General Specifications

GS 01C31T02-01EN

EJA-E Series
FOUNDATION™ Fieldbus
Communication

DPharp EJA™

FOUNDATION

FOUNDATION fieldbus is the digital communication line for the field instruments, whose signal is internationally standardized by Fieldbus Foundation.

The Fieldbus bi-directional digital communication performance makes possible for the field instruments and the control devices to be a complete on-line system, superseding the existing analog transmission lines. EJA-E series differential pressure transmitters can also measure and transmit the static pressure value.

Thus, based on FOUNDATION fieldbus specifications, EJA-E Fieldbus models offer more flexible instrumentation through a higher level communication capability and propose the cost reduction by multi-drop wirings with less cables.

■ FEATURES

- **Interoperability**
  FOUNDATION fieldbus specifications grant the interoperability of the field instruments without preparing designated softwares for the instrument.
- **Multi-sensing function**
  EJA110E Fieldbus model, for example, has three independent AI function blocks for differential pressure and static pressure.
- **Function blocks**
  Arithmetic (AR), Integrator (IT) , Signal Characterizer (SC), Input Selector (IS), and PID function blocks are available as standard function besides three AI function blocks.
- **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.
- **Link master function**
  EJA-E Fieldbus models support the Link Master function. This function enables backup of network manager and local control only by field devices.
- **Alarm function**
  EJA-E Fieldbus models securely support various alarm functions, such as high/low alarm, notice of block error, etc. based on FOUNDATION fieldbus 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.
- **Software download function (option)**
  Software download function permits to update EJA-E software via a FOUNDATION fieldbus.
  Typical use of this function is to add new features such as function blocks and diagnostics to existing devices.

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■ 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 FOUNDATION fieldbus protocol.

Supply Voltage:
9 to 32V DC for general use, flameproof type, Type n, 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:
Steady state: 15 mA (max)
Software download state: 24 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
- Not applicable for EJA210E, EJA118E, and EJA438E.

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 Fieldbus communication conform to the standard specifications (H1) of FOUNDATION fieldbus.

Function Block:

Block name	Number	Execution time	Note
AI	3	30 ms	For differential pressure, static pressure and temperature
SC	1	30 ms	An output of Signal Characterizer block is a non-linear function of the respective input. The function is determined by a table
IT	1	30 ms	Integrator block integrates a variable as a function of the time or accumulates the counts
IS	1	30 ms	Input Selector block provides selection of up to eight inputs and generate an output based on the configured action
AR	1	30 ms	Arithmetic block permits simple use of popular measurement math functions
PID	1	45 ms	Works as a field controller in conjunction with another function block

LM Function:
Link Master function is supported.

■ MODEL AND SUFFIX CODES

EJA□□□E-F□□□□-□□□□□/□
└— Output signal ... Digital communication (FOUNDATION Fieldbus 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	CC
Software download function	Based on FOUNDATION Fieldbus Specification(FF-883) Download class: Class1	EE

*1: Also see 'Ordering Information'

■ OPTIONAL SPECIFICATIONS (For Explosion Protected type)

Item	Description	Code
Factory Mutual (FM)	FM Explosionproof Approval *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 Approval *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**
ATEX	ATEX Flameproof Approval *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 approval *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**

Item	Description	Code
Canadian Standards Association (CSA)	CSA Explosionproof Approval *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 Approval *1 Certificate: CSA05CA1689689X 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, ANSI/ISA–12.27.01 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(–67 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 (–67 to 140°F)*2 Encl. NEMA 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**
IECEx	IECEx Flameproof Approval *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(–67 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: 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 (XD_SCALE of AI1);
   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 (L_TYPE of AI1);
   Select 'Direct', 'Indirect Linear' or 'Indirect SQRT'.
4. Output scale and unit (OUT_SCALE of AI1);
   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. When L_TYPE is Direct, these setting does not affect the output of the AI block
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. Node Address
7. Operation Functional Class
   Select 'BASIC' or 'LINK MASTER'

[When /CC option is specified]

8. Software damping (PRIMARY_VALVE_FTIME of TB); Specify software damping: 0.00 to 100.00 (s)
   Example; When 50 to 1000 mmH_2O for calibration range and 0 to 100% output range is required, specify the values as follows:
   Calibration range:
   Higher value 1000
   Lower value 50
   Calibration unit: mmH_2O
   Output range:
   Higher value 100
   Lower value 0
   Unit of output range: %
   Output mode: Indirect Linear
   Explanation of Fieldbus parameters:
   (1) XD_SCALE: Set the input value from Transducer block (input range of sensor) which corresponds to 0% value and 100% value of the calculation in the AI function block. In the case of EJA series, the value set as calibration range should be entered to this parameter.
   (2) OUT_SCALE: Output scaling parameter. Set the output value which corresponds to 0% value and 100% value of the calculation in the AI function block. In the case of EJA series, the value set as output scale should be entered to this parameter.
   When integral indicator is required, this output is shown on LCD.
   (3) L_TYPE: Determines if the values passed by the tranducer block to the AI block may be used directly (Direct) or if the value is in different units and must be converted linearly (Indirect Linear) or with square root (Indirect SQRT), using the input range defined by XD_SCALE and the associated output range (OUT_SCALE).

< Related Instruments >
The customer should prepare instrument maintenance tool, terminator, fieldbus power supply etc.

<Reference>
- DPharp EJA™ ; Registered trademark of Yokogawa Electric Corporation.
- FOUNDATION Fieldbus; Trademark of FieldComm Group.

< Factory Setting >

Tag Number (Tag plate)		As specified in order
Software Tag (PD_TAG)		'PT2001' unless otherwise both Tag Number and Software Tag specified in order
Node Address		'0xF5' unless otherwise specified in order
Operation Functional Class		'BASIC' or as specified
Primary value *1	Output Mode (L_TYPE)	'Direct' unless otherwise specified in order
	Calibration Range (XD_SCALE) Lower/Higher Range Value	As specified in order
	Calibration Range Unit	Selected from mmH_2O, $mmH_2O(68°F)$, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm^2, kgf/cm^2, inH_2O, $inH_2O(68°F)$, inHg, ftH_2O, $ftH_2O(68°F)$ or psi. (Only one unit can be specified)
	Output Scale (OUT_SCALE) Lower/Higher Range Value	'0 to 100%' unless otherwise specified.
	Software Damping *2	'2 s' or as specified in order
Static pressur display range		0 to maximum working pressure for each model, absolute value. Measuring high or low pressure side depends on the specified model.

*1: Primary means differential pressure in case of differential presser transmitters and pressure in case of pressure transmitters.
*2: To specify this item, /CC option is required.