General Specifications

Model EJA310A Absolute Pressure Transmitter

DPharp

GS1C21D1-E

The high performance gauge pressure transmitter model EJA310A can be used to measure liquid, gas, or steam pressure. It outputs a 4 to 20 mA DC signal corresponding to the measured absolute pressure. Model EJA310A also features remote setup and monitoring through communications with the BRAIN™ terminal and CENTUM-CS™ or µXL™ or HART® 275 host.

■STANDARD SPECIFICATIONS

Refer to GS 1C22T2-E for Fieldbus communication type marked with "◇."

□ PERFORMANCE SPECIFICATIONS

Zero-based calibrated span, linear output, wetted parts material code 'S' and silicone oil.

Reference Accuracy of Calibrated Span

(including the effects of zero-based linearity, hysteresis, and repeatability)

±0.15 % of Span or
±0.20 % of Span for L Capsule

±0.075 % of Span when /HAC is specified.

For spans below X,

$\pm[0.1 + 0.05\frac{X}{Span}]$ % of Span or

$\pm[0.15 + 0.05\frac{X}{Span}]$ % of Span for the L Capsule

$\pm[0.025 + 0.05\frac{X}{Span}]$ % of Span when/HAC is specified.

where X equals:

Capsule	X kPa {psi}
L	5.4 {22 inH_2O}
M	21.8 {3.2}
A	250 {36}

Ambient Temperature Effects

Total Effects per 28 ˚C (50 ˚F) Change

Capsule	Effect
L	±[0.095 % Span + 0.118 % URL]
M	±[0.084 % Span + 0.028 % URL]
A	±[0.080 % Span + 0.008 % URL]

Power Supply Effects "◇"

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

□ FUNCTIONAL SPECIFICATIONS

Span & Range Limits

(Units are in absolute terms.)

Measurement Span and Range		MPa	psi(/D1)	mbar(/D3)	mmHg(/D4)
L	Span	0.67 to 10 kPa	2.67 to 40 inH_2O	6.7 to 100	5 to 75
	Range	0 to 10 kPa	0 to 40 inH_2O	0 to 100	0 to 75
M	Span	1.3 to 130 kPa	0.38 to 38 inHg	13 to 1300	9.6 to 960
	Range	0 to 130 kPa	0 to 38 inHg	0 to 1300	0 to 960
A	Span	0.03 to 3	4.3 to 430	0.3 to 30 bar	0.3 to 30 kgf/cm^2
	Range	0 to 3	0 to 430	0 to 30 bar	0 to 30 kgf/cm^2

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URL is defined as the Upper Range Limit from the table above.

Minimum Input Pressure at Calibration

L capsule: 130 Pa abs. {1 mmHg abs.}
M and A capsules: 2.7 kPa abs. {20 mmHg abs.}

At range calibrating testing, minimum input pressure of 130 Pa abs. {1 mmHg abs.} is obtained by selecting Optional code S1. Always select S1 for M capsule with higher range value(HRV) not exceeding 3.4 kPa abs. {25 mmHg abs.}

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. Span may be adjusted locally using the digital indicator with range switch.

Mounting Position Effect

Rotation in diaphragm plane has no effect. Tilting up to 90˚ will cause zero shift up to 0.4 kPa {1.6 inH_2O} which can be corrected by the zero adjustment.

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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.

Failure Alarm:

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
Note: Applicable for Output signal code D and E

Damping Time Constant (1st order)

The sum of the amplifier and capsule damping time constant must be used for the overall time constant. Amp damping time constant is adjustable from 0.2 to 64 seconds.

Capsule (Silicone Oil)	L, M, and A
Time Constant (approx. sec)	0.2

Ambient Temperature Limits
(approval codes may affect limits)

-40 to 85 ˚C (-40 to 185 ˚F)
-30 to 80 ˚C (-22 to 176 ˚F) with LCD Display

Process Temperature Limits
(approval codes may affect limits)

-40 to 120 ˚C (-40 to 248 ˚F) - M & A capsules
-40 to 100 ˚C (-40 to 212 ˚F) - L capsule

Ambient Humidity Limits

5 to 100 % RH @ 40 ˚C (104 ˚F)

Maximum Overpressure

Capsule	Pressure
L, M	500 kPa {72 psia}
A	4.5 MPa {645 psia}

Working Pressure Limits (Silicone Oil)

Maximum Pressure Limit

Capsule	Pressure
L	10 kPa {1.47 psia}
M	130 kPa {18.65 psia}
A	3 MPa {430 psia)

Minimum Pressure Limit

See Figure 1.

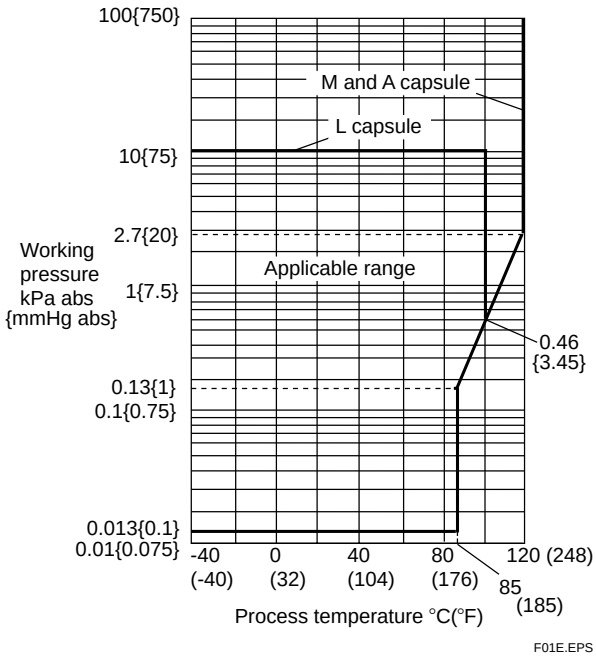

Figure 1. Working Pressure and Process Temperature

Supply & Load Requirements

(Safety approvals can affect electrical requirements)
With 24 V DC supply, up to a 570 Ω load can be used. See Figure 2.

Supply Voltage "◇"

10.5 to 42 V DC for operation(10.5 to 30 V DC for Intrinsically safe type)
16.4 to 42 V DC for digital communications(16.4 to 30 V DC for Intrinsically safe type)

Load (Output signal code D and E)

0 to 1335 Ω for operation
250 to 600 Ω for digital communication

EMC Conformity Standards CE , N200

For EMI (Emission): EN55011, AS/NZS 2064 1/2
For EMS (Immunity): EN50082-2

Communication 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 (see note)

Load Inductance

3.3 mH or less (see note)

Input Impedance of communicating device

10 kΩ or more at 2.4 kHz.

Note : For general-use and Flameproof type.
For Intrinsically safe type, please refer to 'OPTIONAL SPECIFICATIONS.'

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HART

Communication Distance
Up to 1.5 km (1 mile) when using multiple twisted pair cables. Communication distance varies depending on type of cable used.

Use the following formula to determine cable length for specific applications:

$$L=\frac{65 \times 10^6}{(R \times C)} - \frac{(C_f + 10{,}000)}{C}$$

Where:
L = length in meters or feet
R = resistance in Ω (including barrier resistance)
C = cable capacitance in pF/m or pF/ft
C_f = maximum shunt capacitance of receiving devices in pF/m or pF/ft

☐ PHYSICAL SPECIFICATIONS

Wetted Parts Materials

Diaphragm
Hastelloy C-276

Cover flange
SCS14A

Process connector
SCS14A

Capsule Gasket
Teflon-coated SUS316L

Vent and Drain Plug
SUS316

Process Connector Gasket
PTFE Teflon

Non-wetted Parts Materials

Bolting
SCM435 or SUS630

Housing
Low copper cast-aluminum alloy with polyurethane paint (Munsell 0.6GY3.1/2.0)

Enclosure Classification
JISC0920 immersion proof
(equivalent to NEMA 4X and IEC IP67)

Cover O-rings
Buna-N

Name plate and tag
SUS304

Fill Fluid
Silicone, Fluorinated oil(option)

Weight

3.9 kg (8.6 lb) without integral indicator, mounting bracket, and process connector.

Connections

Refer to the model code to specify the process and electrical connection type.

< Settings When Shipped > "◇"

Tag Number	As specified in order *1
Output Mode	'Linear'
Display Mode	'Linear'
Operation Mode	'Normal' unless otherwise specified in order
Damping Time Constant	'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 abs, mmHg abs, Torr, kPa abs, MPa abs, mbar abs, bar abs, kgf/cm^2 abs, inH_2O abs, inHg abs, ftH_2O abs, psia, psi abs, or atm. (Only one unit can be specified)

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

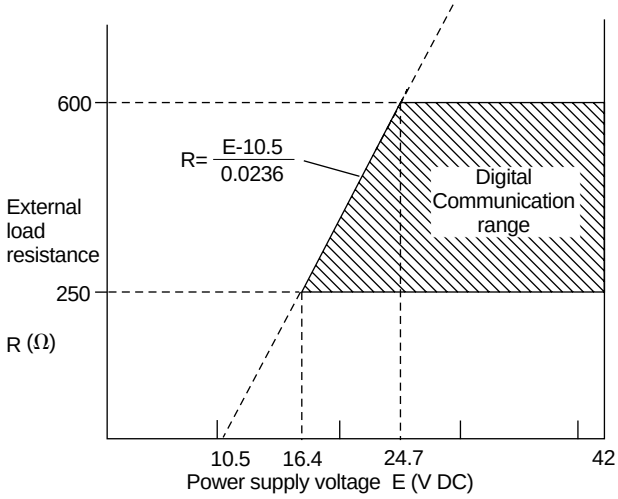

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Figure 2. Relationship Between Power Supply Voltage and External Load Resistance

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n MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
EJA310A	· · · · · · · · · · · · · · · · · · · ·	Absolute pressure transmitter
Output Signal	-D · · · · · · · · · · · · · · · · · · ·	4 to 20 mA DC with digital communication (BRAIN protocol)
	-E · · · · · · · · · · · · · · · · · · ·	4 to 20 mA DC with digital communication (HART protocol, refer to GS 1C22T1-E)
	-F · · · · · · · · · · · · · · · · · · ·	Digital communication (FOUNDATION Fieldbus protocol, refer to GS 1C22T2-E)
Measurement span (capsule)	L · · · · · · · · · · · · · · · · · · ·	0.67 to 10 kPa {5 to 75 mmHg}
	M · · · · · · · · · · · · · · · · · · ·	1.3 to 130 kPa {9.6 to 960 mmHg}
	A · · · · · · · · · · · · · · · · · · ·	0.03 to 3 MPa {0.3 to 30 kgf/cm²}
Wetted parts material		[Body] [Capsule] [Vent plug]
	S · · · · · · · · · · · · · · · · · · ·	SCS14A*1 SUS316L*2 SUS316
Process connections	0 · · · · · · · · · · · · · · · · · · ·	without process connector (Rc1/4 female on the cover flanges)
	1 · · · · · · · · · · · · · · · · · · ·	with Rc1/4 female process connector
	2 · · · · · · · · · · · · · · · · · · ·	with Rc1/2 female process connector
	3 · · · · · · · · · · · · · · · · · · ·	with 1/4 NPT female process connector
	4 · · · · · · · · · · · · · · · · · · ·	with 1/2 NPT female process connector
	☆ 5 · · · · · · · · · · · · · · · · · · ·	without process connector (1/4 NPT female on the cover flanges)
Bolts and nuts material		[Maximum working pressure] (L capsule) (M capsule) (A capsule)
	☆ A · · · · · · · · · · · · · · · · · · ·	SCM435 10 kPa abs {75 mmHg abs} 130 kPa abs {960 mmHg abs} 3 MPa abs {30 kgf/cm² abs}
	B · · · · · · · · · · · · · · · · · · ·	SUS630 10 kPa abs 130 kPa abs 3 MPa abs
	C · · · · · · · · · · · · · · · · · · ·	SUH660 10 kPa abs 130 kPa abs 3 MPa abs
Installation	-2 · · · · · · · · · · · · · · · · · · ·	Vertical impulse piping type, right side high pressure, process connector upside*3
	-3 · · · · · · · · · · · · · · · · · · ·	Vertical impulse piping type, right side high pressure, process connector downside*3
	-6 · · · · · · · · · · · · · · · · · · ·	Vertical impulse piping type, left side high pressure, process connector upside*3
	-7 · · · · · · · · · · · · · · · · · · ·	Vertical impulse piping type, left side high pressure, process connector downside*3
	-8 · · · · · · · · · · · · · · · · · · ·	Horizontal impulse piping type, right side high pressure*4
	☆ -9 · · · · · · · · · · · · · · · · · · ·	Horizontal impulse piping type, left side high pressure*4
Electrical connection	0 · · · · · · · · · · · · · · · · · · ·	G1/2 female, one electrical connection
	☆ 2 · · · · · · · · · · · · · · · · · · ·	1/2 NPT female, two electrical connections without blind plug
	3 · · · · · · · · · · · · · · · · · · ·	PG 13.5 female, two electrical connections without blind plug
	4 · · · · · · · · · · · · · · · · · · ·	M20 female, two electrical connections without blind plug
	5 · · · · · · · · · · · · · · · · · · ·	G1/2 female, two electrical connections and a blind plug
	7 · · · · · · · · · · · · · · · · · · ·	1/2 NPT female, two electrical connections and a blind plug
	8 · · · · · · · · · · · · · · · · · · ·	PG 13.5 female, two electrical connections and a blind plug
	9 · · · · · · · · · · · · · · · · · · ·	M20 female, two electrical connections and a blind plug
Integral indicator	D · · · · · · · · · · · · · · · · · · ·	Digital indicator
	E · · · · · · · · · · · · · · · · · · ·	Digital indicator with the range setting switch
	☆ N · · · · · · · · · · · · · · · · · · ·	(None)
Mounting bracket	☆ A · · · · · · · · · · · · · · · · · · ·	SECC Carbon steel 2-inch pipe mounting (flat type)
	B · · · · · · · · · · · · · · · · · · ·	SUS304 2-inch pipe mounting (flat type)
	C · · · · · · · · · · · · · · · · · · ·	SECC Carbon steel 2-inch pipe mounting (L type)
	D · · · · · · · · · · · · · · · · · · ·	SUS304 2-inch pipe mounting (L type)
	N · · · · · · · · · · · · · · · · · · ·	(None)
Optional codes		/☐ Optional specification

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The '☆' marks indicate the most typical selection for each specification. Example: EJA310A-DMS5A-92NA/☐

*1: Indicates cover flange and process connector material.
*2: Diaphragm material is Hastelloy C-276. Indicated is other wetted parts materials.
*3: If necessary, specify Mounting bracket code C or D.
*4: If necessary, specify Mounting bracket code A or B.

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n OPTIONAL SPECIFICATIONS (For Explosion Protected type "◇")

For FOUNDATION Fieldbus explosion protected type, see GS 1C22T2-E.

Item	Description	Code
Factory Mutual (FM)	FM Explosionproof Approval *3 Explosionproof for Class I, Division 1, Groups B, C and D Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G Hazardous (classified) locations, indoors and outdoors (NEMA 4X) Temperature class : T6 Amb. Temp. :–40 to 60 °C (–40 to 140 °F) Electrical connection : 1/2 NPT female *1	FF1
	FM Intrinsically safe Approval *3 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 Hazardous Locations. Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division. 2, Groups E, F & G, and Class III, Division 1 Hazardous Locations. Enclosure : "NEMA 4X", Temp. Class : T4, Amb. Temp. : –40 to 60 °C (–40 to 140 °F) Intrinsically Safe Apparatus Parameters [Groups A, B, C, D, E, F and G] Vmax=30 V, Imax=165 mA, Pmax=0.9 W, Ci=22.5 nF, Li=730 μH [Groups C, D, E, F and G] Vmax=30 V, Imax=225 mA, Pmax=0.9 W, Ci=22.5 nF, Li=730 μH Electrical connection : 1/2 NPT female *1	FS1
	Combined FF1and FS1*3 Electrical connection : 1/2 NPT female *1	FU1
CENELEC (KEMA)	CENELEC (KEMA) Flameproof Approval *3 EExd IIC T4, T5, T6, Amb. Temp. : –40 to 80 °C (–40 to 176 °F) Max. process Temp. : T4 ; 120 °C (248 °F), T5 ; 100 °C (212 °F), T6 ; 85 °C (185 °F) Electrical connection : 1/2 NPT female, Pg 13.5 female and M20 female *2	KF1
	CENELEC (KEMA) Intrinsically safe Approval *3 EEx ia IIC T4, Amb. Temp. : –40 to 60 °C(–40 to 140 °F) Ui=30 V, Ii=165 mA, Pi=0.9 W, Ci=22.5 nF, Li=730 μH Electrical connection : 1/2 NPT female, Pg 13.5 female and M20 female *2	KS1
	Combined KF1, KS1 and Type n Approval *3 KEMA Type n Approval Ex nA IIC T4, Amb. Temp. : –40 to 60 °C(–40 to 140 °F) U=30 V, I=165 mA Electrical connection : 1/2 NPT female, Pg 13.5 female and M20 female *2	KU1
Canadian Standards Association (CSA)	CSA Explosionproof Approval *3 Explosionproof for Class I, Division 1, Groups B, C and D Dustignitionproof for Class II/III, Division 1, Groups E, F and G Division2 'SEALS NOT REQUIRED' , Temp. Class : T4, T5, T6 Encl Type 4x Max. Process Temp. : T4 ; 120 °C (248 °F), T5 ; 100 °C (212 °F), T6 ; 85 °C (185 °F) Amb. Temp. :–40 to 80 °C (–40 to 176 °F) Electrical connection : 1/2 NPT female *1	CF1
	CSA Intrinsically safe Approval *3 Class I, Groups A, B, C and D Class II and III, Groups E, F and G Encl Type 4x, Temp. Class : T4, Amb. Temp. : –40 to 60 °C (–40 to 140 °F) Vmax=30 V, Imax=165 mA, Pmax=0.9 W, Ci=22.5 nF, Li=730 μH Electrical connection : 1/2 NPT female *1	CS1
	Combined CF1 and CS1 *3 Electrical connection : 1/2 NPT female *1	CU1
Standards Association of Australia (SAA)	SAA Flameproof, Intrinsically safe and Non-sparking Approval *3 Ex d IIC T4/T5/T6, IP67 class I, Zone 1, Amb. Temp. : –40 to 80 °C (–40 to 176 °F) Max. Process Temp. : T4 ; 120 °C (248 °F), T5 ; 100 °C (212 °F), T6 ; 85 °C (185 °F) Ex ia IIC T4, IP67 class I, Zone 0 Ex n IIC T4, IP67 class I, Zone 2 Ui=30 V DC, Ii=165 mA DC, Wi=0.9 W, Amb. Temp. : –40 to 60 °C (–40 to 140 °F) Electrical connection : 1/2 NPT female, Pg 13.5 female and M20 female *2	SU1

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*1: Applicable for Electrical connection code 2 and 7.
*2: Applicable for Electrical connection code 2, 3, 4, 7, 8, and 9.
*3: Applicable for Output signal code D and E.
For intrinsically safe approval, use the safety barrier certified by the testing laboratories (BARD-400 is not applicable).

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n OPTIONAL SPECIFICATIONS

Item		Description		Code
High Accuracy Type		High Accuracy		HAC
Painting	Color change	Amplifier cover only		P□
	Coating change	Epoxy resin-baked coating		X1
Lightning protector		Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type, 9 to 32 V DC for Fieldbus communication type.) Allowable current: Max. 6000 A (1×40 μs), Repeating 1000 A (1×40 μs) 100 times		A
Oil-prohibited use		Degrease cleansing treatment		K1
		Degrease cleansing treatment and with fluorinated oil filled capsule. Operating temperature -20 to 80 °C		K2
Oil-prohibited use with dehydrating treatment		Degrease cleansing treatment and dehydrating treatment		K5
		Degrease cleansing treatment and dehydrating treatment with fluorinated oilfilled capsule. Operating temperature -20 to 80 °C		K6
Calibration units *1		P calibration (psi unit)	(See Table for Span and Range Limits)	D1
		bar calibration (bar unit)		D3
		M calibration (kgf/cm^2 unit)		D4
Sealing treatment to SUS630 nuts		Sealant (liquid silicone rubber) is coated on surfaces of SUS630 nuts used for cover flange mounting.		Y
Long vent *2		Total vent plug Length: 112 mm (standard, 32 mm)		U
Fast response *11		Update time: 0.125 sec or less Response time (with min. damping time constant): max. 0.3 sec		F1
Failure alarm down-scale *3		Output status at CPU failure and hardware error. When combining with Optional code F1, output signal is -2.5%, 3.6 mA DC or less.		C1
Stainless steel amplifier housing *4		Amplifier housing material; SCS14A stainless steel (equivalent to SUS316 cast stainless steel or ASTM CF-8M)		E1
130 Pa abs {1 mmHg abs} Calibration *5		Minimum input pressure: 130 Pa abs{1 mmHg abs} at range calibrating testing		S1
Gold-plate		Gold-plated diaphragm		A1
Body option *12		Without drain and vent plugs		N1
		N1 and Process connection on both sides of cover flange with blind kidney flanges on back		N2
		N1, N2, and Mill certificate for cover flange, diaphragm, capsule body, and blind kidney flange		N3
Stainless steel tag plate		JIS SUS304 stainless steel tag plate wired onto transmitter		N4
Mill Certificate		Cover flange *6		M01
		Cover flange, Process connector *7		M11
pressure test/ Leak test Certificate		Test Pressure: 50 kPa{0.5 kgf/cm^2}*8	Nitrogen(N_2) Gas*10 Retention time: 10 minutes	T04
		Test Pressure: 3 MPa{30 kgf/cm^2}*9		T03

T06E.EPS

*1: The unit of MWP (Max. working pressure) on the name plate of a housing is the same unit as specified by Optional code D1, D3, and D4.
*2: Applicable for vertical impulse piping type (Installation code 2, 3, 6, or 7). Long vent materia is SUS316.
*3: Applicable for Output signal code D and E. The hardware error indicates faulty amplifier or capsule.
*4: Applicable for Electrical connection code 2, 3, 4, 7, 8, and 9. Not applicable for Optional code P□ and X1.
*5: Applicable for Capsule code M and A with higher range value(HRV) smaller than 53.3 kPa{400 mmHg abs} .
If not selected, minimum input pressure will be 2.7 kPa abs{20 mmHg abs} for calibration testing.
For Capsule code L, the Optional code S1 is featured as standard.
*6: Applicable for Process connections code 0 and 5.
*7: Applicable for Process connections code 1, 2, 3, and 4.
*8: Applicable for Capsule code L and M.
*9: Applicable for Capsule code A.
*10: Pure nitrogen gas is used for oil-prohibited use (Optional code K1, K2, K5, and K6).
*11: Applicable for Output signal code D and E. Consult Yokogawa when combining with Optional code for explosion protected type.
*12: Applicable for Process connection code 3, 4, and 5 and Installation code 9.

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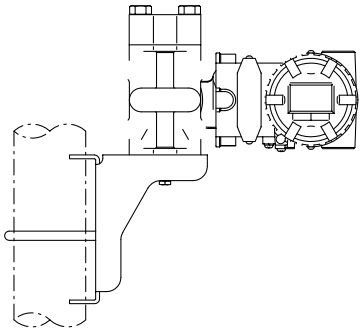
n DIMENSIONS

l Model EJA310A

Vertical Impulse Piping Type

Process connector upside (INSTALLATION CODE '6') (For CODE '2','3' or '7', refer to the notes below.)

Unit : mm (approx.inch)



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