General Specifications

Model EJ130
Differential Pressure Transmitter

DPharp

GS 01C20B04-00E

[Style: S2]

The model EJ130 Differential Pressure Transmitter can be used to measure liquid, gas, or steam flow, as well as liquid level, density, and pressure. It outputs a 4 to 20 mA DC signal corresponding to the measured pressure differential.

The model EJ130 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	Measurement Span	Measurement Range
M	3.3 to 130 kPa {330 to 13000 mmH_2O}	-130 to 130 kPa {-13000 to 13000 mmH_2O}
H	18 to 700 kPa {0.18 to 7 kgf/cm^2}	-100 to 700 kPa {-1 to 7 kgf/cm^2}

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 μF * or less.
Load inductance; 3.3 mH * or less.
Spacing from power line; 15 cm or more.
* For general type and flameproof type

Accuracy:
See Table 1. and Figure 2.

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)

Ambient Temperature Effect:
See Table 1.

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 to 42 MPa {20 mmHg abs to 420 kgf/cm^2}
(See Figure 3).

Static Pressure Effect:
See table 1.

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 mmH_20} /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, and vent plug; See 'Model and Suffix Codes.'
Capsule gaskets; Teflon-coated JIS SUS 316L.
Process connector gasket; Glass reinforced Teflon

Flange Bolts and Nuts Material:
See 'Model and Suffix Codes.'

Amplifier Housing:
Cast aluminum alloy.

Integral Indicator:
LCD digital indicator (optional)

YOKOGAWA
Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
Phone: 81-422-52-5690 Fax.: 81-422-52-2018

GS 01C20B04-00E
©Copyright Dec. 1992
18th Edition Apr. 2006

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 sec.
Capsule assembly time constant;

Capsule	M	H
Time Constant (sec)	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	'Linear' unless otherwise specified in order
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_2O, mmAq, mmWG, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm^2, kgf/cm^2, inH_2O, inHg, ftH_2O, 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.

Paint:
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)

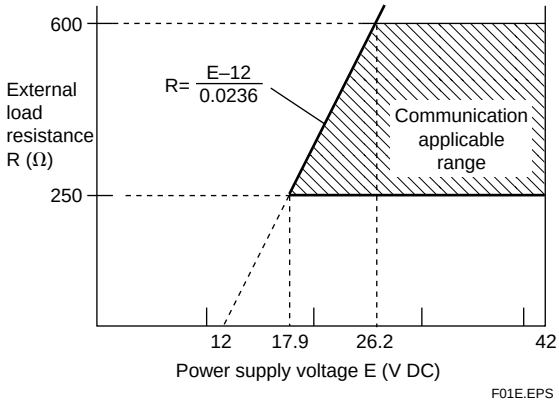
EMC Conformity Standards: N200
AS/NZS CISPR11

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:
13 kg (28.7 lb) (with mounting bracket).



F01E.EPS

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

Table 1. Accuracy, Ambient Temperature Effect, and Static Pressure Effect (With Linear Output, As Percent of 'x') *1

Capsule		M	H
Accuracy		±0.075 % For $x \geq$ Pref	± (0.025+0.05× Pref/x) % For x<Pref
Ambient temperature effect	Zero shift	± (0.2+0.06× Pref/x) %/50 °C change	± (0.2+0.1× Pref/x) %/50 °C change
	Total shift *4	±0.4 %/50 °C change For $x \geq$ 13.3 kPa {1330 mmH_2O} ± (0.25+0.1× Pref/x) %/50 °C change For x<13.3 kPa {1330 mmH_2O}	±0.4 %/50 °C change For $x \geq$ Pref ± (0.25+0.15× Pref/x) %/50 °C change For x< Pref
Static pressure effect *2	Zero shift	±(0.03+ 0.1× P/9.8 × Pref/x) %	±(0.05+0.2 × P/9.8 × Pref/x) %
	Total shift *3*4	± (0.05+0.25× P/9.8) % For $x \geq$ Pref ± (0.05+0.25× P/9.8 × Pref/x) % For x< Pref	

T06E.EPS

*1: 'x' is the highest value among the absolute values of lower range value (LRV) and higher range value (HRV), and the span value in a calibration range.

Percent of span = Percent of $x \times \frac{x}{\text{span}}$

Accuracy of square root output is as shown in Table 3.
*2: P; Static pressure
*3: Values for measurement span 4.9 kPa {500 mmH_2O] or below are estimate values.
*4: Combined zero and span shift.

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

Table 2. Value of 'Pref'

Capsule	M	H
Pref	20 kPa {2000 mmH_2O}	100 kPa {1 kgf/cm^2}

T07E.EPS

Table 3. Accuracy for Square Root Output

Square Root Output	Accuracy
50 % or greater	Same as accuracy for linear output
50 % down to dropout point	(linear output accuracy) $\times \frac{50}{\text{(square root output [\%])}}$

T08E.EPS

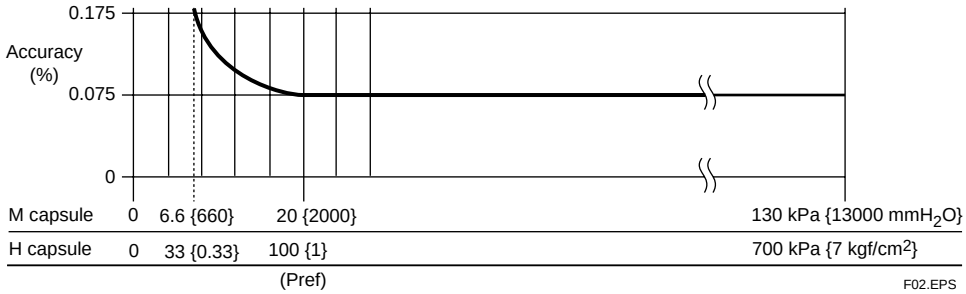
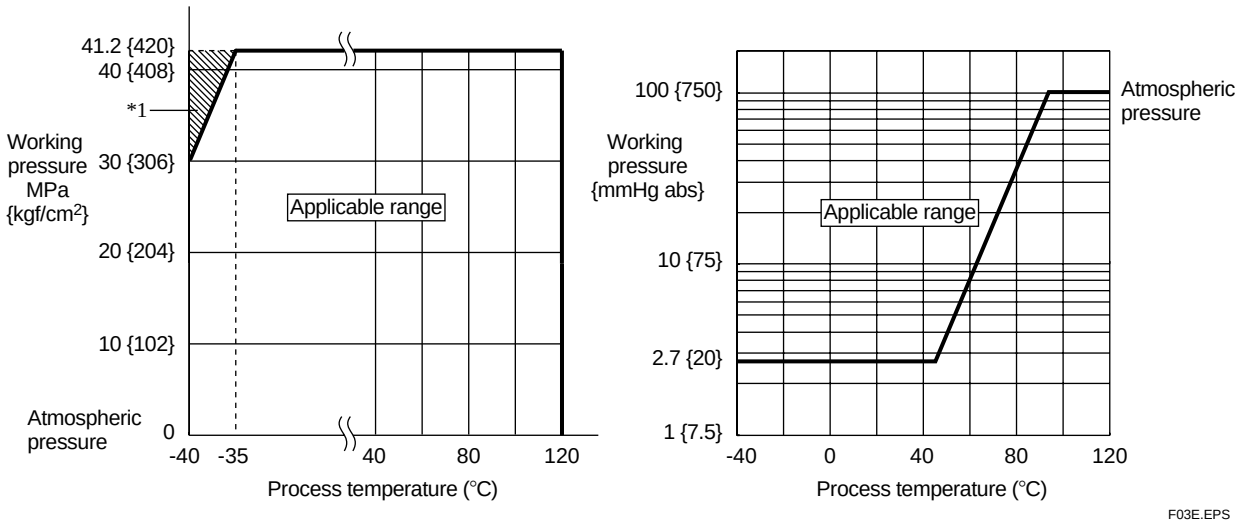


Figure 2. Accuracy



*1: Consult YOKOGAWA if the working pressure and process temperature are used in this region.

Figure 3. Working Pressure and Process Temperature

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
EJ130	· ·	Differential pressure transmitter
Output signal	**-D** ·	4 to 20 mA DC with digital communication (BRAIN protocol)
Measurement span (capsule)	**M** ·	3.3 to 130 kPa {330 to 13000 mmH_2O}
	H ·	18 to 700 kPa {0.18 to 7 kgf/cm^2}
Wetted parts material *4	**S** ·	[Body] JIS SUS316 *2 / [Capsule] JIS SUS316L *1 / [Vent plug] JIS SUS316
Process connection	**1** ·	Rc1/4 female
	2 ·	Rc1/2 female
	3 ·	1/4NPT female
	☆ **4** ·	1/2NPT female
Bolts and nuts material		[Maximum working pressure] (M, H capsule)
	☆ **A** ·	JIS SCM435 — 42 MPa{420 kgf/cm^2}
	B ·	JIS SUS630 — 42 MPa{420 kgf/cm^2}
Installation	☆ **-0** ·	Vertical impulse piping type, left side terminal box, process connector upside
	-1 ·	Vertical impulse piping type, left side terminal box, process connector downside
	-2 ·	Vertical impulse piping type, right side terminal box, process connector upside
	-3 ·	Vertical impulse piping type, right side terminal box, process connector downside
	-4 ·	Horizontal impulse piping type, left side terminal box, *3
	-5 ·	Horizontal impulse piping type, right side terminal box, *3
Electrical connection	**0** ·	G1/2 female
	1 ·	G3/4 female
	☆ **2** ·	1/2 NPT female
	5 ·	G1/2 female, with external indicator connection and a blind plug
	6 ·	G3/4 female, with external indicator connection and a blind plug
	7 ·	1/2 NPT female, with external indicator connection and a blind plug
Integral indicator	**D** ·	Digital indicator
	☆ **N** ·	(None)
Mounting bracket	☆ **A** ·	JIS SECC — 2-inch pipe mounting (flat type)
	B ·	JIS SUS304 — 2-inch pipe mounting (flat type)
	N ·	(None)
Optional codes		/☐ Optional specification

T09E.EPS

The '☆' marks indicate the most typical selection for each specification. Example: EJ130-DMS4A-02NA /☐

*1: Diaphragm material is Hastelloy C-276 or ASTM N10276. Indicated is other capsule wetted parts material.
*2: Indicates cover flange and process connector material.
*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 ºC [302 ºF] or above). Contact Yokogawa for detailed information of the wetted parts material.

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

■ 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/cm²}		**H2**
Calibration units *3		P calibration (psi unit)	(See Table 4.)	**D1**
		bar calibration (bar unit)		**D3**
		M calibration (kgf/cm² unit)		**D4**
Sealing treatment to JIS SUS630 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		**M11**
Pressure test/Leak test Certificate *7*8		42 MPa{420 kgf/cm²}, Nitrogen (N_2) Gas or Water *6 Retention time: 10 minutes		**T07**

T10E.EPS

*1: If Process connector code 3 or 4 is specified, the steam connections will be NPT.
*2: Maximum working pressure is 14 MPa {l40 kgf/cm²}.
*3: The unit of MWP (Max. working pressure) on name plates of a housing is same unit as specified by Optional code D1,D3, and D4.
*4: Applicable 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 or pure water 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 4. Calibration Units

Measurement Span and Range		Optional code		
		D1 (psi Unit)	D3 (bar Unit)	D4 (kgf/cm² Unit)
M	Span	13 to 520 inH_2O	33 to 1300 mbar	330 to 13000 mmH_2O
	Range	-520 to 520 inH_2O	-1300 to 1300 mbar	-13000 to 13000 mmH_2O
H	Span	72 to 2800 inH_2O	180 to 7000 mbar	0.18 to 7 kgf/cm²
	Range	-400 to 2800 inH_2O	-1000 to 7000 mbar	-1 to 7 kgf/cm²

T11E.EPS

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

■ 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 ℃, 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 ℃		**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 transmitter, 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	

T14E.EPS

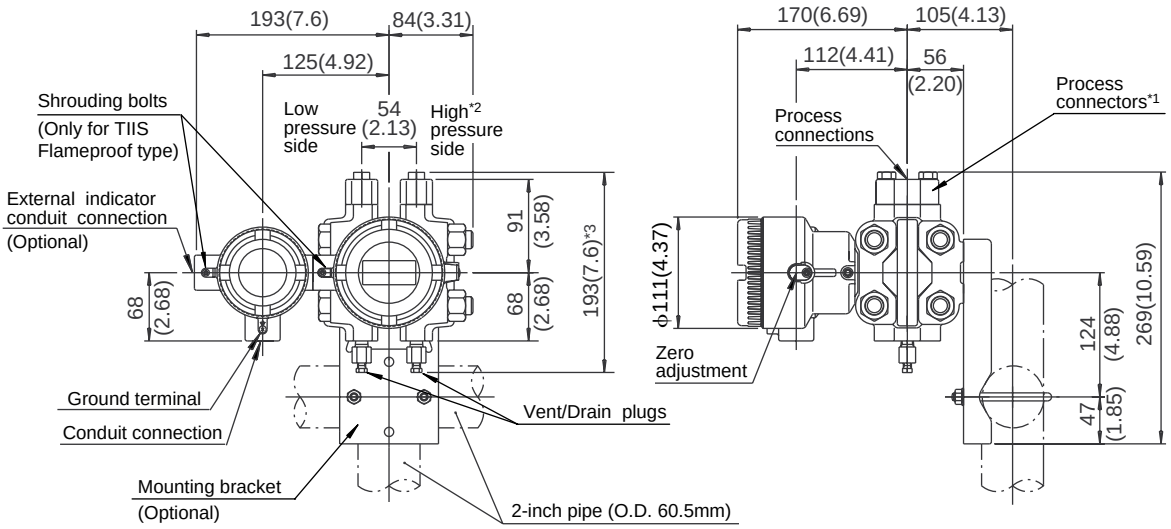
All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

■ DIMENSIONS

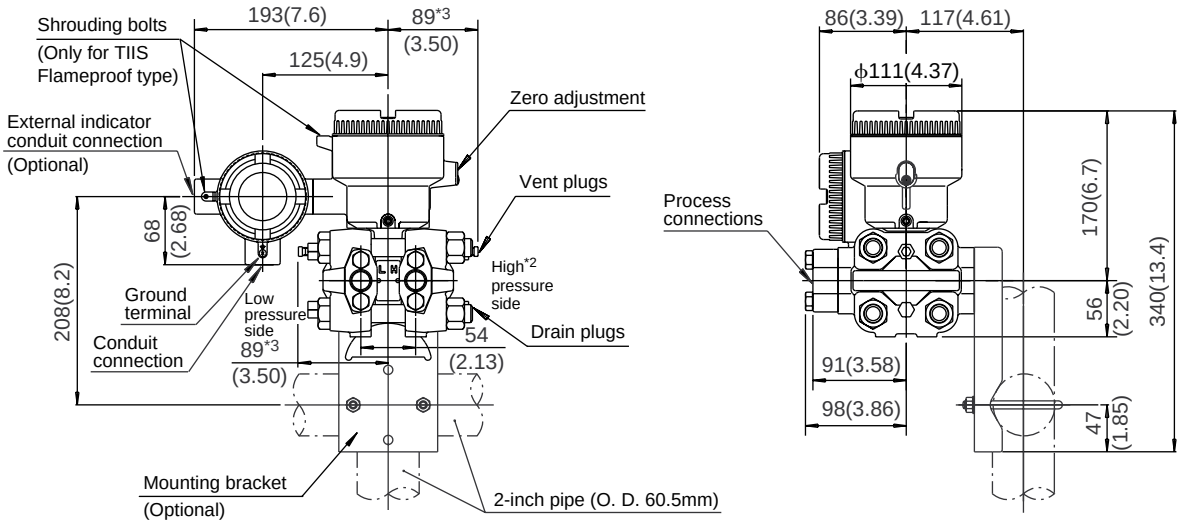
● Model EJ130

Unit: mm
(approx. inch)

● Vertical Impulse Piping Type



● Horizontal Impulse Piping Type



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

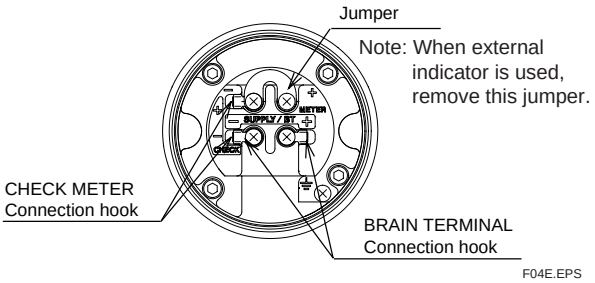
*2: When Optional code L is selected, high and low pressure side on above figure are reversed.
(i.e. high pressure side is on the left side)

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

F05E.EPS

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation

● **Terminal Configuration**



F04E.EPS

● **Terminal Wiring**

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

T13E.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. 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.
   2) Specify only one unit from the table, 'Settings when shipped'.
3. Select linear or square root for output mode and display mode.
   (Note) If not specified, the instrument is shipped set for linear mode.
4. Select normal or reverse for operation mode
   (Note) If not specified, the instrument 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 value specifications up to 5 digits (excluding any decimal point) for low or high range limits within the range of -19999 to 19999.
6. Tag Number. (if required)

<Related Instruments>

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

<Reference>

1. JIS SUS316L stainless steel; Equivalent to AISI 316L.
2. JIS SUS316 stainless steel; Equivalent to AISI 316.
3. JIS SUS304 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 SCM435 chrome molybdenum steel; Equivalent to AISI 4137
7. JIS SUS630 stainless steel; Equivalent to ASTM 630.
8. Hastelloy C-276; Trademark of Union Carbide Corporation (USA) for nickel-molybdenumalloy.
9. Other company names and product names used in this material are registered trademarks or trademarks of their respective owners.

All Rights Reserved. Copyright © 1992, Yokogawa Electric Corporation
Subject to change without notice.