

General Specifications

EJA-E Series PROFIBUS PA Communication



GS 01C31T04-01EN

PROFIBUS is a vendor-independent and open fieldbus based on the international standard IEC61158 and IEC61784. It covers a wide range of applications in manufacturing and process automation fields.

Vendor-independence and openness allow communication between devices of different manufacturers with no special interface adjustment.

EJA-E PROFIBUS PA model offers more flexible instrumentation through a higher level communication capability and proposes the cost reduction by multidrop wirings with less cables.



■ FEATURES

- **Interoperability**
PROFIBUS specifications grant the interoperability of the field instruments without preparing designated softwares for the instrument.
- **Multi-sensing function**
EJA110E PROFIBUS PA model, for example, has three independent AI function blocks for differential pressure and static pressure.
- **Local operation interface (Applicable when digital indicator is specified)**
In addition to being able to perform zero adjustments, the local operation interface can be used to set the Bus address and Ident number by using switch on LCD within Digital indicator code E and external adjustment screw. With this function, it is no longer necessary to use a communication device to set the field device parameters; this can be done directly on the field device.
- **Multi-signal display (Applicable when digital indicator is specified)**
Up to four I/O signals can be alternatively displayed on the digital indicator. The block tags, the parameter names, the process units and the statuses are also displayed in order to show what the displayed signals are.
- **Alarm function**
EJA-E PROFIBUS PA models securely support various alarm functions, such as high/low alarm, notice of block error, etc. based on PROFIBUS specifications.
- **Self-diagnostic function**
A reliable self-diagnostic function based on the NAMUR NE107 standard detects failures in the hardware of pressure sensor, temperature sensor or amplifier assembly, measuring range setting, and communications.
- **Signal totalizer function**
Totalized process values can be calculated using the PROFIBUS totalizer function block. This enables the EJA-E to output totalized flow rate signals for flow applications. A periodic backup function guards against the loss of data when the power supply is disrupted.
- **Supported tools**
DTM for FieldMate
EDD for SIEMENS SIMATIC PDM

■ STANDARD SPECIFICATIONS

For items other than those described below, refer to each General Specification sheet.

Applicable Model:

All DPharp EJA-E series.

Output:

Digital communication signal based on PROFIBUS PA protocol.

Supply Voltage:

9 to 32V DC for general use, flameproof type, intrinsically safe (Ex ic), or nonincendive.
9 to 24 V DC for intrinsically safe type Entity model
9 to 17.5 V DC for intrinsically safe type FISCO model

Communication Requirements:

Supply Voltage: 9 to 32 V DC
Current Draw: 15 mA (max)

Response Time (for Primary Value)

150 ms

- When amplifier damping is set to zero, and including dead time.
- 185 ms for the following model and specification
 - EJA120E and EJA130E
 - Measurement span code: F and L

Update Period:

Differential Pressure: 100 ms
Static Pressure: 100 ms
Capsule Temperature: 1 s
Amplifier Temperature: 1 s

Integral Indicator (LCD display)

5-digit Numerical Display, 6-digit Unit Display and Bar graph. The indicator is configurable to display one or up to four of the I/O signals periodically.

Functional Specifications:

Functional specifications for PROFIBUS communication conform to the PROFIBUS PA Ver 3.02.

Function Block:

Three AI blocks, One Totalizer block

■ MODEL AND SUFFIX CODES

EJA□□□E-G□□□□-□□□□□/□

└─ Output signal ... Digital communication (PROFIBUS PA protocol)

■ OPTIONAL SPECIFICATIONS

For items other than those described below, refer to each General Specification sheet.

Item	Description	Code
Data configuration at factory *1	Software damping	CD

*1: Also see 'Ordering Information'

■ OPTIONAL SPECIFICATIONS (For Explosion Protected type)

Item	Description	Code
Factory Mutual (FM)	FM Explosionproof *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 (Enclosure: Type 4X) "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED." Temperature class: T6, Amb. Temp.: -40 to 60°C (-40 to 140°F)	FF1
	FM Intrinsically Safe and Nonincendive *1 Applicable Standard: FM3600, FM3610, FM3611, FM3810, NEMA 250, ANSI/ISA-60079-0, ANSI/ISA-60079-11, ANSI/ISA-60079-27, ANSI/UL 121201, ANSI/ISA-61010-1 Intrinsically Safe for Class I, II, & III, Division 1, Groups A,B,C,D,E,F & G, Entity, FISCO Class I, Zone 0, AEx ia IIC, Enclosure: Type 4X, Temp. Class: T4, Amb. Temp.: -55 to 60°C (-67 to 140°F) Intrinsically Apparatus Parameters : [FISCO (IIC)] Ui=17.5 V, Ii=380 mA, Pi=5.32 W, Ci=3.52 nF, Li=0 μH [FISCO (IIB)] Ui=17.5 V, Ii=460 mA, Pi=5.32 W, Ci=3.52 nF, Li=0 μH [Entity] Ui=24 V, Ii=250 mA, Pi=1.2 W, Ci=3.52 nF, Li=0 μH Nonincendive for Class I, Division 2, Groups A, B, C and D, NIFW, FNICO Class I, Zone 2, Group IIC, NIFW, FNICO Class II, Division 2, Groups F&G Enclosure: Type 4X, Temp. Class: T4, Amb. Temp.: -55 to 60°C (-67 to 140°F) Nonincendive Apparatus Parameters : Vmax.= 32 V, Ci = 3.52 nF, Li = 0 μH	FS15

Item	Description	Code
ATEX	ATEX Flameproof *1 Applicable Standard: EN IEC 60079-0, EN 60079-1, EN 60079-31 Certificate: KEMA 07ATEX0109 X II 2G, 2D Ex db IIC T6...T4 Gb, Ex tb IIIC T85°C Db Degree of protection: IP66/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) Process Temp. for gas-proof (Tp): T4; -50 to 120°C (-58 to 248°F), T5; -50 to 100°C (-58 to 212°F), T6; -50 to 85°C (-58 to 185°F) Max. surface Temp. for dust-proof: T85°C (Tamb: -30 to 75°C, Tp: -30 to 85°C) *2	KF22
	ATEX Intrinsically safe [Ex ia] *1 No. KEMA 04ATEX1116 X Applicable Standard: EN IEC 60079-0, EN 60079-11 II 1G, 2D Ex ia IIC/IIB T4 Ga Ex ia IIIC T85°C T100°C T120°C Db Ambient Temperature for EPL Ga: -55 to 60°C Ambient Temperature for EPL Db: -30 to 60°C *2 Maximum Process Temperature (Tp.): 120°C Maximum Surface Temperature for EPL Db: T85°C (Tp.: 80°C) T100°C (Tp.: 100°C) T120°C (Tp.: 120°C) Ambient Humidity: 0 to 100% (No condensation) Degree of Protection: IP66/IP67 Electrical Data: [FISCO (IIC)] Ui = 17.5 V, Ii = 380 mA, Pi = 5.32 W, Ci = 3.52 nF, Li = 0 µH [FISCO (IIB)] Ui = 17.5 V, Ii = 460 mA, Pi = 5.32 W, Ci = 3.52 nF, Li = 0 µH [Entity] Ui = 24 V, Ii = 250 mA(resistively limited), Pi = 1.2 W, Ci = 3.52 nF, Li = 0 µH	KS26
	ATEX Intrinsically safe [Ex ic] *1 Applicable standard: EN IEC 60079-0, EN 60079-11 II 3G Ex ic IIC T4 Gc Amb. Temp.: -30 to 60°C (-22 to 140°F) *2 Ui = 32 V, Ci = 3.52 nF, Li = 0 µH	KN26
Canadian Standards Association (CSA)	CSA Explosionproof *1 Certificate: 2014354 Applicable Standard: C22.2 No. 25, C22.2 No. 30, CAN/CSA-C22.2 No. 94, CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-2-030, CAN/CSA-C22.2 No. 60079-0, CAN/CSA-C22.2 No. 60079-1, CAN/CSA-C22.2 No. 60529 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/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 *2 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 *1 Certificate: 1689689 Applicable Standard: CAN/CSA-C22.2 No.0, CAN/CSA-C22.2 No.94, CAN/CSA-C22.2 No.157, C22.2 No.213, C22.2 No.61010-1, C22.2 No.61010-2-030, CAN/CSA-C22.2 No.60079-0, CAN/CSA E60079-11, CAN/CSA E60079-15, CAN/CSA-C22.2 No 60529 Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III; Ex ia IIC T4 Amb. Temp.: -55 to 60°C(-55 to 140°F)*2 Encl. Type 4X, IP66/IP67 Entity Parameters for Intrinsically Safe : Ui (Vmax) = 24 V dc, Ii (Imax) = 250 mA, Pi (Pmax) =1.2 W, Ci = 3.52 nF, Li = 0 µH or Ui (Vmax) = 17.5 V dc, Ii (Imax) = 380 mA, Pi (Pmax) = 5.32 W, Ci = 3.52 nF, Li = 0 µH Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups F & G, Class III; Ex nL IIC T4 Amb. Temp.: -55 to 60°C (-55 to 140°F)*2 Encl. Type 4X, IP66/IP67 Entity Parameters for Nonincendive: Ui = 32V dc, Ci = 3.52 nF, Li = 0 µH 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	CS15

Item	Description	Code
IECEX	IECEx Flameproof *1 Applicable Standard: IEC 60079-0, IEC60079-1 Certificate: IECEx CSA 07.0008 Flameproof for Zone 1, Ex d IIC T6...T4 Gb Enclosure: IP66/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	SF2
	IECEx Intrinsically safe Approval *1 Intrinsically safe Ex ia Certificate No.: IECEx DEK 12.0016X Applicable Standard: IEC 60079-0, IEC 60079-11 Ex ia IIC/IIB T4 Ga Amb. Temp.: -55 to 60°C(-55 to 140°F), Max. Process Temp.: 120°C(248°F) Electrical parameters: [Entity] Ui = 24 V, Ii = 250 mA, Pi = 1.2 W, Ci = 3.52 nF, Li = 0 µH [FISCO IIC] Ui = 17.5 V, Ii = 380 mA, Pi = 5.32 W, Ci = 3.52 nF, Li = 0 µH [FISCO IIB] Ui = 17.5 V, Ii = 460 mA, Pi = 5.32 W, Ci = 3.52 nF, Li = 0 µH Intrinsically safe Ex ic Certificate No.: IECEx DEK 13.0064X Applicable Standard: IEC 60079-0, IEC 60079-11 Ex ic IIC T4 Gc IP code: IP66 Amb. Temp.: -30 to 60°C(-22 to 140°F) *2, Max. Process Temp.: 120°C(248°F) Electrical parameters: Ui = 32 V, Ci = 3.52 nF, Li = 0 µH	SS26

Contact Yokogawa representative for the codes indicated as '-1'.

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

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

< Ordering Information >

Specify the following when ordering

1. Model, suffix codes, and option codes
2. Calibration range and unit (Scale In Lower/Upper Value);
 - 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, 'Factory Setting'.
3. Output mode (Characterization Type);
Select 'LINEAR' or 'SQUARE ROOT'.
4. Output scale and unit (Out Scale Lower/Upper value);
When digital indicator is required, the 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.
5. Tag Number;
Specify software tag (up to 32 letters) to be written on the amplifier memory and Tag number (up to 22 letters, or 16 letters when /N4 is specified) to be engraved on the tag plate separately.
6. Bus Address
Specify the address between hexadecimal 0x03(3) and 0x7E(126).

[When /CD option is specified]

7. Software damping (Filter Time Const of AI function Block); Specify software damping: 0.00 to 100.00(s)

Example; When 50 to 1000 mmH₂O for calibration range and 0 to 100% output scale is required, specify the values as follows:

Calibration range:

Higher value 1000

Lower value 50

Calibration unit: mmH₂O

Output scale:

Higher value 100

Lower value 0

Unit of output scale: %

Output mode: Linear

Explanation of PROFIBUS PA parameters:

- (1) Characterization Type: Type of Linearization, 'LINEAR' or 'SQUARE ROOT' can be selected.
- (2) Scale In Lower/Upper Value: The value set as calibration range should be entered to this parameter. This is the input conversion of the Pressure using the high and low scale.
- (3) Pressure Unit: The unit of calibration by sensor, this is used as the unit of Scale In.
- (4) Out Scale Lower/Upper value: Output scaling parameter. Set the output value which corresponds to 0% value and 100% value of the calculation in the AI1 function block. The value set as output scale should be entered to this parameter. When integral indicator is required, this output is shown on LCD.

< Related Instruments >

The customer should prepare instrument maintenance tool, terminator, Profibus power supply etc.

< DP/PA Coupler for ATEX Intrinsically Safe Type >

Supplier	DP transmission Rate	Model
P+F	97.75kbps	KFD2-BR-Ex1.3 PA.93
SIEMENS	45.45kbps	6ES7 157-0AD82-0XA0

< Reference >

- **DP/PA EIA™**; Registered trademark of Yokogawa Electric Corporation.
- PROFIBUS; Registered trademark of Profibus Nutzerorganisation e.v., Karlsruhe, Germany.

< Factory Setting >

Tag Number (Tag plate)	As specified in order
Software Tag (TAG)	'PT1001' unless otherwise both Tag Number and Software Tag specified in order
Bus Address	'0x7E(126)' unless otherwise specified in order
Output Mode (Characterization Type)	'Linear' unless otherwise specified in order
Calibration Range (Scale In Lower/Upper Value)	As specified in order
Calibration Range Unit	Selected from mmH ₂ O, mmH ₂ O(68°F), mmHg, Pa, hPa, 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)
Output Scale (Out Scale Lower/Upper Value)	'0 to 100%' unless otherwise specified.
Software Damping (Filter Time Const)*1	'2 s' or as specified in order

*1: To specify this item, /CD option is required.