# User's Manual

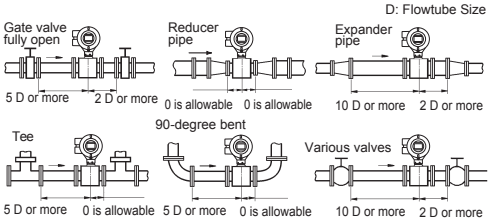
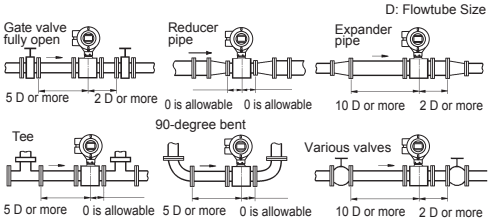
ADMAG AXR

# AXR
# Two-wire
# Magnetic Flowmeter
# Integral Flowmeter

# [Style:S2]

Manual Change No.18-0010-E

Change the corresponding pages of the user's manual IM 01E30D01-01EN (7th Edition) to the contents below.

| Page | Before Change | After Change |
|---|---|---|
| 1-2<br>(1.1 Using the Magnetic Flowmeter Safely) | — | **WARNING**<br>When opening and closing the cover, be sure to handle the cover carefully so that there are no damage and foreign matter adhesion at its threads and O-ring. |
| 3-1<br>(3.1 Piping Design Precautions) | **(3) Required Lengths of Straight Runs**<br>To maintain accurate measurement, read JIS B 7554 which explains the requirements for upstream piping conditions of magnetic flowmeters.<br>The piping conditions we recommend as shown in Figure 3.1.1 are based on JIS B7554 and on our piping condition test data.<br>When installing two or more magnetic flowmeters on a single pipe, provide a run of at least 10D between them.<br>  <br><br>**Figure 3.1.1 Required Lengths of Straight Runs**<br>*1: Do not install anything in the vicinity that may interfere with the magnetic field, induced signal voltages, or flow velocity distributions of the flowmeter.<br>*2: A straight run may not be required on the downstream side of the flowmeter. However, if a downstream valve or other fitting causes irregularity or deviation in flows, provide a straight run of 2D to 3D on the downstream side.<br>*3: Highly recommend to mount valves on the downstream side so that deviated flows do not occur in the flowtube and to avoid startup from an empty condition. | **(3) Required Lengths of Straight Runs**<br>To maintain accurate measurement, read JIS B 7554 which explains the requirements for upstream piping conditions of magnetic flowmeter.<br>The piping conditions we recommend as shown in Figure 3.1.1 are based on JIS B7554 and on our piping condition test data.<br>This is not always enough when the piping line incorporates multiple conditions at the same time.<br>When installing two or more magnetic flowmeter on a single pipe, provide a run of at least 5D between them.<br>  <br><br>**Figure 3.1.1 Required Lengths of Straight Runs**<br>*1: Do not install anything in the vicinity that may interfere with the magnetic field, induced signal voltages, or flow velocity distributions of the flowmeter.<br>*2: A straight run may not be required on the downstream side of the flowmeter. However, if a downstream valve or other fitting causes irregularity or deviation in flows, provide a straight run of 2D to 3D on the downstream side.<br>*3: Highly recommend to mount valves on the downstream side so that deviated flows do not occur in the flowtube and to avoid startup from an empty condition.<br>*4: In case the piping conditions are compounded, install on the straight pipe section where the upstream part is sufficiently rectified. |
| 12-4, 12-5, 12-9, 12-11<br>(12. OUTLINE) | Hastelloy C276 | HASTELLOY C-276 |
| 12-14<br>(12.6 Optional Specifications) | (for optional code BSC and BSF)<br>Nuts: JIS SUS403 (AISI 403 SS stainless steel equivalent) | (for optional code BSC and BSF)<br>Nuts: JIS SUS304 (AISI 304 SS stainless steel equivalent) |

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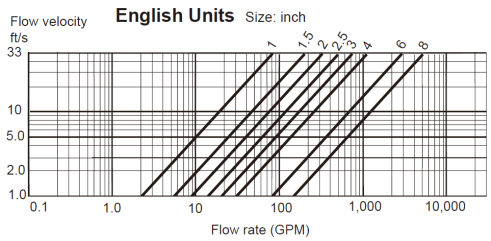
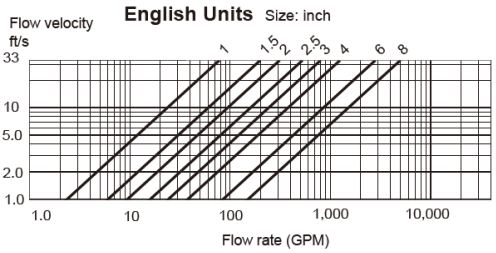
Yokogawa Electric Corporation

Aug. 1, 2018

| Page | Before Change | After Change |
|---|---|---|
| 12-23<br>(12.8 Sizing Data) |  |  |
| 14-1 to 14-3<br>(14.1 ATEX) | — | Replace Section 14.1 with Manual Change No.18-0010-E (pp.3-4). |
| 14-6 to 14-8<br>(14.4 IECEx) | — | Replace Section 14.3 with Manual Change No.18-0010-E (pp.5-6). |
| -<br>(RoHS (2011/65/EU) Directive) | **■ RoHS (2011/65/EU) Directive**<br>Read GS 01E20S00-01EN [ADMAG Series Magnetic Flowmeter List of RoHS (2011/65/EU) Directive Compliant Products] | **■ RoHS (2011/65/EU) Directive**<br>For conformity with the RoHS Directive, read GS 01E20S00-01EN "ADMAG Series Magnetic Flowmeter List of RoHS (2011/65/EU) Directive Compliant Products".<br>Some parts of this product include the restricted substances of RoHS Directive, but their applications are under the exemption of the directive. |

## 14.1 ATEX

**WARNING**

Only trained persons use this instrument in industrial locations.

### (1) Technical Data

Applicable Standard:
EN 60079-0: 2012 + A11:2013,
EN 60079-1: 2014, EN 60079-7: 2015 + A1: 2018,
EN 60079-11: 2012, EN 60079-31: 2014
Certificate: DEKRA 11ATEX0144

**Type of Gas Atmosphere Protection**

Type of Protection:
Group: II
Category: 2G
Ex db e ia IIC T6…T4 Gb
Specification of Protection:
Electrode Circuit: Um=250V
Power Supply/Current Output:
42Vdc max., 4 to 20mA, Um=250V
Digital Output: ON; 2Vdc, 120mA max.,
OFF; 30Vdc max., 4mA,
Um=250V
Excitation Circuit: 29 V max.
Enclosure: IP66/IP67
Process Temperature:

| Temperature Class | Maximum Process Temperature | Minimum Process Temperature |
|---|---|---|
| T6 | +70°C (+158°F) | –30°C (–22°F) |
| T5 | +85°C (+185°F) | –30°C (–22°F) |
| T4 | +130°C (+266°F) | –30°C (–22°F) |

Ambient Temp.: –30°C to +55°C
(–22°F to +131°F)

**Type of Dust Atmosphere Protection**

Type of Protection:
Group: II
Category: 2D
Ex tb IIIC T90°C, T110°C, T130°C Db
Specification of Protection:
Electrode Circuit: Um=250V
Power Supply/Current Output:
42Vdc max., 4 to 20mA, Um=250V
Digital Output: ON; 2Vdc, 120mA max.,
OFF; 30Vdc max., 4mA,
Um=250V
Excitation Circuit: 29 V max.
Enclosure: IP66/IP67
Process Temperature:

| Maximum Surface Temperature | Maximum Process Temperature | Minimum Process Temperature |
|---|---|---|
| T90°C (+194°F) | +70°C (+158°F) | –30°C (–22°F) |
| T110°C (+230°F) | +85°C (+185°F) | –30°C (–22°F) |
| T130°C (+266°F) | +130°C (+266°F) | –30°C (–22°F) |

Ambient Temp.: –30°C to +55°C
(–22°F to +131°F)

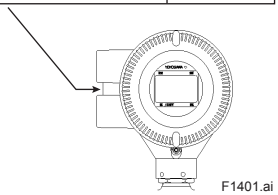
**WARNING**

If the AXR is mounted in an area where the use of EPL Db equipment is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.

### (2) Electrical Connection

The type of electrical connection is stamped near the electrical connection port according to the following codes.

| Screw Size | Marking |
|---|---|
| ISO M20x1.5 female | M ⚠ |
| ANSI 1/2NPT female | N ⚠ |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### (3) Installation

**WARNING**

- Grounding resistance of 100 Ω or less is necessary.
  When optional code A is selected, grounding resistance of 10 Ω or less shall be required.
- All wiring shall comply with EN 60079-14, and local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified ATEX flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is flameproof certified.)
- In order to prevent the grounding ring conductor from loosening, the conductor must be secured to the terminal, tightening the screw with appropriate torque. Care must be taken not to twist the conductor.

The grounding terminals are located on the inside and outside of the terminal area.
Connect the cable to grounding terminal in accordance with wiring procedure 1) or 2).

1) Internal grounding terminal

2) External grounding terminal

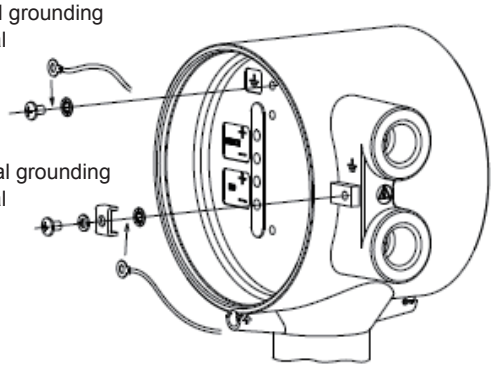

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**Figure 14.1 Wiring Procedure for Grounding Terminals**

### (4) Operation

**WARNING**

- After de-energizing, delay 5 minutes before opening.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

### (5) Maintenance and Repair

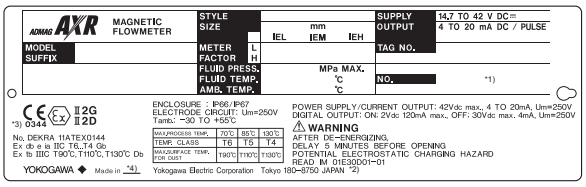
**WARNING**

Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of product.
- Modification of the flameproof joint is not allowed.

### (6) Name Plate




MODEL: Specified model code
SUFFIX: Suffix codes of the model code
STYLE: Specified style code
SIZE: Nominal size of apparatus
METER FACTOR: Sensor constant number of apparatus
SUPPLY: Supply voltage of apparatus
OUTPUT: Output signal of apparatus
FLUID TEMP.: Fluid temperature of apparatus
FLUID PRESS.: Fluid pressure of apparatus
AMB. TEMP., Tamb: Ambient temperature
POWER SUPPLY/CURRENT OUTPUT:
Power supply with output signal of apparatus
DIGITAL OUTPUT: Output signal of apparatus
NO.: Manufacturing serial number *1)
CE: CE marking
II 2G: Group II Category 2 Gas atmosphere
II 2D: Group II Category 2 Dust atmosphere
No.: DEKRA 11ATEX0144
EC Type Examination certificate number
Ex db e ia IIC T6…T4 Gb
Protection type and temp. class for gas
Ex tb IIIC T90°C, T110°C, T130°C Db
Protection type and maximum surface temp. for dust
ENCLOSURE: Enclosure protection code
ELECTRODE CIRCUIT Um: Voltage of electrode circuit
⚠ WARNING: Warning to apparatus
YOKOGAWA ◆ TOKYO 180-8750 JAPAN :
Name and address of manufacturer. *2)

*1: The first number in the second block of “NO.” column is the last one number of the production year. For example, the year of production of the product engraved as follows is year 2008.
No. S5EA05158 8̲45 7
↑
Produced in 2008

*2: “180-8750” is a zip code which represents the following address.
2-9-32 Nakacho, Musashino-shi, Tokyo Japan

*3: The identification number of the notified body :
0344 DEKRA Netherland

*4: The product-producing country

## 14.4 IECEx

**WARNING**

Only trained persons use this instrument in industrial locations.

### (1) Technical Data

Applicable Standard:
IEC 60079-0: 2011, IEC 60079-1: 2014,
IEC 60079-7: 2006, IEC 60079-11: 2011,
IEC 60079-31: 2013
Certificate: IECEx DEK 11.0053

**Type of Gas Atmosphere Protection**

Type of Protection:
Ex db e ia IIC T6…T4 Gb
Specification of Protection:
Electrode Circuit: Um=250V
Power Supply/Current Output:
42Vdc max., 4 to 20mA, Um=250V
Digital Output: ON; 2Vdc, 120mA max.,
OFF; 30Vdc max., 4mA,
Um=250V
Excitation Circuit: 29 V max.
Enclosure: IP66/IP67
Process Temperature:

| Temperature Class | Maximum Process Temperature | Minimum Process Temperature |
|---|---|---|
| T6 | +70°C (+158°F) | –30°C (–22°F) |
| T5 | +85°C (+185°F) | –30°C (–22°F) |
| T4 | +130°C (+266°F) | –30°C (–22°F) |

Ambient Temp.: –30°C to +55°C
(–22°F to +131°F)

**Type of Dust Atmosphere Protection**

Type of Protection:
Ex tb IIIC T90°C, T110°C, T130°C Db
Specification of Protection:
Electrode Circuit: Um=250V
Power Supply/Current Output:
42Vdc max., 4 to 20mA, Um=250V
Digital Output: ON; 2Vdc, 120mA max.,
OFF; 30Vdc max., 4mA,
Um=250V
Excitation Circuit: 29 V max.
Enclosure: IP66/IP67
Process Temperature:

| Maximum Surface Temperature | Maximum Process Temperature | Minimum Process Temperature |
|---|---|---|
| T90°C (+194°F) | +70°C (+158°F) | –30°C (–22°F) |
| T110°C (+230°F) | +85°C (+185°F) | –30°C (–22°F) |
| T130°C (+266°F) | +130°C (+266°F) | –30°C (–22°F) |

Ambient Temp.: –30°C to +55°C
(–22°F to +131°F)

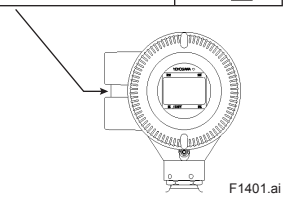
**WARNING**

If the AXR is mounted in an area where the use of EPL Db equipment is required, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.

### (2) Electrical Connection

The type of electrical connection is stamped near the electrical connection port according to the following codes.

| Screw Size | Marking |
|---|---|
| ISO M20x1.5 female | M ⚠ |
| ANSI 1/2NPT female | N ⚠ |




### (3) Installation

**WARNING**

- Grounding resistance of 100 Ω or less is necessary.
  When optional code A is selected, grounding resistance of 10 Ω or less shall be required.
- All wiring shall comply with IEC 60079-14, and local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified IECEx flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is certified as the flameproof and IP66 or IP67 as a part of this apparatus.)
- In case of ANSI 1/2 NPT plug, ANSI hexagonal wrench should be applied to screw in.
- In order to prevent the grounding ring conductor from loosening, the conductor must be secured to the terminal, tightening the screw with appropriate torque. Care must be taken not to twist the conductor.

The grounding terminals are located on the inside and outside of the terminal area.
Connect the cable to grounding terminal in accordance with wiring procedure 1) or 2).

1) Internal grounding terminal

2) External grounding terminal

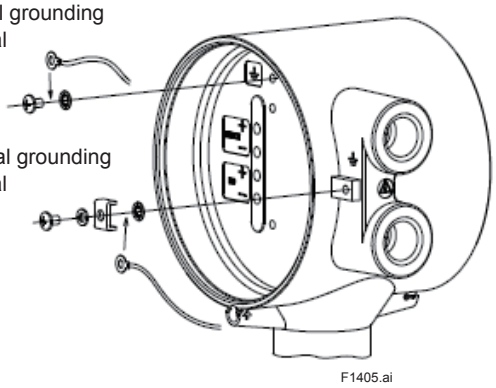


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**Figure 14.4 Wiring Procedure for Grounding Terminals**

### (4) Operation

**WARNING**

- After de-energizing, delay 5 minutes before opening.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

### (5) Maintenance and Repair

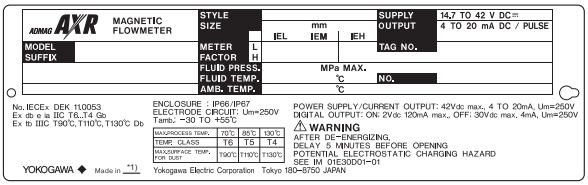
**WARNING**

Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

**WARNING**

- Electrostatic charge may cause an explosion hazard. Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on coating face of product.
- Modification of the flameproof joint is not allowed.

### (6) Name Plate




MODEL: Specified model code
SUFFIX: Suffix codes of the model code
STYLE: Specified style code
SIZE: Nominal size of apparatus
METER FACTOR: Sensor constant number of apparatus
SUPPLY: Supply voltage of apparatus
OUTPUT: Output signal of apparatus
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DIGITAL OUTPUT: Output signal of apparatus
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Ex db e ia IIC T6…T4 Gb
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Protection type and maximum surface temp. for dust
ENCLOSURE: Enclosure protection code
ELECTRODE CIRCUIT Um: Voltage of electrode circuit
⚠WARNING: Warning to apparatus
YOKOGAWA ◆ Name of manufacturer.

*1: The product-producing country