

General Specifications

ADMAG TI Series AXG1A Magnetic Flowmeter Remote Transmitter



GS 01E22C01-01EN

■ GENERAL DESCRIPTION

The AXG1A magnetic flowmeter remote transmitter is a sophisticated product with outstanding reliability and ease of operation, developed based on decades of field-proven experience.

The AXG1A employs an LCD indicator, infra-red switches, and “Easy Setup” parameters to ensure substantially improved its operability. Its diagnostic function to detect the adhesion level on the electrodes combining with a sensor such as AXG and AXW dramatically improves maintainability at the customer.

The AXG1A also employs the “Dual Frequency Excitation Method” which is for fluid noise free for more difficult application to ensure greater stability and quicker response.

Note: The “Dual Frequency Excitation Method” is Yokogawa’s unique technology.



■ FEATURES

●Stable Measurement

Our own dual frequency excitation method realizes stable flow measurement even under high flow noise in the fluid with highly concentrated slurry.

●Multiple Inputs and Outputs

Maximum eight inputs/outputs of current, pulse, and status signals can be selected. Mass or calorie calculation using temperature input is available.

●Improved Operation and Monitoring Function

Operation authority level setting for ensuring safety, process data trend display, display backlight flashing (Squawk) function, and data store / restore function with display unit internal memory or microSD card are available.

●Improved Maintainability

Diagnostic functions that contribute to preventive maintenance of the plant are installed. Diagnosis of the device (verification function) that can be executed without demounting from piping, detection of the process condition by monitoring the flow noise and electric conductivity of the fluid, electrode insulation deterioration diagnosis, electrode adhesion diagnosis, and wiring connection diagnosis are available.

●Communication Protocol

HART, BRAIN

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■ CONSTRUCTION

Combinable Sensor:

Remote Sensor	Size
AXG	2.5 mm to 500 mm (0.1 to 20 in.)
AXW	25 mm to 400 mm (1 to 16 in.)
	500 mm to 1800 mm (20 to 72 in.)

Note: When changing the combined transmitter, readjustment of the meter factor by actual flow calibration is necessary to ensure accuracy.

Material:

Case and Cover: Aluminum alloy JIS ADC12

Coating:

Standard Coating:

Polyester resin powder coating

Rugged Coating:

Epoxy and polyurethane resin solvent coating

Coating Color:

Mint green (Munsell 5.6BG3.3/2.9 equivalent)

Cable Entry:

JIS G1/2 female

ASME 1/2 NPT female

ISO M20 x 1.5 female

Mounting:

2-inch pipe, panel or surface mounting

Grounding:

Grounding Resistance: 10 Ω or less

Note: When the built-in lightning protector as standard is not required, grounding resistance 100 Ω or less can be applied.

■ FUNCTIONS

Display and Setting:

Display unit (3 infrared switches with LCD) enables the user to set the parameters without opening the display cover.

Note: For parameter setting tool, not only display unit but also HHT (handheld terminal) and FieldMate (device adjustment / management software) are provided.

Display:

Full dot matrix LCD, 64 × 128 dots, with backlight, dot reversal display available

Display Language (*):

Display Code 1:

English, French, German, Italian, Spanish, Portuguese, Russian and Japanese. The display languages are selectable and can be changed by customer.

Display Code 2:

English and Chinese. The display languages are selectable and can be changed by customer.

* : The factory default setting is English.

Display Screen Configuration:

Display Screen Item:

Status display (icon), Time (necessary to set the time at power-on), Data display (max. four lines), Infrared switch operation status

Flow Rate Screen:

Measured Data Screen or Online Trend Screen is available. Update period selectable from 0.2, 0.4, 1, 2, 4, and 8 seconds.

Measured Data Screen:

Display up to 4 data points simultaneously with numbers, bar graphs, icons, or character strings. Specify up to 8 points of data and change display data with infrared switches or automatic scroll function (scroll period 2, 4, or 8 seconds).

Selectable Data in Measured Data Screen:

Flow rate (%), Flow velocity, Volume flow rate, Mass flow rate, Calorie, Totalizer 1, Totalizer 2, Totalizer 3, Adhesion level, Current output 1, Current output 2, Flow noise level, Tag No., Communication protocol, Totalizer 1 count, Totalizer 2 count, Totalizer 3 count

Note: Calorie is available for Input / Output signal types J2 and D2, and Current output 2 for types J6 and D6.

Online Trend Screen:

Display one data as trend graph. The display data can be changed with infrared switches or automatic scroll function (scroll period 2, 4, or 8 seconds) selecting up to four data.

Selectable Data in Online Trend Screen:

Flow rate (%), Flow velocity, Volume flow rate, Mass flow rate, Calorie, Totalizer 1, Totalizer 2, Totalizer 3, Current output 1, Current output 2

Note: Calorie is available for Input / Output signal types J2 and D2, and Current output 2 for types J6 and D6.

Alarm Screen:

When an alarm occurs, the flow rate screen and the alarm screen are alternately displayed in the cycle (2, 4, or 8 seconds) linked with the flow rate screen update cycle. Select simple screen (single line display) or detail screen (with alarm countermeasure display).

NAMUR NE 107 Alarm Display Function:

Based on NAMUR NE 107, alarms are classified and displayed as follows. It can also be set to hide.

F: Failure

C: Function Check

S: Out of Specification

M: Maintenance Required

Offline Trend Screen (when optional code MC (microSD card) is selected):

Data stored by the data logging function can be displayed on the trend screen. The selectable data is the same as that for the Online Trend Screen.

Display Backlight Flashing (Squawk) Function:

Display backlight can be set to flash once or continuously at 4-second cycle to identify the device.

Display Operation Authority:

Display operation authority level against the parameters can be controlled by selecting from operator, maintenance, or specialist by passcode.

Operator:

Only parameters related to display setting can be set.

Maintenance:

Only parameters related to display setting and zero adjustment can be set.

Specialist:

All parameters can be set.

Communication Function:BRAIN Communication:

Communication Signal:

Superimposed on the Current Output 1

Communication Line Condition:

Load Resistance: 250 to 450 Ω (including cable resistance)Load Capacitance: 0.22 μF or less

Load Inductance: 3.3 mH or less

Input Impedance of Communicating Device:

10 k Ω or more (at 2.4 kHz)

Communication Distance:

Up to 1.5 km (0.93 miles), when polyethylene insulated PVC-sheathed cables (CEV cables) are used. Communication distance varies depending on the type of cable and wiring used.

Distance from Power Line:

15 cm (6 in.) or more. (Parallel wiring should be avoided)

HART Communication:

Protocol Version: HART 7

Communication Signal:

Superimposed on the Current Output 1

Communication Line Condition:

Load Resistance: 230 to 600 Ω (including cable resistance)**Input/Output Function:****Input Signal**• **Current Input (Active) (Type J2, D2)**

4 to 20 mA DC temperature signal from two-wire type transmitter.

Internal Power Supply: 24 V DC $\pm 20\%$,

Current Range: 2.4 to 21.6 mA

• **Status Input (Dry contact) (Type J#, D#)**

Load Resistance:

200 Ω or less (ON), 100 k Ω or more (OFF)**Output Signal**• **Current Output (Active) (All Type)**

4 to 20 mA DC signal

Load Resistance:

1 k Ω maximum, including cable resistance• **Alarm Output (Passive) (All Type)**

Transistor contact output (open collector)

Contact capacity: 30 V DC (OFF), 200 mA (ON)

• **Pulse/Status Output (Passive) (All Type)**

Transistor contact output (open collector)

Contact Capacity: 30 V DC (OFF), 200 mA (ON)

Pulse Rate: 0.0001 to 10000 pps (pulse per second)

Pulse Width: 0.05, 0.1, 0.5, 1, 20, 33, 50, 100, 200, 330, 500, 1000, 2000 ms or Duty cycle 50%

(Maximum pulse width 5 minutes) configurable

Frequency Output Range: 1 to 12500 Hz

• **Pulse/Status Output (Active)****Without Internal Resistor (Type J4, D4)**

• Driving Electronic Counter

Load Resistance: 1 k Ω or more,Internal Power Supply: 24 V DC $\pm 20\%$

Pulse Rate: 0.0001 to 10000 pps (pulse per second)

Pulse Width: 0.05, 0.1, 0.5, 1, 20, 33, 50, 100, 200, 330, 500, 1000, 2000 ms or Duty cycle 50% (Maximum pulse width 5 minutes) configurable

Frequency Output Range: 1 to 12500 Hz

• Driving Electromechanical Counter

Maximum Current: 150 mA,

Internal Power Supply: 24 VDC $\pm 20\%$

Pulse Rate: 0.0001 to 2 pps (pulse per second)

Pulse Width: 20, 33, 50, or 100 ms configurable

With Internal Resistor (Type J5, D5)Internal resistor: 2.2 k Ω ,Internal Power Supply: 24 VDC $\pm 20\%$

Pulse Rate: 0.0001 to 10000 pps (pulse per second)

Pulse Width: 0.05, 0.1, 0.5, 1, 20, 33, 50, 100, 200, 330, 500, 1000, 2000 ms, or Duty cycle 50%

(Maximum pulse width 5 minutes) configurable

• **Status Output (Passive) (Type J#, D#)**

Transistor contact output (open collector)

Contact capacity: 30 V DC (OFF), 200 mA (ON)

Temperature Input Processing Function:

Input current signal as temperature difference or absolute temperature. It can be used for temperature check by parameter, mass flow calculation by density correction, and calorie calculation.

Flow Calculation Function:Excitation Method:

Dual Frequency Excitation for sizes 2.5 to 400 mm (0.1 to 16 in.)

Pulsed DC Excitation for size 500 mm (20 in.) or larger

Span Setting:

Span flow can be set in units such as volume flow rate, mass flow rate, time, and flow rate value. The velocity unit can also be set.

Volume Flow Rate Unit:

kcf, cf, mcf, Mgal (US), kgal (US), gal (US), mgal (US), kbbbl (US)*, bbl (US)*, mbbbl (US)*, μbbl (US)*, MI (megaliter), m3, kl (kiloliter), l (liter), cm3*: "US Oil" or "US Beer" can be selected.

Mass Flow Rate Unit:

klb (US), lb (US), t (ton), kg, g

Calorie Unit:

MJ, kJ, J, kcal, cal, BTU (Specific heat setting and temperature input required)

Velocity Unit: ft, m (meter)

Time Unit: s (second), min (minute), h (hour), d (day)

Mass Flow Rate Processing:

The mass flow rate V_m is obtained in the following expression.

$$V_m = V_f \times \rho$$

 V_m : Mass flow rate [kg/s] V_f : Volume flow rate [m^3/s] ρ : Density [kg/m^3]

Calorie Processing:

The calorie Q is obtained in the following expression.

$$Q = c \times V_m \times \Delta t$$

 Q : Calorie [J/s] c : Specific heat [J/kg·K] V_m : Mass flow rate [kg/s] Δt : Temperature difference [K]

Damping Function (63% response):

Can be set for each measurement value of flow velocity, volume flow rate, mass flow rate, calorie, flow noise.

Output Damping:

For each measured value, the time constant for instantaneous value output (0.1 to 200.0 seconds, shipped with 3.0 seconds) and the time constant for totalization / pulse output (0.0 to 200.0 seconds, shipped with 3.0 seconds) can be individually set. In the case of piston pump etc., it is possible to measure pulsatile flow up to 1 Hz with output damping 0.1 seconds. However, note that decreasing damping time generally increases output fluctuation.

Display Damping:

A common time constant can be set for each screen display value of each measurement value. Time constant 0.0 to 200.0 seconds (shipped with 0.0 seconds).

Current Output:

Current signal (4 to 20 mA DC) proportional to instantaneous flow rate is output.

Pulse Output:

The totalized value of the flow rate is converted into the number of pulses converted by the pulse rate, and is output.

Frequency Output:

Frequency signal (Duty 50%) proportional to the instantaneous value of the flow rate is output. Output terminal is shared with pulse output.

Totalization Function:

Three independent totalizers can be allocated independently, including the start and stop of integration, for each measured value of volume flow rate, mass flow rate, and calorie.

Totalization Type:

Forward / reverse difference flow totalization, Absolute value totalization, Forward direction totalization, Reverse direction totalization

Totalization Display:

Select from actual flow rate display or count value display scaled by counter conversion rate.

Low-cut Function:

For each current output, pulse output, or frequency output, the output signal below the set actual flow rate can be cut (*). Low-cut function for current output signal is operated independently. The functions for pulse output signal and frequency output signal are operated synchronously.

*: When "Forward and Reverse Flow Measurement" or "Absolute Range" is specified, the output signal below the set actual flow rate value against the absolute value of the measured one is cut.

Output Processing Function:**Multi-range:**

Flow range can be switched by status input or automatic switching. By status output, it is possible to identify in what range the measurement is being measured, and the status is also displayed on the display.

Forward and Reverse Flow Measurement:

Flow rate measurement in both forward and reverse directions is possible. By status output, it is possible to identify in which direction the measurement is being performed, and the status is also displayed on the display.

Absolute Range:

With 12 mA as flow rate zero, measurements in the forward (12 to 20 mA) and reverse (4 to 12 mA) directions are possible in a single range.

Totalization Switch:

Status signal is output when the totalized value becomes equal to or larger than the set value.

Preset Totalization:

By parameter setting or status input, the totalized value is preset to zero or a set value.

0% Signal Lock:

With status input, the current output is forcibly fixed to 0%. Mode is selectable whether to continue output processing for instantaneous flow rate display/ pulse output/ flow rate totalization or to fix flow rate at 0.

Alarm Function:**Alarm Configuration:**

Alarms are classified into system alarm (device failure), process alarm, setting alarm, and warning. Alarm output availability can be selected for each item.

Current Output at Alarm Occurrence:

The current output at alarm occurrence is arbitrarily selected from 2.4 mA or less, 3.8 mA fixed, 4 mA fixed, 20.5 mA fixed, 21.6 mA or more, measured value, or HOLD.

Alarm Countermeasure Indication:

A specific countermeasure method can be displayed on the display when an alarm occurs.

Alarm Type:**System Alarm:**

CPU failure, A/D converter failure, Sensor coil circuit break (open), Sensor coil short circuit

Process Alarm:

Input signal error (signal overflow), Sensor empty pipe, Electrode adhesion (of insulator)

Setting Alarm:

Detect inconsistency in parameter setting

Warning:

Warning in a state where measurement can be continued

Alarm History:

Keep history of up to four alarms.

Verification Function:

Function to diagnose the soundness of the device itself. Diagnose the magnetic circuit, excitation circuit, arithmetic processing circuit, etc. offline (i.e. flow measurement function stopped) and display the result without demounting the device from piping.

Data Management Function:**Store / Restore Function of Parameters:**

Main parameters can be stored and restored using nonvolatile memory of display unit. The restore can also be used for copying parameters to another device (except for parameters under unmatched specification for the devices). When optional code MC is selected, this function is also available by using microSD card.

Data Logging Function**(when optional code MC (microSD card) is selected):**

It is possible to log up to four process data at the same time. In addition to displaying the logged results on the trend screen, it is also possible to connect the microSD card to a PC and retrieve the data.

Logging Cycle:

1 second, 10 seconds, 30 seconds, 1 minute, 5 minutes, 30 minutes, 1 hour

Logging Time:

10 minutes, 30 minutes, 1 hour, 3 hours, 12 hours, 24 hours, 72 hours, 240 hours, 720 hours, 1440 hours

Logging Data:

Flow velocity, Volume flow rate, Mass flow rate, Calorie, Flow noise, Adhesion resistance, Electrode potential (A, B), Flow signal peak value

Data Security During Power Failure:

Protection of data, such as parameters and integrated values, by nonvolatile memory at power failure.

Factory Default Parameter Restore:

It is possible to restore the parameters to the values that were set at the time of factory shipment.

Lightning Protection:

Built-in lightning protector for excitation, signal common, input / output terminals, and power supply terminal.

Test Standard: IEC61000-4-5

Test Method:

Series mode 1 kV / Common mode 2 kV

Surge waveform 8/20 μ S

■ CONFORMITY STANDARDS

If exporting the product, it must be fully complied with all applicable laws and regulations.

Safety Requirements:

EN61010-1

EN61010-2-030

CAN/CSA-C22.2 No.61010-1

CAN/CSA-C22.2 No.61010-2-30

UL 61010-1 (3rd Edition)

UL 61010-2-030 (1st Edition)

IEC 60529

Altitude at Installation Site: Max. 2000 m above sea level

Installation Category (Overvoltage category): II

Micro Pollution Degree: 2

Macro Pollution Degree: 4

Protection Degree: IP66/IP67

EMC:

EN61326-1 Class A, Table 2

EN61326-2-3

EN61000-3-2 Class A

EN61000-3-3

RCM in Australia/New Zealand

KC mark in Korea

CMIM mark in Morocco

CE marking (optional code EC):

CE marking is indicated on the nameplate. The product which is attaching CE marking is in conformity with the statutory requirements of the applicable EU Directives.

EU RoHS Directive:

Note: Only applicable when optional code EC (CE marking) is selected.

Morocco conformity mark

This conformity mark indicates that the product complies with Moroccan safety and EMC requirements.

Note: For remote sensor, please refer to general specification of AXG and AXW.

■ PERFORMANCE**Accuracy:****• Combination with AXG Remote Sensor (except optional code HF2)**

Size mm (in.)	Flow Velocity V m/s (ft/s)	Standard Accuracy (Accuracy Code B)
2.5 to 15 (0.1) (0.5)	$V < 0.3$ (1)	± 1.0 mm/s
	$0.3 \leq V \leq 10$ (1) (33)	$\pm 0.3\%$ of rate
25 to 400 (1.0) (16)	$V < 0.15$ (0.5)	± 0.5 mm/s
	$0.15 \leq V \leq 10$ (0.5) (33)	$\pm 0.3\%$ of rate
500 (20)	$V < 0.3$ (1)	± 2.0 mm/s
	$0.3 \leq V \leq 10$ (1) (33)	$\pm 0.35\%$ of rate ± 1.0 mm/s

Size mm (in.)	Flow Velocity V m/s (ft/s)	High Grade Accuracy (Accuracy Code C)
25 to 200 (1.0) (8)	$V < 0.15$ (0.5)	± 0.5 mm/s
	$0.15 \leq V < 1$ (0.5) (3.3)	$\pm 0.18\%$ of rate ± 0.2 mm/s
	$1 \leq V \leq 10$ (3.3) (33)	$\pm 0.15\%$ of rate

• Combination of AXG Remote Sensor (combined with optional code HF2)

Size mm (in.)	Flow Velocity V m/s (ft/s)	Standard Accuracy (Accuracy Code B)
25 to 200 (1) (8)	$V < 0.15$ (0.5)	± 1.5 mm/s
	$0.15 \leq V < 10$ (0.5) (33)	$\pm 0.35\%$ of rate ± 1 mm/s

• Combination with AXW Remote Sensor

Size mm (in.)	Flow Velocity V m/s (ft/s)	Standard Accuracy (Accuracy Code B)
25 to 400 (1.0) (16)	$V < 0.3$ (2.0)	± 1.0 mm/s
	$0.3 \leq V \leq 10$ (1.0) (33)	$\pm 0.35\%$ of rate

Size mm (in.)	Flow Velocity V m/s (ft/s)	Standard Accuracy (Accuracy Code B)
500 to 1000 (20) (40)	$V < 0.3$ (1.0)	± 2.0 mm/s
	$0.3 \leq V \leq 10$ (1.0) (33)	$\pm 0.35\%$ of rate ± 1.0 mm/s
1100 to 1800 (44) (72)	$V < 0.3$ (1.0)	± 3.0 mm/s
	$0.3 \leq V < 1.0$ (1.0) (33)	$\pm 0.4\%$ of rate ± 1.8 mm/s
	$1.0 \leq V \leq 10$ (3.3) (33)	$\pm 0.5\%$ of rate ± 1.0 mm/s

Note: The accuracy above is the result of calibration test at our water flow facility before shipment. It is defined by the integrated value of the pulse output. As for the current output accuracy, add $\pm 8 \mu\text{A}$ ($\pm 0.05\%$ of span) to the accuracy above.
Calibration takes place at reference conditions as below.

Medium: Water
Density: 0.9 to 1.1 kg/l
Medium temperature 10 to 35°C (50 to 95°F)
(Average temperature 22.5°C (72.5 °F))
Ambient temperature 10 to 35°C (50 to 95°F)
Process pressure (absolute):
0.1 to 0.2 MPa (15 to 29 psi)
Reference Standards:
JIS B 7554, ISO 4185, ISO 5168, ISO 20456,
BS EN 29104

Repeatability:

Size 400 mm (16 in.) or smaller:

$\pm 0.1\%$ of rate (Velocity 1 m/s (3.3 ft/s) or above)
 $\pm 0.05\%$ of rate ± 0.5 mm/s (Velocity below 1 m/s (3.3 ft/s))

Size 500 mm (20 in.) or larger:

$\pm 0.2\%$ of rate (Velocity 1 m/s (3.3 ft/s) or above)
 $\pm 0.1\%$ of rate ± 1 mm/s (Velocity below 1 m/s (3.3 ft/s))

Measurement Range:

Minimum Span Velocity: 0.1 m/s (0.33 ft/s)
Maximum Span Velocity: 10 m/s (33 ft/s)
Note: For details of span flow rate, read "Sizing Data", and "Ordering Information".

Power Consumption:

32 W
Note: The power consumption is the same as above regardless of the communication and I/O type.

Insulation Resistance:

Between power supply terminals and ground terminal:
100 M Ω /500 V DC
Between power supply terminals and input/output or excitation current terminals:
100 M Ω /500 V DC
Between ground terminal and input/output or excitation current terminals:
20 M Ω /100 V DC or 125 V DC
Between input/output* and excitation current terminals:
20 M Ω /100 V DC or 125 V DC

Withstand Voltage:

Between power supply terminals and ground terminal:
1400 V AC for 2 seconds
Between power supply terminals and input/output terminals:
1400 V AC for 2 seconds
Between excitation current terminal and ground terminal:
160 V AC for 2 seconds
Between excitation current terminal and input/output terminals:
350 V AC for 2 seconds

NORMAL OPERATING CONDITIONS

Ambient Temperature:

–40 to 60°C (–40 to 140°F)

Note: Display operating range is –20 to 60°C (–4 to 140°F).

Ambient Humidity:

0 to 100%

Note: Lengthy continuous operation at 95% or more is not recommended.

Power Supply:

Power Supply Code 1:

AC Type:

Rated Power Supply: 100 to 240 V AC, 50/60 Hz
Operating Voltage Range: 80 to 264 V AC

DC Type:

Rated Power Supply: 100 to 120 V DC
Operating Voltage Range: 90 to 130 V DC

Power Supply Code 2:

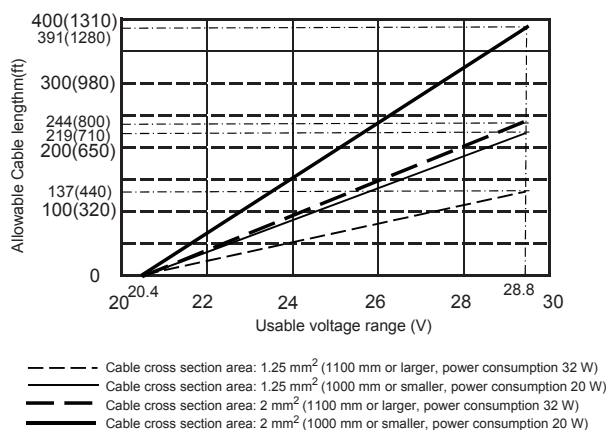
AC Type:

Rated Power Supply: 24 V AC, 50/60 Hz
Operating Voltage Range: 20.4 to 28.8 V AC

DC Type:

Rated Power Supply: 24 V DC
Operating Voltage Range: 20.4 to 28.8 V DC

Supply Voltage and Power Supply Cable Length for Power Supply Code 2:



F01.ai

Fluid Conductivity:

Size 2.5 to 10 mm (0.1 to 0.4 in.): 5 $\mu\text{S}/\text{cm}$ or larger
Size 15 to 125 mm (0.5 to 5 in.): 1 $\mu\text{S}/\text{cm}$ or larger
Size 150 to 400 mm (6 to 16 in.): 3 $\mu\text{S}/\text{cm}$ or larger
Size 500 to 1000 mm (20 to 40 in.): 20 $\mu\text{S}/\text{cm}$ or larger
Size 1100 to 1800 mm (44 to 72 in.): 50 $\mu\text{S}/\text{cm}$ or larger

Note: For measuring low conductivity fluids, read "Cautions on Selection and Installation".

Vibration Conditions:

Level of vibration in conformity with IEC 60068-2-6 (SAMA31.1)

4.9 m/s² or less (frequency of 500 Hz or less)

Note: Avoid locations with much vibration (with a vibration frequency of 500 Hz or more), which may cause damage to the equipment.

■ MODEL AND SUFFIX CODE

Note: There are some limitations on the combination of specifications. Read specification code table when selecting specification code.

●General-purpose Remote Transmitter

Model	Suffix Code	Description	Limitation
AXG1A		Magnetic Flowmeter Remote Transmitter	
Use	-G	General-purpose	
Explosion Protection	000	Non Explosion Protection Approval	
Housing and Coating	1	Standard Material with Standard Coating	
	2	Standard Material with Rugged Coating	
Cable Entry	0	JIS G1/2 Female	
	2	ASME 1/2 NPT Female	
	4	ISO M20×1.5 Female	
Power Supply	1	100-240 V AC / 100-120 V DC	
	2	24 V AC / DC	
Communication and I/O	J#	#: 0, 2, 3, 4, 5, 6 HART 7 and I/O	
	D#	#: 0, 2, 3, 4, 5, 6 BRAIN and I/O	
Transmitter Wiring Terminal	1	M4 Screw-type	
Display	1	With Display (English, Multi-language)	
	2	With Display (English, Chinese)	
Optional Specification		/# Refer to optional specification table.	

●Signal Cable for AXG Remote Sensor or AXW Remote Sensor

Model	Suffix Code	Optional Code	Description
AX01C			Magnetic Flowmeter Signal Cable
Cable Finish and Length	-A### (*1)		Unfinished, Cable length ### m, Set of Finishing Parts for M4 Screws
	-B### (*1)		Finished for AXG1A, Cable Length ### m
Finishing Parts		/C# (*2)	Finishing Parts (# sets)

*1: Specify the cable length in the "###" with the numerical value three digits (001 to 200) as multiple of 1 meter (e.g. 001, 002, or 005) for a length up to 5 m, as multiple of 5 meters up to 100 m (e.g. 010, 020, or 100), or as multiple of 10 meters up to 200 m (e.g. 110, 120, or 200). The maximum cable length is 200 m.

*2: Specify the finishing parts quantity in the "#" with the numerical value one digit (1 to 9).

●Details: Communication and I/O

Communication and I/O Code (Type)		Number of Input and Output							
		Current Output (Active)	Pulse/ Status Output (Passive)	Alarm Output (Passive)	Status Input (No-voltage)	Status Output (Passive)	Pulse/ Status Output (Active, with internal resistor)	Pulse/ Status Output (Active, without internal resistor)	Current Input (Active)
BRAIN	HART 7								
D0	J0	1	1	1	2	2	—	—	—
D2	J2	1	1	1	2	2	—	—	1
D3	J3	1	2	1	2	2	—	—	—
D4	J4	1	1	1	2	2	—	1	—
D5	J5	1	1	1	2	2	1	—	—
D6	J6	2	1	1	2	2	—	—	—

■ OPTIONAL CODE

●Application, Usage, and Operating Function

Item	Specification and Applicable Condition	Code
DC Noise Cut Circuit (for electrolytic bath)	The DC Noise cut circuit is built into a flowmeter. It works effectively when the size is 15 mm (0.5 in.) or more and fluid conductivity is 50 μ S/cm or more. Empty pipe detection, electrode adhesion diagnosis, electrode potential measurement, and wetted resistance measurement function can not be used. It must be combined with remote sensor of size 15 mm (0.5 in.) or more.	ELC
Signal Down on Failure	The current output signal is set as follows when shipped. Output signal at CPU failure or alarm occurrence: 2.4 mA (–10 %) or less (The standard setting is 21.6 mA (110%) or more at CPU failure or alarm occurrence.)	C1
Signal Down on Failure (NAMUR NE 43 Compliant)	The current output signal is set as follows when shipped. Output signal limits: 3.8 to 20.5 mA Output signal at CPU failure or alarm occurrence: Low: 2.4 mA (–10%) or less	C2
Signal Up on Failure (NAMUR NE 43 Compliant)	The current output signal is set as follows when shipped. Output signal limits: 3.8 to 20.5 mA Output signal at CPU failure or alarm occurrence: High: 21.6 mA (110%) or more	C3
Enhanced Dual Frequency Excitation Type	The "Enhanced Dual Frequency Excitation Method" can be used in addition to the "Dual Frequency Excitation Method". For difficult applications such as for high concentration slurries or low conductivity fluid, extremely stable measurements can be realized. HF2 must also be added to the remote sensor to be combined.	HF2
microSD Card	A microSD card slot is added to the display unit, and a microSD card (capacity 1 GB, format FAT 16) is inserted when shipped. When using parameter store/ restore function with microSD card, and/or data logging function, specify optional code MC. Be careful that the microSD card slot is not mounted unless optional code MC is specified.	MC
Air Purge Fitting	An air purge fitting (1.5 L/min air consumption) is provided with purge air pressure at 0.14 MPa or less. 1/4 NPT female (when cable entry code is 2) or Rc1/4 female (when cable entry code is 0).	APC
CE Marking	CE marking is indicated on the nameplate. When the product is used in the countries where CE marking is required, specify optional code EC.	EC
Canada Domestic Sales	Compliant to CSA standards. When the product is used in Canada, it is mandatory to comply with the CSA standard. Specify optional code CS. Not applicable with the following specifications: - Optional code: EC (CE Marking) - Optional code: VR, VE (EAC Marking) - Optional code: JC (Flow Calibration in Japan)	CS
Japan Domestic Sales	Identifies the final destination as Japan. Mandatory when the final destination is Japan. Not applicable when the final destination is not in Japan.	PJ
EAC Approval and Russian Pattern Approval Marking	EAC approval marking and Russian pattern approval marking are indicated on the nameplate. When the product is used in Russian Federation, specify optional code VR. Not applicable with the following specifications: - Optional code: EC (CE Marking) - Optional code: CS (Canada Domestic Sales) - Optional code: JC (Flow Calibration in Japan)	VR
EAC Approval Marking without Russian Pattern Approval Marking	EAC approval marking is indicated on the nameplate. (no Russian pattern approval marking). When the product is used in EEU except for Russian Federation, specify optional code VE. Not applicable with the following specifications: - Optional code: EC (CE Marking) - Optional code: CS (Canada Domestic Sales) - Optional code: JC (Flow Calibration in Japan)	VE

●Tag Plate and Mounting Bracket

Item	Specification and Applicable Condition	Code
Stainless Steel Tag Plate	Screwed tag plate (stainless steel 304). Select optional code SCT when stainless steel tag plate is required in addition to the standard nameplate with the tag number inscribed on it. Plate size (Height x Width): Approx. 12.5 mm x 40 mm (4.92 in. x 15.7 in.)	SCT
Stainless Steel Mounting Bracket	Change the material of mounting bracket, from carbon steel to stainless steel 304.	SB
AM11 Replacement Bracket	Provided with a special mounting bracket for replacing an AM11 converter with an AXG1A.	RK

●Certificate, Calibration, and Various Test

Item	Specification and Applicable Condition	Code
Calibration Certificate (Level 2)	The Declaration and the Calibration Equipment List are issued.	L2
Calibration Certificate (Level 3)	The Declaration and the Primary Standard List are issued.	L3
Calibration Certificate (Level 4)	The Declaration and the Yokogawa Measuring Instruments Control System are issued.	L4
Flow Calibration in Japan	The actual flow inspection is performed at Yokogawa Manufacturing Kofu Factory in Japan. The result of that flow inspection is described in a test certificate (QIC). To perform the actual flow inspection regularly at Kofu factory, specify optional code JC. Available only when ordered as a combination with the sensor. In this case, specify this optional code JC for both the sensor and AXG1A. Not available when AXG1A is ordered alone. Not applicable with the following specifications: - Optional code: CS (Canada Domestic Sales) - Optional code: VR, VE (EAC Marking)	JC

●Direction of Cable Entry, Waterproof, Plastic and Flameproof Glands

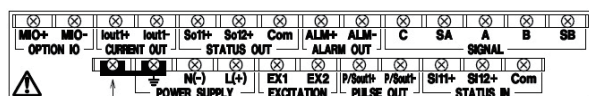
Item	Specification and Applicable Condition	Code
Waterproof Glands (Type G5)	5 pcs. of waterproof gland. Available only for cable entry code 0 (JIS G1/2 female thread).	EG5
Waterproof Glands (Type U5)	5 pcs. of waterproof gland with union joint. Available only for cable entry code 0 (JIS G1/2 female thread).	EU5
Plastic Glands (Type P5)	5 pcs. of plastic gland. Available only for cable entry code 0 (JIS G1/2 female thread).	EP5
Waterproof Glands (Type W5)	5 pcs. of waterproof gland with JIS G3/4 female. Available only for cable entry code 0 (JIS G1/2 female thread).	EW5

■ ACCESSORIES

- Mounting Bracket: 1 set

Note: Accessories differ depending on specifications to be selected.

■ TERMINAL CONFIGURATION



Short Bar

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Terminal Symbol	Description
SIGNAL	C SA A B SB Flow signal input
ALARM OUT	ALM+ ALM- Alarm output
STATUS OUT	So11+ So12+ COM Status output (Two outputs)
CURRENT OUT	lout1+ lout1- Current output 1 4~20 mA DC
OPTION IO	MIO+ MIO- Option input/output
STATUS IN	Si11+ Si12+ COM Status input (Two inputs)
PULSE OUT	P/Sout1+ P/Sout1- Pulse/Status output 1
EXCITATION	EX1 EX2 Excitation current output
POWER SUPPLY	N(-) L(+) Power supply
	Functional grounding
	Protective grounding (Outside of the terminal)

Recommended Cable for Excitation, Power and Input / Output:

JIS C 3401 control cable equivalent

JIS C 3312 power cable equivalent

14 AWG Belden 8720 equivalent

Outer Diameter:

- Without gland option;
 $\phi 6.5$ to $\phi 12$ mm ($\phi 0.26$ to $\phi 0.47$ in.)
- With gland options EG5, EU5 and EW5;
 - Excitation cable;
 $\phi 10.5$ or $\phi 11.5$ mm ($\phi 0.41$ or $\phi 0.45$ in.)
 - Power and output cable;
 $\phi 7.5$ to $\phi 12$ mm ($\phi 0.3$ to $\phi 0.47$ in.)
- With gland options EP5;
 $\phi 6$ to $\phi 12$ mm ($\phi 0.24$ to $\phi 0.47$ in.)

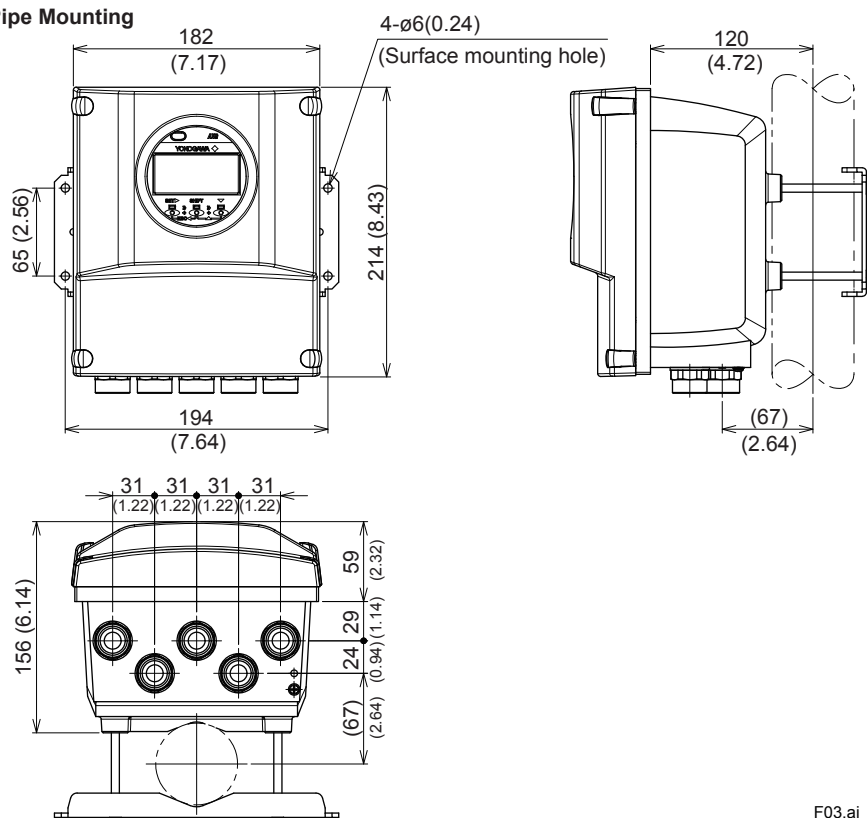
Nominal Cross Section:

- Single wire: 0.5 to 2.5 mm²
- Stranded wire: 0.5 to 1.5 mm²

■ DIMENSIONAL DRAWINGS

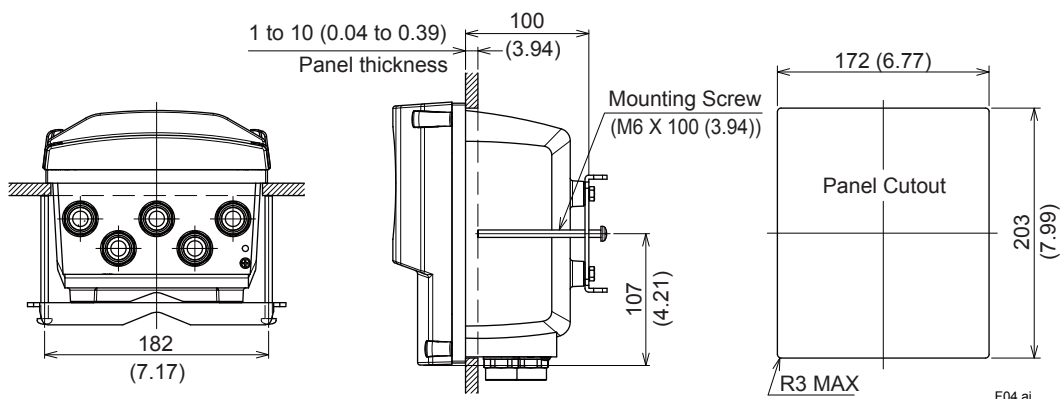
● Remote Transmitter AXG1A

Pipe Mounting

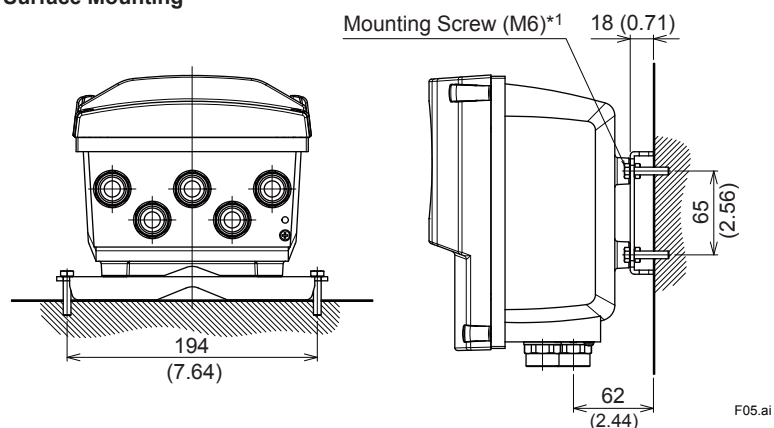


Panel Mounting

Weight 3.3 kg (7.3 lb)



Surface Mounting

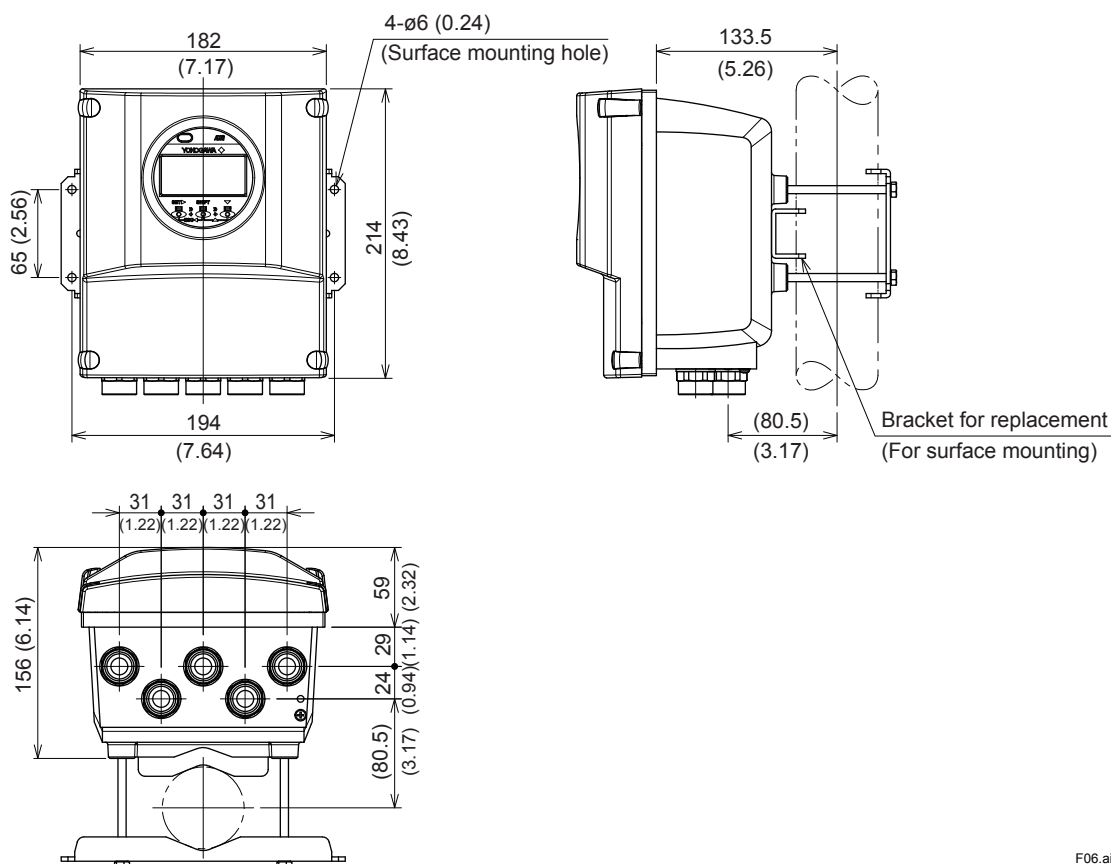


*1: These screws must be provided by the user.

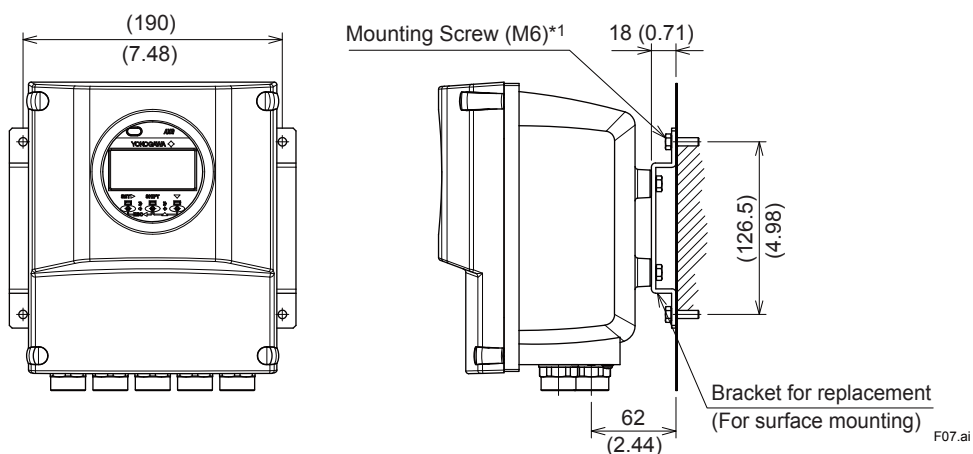
● Remote Transmitter AXG1A /RK (AM11 Replacement Bracket)

Pipe Mounting

Unit: mm (approx. inch)



Surface Mounting

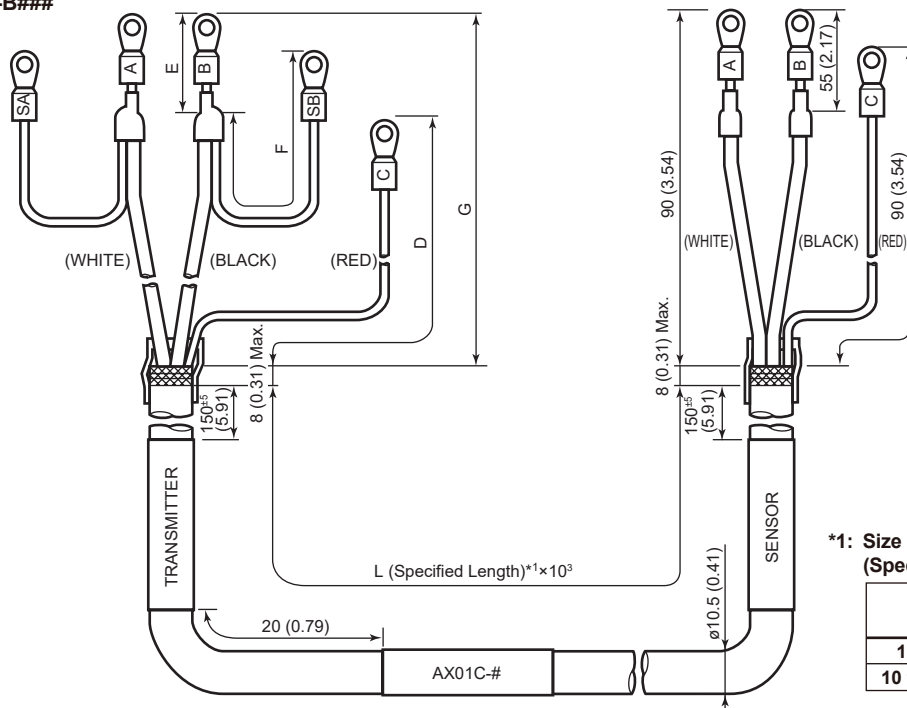


• Dedicated Signal Cable

For AXG Remote Sensor or AXW Remote Sensor

AX01C-B###

Unit: mm (approx. in.)



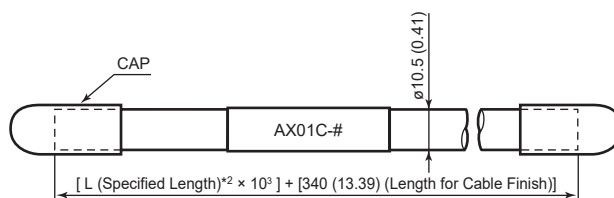
*1: Size Limit Deviation for L (Specified Length)

L [m]	Limit Deviation	
	Lower	Upper
1 to 9	0	+2 %
10 to 200	0	+1 %

Unit: mm (approx. in.)

Specification Code	Length			
	D	E	F	G
AX01C-B###	70 (2.8) ⁺⁵ ₀	25 (1.0) ⁺⁵ ₀	50 (2.0) ⁺⁵ ₀	60 (2.4) ⁺⁵ ₀

AX01C-A###



*2: Size Limit Deviation for L (Specified Length)

L [m]	Limit Deviation	
	Lower	Upper
1 to 9	0	+4 %
10 to 100	0	+2 %
101 to 200	0	+1 %

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• Limit Deviation

Unless otherwise specified, size limit deviations in the drawings are as shown in the following table.

General limit deviation in the dimensional outline drawing.

Unit: mm (approx. in.)

Category of basic size		Limit deviation	Category of basic size		Limit deviation
Above	Equal or below		Above	Equal or below	
	3 (0.12)	±0.7 (±0.03)	500 (19.69)	630 (24.80)	±5.5 (±0.22)
3 (0.12)	6 (0.24)	±0.9 (±0.04)	630 (24.80)	800 (31.50)	±6.25 (±0.25)
6 (0.24)	10 (0.39)	±1.1 (±0.04)	800 (31.50)	1000 (39.37)	±7.0 (±0.28)
10 (0.39)	18 (0.71)	±1.35 (±0.05)	1000 (39.37)	1250 (49.21)	±8.25 (±0.32)
18 (0.71)	30 (1.18)	±1.65 (±0.06)	1250 (49.21)	1600 (62.99)	±9.75 (±0.38)
30 (1.18)	50 (1.97)	±1.95 (±0.08)	1600 (62.99)	2000 (78.74)	±11.5 (±0.45)
50 (1.97)	80 (3.15)	±2.3 (±0.09)	2000 (78.74)	2500 (98.43)	±14.0 (±0.55)
80 (3.15)	120 (4.72)	±2.7 (±0.11)	2500 (98.43)	3150 (124.02)	±16.5 (±0.65)
120 (4.72)	180 (7.09)	±3.15 (±0.12)			
180 (7.09)	250 (9.84)	±3.6 (±0.14)			
250 (9.84)	315 (12.40)	±4.05 (±0.16)			
315 (12.40)	400 (15.75)	±4.45 (±0.18)			
400 (15.75)	500 (19.69)	±4.85 (±0.19)			

Remarks: The numeric is based on criteria of standard tolerance grade IT18 in JIS B 0401-1.

■ ORDERING INFORMATION

Note 1: When ordering, the span flow rate, unit, output pulse weight, and totalizer display pulse weight can be specified. These parameters will then be set before shipment. When ordering of a remote transmitter alone, these parameters cannot be specified. Custom configuration request is necessary for setting these parameters out of regular setting range.

Note 2: Some options, if ordered, require the relevant specifications to be input when ordering.

1. Model, Suffix Code and Optional Code
2. Combination

This is necessary when ordering combination of remote sensor and transmitter. Specify the combination of a sensor and a transmitter one by one by their model name, specification code, or Tag No. etc. On the nameplate of each sensor and transmitter, the serial number of the specified combination partner is described when shipped.

3. Tag No.

The Tag No. can be specified by a combination of the characters shown in the following table.

Symbol	-	Hyphen-minus	.	Period		Space (*1)
	_	Underscore	=	Equal sign	+	Plus sign
	/	Slash	(	Left round bracket	)	Right round bracket
	:	Colon	#	Hash mark	!	Exclamation mark
Number	0, 1, 2, 3, 4, 5, 6, 7, 8, 9					
Uppercase letter	A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z					
Lowercase letter (*2)	a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z					

*1: Leading and trailing space characters are deleted and left-justified, then printed on the name plate/ tag plate and written to the amplifier memory.

*2: When Communication and I/O code J# (HART communication) is specified, the lowercase letters are converted to uppercase and written to the parameter "Tag". For parameter "Long Tag", they are written in lowercase as is.

Tag No. can be "described on the nameplate and stainless steel tag plate (optional code SCT)" and "set to the memory in the transmitter". Refer to the following table for the item to be specified.

Described/ Setting Destination	Items to be Specified	Maximum Number of Characters
• Name plate • Stainless steel tag plate (Optional code SCT)	TAG NO	30
• Amplifier memory		30 There are restrictions on the write destination parameters. Read the next table.
	SOFTWARE TAG (Overrides TAG NO designation)	Read the next table

The characters specified by "TAG NO" are also written to the memory (parameter) in the amplifier. If it is necessary to specify a different tag number only for the amplifier memory, specify "SOFTWARE TAG". It is also possible to specify only SOFTWARE TAG. Names of the parameter to be written and the maximum number of characters are as shown in the following table. If the number of specified characters exceed the maximum number, the characters from the beginning up to the maximum number is written.

Tag No. in Amplifier Memory			
Items to be Specified	Communication	Parameter Name	Maximum Number of Characters
TAG NO or SOFTWARE TAG	BRAIN	TAG NO	16
		Long Tag	32
	HART	Tag	8

■ RELATED INSTRUMENTS

Product	Document Number
AM012 Calibrator for Magnetic Flowmeter	GS 1E6K2-E
BT200 BRAIN TERMINAL	GS 01C00A11-00EN
FieldMate Versatile Device Management Wizard	GS 01R01A01-01E
ADMAG TI Series AXG Magnetic Flowmeter	GS 01E22A01-01EN
ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)]	GS 01E24A01-01EN
ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)]	GS 01E25D11-01EN
FSA130 ADMAG TI Verification Tool	GS 01E21A04-01EN

■ REFERENCE STANDARD

Design and Test on Magnetic Flowmeters:

JIS B 7554(1997), ISO 20456(2017),
NAMUR NE70(2006), ASME MFC-16-2014

■ TRADEMARKS

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Note: The terms "transmitter" and "sensor" in this document are used in the same manner as "converter" and "flowtube" respectively which are used for our previous magnetic flowmeter models.

<Information on EU WEEE Directive>

EU WEEE (Waste Electrical and Electronic Equipment) Directive is only valid in the EU.

This instrument is intended to be sold and used only as a part of equipment which is excluded from WEEE Directive, such as large-scale stationary industrial tools, a large-scale fixed installation and so on, and, therefore, subjected to the exclusion from the scope of the WEEE Directive. The instrument should be disposed of in accordance with local and national legislation/regulations.