

General Specifications

Model EJ115
Low Flow Transmitter

DPharP

GS 01C20K01-00E

[Style: S3]

The model EJ115 Low Flow Transmitter is a flowmeter comprised of a differential pressure transmitter 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.

The orifice is available in six types with a bore ranging from 0.508 mm to 6.350 mm. The combination of the bore selection with the differential pressure measurement span variation of the differential pressure transmitter enables a wide range of very small flow measurement.

The model EJ115 also features remote setup and monitoring through communications with the model BT200/100 BRAIN TERMINAL, CENTUM-CS/XL system, etc.



STANDARD SPECIFICATIONS

Measurement Ranges:

Capsule	Differential Pressure Span	Water Equivalent Flow l/min	Air Equivalent Flow Nl/min
L	1 to 10 kPa {100 to 1000 mmH ₂ O}	0.016 to 7.2	0.44 to 198
M	1.3 to 130 kPa {130 to 13000 mmH ₂ O}	0.018 to 26.0	0.50 to 716
H	14 to 210 kPa {1400 to 2100 mmH ₂ O}	0.058 to 33.0	1.65 to 910

T01E.EPS

Output Signal:

4 to 20 mA DC, 2-wire system

Failure Alarm:

Output status at CPU failure;

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

Output status at Hardware error;

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

Down-scale: -2.5%, 3.6 mA DC

Conditions of Communication Line:

Power supply voltage;

18 to 42 V DC *

Load resistance; See Figure 1.

Note: In case of an intrinsically safe transmitter, external load resistance includes safety barrier resistance.

Communication distance;

2 km *, when polyethylene-insulated PVC-sheathed control (CEV) cables are used.

Load capacitance; 0.22 μ F * or less

Load inductance; 3.3 mH * or less

Spacing from power lines; 15 cm or more

* For general type and flameproof type

Accuracy:

± 5 % of span

Ambient Temperature Limits:

-40 to 85 °C (-40 to 185 °F) (general-use type)

-30 to 80 °C (-22 to 176 °F) (with integral indicator)

(See 'Optional Specifications' for Explosion-protected types)

Process Temperature Limits:

-40 to 120 °C (-40 to 248 °F) (general-use type)

(See 'Optional Specifications' for Explosion-protected types)

Ambient Humidity Limits:

5 to 100 % R.H. (at 40 °C)

Working Pressure Limits:

2.7 kPa abs {20 mmHg abs} to maximum working pressure (See 'Model and Suffix Codes').

For atmospheric pressure or below, see Figure 2.

Power Supply Effect:

± 0.005 %/V (21.6 to 32 V DC, 350 Ω)

Mounting:

2-inch pipe mounting

Mounting Position Effect:

440 Pa {45 mmH₂O} /90 °.

No effect for displacement parallel to diaphragm.

These errors can be corrected by the zero adjustment.

Degrees of Protection:

IP67, NEMA4, JIS C0920 immersion proof

Explosion-protected Construction:

See 'Optional Specifications.'

Electrical Connection:

See 'Model and Suffix Codes.'

Process Connections:

See 'Model and Suffix Codes.'

Wetted Parts Material:

Diaphragm, cover flange, process connector, vent plug, manifold, and orifice; See 'Model and Suffix Codes.'
Capsule gaskets; Teflon-coated JIS SUS 316L Process connector gasket; PTFE (Teflon)

Flange Bolts and Nuts Material:

See 'Model and Suffix Codes.'

Amplifier Housing:

Cast aluminum alloy.

Painting:

Polyurethane resin baked finish
For case; frosty white (Munsell 2.5Y8.4/1.2)
For cover; deep sea moss green (Munsell 0.6GY3.1/2.0)

Integral Indicator:

LCD digital indicator (optional)

Damping Time Constant:

(Sum of time constants for amplifier assembly and capsule assembly)

Amplifier assembly time constant; Can be set in 9 increments from 0.2 to 64 seconds.

Capsule assembly time constant;

Capsule	L	M	H
Time Constant (sec)	Approx. 0.7	Approx. 0.5	Approx. 0.3

T02E.EPS

<Settings When Shipped>

Tag Number	As specified in order *1
Output Mode	'Linear' unless otherwise specified in order
Display Mode	'Square root'
Operation Mode	'Normal' unless otherwise specified in order
Damping Time Constant *2	'2 sec.'
Calibration Range Lower Range Value	As specified in order
Calibration Range Higher Range Value	As specified in order
Calibration Range Units	Selected from mmH ₂ O, mmAq, mmWG, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm ² , kgf/cm ² , inH ₂ O, inHg, ftH ₂ O, or psi. (Only one unit can be specified.)

T05E.EPS

*1: Up to 16 alphanumeric characters (including - and ·) will be entered in the amplifier memory.

*2: If using square root output, set damping time constant to 2 sec. or more.

EMC Conformity Standards: **N200**

AS/NZS CISPR11

External Zero Adjustment:

Continuously adjustable

Resolution : 0.01 % of span

Zero Adjustment Limits:

Zero can be fully elevated or suppressed as long as low and high range values are within the measurement range limits of the capsule.

Tag Plate:

JIS SUS 304

Weight:

9.8 kg (21.8 lb) (with mounting bracket)

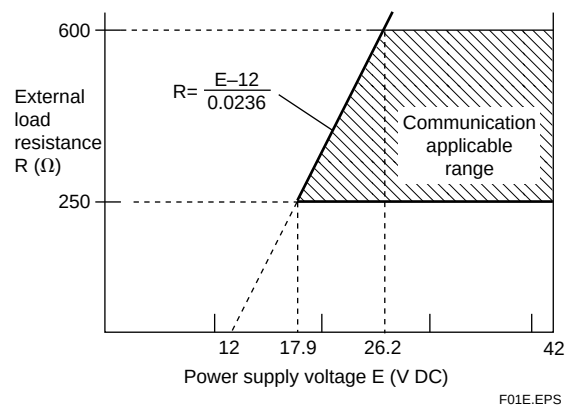


Figure 1. Relationship Between Power Supply Voltage and External Load Resistance

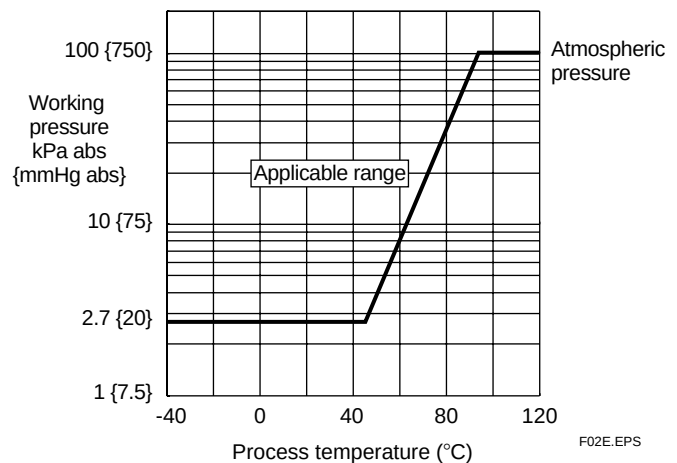


Figure 2. Working Pressure and Process Temperature

MODEL AND SUFFIX CODES

● Model EJ115 (L capsule)

Model	Suffix codes	Description
EJ115		Low flow transmitter
Output signal	-D	4 to 20 mA DC with digital communication (BRAIN protocol)
Measurement span (capsule)	L	1 to 10 kPa {100 to 1000 mmH ₂ O}
Wetted parts material *4	S	[Body] JIS SUS 316*2 [Capsule] JIS SUS 316L *1 [Orifice] JIS SUS 316
Process connections	2 4	Rc1/2 female 1/2NPT female
—	00	Always 00
Bolts and nuts material ☆	A B	[Maximum working pressure] JIS SCM 435 3.5 MPa{35 kgf/cm ² } JIS SUS 630 3.5 MPa{35 kgf/cm ² }
Installation ☆	-0 -1 -2 -3 -4 -5	Vertical impulse piping type, left side terminal box, manifold upside Vertical impulse piping type, left side terminal box, manifold downside Vertical impulse piping type, right side terminal box, manifold upside Vertical impulse piping type, right side terminal box, manifold downside Horizontal impulse piping type, left side terminal box *3 Horizontal impulse piping type, right side terminal box *3
Electrical connection ☆	0 1 2 5 6 7	G1/2 female G3/4 female 1/2 NPT female G1/2 female, with external indicator connection and a blind plug G3/4 female, with external indicator connection and a blind plug 1/2 NPT female, with external indicator connection and a blind plug
Integral indicator ☆	D N	Digital indicator (None)
Mounting bracket ☆	A B N	JIS SECC 2-inch pipe mounting (flat type) JIS SUS 304 2-inch pipe mounting (flat type) (None)
Optional codes	/□ Optional specifications	

T06E.EPS

The '☆' marks indicate the most typical selection for each specifications. Example: EJ115-DLS200A-02NA /□

*1: Diaphragm material is Hastelloy C-276 or ASTM N10276. Indicated is other capsule wetted parts material.

*2: Indicates cover flange material. Material of process connectors is SCS14A (SUS316 equivalent).
Manifold and vent plug materials are SUS316.

*3: Not available with integral indicator.

*4: ⚠ 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.

● Model EJ115 (M and H capsules)

Model	Suffix codes	Description
EJ115		Low flow transmitter
Output signal	-D	4 to 20 mA DC with digital communication (BRAIN protocol)
Measurement span (capsule)	M H	1.3 to 130 kPa {30 to 13000 mmH ₂ O} 14 to 210 kPa {1400 to 2100 mmH ₂ O}
Wetted parts material *4	S	[Body] JIS SUS 316*2 [Capsule] JIS SUS 316L *1 [Orifice] JIS SUS 316
Process connections	2 4	Rc1/2 female 1/2NPT female
—	00	Always 00
Bolts and nuts material ☆	A B	[Maximum working pressure] JIS SCM 435 13.7 MPa{140 kgf/cm ² } JIS SUS 630 13.7 MPa{140 kgf/cm ² }
Installation ☆	-0 -1 -2 -3 -4 -5	Vertical impulse piping type, left side terminal box, manifold upside Vertical impulse piping type, left side terminal box, manifold downside Vertical impulse piping type, right side terminal box, manifold upside Vertical impulse piping type, right side terminal box, manifold downside Horizontal impulse piping type, left side terminal box *3 Horizontal impulse piping type, right side terminal box *3
Electrical connection ☆	0 1 2 5 6 7	G1/2 female G3/4 female 1/2 NPT female G1/2 female, with external indicator connection and a blind plug G3/4 female, with external indicator connection and a blind plug 1/2 NPT female, with external indicator connection and a blind plug
Integral indicator ☆	D N	Digital indicator (None)
Mounting bracket ☆	A B N	JIS SECC 2-inch pipe mounting (flat type) JIS SUS 304 2-inch pipe mounting (flat type) (None)
Optional codes	/□ Optional specifications	

T07E.EPS

The '☆' marks indicate the most typical selection for each specifications. Example: EJ115-DMS200A-02NA /□

*1: Diaphragm material is Hastelloy C-276 or ASTM N10276. Indicated is other capsule wetted parts material.

*2: Indicates cover flange material. Material of process connectors is SCS14A (SUS316 equivalent).
Manifold and vent plug materials are SUS316.

*3: Not available with integral indicator.

*4: ⚠ 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.

<Measurement Range (Approximate Value)>

	Orifice Bore (mm)	L Capsule	M Capsule	H Capsule
Water Equivalent Maximum Flow Range l/min	0.508	0.016 to 0.049	0.018 to 0.177	0.058 to 0.225
	0.864	0.046 to 0.145	0.053 to 0.52	0.173 to 0.67
	1.511	0.134 to 0.42	0.152 to 1.52	0.50 to 1.93
	2.527	0.36 to 1.15	0.41 to 4.09	1.34 to 5.2
	4.039	0.92 to 2.9	1.02 to 10.2	3.4 to 13.0
	6.350	2.3 to 7.2	2.6 to 26	8.5 to 33
Air Equivalent Maximum Flow Range NI/min	0.508	0.44 to 1.40	0.50 to 5.0	1.65 to 6.4
	0.864	1.30 to 4.10	1.46 to 14.6	4.8 to 18.5
	1.511	3.7 to 11.7	4.2 to 42	14.0 to 54
	2.527	10.3 to 32	11.8 to 118	39 to 150
	4.039	25 to 79	29 to 291	96 to 370
	6.350	63 to 198	72 to 716	235 to 910

T10E.EPS

OPTIONAL SPECIFICATIONS

Item		Description		Code	
Painting	Color change	Amplifier cover only		P□	
	Coating change	Epoxy resin-baked coating *9		X1	
Lightning protector		Transmitter power supply voltage: 12.5 to 32 V DC Allowable current: Max. 6000 A (1×40 μs), Repeating 1000 A (1×40 μs) 100 times		A	
Oil-prohibited use		Degrease cleaning treatment		K1	
		Degrease cleaning treatment and with fluorinated oil filled capsule. Operating temperature: -20 to 80 °C		K2	
Steam tracing	Internal	Steam connection: R1/8 male *1 *2	Transmitter ambient temperature and process temperature after steam tracing must be within limits specified in GS.	H1	
	External	Steam connection: Rc1/4 female *1 Maximum steam pressure: 300 kPa {3 kgf/cm ² }		H2	
Calibration units *3		P calibration (psi unit)	(See Table 1.)	D1	
		bar calibration (bar unit)		D3	
		M calibration (kgf/cm ² unit)		D4	
Sealing Treatment to JIS SUS 630 nuts		Sealant(liquid silicone rubber) is coated on JIS SUS630 cover flange mounting nuts against stress corrosion cracking.		Y	
Long vent *4		Total length: 119 mm (standard: 39 mm); Total length when combining with Optional code K1 and K2: 130 mm. Material: SUS316.		U	
Left side high pressure		Process connection: Left side high pressure (standard, right side high pressure)		L	
CPU failure alarm down-scale *5		Output status at CPU failure and hardware error for -5%, 3.2 mA DC or less with attached user selectable high-low jumper switch.		C1	
Gold-plate		Surface of isolating diaphragms are gold plated, effective for hydrogen permeation.		A1	
Mill Certificate		Cover flange, Process connector, Manifold, Orifice, Spacer		M12	
Pressure test/Leak test Certificate *7*8		L capsule	3.5 MPa {35 kgf/cm ² }	Nitrogen (N ₂) Gas *6	T01
		M, H capsule	14 MPa {140 kgf/cm ² }	Retention time: 10 minutes	T05

T08E.EPS

- *1: If Process connections code 3 or 4 is specified, the steam connections will be NPT.
 *2: Maximum working pressure is 7.6 MPa {77 kgf/cm²}.
 *3: The unit of MTP (Max. working pressure) on name plates of a housing is same unit as specified by Optional code D1, D3, and D4.
 *4: Applicable only for vertical impulse piping type (Installation code 0, 1, 2, or 3).
 *5: The direction of hardware error alarm is user selectable by BT200.
 *6: Pure nitrogen gas is used for oil-prohibited use (Optional code K1 and K2)
 *7: Not applicable for internal steam tracing (Optional code H1)
 *8: The unit on the certificate is always MPa regardless of selection of option code D1, D3, or D4.
 *9: Not applicable for color change option.

Table 1. Calibration Units

Measurement Span and Range		Optional code		
		D1 (psi Unit)	D3 (bar Unit)	D4 (kgf/cm ² Unit)
L	Span	4 to 40 inH ₂ O	10 to 100 mbar	100 to 1000 mmH ₂ O
	Range	0 to 40 inH ₂ O	0 to 100 mbar	0 to 1000 mmH ₂ O
M	Span	5.2 to 520 inH ₂ O	13 to 1300 mbar	130 to 13000 mmH ₂ O
	Range	0 to 520 inH ₂ O	0 to 1300 mbar	0 to 13000 mmH ₂ O
H	Span	56 to 830 inH ₂ O	140 to 2100 mbar	1400 to 21000 mmH ₂ O
	Range	0 to 830 inH ₂ O	0 to 2100 mbar	0 to 21000 mmH ₂ O

T09E.EPS

■ OPTIONAL SPECIFICATIONS (For Explosion Protected types)

Item	Description		Code
Explosionproof type	TIIS Flameproof Approval, Ex do IIC T4X *2 *3 Certificate: TC13810 (Without integral indicator) TC13811 (With integral indicator) Amb. Temp. : -20 to 60 °C, Max. Process Temp. : 120 °C		JF3
	FM Explosionproof Approval Applicable standard: FM3600, FM3615, FM3810, NEMA 250, ANSI/NFPA 70 Class I, II and III, Division 1, Groups B, C, D, E, F and G. Outdoor hazardous locations (NEMA 4), Temperature class : T6 Electrical connection : 1/2 NPT female, Amb. Temp. : -40 to 60 °C		FF1
Intrinsically safe type	TIIS Intrinsically Safe Approval, i3aG4 *2 *5 *6 (Using Model BARD-800 safety barrier : Model BARD-400 can also be used.) Vm : 31.5 V DC, Im : 29.2 mA, Pm : 0.92 W, Load inductance : 1.0 mH or less, Load capacitance : 0.040 µF or less Amb. Temp. : -10 to 60 °C, Max. Process Temp. : 80 °C		JS11
	FM Intrinsically Safe Approval *4 Class I Division 1 groups A, B, C and D Class II Division 1 groups E, F and G, Class III Division 1 Vmax : 31.5 VDC Imax : 93 mA Pmax : 1.1 W Ci=2 nF Li=1.04 mH Temperature Class : T4 Outdoor hazardous locations (NEMA 4) Amb. Temp. : -20 to 60 °C		FS1
Attached flameproof packing adapter *1	Electrical connection : G1/2 female Applicable cable O.D. : 8 to 12 mm	1 pc.	G11
		2 pcs.	G12
	Electrical connection : G3/4 female Applicable cable O.D. : 10 to 16 mm	1 pc.	G21
		2 pcs.	G22

T12E.EPS

- *1: If cable wiring is to be used to a TIIS flameproof type, do not fail to add the YOKOGAWA-assured flameproof packing adapter.
 *2: TIIS (The Technology Institution of Industrial Safety) Certification is a new notation for the explosionproof approval in Japan instead of JIS.
 *3: In case the ambient temperature exceeds 50°C, use heat-resistant cables with maximum allowable temperature of 75°C or above.
 *4: Model BARD-800 is not applicable.
 *5: The communication distance is about 800 m when using polyethylene-insulated PVC sheathed control (CEV) cables.
 *6: See certificate list of TIIS intrinsically safe approval below.

	Connection to BARD-800	Connection to BARD-400
Without lightning protector (option code /A)	T56212	T54512
With lightning protector (option code /A)	T56213	

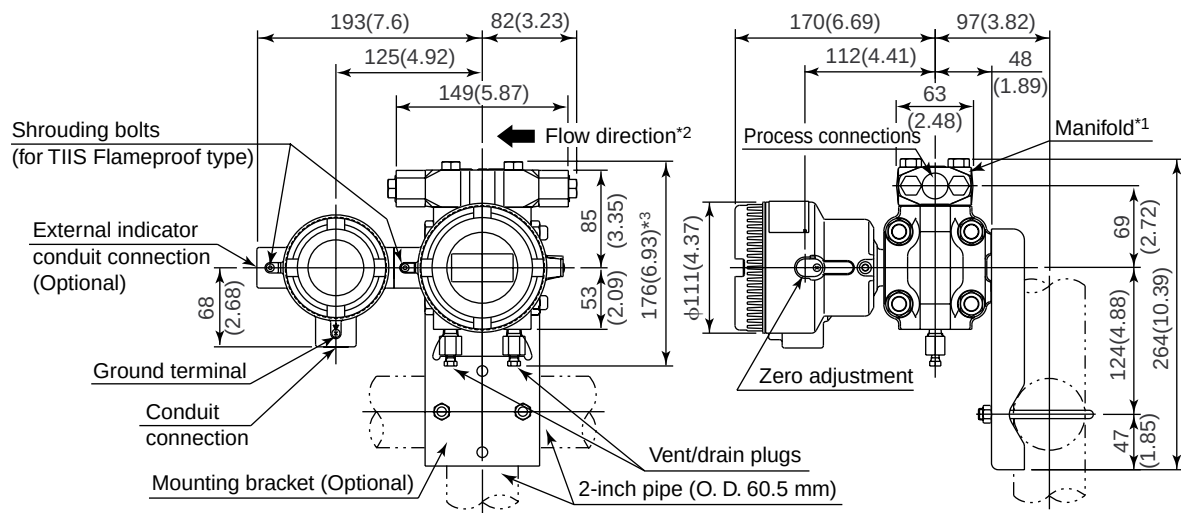
T13E.EPS

■ DIMENSIONS

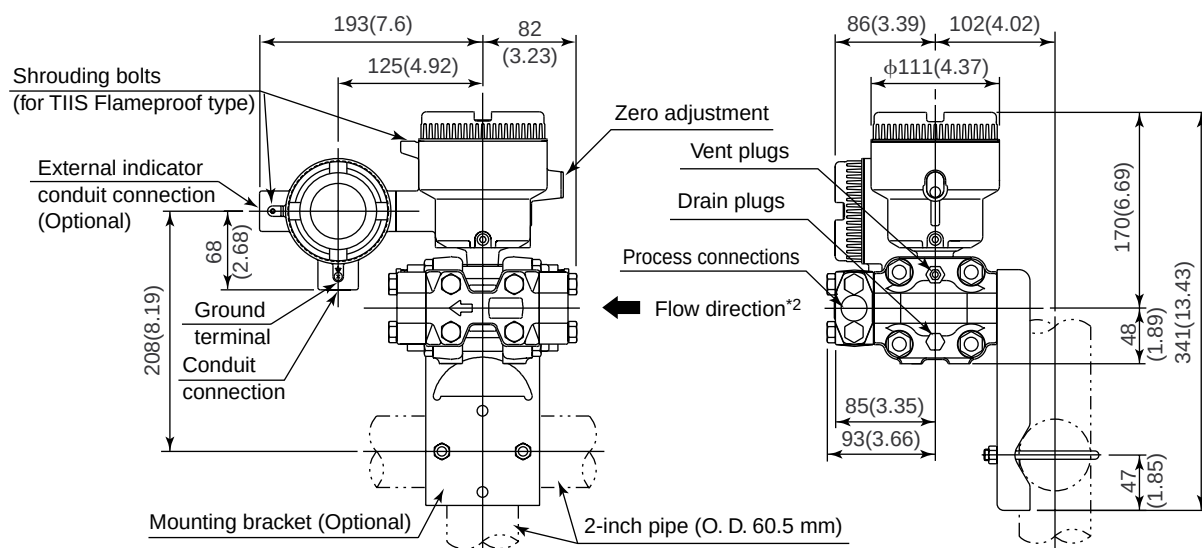
● **Model EJ115**

Unit: mm
(approx. inch)

- Vertical Impulse Piping Type



● Horizontal Impulse Piping Type



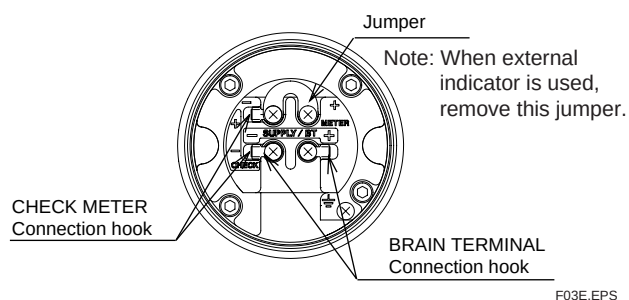
*1: When Installation code 1 is selected, the positions of manifold and vent/drain plugs on above figure are reversed.
(i.e. the process connectors are at the downside)

*2: When Optional code L is selected, the flow direction on above figure is reversed.
(i.e. the arrow faces to the right [➡])

*3: When Optional code K1 or K2 is selected, add 10 mm(0.39 inch) to the value in the figure.

F04E.EPS

● Terminal Configuration



● Terminal Wiring

SUPPLY/BT	+ -	Power supply and output terminal
METER	+ -	External indicator (ammeter) terminal
		Ground terminal

T11E.EPS

Note: When using an external indicator, the internal resistance must be 10Ω or less.

<Ordering Information>

Specify the Following When Ordering

1. Model, suffix codes, and optional codes
2. Calibrated range and units
 - 1) Calibration range can be specified with range value specifications up to 5 digits (excluding any decimal point) or low and high range limits within the range of -32000 to 32000.
 - 2) Specify only one unit from the table, 'Settings when shipped.'
3. Proportional or square root setting for output mode

Note: If not specified, the transmitter is shipped in proportional mode.
4. Select normal or reverse for operation mode

Note: If not specified, the transmitter is shipped in normal operation mode.
5. Display scale and units (for transmitters equipped with integral indicator only)

Specify either 0 to 100 % or engineering unit scale and '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 and high range limits within the range of -19999 to 19999.
6. Tag Number (if required)
7. 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.

<Related Instruments>

Power Distributor: Refer to GS 01B04T01-02E or GS 01B04T02-02E
 BRAIN TERMINAL: Refer to GS 01C00A11-00E

<Reference>

1. JIS SUS 316L stainless steel; Equivalent to AISI 316L.
2. JIS SUS 316 stainless steel; Equivalent to AISI 316.
3. JIS SUS 304 stainless steel; Equivalent to AISI 304.
4. JIS S25C carbon steel; Equivalent to AISI 1025.
5. Teflon; Trademark of E.I. DuPont de Nemours & Company (USA) for polytetrafluoroethylene.
6. JIS SCM 435 chrome molybdenum steel; Equivalent to AISI 4137.
7. JIS SUS 630 stainless steel; Equivalent to ASTM 630.
8. Hastelloy C-276; Trademark of Union Carbide Corporation (USA) for nickel-molybdenum alloy.
9. JIS SCS 14A stainless steel: Equivalent to JIS SUS 316 cast stainless steel or ASTM CF-8M.
10. Other company names and product names used in this material are registered trademarks or trademarks of their respective owners.