General Specifications

Model EJA110A Differential Pressure Transmitter

DPharp

GS 1C21B1-E

The high performance differential pressure transmitter model EJA110A 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 differential pressure. Model EJA110A 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)

±0.075 % of Span

For spans below X

$$\pm[0.025 + 0.05 \frac{X}{Span}]\ \%\ of\ Span$$

where X equals:

Capsule	X kPa {inH_2O}
L	3 {12}
M	10 {40}
H	100 {400}
V	1.4 MPa {200 psi}

Square Root Output Accuracy
The square root accuracy is a percent of flow span.

Output	Accuracy
50 % or Greater	same as reference accuracy
50 % to Dropout point	$\frac{\text{reference accuracy} \times 50}{\text{square root output (\%)}}$

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

Capsule	Effect
L	±[0.08 % Span + 0.09 % URL]
M	±[0.07 % Span + 0.02 % URL]
H	±[0.07 % Span + 0.015 % URL]
V	±[0.07 % Span + 0.03 % URL]

Static Pressure Effects

Total Effects per Change
L capsule
±[0.07 % Span+0.052 % URL] per 3.4 MPa {500 psi}
M, H and V capsules
±[0.1% Span+0.028 % URL] per 6.9 MPa {1000 psi}

Effect on Zero (can be corrected at line pressure)
L capsule
±[0.02 % Span+0.052 % URL] per 3.4 MPa {500 psi}

M, H and V capsules
±0.028 % of URL per 6.9 MPa {1000 psi}

Overpressure Effects (M, H and V capsules)
±0.03 % of URL per 14 MPa {2000 psi}

Stability (M, H and V capsules)
±0.1 % of URL per 60 months

Power Supply Effects "◇"
±0.005 % per Volt (from 21.6 to 32 V DC, 350 Ω for Output signal code D and E.)

□ FUNCTIONAL SPECIFICATIONS

Span & Range Limits

Measurement Span/Range		kPa	inH_2O(/D1)	mbar(/D3)	mmH_2O(/D4)
L	Span	0.5 to 10	2 to 40	5 to 100	50 to 1000
	Range	-10 to 10	-40 to 40	-100 to 100	-1000 to 1000
M	Span	1 to 100	4 to 400	10 to 1000	100 to 10000
	Range	-100 to 100	-400 to 400	-1000 to 1000	-10000 to 10000
H	Span	5 to 500	20 to 2000	50 to 5000	0.05 to 5 kgf/cm^2
	Range	-500 to 500	-2000 to 2000	-5000 to 5000	-5 to 5 kgf/cm^2
V*1	Span	0.14 to 14 MPa	20 to 2000 psi	1.4 to 140 bar	1.4 to 140 kgf/cm^2
	Range	-0.5 to 14 MPa	-71 to 2000 psi	-5 to 140 bar	-5 to 140 kgf/cm^2

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*1: For Wetted parts material code other than S, the ranges are 0 to 14 MPa, 0 to 2000 psi, 0 to 140 bar, and 0 to 140 kgf/cm^2.

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

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.

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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.

Output "◇"

Two wire 4 to 20 mA DC output with digital communications, linear or square root programmable. 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	H and V
Time Constant (approx. sec)	0.8	0.6	0.3

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)

Ambient Humidity Limits

5 to 100 % RH @ 40 ˚C (104 ˚F)

Working Pressure Limits (Silicone Oil)

Maximum Pressure Limit

Capsule	Pressure
L	3.5 MPa {500 psig}
M, H, and V	14 MPa {2000 psig}

Minimum Pressure Limit

See graph below

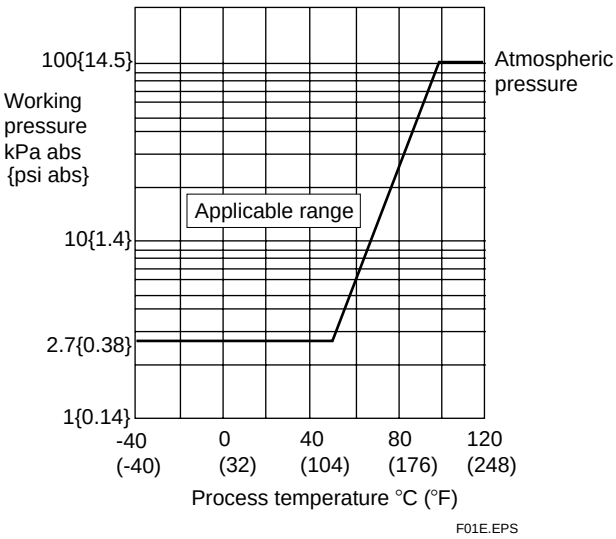

Figure 1. Working Pressure and Process Temperature

Supply & Load Requirements

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

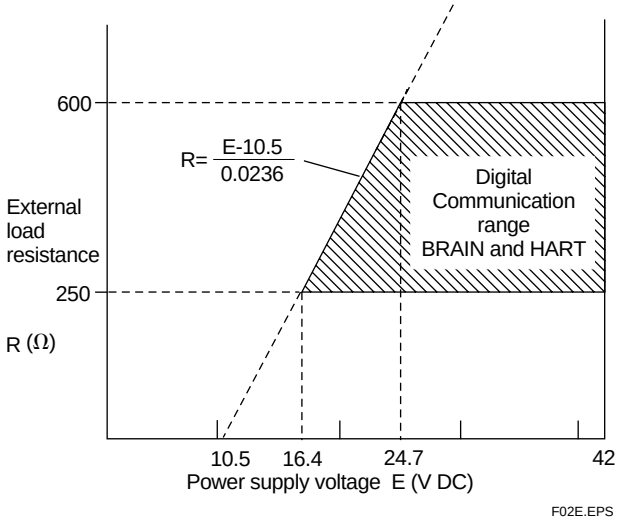

Figure 2. Relationship Between Power Supply Voltage and External Load Resistance

Supply Voltage "◇"

10.5 to 42 V DC for operation(10.5 to 30 V DC for Intrinsically safe type)
16.4 to 42 V DC for digital communications, BRAIN and HART protocols(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, Cover flange, Process connector, and Vent/Drain Plug
Refer to 'MODEL AND SUFFIX CODE.'

Capsule Gasket
For wetted parts material code S, Teflon-coated SUS316L.
For wetted parts material code other than S, PTFE(Teflon).

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
JIS C0920 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' 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, kPa, MPa, mbar, bar, gf/cm^2, kgf/cm^2, inH_2O, inHg, ftH_2O, or psi. (Only one unit can be specified)

T07E.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.

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n MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
EJA110A	á á á

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

T05E.EPS

*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 SPECIFICATION

Item		Description		Code
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*11		Degrease cleansing treatment		K1
		Degrease cleansing treatment and with fluorinated oilfilled capsule. Operating temperature -20 to 80 °C		K2
Oil-prohibited use with dehydrating treatment*11		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: 112mm (standard, 32mm)		U
Fast response*12		Update time: 0.125 sec or less Response time (with min. damping time constant): max. 0.5 sec (for L capsule: max. 0.6 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
Gold-plate*5		Gold-plated diaphragm		A1
Body option*13		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: 3.5 MPa{35 kgf/cm^2}*8	Nitrogen(N_2) Gas*10 Retention time: 10 minutes	T01
		Test Pressure: 14 MPa{140 kgf/cm^2}*9		T02

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, and 7) and Wetted parts material code S, H, M, and T. Long vent material 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 Wetted parts material code S.
*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.
*9: Applicable for Capsule code M, H and V.
*10: Pure nitrogen gas is used for oil-prohibited use (Optional code K1, K2, K5, and K6).
*11: Applicable for Wetted parts material code S, H, M, and T.
*12: Applicable for Output signal code D and E. Consult Yokogawa when combining with Optional code for explosion protected type.
*13: Applicable for Wetted material code S, H, T, and M; Process connection code 3, 4, and 5; and Installation code 9.

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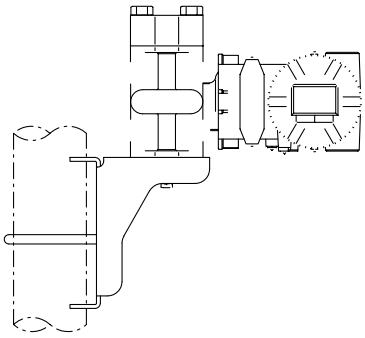
n DIMENSIONS

l **Model EJA110A**

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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