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:

<table>
<thead>
<tr>
<th>Remote Sensor</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXG</td>
<td>2.5 mm to 500 mm (0.1 to 20 in.)</td>
</tr>
<tr>
<td>AXW</td>
<td>25 mm to 400 mm (1 to 16 in.)</td>
</tr>
<tr>
<td></td>
<td>500 mm to 1800 mm (20 to 72 in.)</td>
</tr>
</tbody>
</table>

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: Urethane curing type 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 x 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 number, Communication protocol
  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 kΩ 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.
  - **Current Range:** 2.4 to 21.6 mA
- **Status Input (Dry contact) (Type J#, D#)**
  - Load Resistance: 200 Ω or less (ON), 100 kΩ or more (OFF)

**Output Signal**
- **Current Output (Active) (All Type)**
  - 4 to 20 mA DC signal
  - **Load Resistance:** 1 kΩ 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% (max pulse width is 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 kΩ or more
      - **Internal Power Supply:** 24 V DC ±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% (max pulse width is 5 minutes) configurable
    - **Driving Electromechanical Counter**
      - Maximum Current: 150 mA
      - **Internal Power Supply:** 24 VDC ±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 kΩ
    - **Internal Power Supply:** 24 VDC ±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, or 2000 ms 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), mgal (US), kbbi (US)*, bbl (US)*, mbbl (US)*, µbbl (US)*, Mgal (US)*, 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 (sec), min, h (hour), d (day)

**Mass Flow Rate Processing:**
- **Volume Flow Rate Vm** is obtained in the following expression.
  
  \[ Vm = Vf \times \rho \]

  - **Vm:** Mass flow rate [kg/s]
  - **Vf:** Volume flow rate [m³/s]
  - **ρ:** Density [kg/m³]

**Calorie Processing:**
- **The calorie Q is obtained in the following expression.**

  \[ Q = c \times Vm \times \Delta T \]

  - **Q:** Calorie [J/s]
  - **C:** Specific heat [J/kg•K]
  - **Vm:** 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 and the time constant for totalization / pulse output can be individually set. Time constant 0.1 to 200.0 seconds (shipped with 3.0 seconds). In the case of piston pump etc., it is possible to measure pulsatile flow up to 1 Hz with output damping 0.1 sec. 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 outputted.

### Pulse Output:
The totalized value of the flow rate is converted into the number of pulses converted by the pulse rate, and is outputted.

### Frequency Output:
Frequency signal (Duty 50%) proportional to the instantaneous value of the flow rate is outputted. 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 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 vale 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 outputted 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%. Select from the mode to continue the output processing for instantaneous flow rate display, pulse output, and flow rate totalization, or to fix the flow rate to 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
  - Input signal error (signal overflow), Sensor empty pipe, Electrode adhesion (of insulator)

- **Process Alarm:**
  - 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 or optional microSD card. The restore can also be used for copying parameters to another device (except for parameters under unmatched specification for the devices).

- **Data Logging Function:**
  - 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

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 μS

CONFORMITY STANDARDS

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 609529
Altitude at Installation Site: Max. 2000 m above sea
level
Installation Category (Overtoltage 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

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:
EN 50581
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:

<table>
<thead>
<tr>
<th>Size (mm in.)</th>
<th>Flow Velocity V m/s (ft/s)</th>
<th>Standard Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 to 15 (0.1) (0.5)</td>
<td>V &lt; 0.3 (1)</td>
<td>±1.0 mm/s</td>
</tr>
<tr>
<td>25 to 400 (1.0) (16)</td>
<td>0.3 ≤ V ≤ 10 (1) (33)</td>
<td>±0.3% of rate</td>
</tr>
<tr>
<td>500 (20)</td>
<td>V &lt; 0.3 (1)</td>
<td>±2.0 mm/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size (mm in.)</th>
<th>Flow Velocity V m/s (ft/s)</th>
<th>High Grade Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 to 200 (1.0) (8)</td>
<td>V &lt; 0.15 (0.5)</td>
<td>±0.5 mm/s</td>
</tr>
<tr>
<td>25 to 400 (1.0) (16)</td>
<td>0.15 ≤ V ≤ 10 (0.5) (33)</td>
<td>±0.18% of rate ±0.2 mm/s</td>
</tr>
<tr>
<td>500 (20)</td>
<td>V &lt; 0.3 (1)</td>
<td>±0.15% of rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size (mm in.)</th>
<th>Flow Velocity V m/s (ft/s)</th>
<th>Standard Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 to 1000 (20) (40)</td>
<td>V &lt; 0.3 (1.0)</td>
<td>±2.0 mm/s</td>
</tr>
<tr>
<td>1100 to 1800 (44) (72)</td>
<td>0.3 ≤ V &lt; 1.0 (1.0) (33)</td>
<td>±0.3% of rate ±1.0 mm/s</td>
</tr>
<tr>
<td>1.0 ≤ V ≤ 10 (3.3) (33)</td>
<td>±0.4% of rate ±1.8 mm/s</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size (mm in.)</th>
<th>Flow Velocity V m/s (ft/s)</th>
<th>Standard Accuracy</th>
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<td>500 to 1000 (20) (40)</td>
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<td>0.3 ≤ V &lt; 1.0 (1.0) (33)</td>
<td>±0.3% of rate ±1.0 mm/s</td>
</tr>
<tr>
<td>1.0 ≤ V ≤ 10 (3.3) (33)</td>
<td>±0.4% of rate ±1.8 mm/s</td>
<td></td>
</tr>
</tbody>
</table>

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 ±8 µA (±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

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

Reference Standards:
JIS B 7554, ISO 4185, ISO 5168, ISO 20456,
BS EN 29104

END OF PAGE
Repeatability:

Size 400 mm (16 in.) or smaller:
±0.1% of rate (Velocity 1 m/s (3.3 ft/s) or above)
±0.05% of rate ± 0.5 mm/s (Velocity below 1 m/s (3.3 ft/s))

Size 500 mm (20 in.) or larger:
±0.2% of rate (Velocity 1 m/s (3.3 ft/s) or above)
±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)

Power Consumption:
32 W

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

Fluid Conductivity:
Size 2.5 to 10 mm (0.1 to 0.4 in.): 5 μS/cm or larger
Size 15 to 125 mm (0.5 to 5 in.): 1 μS/cm or larger
Size 150 to 400 mm (6 to 16 in.): 3 μS/cm or larger
Size 500 to 1000 mm (20 to 40 in.): 20 μS/cm or larger
Size 1100 to 1800 mm (44 to 72 in.): 50 μS/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

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXG1A</td>
<td>-G</td>
<td>Magnetic Flowmeter Remote Transmitter</td>
<td></td>
</tr>
</tbody>
</table>

**Use**
- 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
- D#: 0, 2, 3, 4, 5, 6

**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

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Optional Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AX01C</td>
<td>-A### (*)</td>
<td></td>
<td>Magnetic Flowmeter Signal Cable</td>
</tr>
<tr>
<td></td>
<td>-B### (*)</td>
<td></td>
<td>Unfinished, Cable length ### m, Set of Finishing Parts for M4 Screws</td>
</tr>
<tr>
<td></td>
<td>/C# (*)</td>
<td></td>
<td>Finished for AXG1A, Cable Length ### m</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Communication and I/O Code (Type)</th>
<th>Number of Input and Output</th>
<th>Current Input (Active)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAIN HART 7</td>
<td>Current Output (Active)</td>
<td>Pulse/Status Output (Passive)</td>
</tr>
<tr>
<td>D0 J0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>D2 J2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>D3 J3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>D4 J4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>D5 J5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>D6 J6</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
## OPTIONAL CODE

### Application, Usage, and Operating Function

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification and Applicable Condition</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Noise Cut Circuit (for electrolytic bath)</td>
<td>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 μS/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.</td>
<td>ELC</td>
</tr>
<tr>
<td>Signal Down on Failure</td>
<td>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.)</td>
<td>C1</td>
</tr>
<tr>
<td>Signal Up on Failure (NAMUR NE 43 Compliant)</td>
<td>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</td>
<td>C2</td>
</tr>
<tr>
<td>microSD Card</td>
<td>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, and/or data logging function, specify optional code MC.</td>
<td>MC</td>
</tr>
<tr>
<td>Air Purge Fitting</td>
<td>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).</td>
<td>APC</td>
</tr>
<tr>
<td>CE Marking</td>
<td>CE marking is indicated on the nameplate. When the product is used in the countries where CE marking is required, specify optional code EC.</td>
<td>EC</td>
</tr>
<tr>
<td>Canada Domestic Sales</td>
<td>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 optional code EC (CE Marking)</td>
<td>CS</td>
</tr>
</tbody>
</table>

### Tag Plate and Mounting Bracket

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification and Applicable Condition</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel Tag Plate</td>
<td>Screwsed SUS304 stainless steel tag plate. 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.)</td>
<td>SCT</td>
</tr>
<tr>
<td>Stainless Steel Mounting Bracket</td>
<td>Change the material of mounting bracket, from carbon steel to stainless steel 304.</td>
<td>SB</td>
</tr>
<tr>
<td>AM11 Replacement Bracket</td>
<td>Provided with a special mounting bracket for replacing an AM11 converter with an AXG1A.</td>
<td>RK</td>
</tr>
</tbody>
</table>

### Certificate, Calibration, and Various Test

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification and Applicable Condition</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration Certificate (Level 2)</td>
<td>The Declaration and the Calibration Equipment List are issued.</td>
<td>L2</td>
</tr>
<tr>
<td>Calibration Certificate (Level 3)</td>
<td>The Declaration and the Primary Standard List are issued.</td>
<td>L3</td>
</tr>
<tr>
<td>Calibration Certificate (Level 4)</td>
<td>The Declaration and the Yokogawa Measuring Instruments Control System are issued.</td>
<td>L4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification and Applicable Condition</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterproof Glands (Type G5)</td>
<td>5 pcs. of waterproof gland. For cable entry, selection of JIS G1/2 female thread is necessary.</td>
<td>EG5</td>
</tr>
<tr>
<td>Waterproof Glands (Type U5)</td>
<td>5 pcs. of waterproof gland with union joint. For cable entry, selection of JIS G1/2 female thread is necessary.</td>
<td>EU5</td>
</tr>
<tr>
<td>Plastic Glands (Type P5)</td>
<td>5 pcs. of plastic gland. For cable entry, selection of JIS G1/2 female thread is necessary.</td>
<td>EP5</td>
</tr>
<tr>
<td>Waterproof Glands (Type W5)</td>
<td>5 pcs. of waterproof gland with JIS G3/4 female. For cable entry, selection of JIS G1/2 female thread is necessary.</td>
<td>EW5</td>
</tr>
</tbody>
</table>
## ACCESSORIES

- Mounting Bracket: 1 set

Note: Accessories differ depending on specifications to be selected.

## TERMINAL CONFIGURATION

### Terminal Symbol and Description

<table>
<thead>
<tr>
<th>Terminal Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Flow signal input</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>SB</td>
<td></td>
</tr>
<tr>
<td>ALM+</td>
<td>Alarm output</td>
</tr>
<tr>
<td>ALM-</td>
<td></td>
</tr>
<tr>
<td>So11+</td>
<td>Status output (Two outputs)</td>
</tr>
<tr>
<td>So12+</td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td></td>
</tr>
<tr>
<td>Iout1+</td>
<td>Current output 1</td>
</tr>
<tr>
<td>Iout1-</td>
<td>4-20 mA DC</td>
</tr>
<tr>
<td>MIO+</td>
<td>Option input/output</td>
</tr>
<tr>
<td>MIO-</td>
<td></td>
</tr>
<tr>
<td>Si11+</td>
<td>Status input (Two inputs)</td>
</tr>
<tr>
<td>Si12+</td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td></td>
</tr>
<tr>
<td>P/Sout1+</td>
<td>Pulse/Status output 1</td>
</tr>
<tr>
<td>P/Sout1-</td>
<td></td>
</tr>
<tr>
<td>EX1</td>
<td>Excitation current output</td>
</tr>
<tr>
<td>EX2</td>
<td></td>
</tr>
<tr>
<td>N(-)</td>
<td>Power supply</td>
</tr>
<tr>
<td>L(+)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Functional grounding</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protective grounding</td>
</tr>
<tr>
<td></td>
<td>(Outside of the terminal)</td>
</tr>
</tbody>
</table>

### 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; ø6.5 to ø12 mm (0.26 to ø0.47 in.)
- With gland options EG5, EU5 and EW5:
  - Excitation cable; ø10.5 or ø11.5 mm (0.41 or ø0.45 in.)
  - Power and output cable; ø7.5 to ø12 mm (0.3 to ø0.47 in.)
- With gland options EP5:
  - ø6 to ø12 mm (0.24 to ø0.47 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**

Unit: mm (approx. inch)

- Dimensional Drawings

**Panel Mounting**

- Panel thickness
- Panel Cutout

**Surface Mounting**

- Mounting Screw (M6)*1

---

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

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GS 01E22C01-01EN   Sep. 15, 2020-00
- Remote Transmitter AXG1A /RK (AM11 Replacement Bracket)

Pipe Mounting

Unit: mm (approx. inch)

Surface Mounting

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

For AXG Remote Sensor or AXW Remote Sensor

**AX01C-B###**

![Diagram of AX01C-B###]

**APX01C-A###**

![Diagram of AX01C-A###]

**Specifications**

<table>
<thead>
<tr>
<th>Specification Code</th>
<th>Length (D)</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>AX01C-B###</td>
<td>70 m</td>
<td>25 m</td>
<td>50 m</td>
<td>60 m</td>
</tr>
</tbody>
</table>

**Tolerance for L (Specified Length)**

- 1 to 9 m: ±2%
- 10 to 200 m: ±3%

**Tolerance for L (Specified Length)** +340 mm (Length for Cable Finish)

- 1 to 9 m: ±3%
- 10 to 100 m: ±2%
- 10 to 200 m: ±2%
### Dimensional Tolerance

Unless otherwise specified, dimensional tolerances on the drawings are as shown in the following table.

**General tolerance in the dimensional outline drawing.**

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

Remarks: The numeric is based on criteria of tolerance class 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.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Hyphen-minus</th>
<th>Period</th>
<th>Space (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Underscore</td>
<td>Equal sign</td>
<td>Plus sign</td>
</tr>
<tr>
<td></td>
<td>Slash (left round bracket)</td>
<td>Right round bracket</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colon # Hash mark</td>
<td>Exclamation mark</td>
<td></td>
</tr>
</tbody>
</table>

**Number:** 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
**Lowercase 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

*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 # (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.

<table>
<thead>
<tr>
<th>Described/ Setting Destination</th>
<th>Items to be Specified</th>
<th>Maximum Number of Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Name plate</td>
<td>TAG NO</td>
<td>30</td>
</tr>
<tr>
<td>• Stainless steel tag plate (Optional code SCT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Amplifier memory</td>
<td>SOFTWARE TAG (Overrides TAG NO designation)</td>
<td>Read the next table.</td>
</tr>
</tbody>
</table>

There are restrictions on the write destination parameters. 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.

<table>
<thead>
<tr>
<th>Tag No. in Amplifier Memory</th>
<th>Items to be Specified</th>
<th>Communication</th>
<th>Parameter Name</th>
<th>Maximum Number of Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAG NO or SOFTWARE TAG</td>
<td>BRAIN</td>
<td>TAG NO</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Long Tag</td>
<td>HART</td>
<td>Long Tag</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Tag</td>
<td></td>
<td>Tag</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</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.
RELATED INSTRUMENTS

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

REFERENCE STANDARD

Design and Test on Magnetic Flowmeters:

TRADEMARKS

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<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.