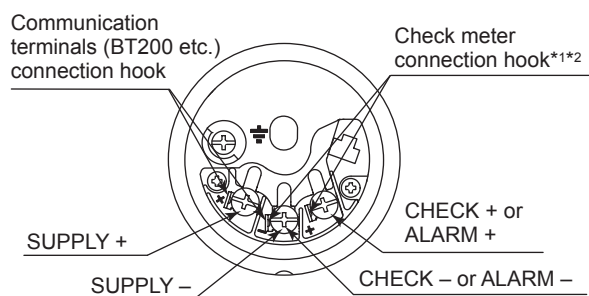
Flange rating	ØD	ØC	Øg	T	t	f	n	Øh
JIS 10K	100(3.94)	75(2.95)	56(2.20)	39(1.54)	14(0.55)	1(0.04)	4	15(0.59)
JIS 20K	100(3.94)	75(2.95)	56(2.20)	39(1.54)	16(0.63)	1(0.04)	4	15(0.59)
JIS 40K	120(4.72)	85(3.35)	60(2.36)	39(1.54)	20(0.79)	1(0.04)	4	19(0.75)
ANSI class 150	98.6(3.88)	69.9(2.75)	42.9(1.69)	39(1.54)	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)	39(1.54)	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)	60(2.36)	15.8(0.62)	6.4(0.25)	4	19.1(0.75)
JPI class 150	99(3.90)	69.8(2.75)	42.9(1.69)	39(1.54)	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)	39(1.54)	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)	60(2.36)	15.8(0.62)	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)	39(1.54)	14(0.55)	1(0.04)	4	19(0.75)
JIS 20K	125(4.92)	90(3.54)	67(2.64)	39(1.54)	16(0.63)	1(0.04)	4	19(0.75)
JIS 40K	130(5.12)	95(3.74)	70(2.76)	39(1.54)	22(0.87)	1(0.04)	4	19(0.75)
ANSI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	39(1.54)	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)	39(1.54)	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)	60(2.36)	17.6(0.69)	6.4(0.25)	4	19.1(0.75)
JPI class 150	108(4.25)	79.2(3.12)	50.8(2.00)	39(1.54)	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)	39(1.54)	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)	60(2.36)	17.6(0.69)	6.4(0.25)	4	19(0.75)

F10E.ai

• Terminal Configuration



F11E.ai

• Terminal Wiring

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

*1: When using an external indicator or check meter, the internal resistance must be $10\ \Omega$ or less. A check meter or indicator cannot be connected when /AL option is specified.

*2: Not available for fieldbus communication type.

• Wiring Example for Analog Output and Status Output

Connection	Description
Analog output	F12E.ai
Analog and Status output (when /AL is specified) If shield cable is not used, communication is not possible.	Use two-wire separately shielded cables. F13E.ai

< 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. 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 (upto 8 letters) to be written on the amplifier memory and Tag number(upto 16 letters) to be engraved on the tag plate seperately.
5. 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 sec)

[/CB : For BRAIN communication type]

 - 1) Software damping (0.00 to 100.00 sec)
6. Process fluid temperature for zero compensation (if required)

< Factory Setting > “◇”

Tag Number	As specified in order
Software damping *1	'2.00 sec' 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