

# General Specifications

GS 01F06F01-01E

Model DY  
Model DYA  
FOUNDATION Fieldbus Communication Type  
Vortex Flowmeter

digitalYEWFLO



## General

In addition to the benefits of smart type YEWFLO models of high accuracy, stability, and reliability thanks to spectral signal processing (SSP\*), the Fieldbus type digitalYEWFLO offers signal transmissions internationally standardized by the Fieldbus FOUNDATION\*\*.

The bi-directional Fieldbus digital communication enables field devices such as sensors and actuators to constitute a complete on-line system, superseding existing analog transmission lines. Also, the precise transmission of various process data including the measured and manipulated values of field devices is well established by the Fieldbus multi-sensing feature.

Thus, based on the FOUNDATION Fieldbus specification, Fieldbus-enabled Models DY and DYA offer more flexible instrumentation through greater communication capabilities as well as cost reduction by multi-drop wiring with fewer cables.

Thanks to independent two AI and two DI function blocks, the multi-variable type option that adds a temperature sensor built into the vortex shedder bar, in particular, enables temperature signals and limit switch signals to be handled.

\* SSP is Yokogawa's original technology for digital signal processing.  
\*\* FOUNDATION is a registered trademark of Fieldbus FOUNDATION.

## FEATURES

### Interoperability

### Reduction of instrumentation cost

The FOUNDATION Fieldbus specification ensures interoperability and reduces the wiring cost, etc.

### Independent flow and temperature calculations (multi-variable type)

Each Fieldbus type digitalYEWFLO contains two AI function blocks and two DI function blocks as standard. The multi-variable type (MV) option offers temperature output via one of these AI blocks (AI2). These function blocks allow volumetric flow rates and temperature of the process fluid to be measured, temperature-compensated mass flow rates to be calculated, and limit switch signals for both the flow and temperature to be generated. Besides, built-in steam tables enable mass flow measurement of saturated as well as superheated steams.



Model DYA  
Remote Type Converter



Model DY-D  
Integral Type Vortex  
Flowmeter

### Advanced self-diagnostics

The digitalYEWFLO has advanced self-diagnostics which can predict and identify anomalies in the process conditions, such as high pipeline vibration and abnormal flow. Also, the Fieldbus type digitalYEWFLO supports various alarm functions, such as high/low-limit alarms and alerts of block errors, based on the FOUNDATION Fieldbus specification.

### High-speed processing and stable control with less power ( $\leq 11$ mA)

The lower power requirement enables more devices to be connected on each fieldbus segment. High-speed processing and stable control are achieved by shortened function block execution times.

(AI block  $\leq 29$  ms\*, PID  $\leq 44$  ms\*, DI  $\leq 25$  ms\*)

\* At the maximum load condition.

### Link Master function : BASIC at factory setting.

### PID function block (option)

A PID function block (with the I-PD control algorithm) enables the field device to control the process.

## STANDARD SPECIFICATIONS

For items other than those described below, refer to GS 01F06A00-01E.

### Applicable Models

All the models of DY and DYA with Fieldbus communication functions (Output code: F). These models conform to the following EMC standards:

- EN61326
- AS/NZS2064

**Output Signals**

Digital communication signal compliant with the FOUNDATION Fieldbus protocol

**Supply Voltage**

9 to 32 V DC for general-purpose, flameproof types and Nonincendive type  
 9 to 24 V DC for intrinsically safe type (Entity model)  
 9 to 17.5 V DC for intrinsically safe type (FISCO model)

**Condition of Communication Line**

Supply voltage: 9 to 32 V DC  
 Supply current: 11 mA (maximum)

**Functional Specifications**

The communication specifications conform to the H1 fieldbus specification of the Fieldbus FOUNDATION.

Function blocks

- Two AI function blocks (AI1 monitors the flow rate and totalized flow rate; AI2 monitors the temperature for a model with the multi-variable type option).
- Two DI function blocks for flow and temperature limit switches
- One PID block (for a model with LC1 option)

Link master function (BASIC of factory setting)

**MODEL AND SUFFIX CODES**

DY□□□-F□□□□□-□□/□

DYA-F□□/□

“F” following the first dash indicates that the output is digital communication compliant with the FOUNDATION Fieldbus protocol.

**OPTIONAL SPECIFICATIONS**

For options other than below, see GS 01F06A00-01E.

(Note ) For intrinsically safe approval, use the barrier certified by the testing laboratories (BARD-400 is not applicable).

Item	Description	Code
PID Function	Provides a PID control function block.	LC1
Multi-variable Type	Provides a temperature sensor (Pt 1000 Ω) built into the vortex shedder bar, enabling the AI2 function block to output the process fluid temperature, and mass flow rates to be calculated. (For details, see GS 01F06A00-01E.)	MV
Factory Mutual (FM)	FM explosion-proof Approval Type of Protection: explosion-proof for Class I, Division 1, Groups A, B, C, and D; Dust-ignitionproof Class II/III, Division 1, Groups E, F, and G. “SEAL ALL CONDUITS WITHIN 18 INCHES.” “WHEN INSTALLED IN DIV.2, SEALS NOT REQUIRED.” Enclosure Rating: NEMA TYPE 4X Temperature Code: T6 Ambient Temperature: -29 to +60°C (Integral Type Flowmeter and Remote Type Flowmeter) -40 to +60°C (Remote Type Converter) Ambient Humidity: 0 to 100%RH Maximum Working Pressure: 42MPa (6092psi) Coating of Enclosure: Epoxy resin coating or Polyurethane resin coating. Electrical Connection: ANSI 1/2NPT female	FF1
	FM Intrinsically Safe Approval (Note 1) Type of Protection : Intrinsically Safe for Class I, II, III, DIV.1, Groups A, B, C, D, E, F and G, T4, and Class I, Zone 0, AEx ia IIC T4 Nonincendive for Class I, II, Div.2, Groups A, B, C, D, F and G, Class III, DIV.1, T4 Ambient Temperature : -29 to +60°C (Integral Type Flowmeter) -29 to +80°C (Remote Type Flowmeter) -40 to +60°C (Remote Type Converter) Ambient Humidity : 0 to 100% RH (No condensation) Indoors and Outdoors : NEMA TYPE 4X Electrical Parameters : Intrinsically Safe [Entity] Vmax=24V, Imax=250mA, Pi=1.2W, Ci=1.76nF, Li=0 [FISCO] Vmax=17.5V, Imax=380mA, Pi=5.32W, Ci=1.76nF, Li=0 Nonincendive Vmax=32V, Ci=1.76nF, Li=0 Electrical Connection : ANSI 1/2NPT female	FS15

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Item	Description	Code
CENELEC ATEX (KEMA)	<p>CENELEC ATEX(KEMA) explosion-proof Approval                      Type of Protection: EExd IIC T6...T1 (Integral Type Flowmeter and Remote Type Flowmeter)                      EExd IIC T6 (Remote Type Converter)</p> <p>Groups: Group II                      Category: Category 2G                      Temperature Class: T6...T1 (Integral Type Flowmeter and Remote Type Flowmeter)                      T6 (Remote Type Converter)                      Process Temp.: T6; 85°C, T5; 100°C, T4; 135°C, T3; 200°C, T2; 300°C, T1; 450°C                      (Use /HT version above 260°C)                      Degree of Protection of Enclosure: IP67                      Tamb: -29 to +60°C (Integral Type Flowmeter and Remote Type Flowmeter)                      : -30 to +60°C (Remote Type Converter)                      : -29 to +60°C (Integral Type Flowmeter with indicator)                      : -30 to +60°C (Remote Type Converter with indicator)                      Ambient Humidity: 0 to 100% RH                      Maximum Working Pressure: 42MPa                      Coating of Enclosure: Epoxy resin coating or Polyurethane resin coating.                      Electrical Connection: ANSI 1/2 NPT female, ISO M20 × 1.5 female</p>	KF1
CENELEC ATEX (KEMA)	<p>CENELEC ATEX(KEMA) Intrinsically Safe Approval (Note 1)                      Type of Protection: EEx ia IIC T4...T1 (Integral Type Flowmeter and Remote Type Flowmeter)                      EEx ia IIC T4 (Remote Type Converter)</p> <p>Groups: II                      Category: 1G                      Maximum Working Pressure: 42MPa                      Tamb. (Integral Type Flowmeter): -29 to +60°C                      Tamb. (Remote Type Flowmeter): -29 to +80°C                      Tamb. (Remote Type Converter): -40 to +60°C                      Ambient Humidity: 0 to 100%RH (No condensation)                      Process Temp.: T4; 135°C, T3; 200°C, T2; 300°C, T1;450°C                      (Use /HT version above 260°C)                      For connection to certified Intrinsically Safe circuit with Supply circuit of Integral Type Flowmeter and Remote Type Converter:                      Ratings 1 (Entity): Ui=24 V, li=250 mA, Pi=1.2 W, Ci=1.76 nF, Li=0                      Ratings 2 (FISCO): Ui=17.5 V, li=380 mA, Pi=5.32 W, Ci=1.76 nF, Li=0                      Connect sensor circuit of DYA and DY-N (/HT)                      Electrical Connection: ANSI 1/2NPT female, ISO M20 × 1.5 female</p>	KS25
Canadian Standards Association (CSA)	<p>CSA explosion-proof Approval                      Type of Protection: explosion-proof for Class I, Groups B, C and D;                      Class II, Groups E, F and G; Class III.                      For Class I, Division 2 locations-                      "FACTORY SEALED, CONDUIT SEAL NOT REQUIRED."                      Enclosure: Type 4X                      Temperature Class: T6...T1(Integral Type Flowmeter and Remote Type Flowmeter)                      T6 (Remote Type Converter)                      Amb. Temp.: -29 to +60°C (Integral Type Flowmeter and Remote Type Flowmeter)                      -40 to +60°C (Remote Type Converter)                      Process Temp. : T6;85°C, T5;100°C, T4;135°C, T3;200°C, T2;300°C, T1;450°C                      Enclosure : Type 4X                      Maximum Working Pressure: 42MPa(6092 psi)                      Coating of Enclosure: Epoxy resin coating or Polyurethane resin coating.                      Electrical Connection: ANSI 1/2 female</p>	CF1
Standard Association of Australia (SAA)	<p>SAA Flame Proof Approval                      Ex d IIC T6...T1, IP67, Class I, Zone 1                      Amb.Temp.: -29 to +60°C (Integral Type Flowmeter and Remote Type Flowmeter)                      -40 to +60°C (Remote Type Converter)                      Max. process temp. : T6;85°C, T5;100°C, T4;135°C, T3;200°C, T2;300°C,                      T1;450°C                      Electrical connection: ANSI 1/2 NPT female, ISO M20 × 1.5 female</p>	SF1
Technology Institution of Industrial Safety (TIIS), Japan	<p>TIIS explosion-proof ExdIIC T6 approval                      Amb. temp.: -20 to 60°C (integral type flowmeter and remote type flowmeter)                      Electrical connection: JIS G1/2 female</p>	JF3

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**Setting When Shipped**

Item	AI1 for Flow Rate Signal (Standard)	AI2 for Temperature Signal (with MV Option)
Tag number* (PD_TAG)	Set to "FT1003" by default unless otherwise specified when ordered.	
Output mode (L_TYPE)	"Direct"	
Upper and lower calculation range limits and unit (XD_SCALE)	The upper range limit will be set to the maximum flow rate range specified on the order sheet (WS 1F6A0-01E), or to the 0 to 10 m <sup>3</sup> /h range unless the order sheet is not supplied.	-40 to 260°C or -40 to 500°F
Upper and lower output range limits and unit (OUT_SCALE)		
Node address	Set to 0xF2 unless otherwise specified when ordered.	

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- \* The tag number, if specified, will be written to the amplifier memory and inscribed on the stainless steel tag plate.
  - A tag number of up to 32 characters of alphanumerics, hyphens (-), and bullets (·) can be written to the amplifier memory.
  - A tag number of up to 16 characters of alphanumerics, hyphens (-), and bullets (·) can be inscribed on the stainless steel tag plate (only for models with option code /SCT specified; see GS 01F06A00-01E).

Explanation of parameters listed above:

- (1) XD\_SCALE: Defines the input values from the transducer block (input range of the sensor) corresponding to 0% and 100% values in the calculation inside the AI function block. For a digital YEWFLOW, the values set as the flow span or temperature range (optional) are stored in this parameter. A value exceeding 32,000 cannot be set in XD\_SCALE.
- (2) OUT\_SCALE: Output scaling parameter. Defines the output values corresponding to 0% and 100% values in the calculation inside the AI function block.
- (3) L\_TYPE: Determines whether the values passed from the transducer block (sensor) should be output without processing ("Direct") or through scaling conversion based on OUT\_SCALE ("Indirect").

**■ TERMINAL CONNECTION**

Terminal Symbols	Description
SUPPLY ⊕ SUPPLY ⊖	Fieldbus communication signal
⊥	Internal Ground Terminal

⊥ External Ground Terminal

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**Ordering Instructions**

When ordering, specify:

1. Model, suffix, and option codes.
2. Flow rate range and unit (XD\_SCALE). The maximum flow rate range specified on the order sheet (WS 1F6A0-01E) will be used for this specification.
3. Output range and units (OUT\_SCALE). The maximum flow rate range specified on the order sheet (WS 1F6A0-01E) will be used for this specification.
4. Tag number (PD\_TAG)
5. Node address
6. Fluid conditions: Specify the flow conditions while referring to GS 01F06A00-01E.

**Related Instruments**

Maintenance tools for field devices, bus terminators, fieldbus power supply, and other fieldbus components need to be prepared by the customer.