

ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)] Installation Manual [Style: S1, S2]

IM 01E25A01-01EN



Integral Flowmeter
(AXW###G)



Remote Sensor
(AXW###G, AXW###W)



Remote Transmitter
(AXG1A)



Remote Transmitter
(AXW4A)



Remote Transmitter
(AXFA11G)

This manual outlines the basic guidelines for installation and wiring procedures. For the items which are not covered in this manual, see the user's manuals and the general specifications as listed in Table 1.1.

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1. Introduction

This manual provides the basic guidelines for installation, wiring procedures and basic operation of ADMAG TI (Total Insight) Series AXW magnetic flowmeters (size: 500 to 1800 mm (20 to 72 in.)) with BRAIN, HART and Modbus protocol.

For the items which are not covered in this manual, read the applicable user's manuals and general specifications as listed in Table 1.1. These documents can be downloaded from the website of YOKOGAWA. To ensure correct use of the instrument, read these manuals thoroughly and fully understand how to operate the instrument before operating it. For method of checking the model and specifications, read Chapter 2 and general specifications as listed in Table 1.1.

Website address: <http://www.yokogawa.com/fld/doc/>
 These manuals can be downloaded from the website of YOKOGAWA or purchased from the YOKOGAWA representatives.

Table 1.1 Manual and General Specifications List

Model	Document Title	Document No.
AXW###G AXW###W AXW4A AXG1A AX01C	ADMAG TI Series AXG###, AXW###, AXG4A, AXW4A, AXG1A Magnetic Flowmeter Read Me First	IM 01E21A21-01Z1
	ADMAG TI Series AXG/AXW Magnetic Flowmeter Safety Manual	IM 01E21A21-02EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)] Installation Manual	IM 01E25A01-01EN (this manual)
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 1800 mm (1 to 72 in.)] Maintenance Manual	IM 01E24A01-02EN
	ADMAG TI Series AXW Magnetic Flowmeter BRAIN Communication Type	IM 01E24A02-01EN
	ADMAG TI Series AXW Magnetic Flowmeter HART Communication Type	IM 01E24A02-02EN
	ADMAG TI Series AXG, AXW Magnetic Flowmeter Modbus Communication Type	IM 01E21A02-05EN
	ADMAG TI Series AXG/AXW Magnetic Flowmeter FOUNDATION Fieldbus Communication Type	IM01E21A02-03EN
	ADMAG TI Series AXG1A Magnetic Flowmeter BRAIN Communication Type	IM 01E22C02-01EN
	ADMAG TI Series AXG1A Magnetic Flowmeter HART Communication Type	IM 01E22C02-02EN
	ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)] General Specifications	GS 01E25D11-01EN
	ADMAG TI Series AXG1A Magnetic Flowmeter Remote Transmitter General Specifications	GS 01E22C01-01EN

Model	Document Title	Document No.
AXFA11G AXFC	AXF Series Magnetic Flowmeter Read Me First	IM 01E20A21-01Z1
	AXFA11G Remote Converter [Hardware Edition/Software Edition]	IM 01E20C01-01E
	AXFA11G Remote Converter General Specifications	GS 01E20C01-01E



NOTE

When describing the model name like AXW###G in this manual, "###" means any of the following.
 500, 600, 700, 800, 900, 10L, 11L, 12L, 13L, 14L, 15L, 16L, 18L

■ Precautions Related to the Protection, Safety, and Alteration of the Instrument

The following safety symbol marks are used in this manual and instrument.



WARNING

A WARNING sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.



CAUTION

A CAUTION sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.



IMPORTANT

An IMPORTANT sign denotes that attention is required to avoid damage to the instrument or system failure.



NOTE

A NOTE sign denotes information necessary for essential understanding of operation and features.

The following symbols are used in the Instrument and the manual to indicate the accompanying safety precautions:

	Protective grounding terminal
	Functional grounding terminal (This terminal should not be used as a protective grounding terminal.)
	Alternating current
	Direct current
	Caution This symbol indicates that the operator must refer to an explanation in the user's manual in order to avoid the risk of injury or death of personnel or damage to the instrument.

- For the protection and safe use of the instrument and the system in which this instrument is incorporated, be sure to follow the instructions and precautions on safety that is stated in this manual whenever you handle the instrument. Take special note that if you handle the instrument in a manner that violated these instructions, the protection functionality of the instrument may be damaged or impaired. In such cases, YOKOGAWA does not guarantee the quality, performance, function, and safety of instrument.
- When installing protection and/or safety as lighting protection devices and equipment for the instrument and control system or designing or installing separate protection and/or safety circuits for fool-proof design and fail-safe design of the processes and lines that use the instrument and the control system, the user should implement these using additional devices and equipment.
- Should use the parts specified by YOKOGAWA when replacing. Please contact YOKOGAWA's service office for fuse replacement.
- This instrument is not designed or manufactured to be used in critical applications that directly affect or threaten human lives. Such applications include nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, air navigation facilities, aviation facilities, and medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
- Do not modify this instrument.
- YOKOGAWA will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.
- The instrument should be disposed of in accordance with local and national legislation/regulations.

■ Regarding This User's Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without YOKOGAWA's written permission.
- YOKOGAWA makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, inform the nearest YOKOGAWA sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
- Note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- This manual is intended for the following personnel; Engineers responsible for installation and wiring of the instrument.
Personnel responsible for normal daily operation of the instrument.
- To ensure correct use, read this manual and the applicable manuals as listed in Table 1.1 thoroughly before starting operation. Read the general specifications as listed in Table 1.1 for its specification.

■ Trademarks:

- HART is a registered trademark of FieldComm Group.
- Modbus is a registered trademark of AEG Schneider.
- FOUNDATION is a registered trademark of FieldComm Group.
- All the brands or names of Yokogawa Electric's products used in this manual are either trademarks or registered trademarks of Yokogawa Electric Corporation.
- All other company and product names mentioned in this manual are trade names, trademarks or registered trademarks of their respective companies.
- In this manual, trademarks or registered trademarks are not marked with TM or [®].

1.1 For Safe Use of Product

For the protection and safe use of the instrument and the system in which this instrument is incorporated, be sure to follow the instructions and precautions on safety that is stated in this manual whenever you handle the instrument. Take special note that if you handle the instrument in a manner that violated these instructions, the protection functionality of the instrument may be damaged or impaired. In such cases, YOKOGAWA shall not be liable for any indirect or consequential loss incurred by either using or not being able to use the Instrument.

(1) General

- This instrument conforms to EN61326-1, EN61326-2-3, EN61326-2-5, EN61000-3-2, and EN61000-3-3 (EMC standard).
- This instrument is an EN61326-1 (EMC standard), Class A (for use in commercial, industrial, or business environments).
- This instrument (General-purpose type) is complied with IP66 and IP67 in the IP Protection Grade. YOKOGAWA assumes no liability for the customer's failure to comply with these requirements.
- This instrument (Submersible type) is complied with IP68 in the IP Protection Grade. YOKOGAWA assumes no liability for the customer's failure to comply with these requirements.
- This instrument is designed for indoor and outdoor use.
- This instrument is Micro Pollution Degree: 2.
- This instrument is Macro Pollution Degree: 4.
- This instrument is designed for altitude at installation Site Max. 2000 m above sea level.
- This instrument is installation Category (Overvoltage category): II.



CAUTION

This instrument is a Class A instrument in the EN61326-1(EMC standard). Operation of this instrument in a residential area may cause radio interference, in which case the user is required to take appropriate measures to correct the interference.



IMPORTANT

The minimum ambient temperature is limited by the minimum fluid temperature of the sensor (the lining). For more information, read the applicable general specifications as listed in Table 1.1. The flowmeter may be used in an ambient humidity where the relative humidity ranges from 0 to 100%. However, avoid long-term continuous operation at relative humidity above 95%.



WARNING

- **Purpose of use**
This instrument is the Magnetic Flowmeter for use of measuring the liquid flow. Do not use this instrument for other purposes.



WARNING

- Installation, wiring and maintenance of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to installation, wiring and maintenance.
- Wiring work should be done adequate wire, sleeve crimp and torque force. Use terminal with insulating cover for the power supply wiring and protective grounding wiring. Do not pull the wires too much strongly in order to prevent electric shocks caused by their damage.
- Do not open the cover in wet weather or humid environment. When the cover is open, stated enclosure protection is not applicable.
- Ensure that the power supply is off in order to prevent electric shocks.
- When opening the cover, wait for more than 20 minutes after turning off the power. Only expert engineer or skilled personnel are permitted to open the cover.
- When opening and closing the transmitter cover, be sure to handle the transmitter cover carefully so that there are no damage and foreign matter adhesion at its threads and O-ring.
- This instrument employs the parts which are affected by a function damage caused by static electricity. Thus, you should do the antistatic work using an anti-static wrist band for it and be careful to avoid touching each electrical parts and circuitry directly.
- When connecting the wiring, check that the supply voltage is within the range of the voltage specified for this instrument before connecting the power cable. In addition, check that no voltage is applied to the power cable before connecting the wiring.
- To prevent electric shocks, ensure the electrical wiring cover is completely attached after the wiring work.
- To prevent electric shocks, do not impress over rated voltage to each input/output terminals.
- If there is any unused electrical connection, use the blanking plug to cover which comes with this instrument or which is supplied by YOKOGAWA. The blanking plug should be fastened into the unused electrical connection without any mistake. If not, stated enclosure protection is not applicable.

(2) Installation



WARNING

- For AXG1A, impact resistance rating of glass on the display cover is IK06, metal housing is IK08. In the test method, the steel ball is dropped from a height of 200 mm after pre-cooling the housing to -40 degree C. (Impact on horizontal surface)
- The magnetic flowmeter is a heavy instrument. Be careful that no damage is caused personnel through accidentally dropping it, or by exerting excessive force on the magnetic flowmeter. When moving the magnetic flowmeter, always use a trolley and have at least two people carry it.
- Do not apply excessive weight, for example, a person stepping on the magnetic flowmeter.
- The magnetic flowmeter must be installed within the specification conditions.
- **Connect the Protective Grounding Terminal**
Ensure to connect the protective grounding to prevent electric shock before turning on the power.
- **Do Not Impair the Protective Grounding**
Never cut off the internal or external protective grounding wire or disconnect the wiring of the protective grounding terminal. Doing so invalidates the protective functions of the instrument and poses a potential shock hazard.
- **Do Not Operate with Defective Protective Grounding**
Do not operate the instrument if the protective grounding might be defective. Also, ensure to check them before operation.
- **Do Not Operate in an Explosive Atmosphere**
Do not operate the instrument in the presence of flammable gas, vapors, or combustible dust. Operation in such an environment constitutes a safety hazard. Prolonged use in a highly dense corrosive gas (H₂S, SO_x, etc.) will cause a malfunction.
- **Ground the Instrument before Making External Connections**
Connect the protective grounding before connecting to the item under measurement or control unit.
- **Damage to the Protection**
Operating the instrument in a manner neither described in this manual nor the manuals as listed in Table 1.1 may damage the instrument's protection.
- The flowmeter should be installed away from electrical motors, transformers, and other power sources in order to avoid interference with measurement.



WARNING

- Install an external switch or circuit breaker as a means to turn the power off (capacitance: 15A, conforming to IEC60947-1 and IEC60947-3). Locate this switch either near the instrument or in other places facilitating easy operation. Affix a "Power Off Equipment" label to this external switch or circuit breaker.
- All procedures relating to installation must comply with the electrical code of the country where it is used.

(3) Wiring



WARNING

- In cases where the ambient temperature exceeds 50°C, use external heat resistant wiring with a maximum allowable temperature of 70°C or above.
- When wiring the conduits, pass the conduit through the wiring connection port, and utilize the waterproof gland to prevent water from flowing in. Install a drain valve at the low end of the vertical pipe, and open the valve regularly.
- Do not connect cables outdoors in wet weather in order to prevent damage from condensation and to protect the insulation, e.g. inside the terminal box of the flowmeter.
- The transmitter case should be removed by YOKOGAWA's qualified personnel only. Opening the transmitter case is dangerous, because some areas inside the instrument have high voltages.
- The protective grounding must be connected securely at the terminal with the ⊕ mark to avoid danger to personnel.

(4) Operation



WARNING

Be sure to enable the write protect function to prevent the overwriting of parameters after finishing parameter setting.

In rare cases, the infra-red switches may respond unexpectedly in such conditions as sticking ball of water or extraneous substances on the surface of display panel glass according to the principle of infra-red switch operation. Its probability rises in such cases as sticking rain water by storm or other similar situation and washing up work near flowmeter installation place. Blinking light from a flashlight etc. to the infra-red switches may result in the malfunction. Read Section 6.3 for the hardware write protect function, and the user's manual of applicable communication type as listed in Table 1.1 for the software write protect function.

(5) Maintenance



WARNING

- When maintaining the instrument, read the maintenance manual as listed in Table 1.1. Do not perform the maintenance that is not described in the manual. If necessary, contact YOKOGAWA.
- When the magnetic flowmeter is processing hot fluids, the instrument itself may become extremely hot. Take sufficient care not to get burnt.
- Where the fluid being processed is a toxic substance, avoid contact with the fluid and avoid inhaling any residual gas, even after the instrument has been taken off the piping line for maintenance and so forth.
- If dirt, dust or other substances surfaces on the glass of display cover, wipe them clean with a soft dry cloth.
- Maintenance of this flowmeter should be implemented in a maintenance service shop where the necessary tools and environment condition are provided.
The necessity of this environmental condition is that ambient temperature is 5 to 40°C (the maximum relative humidity is 80 % for temperature 5 to 31°C, and decreasing linearly to 50 % relative humidity at 40°C).

(6) Modification

- Do not modify this instrument.
- YOKOGAWA will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

(7) Product Disposal

The instrument should be disposed of in accordance with local and national legislation/regulations.

(8) Power Supply

Ensure that the source voltage matches the voltage of the power supply before turning on the power.

Power Supply Code 1:

- AC Type:
Rated Power Supply: 100 to 240 V AC, 50/60 Hz
- DC Type:
Rated Power Supply: 100 to 120 V DC

Power Supply Code 2:

- AC Type:
Rated Power Supply: 24 V AC, 50/60 Hz
- DC Type:
Rated Power Supply: 24 V DC

Power Consumption:

- Integral Type: 13 W
- Remote Type (with AXG4A): 13 W
- Remote Type (with AXG1A): 32 W

Note: Power Consumption is independent of communication and I/O specification.

Note: For AXFA11, read the applicable user's manual as listed in Table 1.1.

(9) microSD Card



IMPORTANT

- Do not store or use the microSD card in places with static electricity, near electrically charged objects, or where electrical noise is present. Doing so can result in shock or damage.
- Do not disassemble or modify the microSD card.
- Do not physically shock, bend, or pinch the microSD card.
- During reading/writing of data, do not turn off the power, apply vibration or shock, or pull out the card. Data can corrupt or be permanently lost.
- Use only micro SD cards sold by YOKOGAWA. Operation cannot be guaranteed when other cards are used.
- When inserting the microSD card into the instrument, make sure to orient the microSD card correctly (face up or down) and insert it securely. If not inserted correctly, the microSD card will not be recognized by the instrument.
- Do not touch the microSD card with wet hands.
- Do not use the microSD card if it is dusty or dirty.
- The microSD card comes formatted. If you want to format the microSD card, use the instrument's Format function.
- YOKOGAWA provides no warranty for damage to, or loss of data recorded on the microSD card, regardless of the cause of such damage or loss. We recommend making backup copies of your data.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurred during the warranty period shall basically be repaired free of charge.
- In case of problems, the customer should contact the YOKOGAWA representative from which the instrument was purchased, or the nearest YOKOGAWA office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- Responsible party for repair cost for the problems shall be determined by YOKOGAWA based on our investigation.
- The Purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:
 - Improper and/or inadequate maintenance by the purchaser.
 - Failure or damage due to improper handling, use or storage which is out of design conditions.
 - Use of the product in question in a location not conforming to the standards specified by YOKOGAWA, or due to improper maintenance of the installation location.
 - Failure or damage due to modification or repair by any party except YOKOGAWA or an approved representative of YOKOGAWA.
 - Malfunction or damage from improper relocation of the product in question after delivery.
 - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

1.3 Combination for Remote Sensor and Remote Transmitter



IMPORTANT

- The AXW remote sensor (sizes 500 to 1800 mm (20 to 72 in.)) should be combined with a remote transmitter according to Table 1.2.
- If the transmitter combined with the AXW magnetic flowmeter's remote sensor is changed from the original transmitter which was delivered the meter factor of the remote sensor must be readjusted according to its flow calibration.

Table 1.2 Combination for sensor and transmitter

Remote Sensor		Combined with the Remote Transmitter
Model	Converter, Communication, I/O	Model
AXW500G to AXW10LG AXW500W to AXW10LW	-W	AXW4A
AXW500G to AXW18LG AXW500W to AXW18LW	-B	AXG1A
AXW500G to AXW18LG AXW500W to AXW18LW	-N	AXFA11G

Contact YOKOGAWA before using it in combination with transmitters other than those listed above.



NOTE

In case of combination with AXFA11 remote transmitter, select "ADMAG AXF" in the parameter "C30" of the AXFA11 remote transmitter.

2. Receiving and Storage

When the instrument is delivered, visually check that no damage has occurred during transportation. Also check that all flowmeters mounting hardware shown below is included.

Integral Flowmeter

Model	Part name	Qty.
AXW###G	Blanking Plug (*1)	0 to 2 pcs.

Remote Transmitter

Model	Part name	Qty.
AXW4A	Mounting Bracket	1 set
	Blanking Plug (*1)	0 to 2 pcs.
AXG1A	Mounting Bracket	1 set
AXFA11G	Mounting Bracket	1 set

*1: When the following code is specified for "Power Supply" and "Converter, Communication, I/O", the following quantity of blind plug is attached.

Power Supply code	Communication and I/O code	Qty
-1	-D, -E, -M, -F	1 pc.
	Other than those above	0 pc.
-2	-D or -E	2 pcs.
	-P	0 pc.
	Other than those above	1 pc.

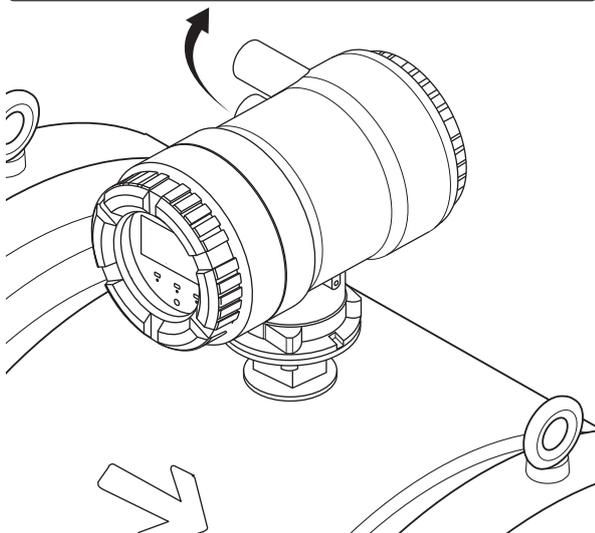
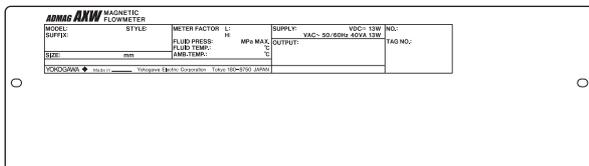


Figure 2.1 Name Plate (AXW Integral Flowmeter)

F0201.ai

2.1 Model and Specifications Check

As shown in Figure 2.1 to Figure 2.5, the model, suffix code, serial number, meter factor, fluid specification, and device information are found on the name plate located on the outside of the housing. And, this instrument can check their information from parameters. Read the user's manual of applicable communication type as listed in Table 1.1 for checking device information from parameters.

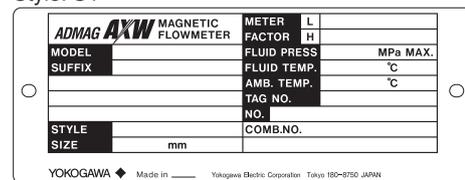
When checking the matching of model and specification you ordered, see the applicable general specifications as listed in Table 1.1.

Be sure you have the model code and serial number available when contacting YOKOGAWA.

Note: Description on the nameplate

- Made in _____: Country of origin
- COMB No.: Serial number of the combined remote sensor or remote transmitter

Style: S1



Style: S2

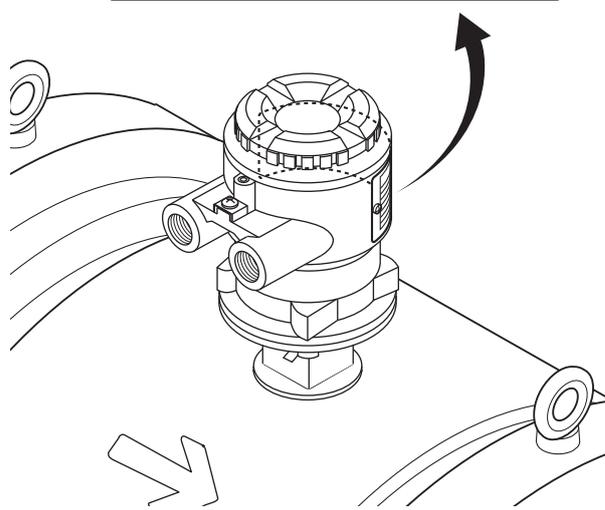
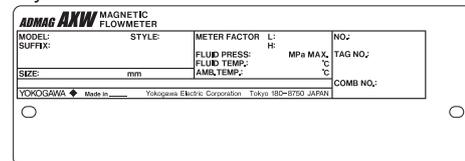
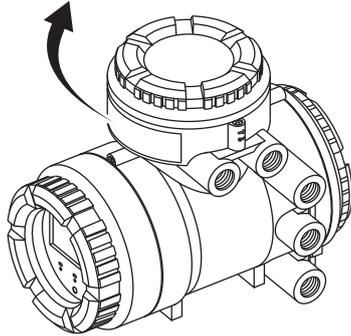
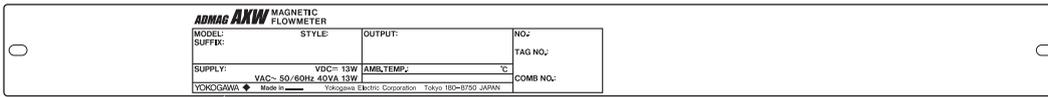


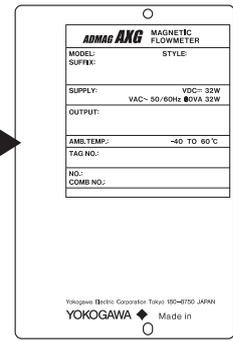
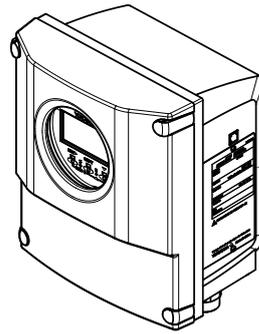
Figure 2.2 Name Plate (AXW Remote Sensor)

F0202.ai



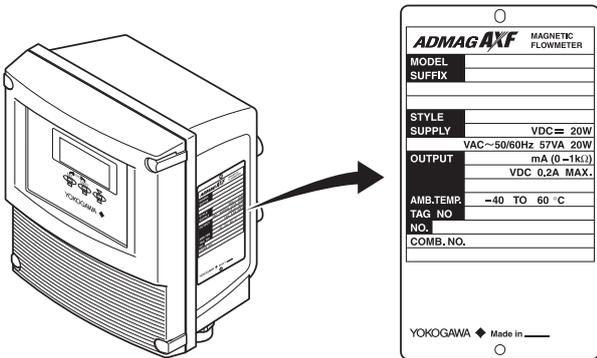
F0203.ai

Figure 2.3 Name Plate (AXW4A Remote Transmitter)



F0204.ai

Figure 2.4 Name Plate (AXG1A Remote Transmitter)



F0205.ai

Figure 2.5 Name Plate (AXFA11 Remote Transmitter)

2.2 Storage Precautions

If the instrument is to be stored for a long period of time after delivery, observe the following points.

- The instrument should be stored in its original packing condition in the storage location.
- Select a storage location that fulfils the following conditions:
 - A place where it will not be exposed to rain or water
 - A place subject to minimal vibrations or shocks
 - Temperature and humidity levels should be as follows:
 Temperature: -10 to 70°C
 Humidity: 5 to 80% RH (no condensation)
 The preferred ambient temperature and humidity levels are 25°C and approximately 65% RH.
- If the instrument is transferred to the installation site and stored without being installed, its performance may be impaired due to the infiltration of rainwater and so forth. Be sure to install and wire the instrument as soon as possible after transferring it to the installation location.

3. Installation



WARNING

Installation of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to installation.

Installation Location Precautions

Select the installation location with consideration to the following items to ensure long-term stable operation of the instrument.

■ Ambient Temperature:

Avoid installing the instrument in locations with constantly fluctuating temperatures. If the location is subject to radiant heat from the plant, provide heat insulation or improve ventilation.

■ Atmospheric Condition:

Avoid installing the instrument in a corrosive atmosphere. In situations where this is unavoidable, consider ways to improve ventilation and to prevent rainwater from entering and being retained in the conduit pipes.

■ Vacuum:

In the case of PTFE lining, avoid the negative pressure inside the measuring pipe.

■ Vibrations or Shocks:

Avoid installing the instrument in a place subject to shocks or vibrations.

3.1 Piping Design Precautions



IMPORTANT

Design piping correctly, referring to the following to prevent damage to sensors and to assure accurate measuring.



NOTE

This section describes the remote sensor as an example. The same attention must be paid to the integral flowmeter.

(1) Location



IMPORTANT

Install the flowmeter in a location where it is not exposed to direct sunlight. The minimum ambient temperature is limited by the minimum fluid temperature of the sensor (the lining). For more information, read the applicable general specification as listed in Table 1.1. The flowmeter may be used in an ambient humidity where the relative humidity ranges from 0 to 100%. However, avoid long-term continuous operation at relative humidity 95% or higher.

(2) Noise Avoidance



IMPORTANT

The flowmeter should be installed away from electrical motors, transformers, and other power sources in order to avoid interference with measurement. When installing two or more magnetic flowmeters, provide a distance of at least 5D (D is size of model code) each other. If diameters of them are different, let D be the larger one.

(3) Required Lengths of Straight Runs

Based on JIS B 7554 “Electromagnetic Flowmeters” and our piping condition test data, we recommend the piping conditions as shown in the following figures. This is not always enough when the piping line incorporates multiple conditions at the same time.

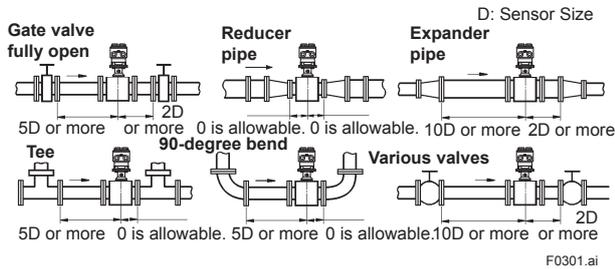


Figure 3.1.1 Required Lengths of Straight Runs

- *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.
- *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.
- *3: The valves shall be mounted on the downstream side so that deviated flows do not occur in the sensor and to avoid startup from an empty condition.
- *4: In case the piping conditions are compounded, install on the straight pipe section where the upstream part is sufficiently rectified.

(4) Maintaining Stable Fluid Conductivity



IMPORTANT

Do not install the flowmeter where fluid conductivity tends to become uneven. If chemicals are fed near the upstream side of a magnetic flowmeter, they may affect the flow rate's indications. To avoid this situation, it is recommended that the chemical feed ports be located on the downstream side of the flowmeter. If it is unavoidable that chemicals must be fed on the upstream side, provide a sufficient length of straight run (approximately 50D or more) to ensure the proper mixture of fluids.

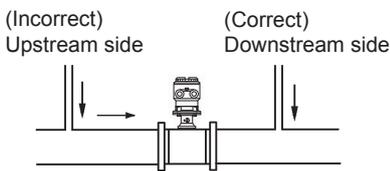


Figure 3.1.2 Chemical Injection

(5) Precautions for Use of Liquid Sealing Compounds



IMPORTANT

Care must be taken in using liquid sealing compounds on the piping, as it may have a negative influence on the flow indications by flowing out and covering the surfaces of an electrode or grounding ring. In particular, care must be taken if a liquid sealing compound is used in the case of vertical piping.

(6) Service Area

Select locations where there is adequate space to service installing, wiring, overhauling, etc.

(7) Bypass Line

It is recommended to install a bypass line to facilitate maintenance and zero adjustment.

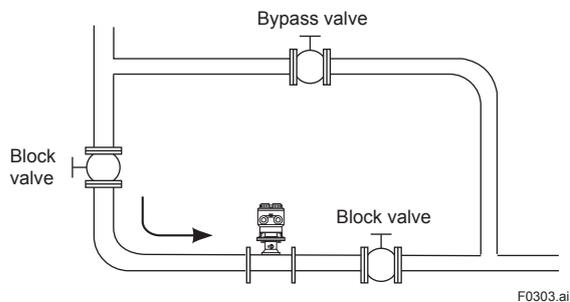
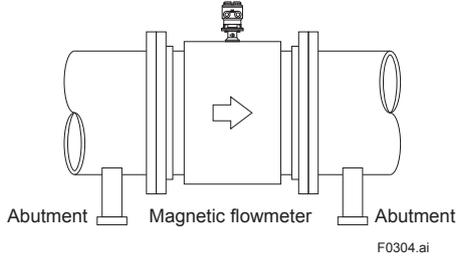


Figure 3.1.3 Bypass Line

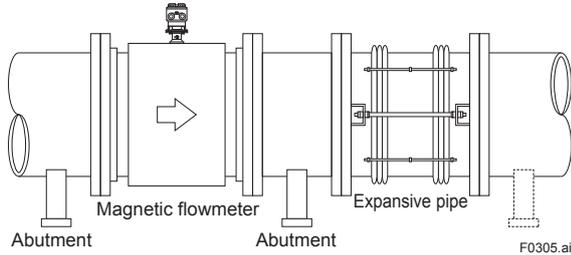
(8) Supporting the Flowmeter



Do not secure the flowmeter separately to prevent the vibrations, shocks, and expansion and contraction forces of the piping from affecting it. Fix the pipes first, then support the flowmeter with the pipes.



To release the load from installing the flowmeter to the pipeline, set a expansive pipe in the downstream side.



For vertical mounting, make sure that the weight of piping does not weigh on the flowmeter.

(9) Mounting Positions

- Pipes must be fully filled with liquids.



It is essential that pipes remain fully filled at all times, otherwise flow rate indications may be affected and measurement errors may be caused.

Piping shall be designed so as to maintain the interior of the sensor filled with fluids.

Vertical mounting is effective in such cases as when fluids tend to separate or solid matter may be precipitated. When employing vertical mounting, direct the fluids from the bottom to the top to ensure that the pipes remain fully filled.

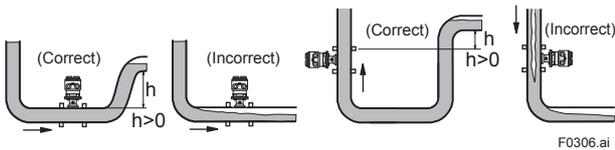


Figure 3.1.4 Mounting Positions

- Avoid air bubbles.



If air bubbles enter a measurement pipe, flow rate indications may be affected and measurement errors may be caused.

In cases where fluids contain air bubbles, piping must be designed to prevent them from accumulating in the measurement pipe of a sensor.

If a valve exists near the flowmeter, try to mount the flowmeter on the valve's upstream side in order to prevent a possible reduction of pressure inside the pipe, thereby avoiding the possibility of air bubbles.

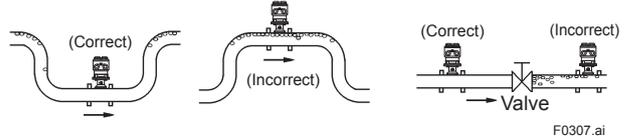


Figure 3.1.5 Avoiding Air Bubbles

- Mounting orientation



Install the magnetic flowmeter so that the electrodes position is not perpendicular to the ground. Otherwise it may cause the measuring errors because air bubbles at upper side or slurry at downside covers the electrode. Mount the terminal box of a remote sensor and the transmitter of an integral flowmeter above the piping to prevent water from entering them.

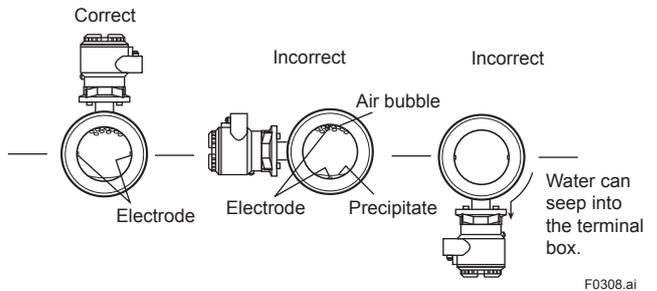


Figure 3.1.6 Mounting Orientation

3.2 Handling Precautions

WARNING

The magnetic flowmeter is a heavy instrument. Be careful that no damage is caused to personnel through accidentally dropping it, or by exerting excessive force on the magnetic flowmeter. When moving the magnetic flowmeter, always use a trolley and have at least two people carry it.

NOTE

This section describes the remote sensor as an example. The same attention must be paid to the integral flowmeter.

3.2.1 General Precautions

(1) Precaution during Transportation

The magnetic flowmeter is packed tightly. When it is unpacked, pay attention to prevent damaging the flowmeter. To prevent accidents while it is being transported to the installing location, transport it to the site in its original packing.

CAUTION

When lifting the magnetic flowmeter, use the lifting rings (eye bolts or eye plates) as in Figure 3.2.1. Never lift it using a bar passed through the magnetic flowmeter as this damages the liner severely.

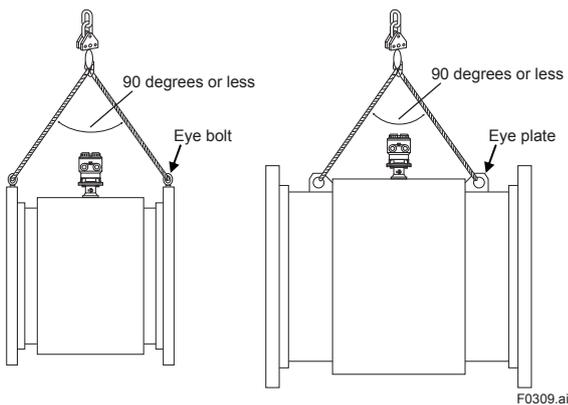


Figure 3.2.1 Lifting Flowmeter

(2) Avoid Shocks from Impact

CAUTION

Care should be taken not to drop the flowmeter or expose it to excessive shock. In particular, be careful not to subject the flange surface to shock. This may lead to lining damage which will result in inaccurate readings.

(3) Flange Protection Covers

IMPORTANT

Keep the protective covering (i.e. the corrugated cardboard or other cushioning material) in place over the flange except when mounting the flowmeter to the pipe.

(4) Terminal Box Cover

IMPORTANT

As it is possible that the insulation will deteriorate, do not open the terminal box cover until it is time to wire it.

(5) Long-term Non-use

IMPORTANT

It is not desirable to leave the flowmeter unused for a long term after installation. If this situation is unavoidable, take care of the flowmeter by observing the following.

● Confirmation of sealing conditions for the flowmeter

Confirm that the terminal box screw and electrical connections are well sealed. Equip the conduit piping with drain plugs or waterproof glands to prevent moisture or water from penetrating into the flowmeter through the conduit.

● Regular inspections

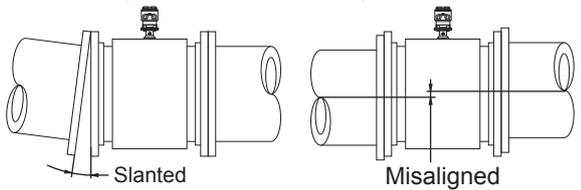
Inspect the sealing conditions as mentioned above, and the inside of the terminal box at least once a year. Also, due to rain, etc. when it is suspected that water may have penetrated into the inside of the flowmeter, perform supplementary inspections.

3.2.2 Flowmeter Piping

CAUTION

Misaligned or slanted piping can lead to leakage and damage to the flanges.

- (1) Correct any misaligned or slanted piping, and any gaps that may exist between mounting flanges before installing the flowmeter (see Figure 3.2.2).



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Figure 3.2.2 Slanted and Misaligned Flowmeter Piping

- (2) Inside a newly installed pipeline, there may be some foreign substances such as residue from welding or wood chips. Remove them by flushing the piping before mounting the flowmeter. This prevents the lining from being damaged, as well as the occurrence of erroneous measured signals resulting from foreign substances passing through the sensor during measurement.

3.3 Integral Flowmeter and Remote Sensor Installation

WARNING

- All gaskets used for piping of Magnetic Flowmeters should be prepared by customers except in some cases. With the option of grounding ring, if the lining is natural hard rubber or PTFE, gaskets must be placed between each the grounding ring and the sensor to avoid fluid leakage. These gaskets are to be supplied by customer. Do not forget those gaskets also when ordering and attaching the grounding rings later additionally.
- Use the gasket of the equivalent hardness for gasket (customer pipe) and gasket (sensor).

NOTE

- The tightening torque of gaskets varies by the type and external dimensions of the lining and the gasket. The tightening torque values should be decided by referring to Table 3.3.1.
- For fluids capable of potentially permeating PTFE linings (such as nitric acid, hydrofluoric acid, or sodium hydrate at high temperatures), do not use the PTFE lining type.

NOTE

- The PTFE lining has a structure adhering PTFE to the metal inner face of the sensor. When tightening bolts and nuts to install to the piping, be careful not to bring unequal stress or torque to the PTFE lining.
- For the PTFE lining, it is recommended to be installed with grounding rings, or to be installed with short pipes at upstream and downstream sides.

IMPORTANT

Use bolts and nuts in compliance with the flange ratings. When choosing the gaskets, be sure to choose sheet gaskets designed to fit for flange standard.

(1) Mounting Direction

Mount the flowmeter so that the flow direction of the fluid to be measured is in line with the direction of the arrow mark on the flowmeter. It may be especially difficult to move large size sensors after bringing them into the pit. Check directions before bringing.



IMPORTANT

If it is impossible to match the direction of the arrow mark, the direction of the electrical connection can be changed. Read Section 3.5.

In case the fluid being measured flows against the arrow direction, change the value from “Forward” to “Reverse” at the parameter “Flow direct”. Read the user’s manual of the applicable communication type (for AXW/AXW4A/AXG1A) or the hardware/software edition (for AXFA11) as listed in Table 1.1.

Display Menu Path (AXW/AXW4A/AXG1A):
 Device setup ▶ Detailed setup ▶ AUX calculation ▶ Flow direct

(2) Lifting

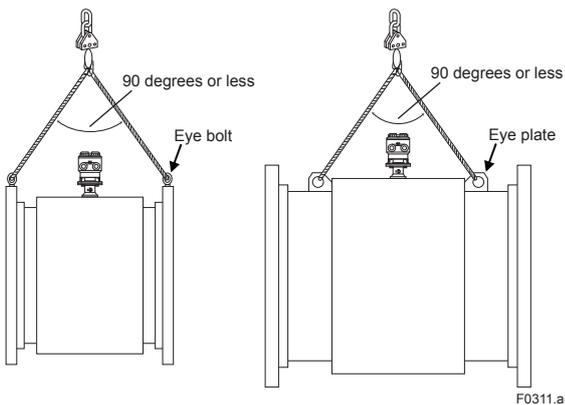


Figure 3.3.1 Lifting



CAUTION

- When carrying the magnetic flowmeter, use the lifting rings (eye bolts or eye plates).
- To assure safety, keep lifting angle less than 90 degrees as shown in Figure 3.3.1

(3) Transportation and Positioning

Bring in the magnetic flowmeter, place it and use a jack to adjust its position.



IMPORTANT

Apply the jack to the flanges of the magnetic flowmeter.

In addition, adjust any misalignment when the magnetic flowmeter is brought in, as the jack can adjust vertical position, but not horizontal one.

(4) Applying Gasket and optional Grounding Rings

Gasket:

Necessary gaskets for piping connection are as below depending on the choice of grounding rings. Use sheet gaskets designed to fit for the flange ratings and fluid specifications. The GF type-1 gaskets by JIS G 3443-2 should be used for the JIS F12 flange models in sizes 1100 mm (44 in.) and above. In this case, the gasket groove is required on the customer pipe flanges.

The thickness of gasket should be 2 mm (0.08 in.) to 5 mm (0.2 in.) for sizes up to 1000 mm (40 in.), and 5 mm (0.2 in.) or more for larger sizes. Use soft rubber gasket, PTFE-sheathed non-asbestos gasket, or its equivalent in hardness.

1. Standard (no grounding rings)

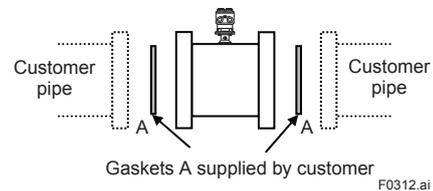


Figure 3.3.2 Installation without Grounding Rings

When using the GF type-1 gaskets, the gasket groove is required as mentioned above.

2. With optional grounding rings (code GR1)

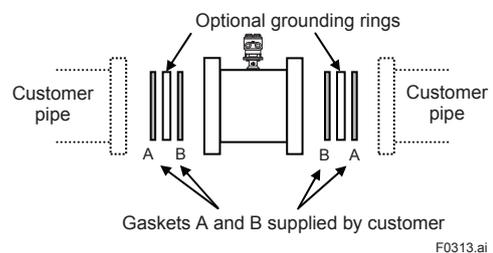


Figure 3.3.3 Installation with Grounding Rings GR1

It is recommended to use the same gasket for A and B. Both gaskets A and B are to be supplied by customer.

When polyurethane or natural soft rubber lining, the gaskets B are not necessary.

- With optional grounding rings (code GR2)

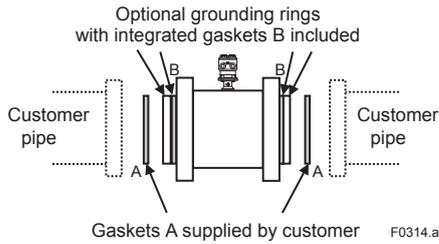


Figure 3.3.4 Installation with Grounding Rings GR2

This is available for the models with process connection JIS F12 (JIS 75M) in sizes 1100 mm (44 in.) and above. Only gaskets A are to be supplied by customer. Use soft rubber gasket, PTFE-sheathed non-asbestos gasket, or its equivalent in hardness. The grounding rings are installed and locked onto the magnetic flowmeter with gaskets B when shipped from factory.

Mounting Procedure (no Grounding Rings):

Connect the magnetic flowmeter's flange and the customer's pipe which contact process fluid by some wire supplied by customer.

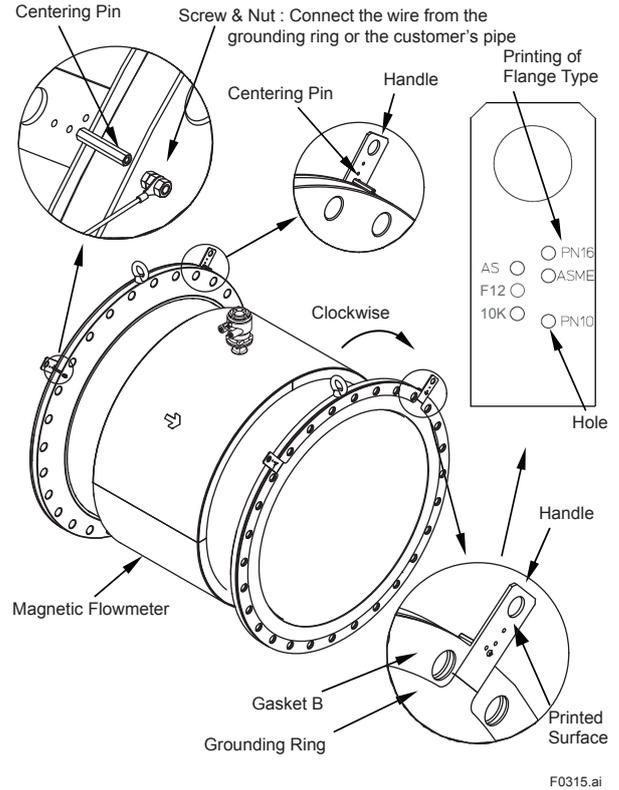
Mounting Procedure (with optional Grounding Rings GR1 for sizes up to 1000 mm (40 in.)):

- Handles of the grounding ring have some holes which correspond to outer diameter of each flange type. There are printings near each hole. The printings show types of flange. See the table below.

Printing	Process Connection Code	Flange Standard
ASME	-CA1	ASME B16.5 Class 150, ASME B16.47 Class 150
AWWA	-CB1	AWWA C207 Class D
PN10	-CE1	EN1092-1 PN10
PN16	-CE2	EN1092-1 PN16
10K	-CJ1	JIS B2220 10K
AS	-CS1, -CS2, -CT1	AS2129 table D, E AS4087 PN16
F12	-CG1	JIS F12 (JIS 75M)

- Confirm the centering pin is fixed to the hole corresponding to flange or fix the centering pin to the correct hole.
- Hang the grounding rings with their flange type printings outer side of the magnetic flowmeter. Set the angle of both handles symmetrically to be 45 degree from top. If there are any bolt-holes under the handles, turn the grounding rings clockwise in order to locate handles between bolt-holes. Center the grounding ring to the center of the magnetic flowmeter.
- Connect the wire from the grounding ring to the screw of the magnetic flowmeter's flange and fix the wire by the nut. This procedure (item 1 to 4) must be done for the both sides of the magnetic flowmeter.

- Install the magnetic flowmeter into the customer's pipe with the gaskets A.



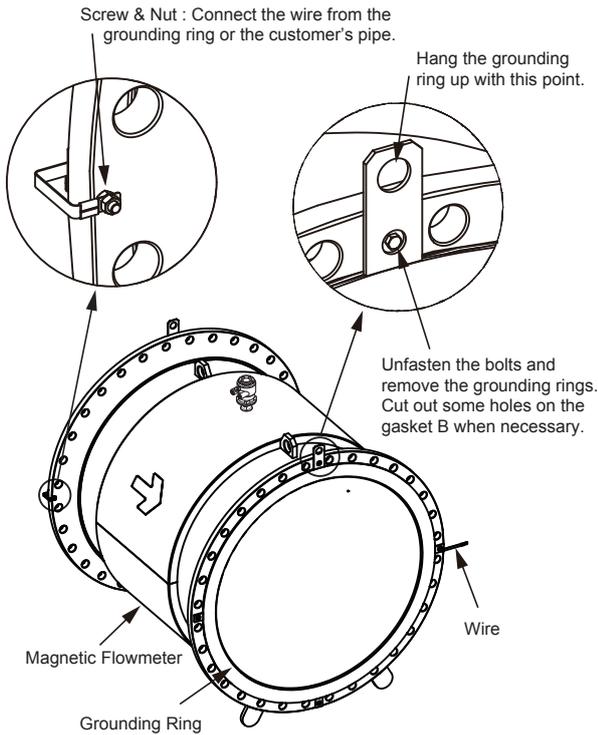
Note : Gasket A and B are also placed concentrically with the magnetic flowmeter.

Figure 3.3.5 Mounting Procedure with Grounding Rings GR1 for sizes up to 1000 mm (40 in.)

Mounting Procedure (with optional Grounding Rings GR1 for sizes 1100mm (44 in.) and above :

- The grounding ring is temporarily fixed onto the magnetic flowmeter by four bolts. Hang the grounding ring up using a crane or a hoist so that it would not fall down from the magnetic flowmeter while setting the gasket B.
- Unfasten the bolts and remove the grounding ring off from the magnetic flowmeter.
- Place the gasket B to the magnetic flowmeter. Cut out holes on the gasket B if necessary, so that the bolts can go through. Fix the grounding ring to the magnetic flowmeter by the four bolts again.
- Connect the wire from the grounding ring to the screw at the flange and fix the wire by the nut. This procedure (item 1 to 4) must be done for the both sides of the magnetic flowmeter.

5. Install the magnetic flowmeter into the customer's pipe with the gaskets A.



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Note : Gasket A and B should be placed concentrically with the magnetic flowmeter.

Figure 3.3.6 Mounting Procedure with Grounding Rings GR1 for sizes 1100 mm (44 in.) and above

Mounting Procedure (with optional Grounding Rings GR2):

The grounding rings are installed and locked onto the magnetic flowmeter with gaskets B when shipped from factory. Install the magnetic flowmeter into the customer's pipe with gaskets A supplied by customer.

(5) Tightening Nuts

Pass the bolts from pipe line side, not magnetic flowmeter side, and tighten the nuts according to the torque values for the metal piping in Table 3.3.1 or Table 3.3.2.

CAUTION

- Be sure to tighten the nuts according to the prescribed torque values. Tighten them diagonally with the same torque values, step by up to the prescribed torque value.

Table 3.3.1 Tightening Torque Values for Metal Piping (N-m)

Unit: N-m

Lining type		PTFE / Natural hard rubber / Natural soft rubber				
Gasket type		Soft rubber gasket, or the equivalent in hardness (supplied by customer)				
Size mm (inch)	Process connection	ASME B16.5 (500, 600) B16.47 (700-1000) Class 150	EN1092-1 PN10 JIS B2220 10K	EN 1092-1 PN16	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16
		500 (20)		99 to 166	85 to 140	143 to 238
600 (24)		144 to 240	108 to 175	218 to 363		239 to 331
700 (28)		168 to 281	176 to 266	180 to 300	176 to 293	240 to 333
800 (32)		259 to 432	212 to 302	236 to 393	246 to 410	400 to 612
900 (36)		274 to 457	206 to 338	224 to 373	258 to 430	399 to 604
1000 (40)		274 to 457	277 to 422	307 to 512	286 to 477	422 to 587

Unit: N-m

Lining type		Polyurethane rubber					
Gasket type		Soft rubber gasket, or the equivalent in hardness (supplied by customer)					
Size mm (inch)	Process connection	ASME B16.5 (500, 600) B16.47 (700-1000) Class 150	EN1092-1 PN10 JIS B2220 10K	EN 1092-1 PN16	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16	JIS F12 (JIS 75M)
		500 (20)		71 to 118	60 to 99	74 to 123	
600 (24)		97 to 162	82 to 126	101 to 168		118 to 171	124 to 206
700 (28)		125 to 208	135 to 202	146 to 244	120 to 200	167 to 242	202 to 337
800 (32)		176 to 294	160 to 229	190 to 316	169 to 281	218 to 348	197 to 328
900 (36)		170 to 283	151 to 251	178 to 296	161 to 268	200 to 317	221 to 369
1000 (40)		175 to 291	206 to 314	220 to 367	165 to 275	253 to 370	218 to 363

Unit: N-m

Lining type		Natural hard rubber				Polyurethane rubber
Gasket type		Soft rubber gasket, or the equivalent in hardness (supplied by customer)				
Size mm (inch)	Process connection	EN1092-1 PN6	EN1092-1 PN10	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16	JIS F12 (JIS 75M)
		1100 (44)				
1200 (48)		180 to 300	327 to 546	298 to 497	400 to 582	281 to 468
1350 (54)						397 to 662
1400 (56)		233 to 388	379 to 632			
1500 (60)						421 to 702
1600 (64)		238 to 397	532 to 886			532 to 887
1800 (72)		291 to 485	552 to 919			468 to 779

Table 3.3.2 Tightening Torque Values for Metal Piping (lbf-in)

Unit: lbf-in

Lining type	PTFE / Natural hard rubber / Natural soft rubber				
Gasket type	Soft rubber gasket, or the equivalent in hardness (supplied by customer)				
Process connection Size mm (inch)	ASME B16.5 (500, 600) B16.47 (700-1000) Class 150	EN1092-1 PN10 JIS B2220 10K	EN 1092-1 PN16	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16
500 (20)	880 to 1467	748 to 1239	1266 to 2110		1332 to 2062
600 (24)	1275 to 2125	955 to 1546	1928 to 3214		2113 to 2932
700 (28)	1490 to 2483	1561 to 2357	1594 to 2657	1558 to 2596	2123 to 2943
800 (32)	2292 to 3820	1880 to 2671	2085 to 3475	2176 to 3627	3538 to 5413
900 (36)	2426 to 4043	1821 to 2991	1980 to 3301	2285 to 3809	3535 to 5346
1000 (40)	2426 to 4043	2450 to 3739	2717 to 4528	2534 to 4224	3734 to 5265

Unit: lbf-in

Lining type	Polyurethane rubber					
Gasket type	Soft rubber gasket, or the equivalent in hardness (supplied by customer)					
Process connection Size mm (inch)	ASME B16.5 (500, 600) B16.47 (700-1000) Class 150	EN1092-1 PN10 JIS B2220 10K	EN 1092-1 PN16	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16	JIS F12 (JIS 75M)
500 (20)	626 to 1044	527 to 876	652 to 1087		674 to 1089	1159 to 1931
600 (24)	862 to 1436	727 to 1113	894 to 1490		1043 to 1512	1095 to 1825
700 (28)	1106 to 1843	1193 to 1791	1295 to 2159	1061 to 1769	1478 to 2142	1788 to 2980
800 (32)	1562 to 2603	1420 to 2024	1680 to 2800	1494 to 2491	1926 to 3076	1739 to 2899
900 (36)	1505 to 2508	1340 to 2218	1571 to 2619	1422 to 2370	1773 to 2808	1958 to 3263
1000 (40)	1546 to 2577	1824 to 2781	1951 to 3251	1459 to 2432	2239 to 3274	1928 to 3213

Unit: lbf-in

Lining type	Natural hard rubber				Polyurethane rubber
Gasket type	Soft rubber gasket, or the equivalent in hardness (supplied by customer)				
Process connection Size mm (inch)	EN1092-1 PN6	EN1092-1 PN10	AWWA C207 Class D	AS2129 Table D, E AS4087 PN16	JIS F12 (JIS 75M)
1100 (44)					2527 to 4211
1200 (48)	1594 to 2657	2898 to 4830	2639 to 4398	3539 to 5149	2484 to 4139
1350 (54)					3517 to 5862
1400 (56)	2060 to 3434	3358 to 5597			
1500 (60)					3729 to 6215
1600 (64)	2109 to 3515	4705 to 7842			4713 to 7854
1800 (72)	2576 to 4293	4883 to 8138			4138 to 6897

3.4 Remote Transmitter Installation



WARNING

Installation of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to installation.

3.4.1 Installation Location



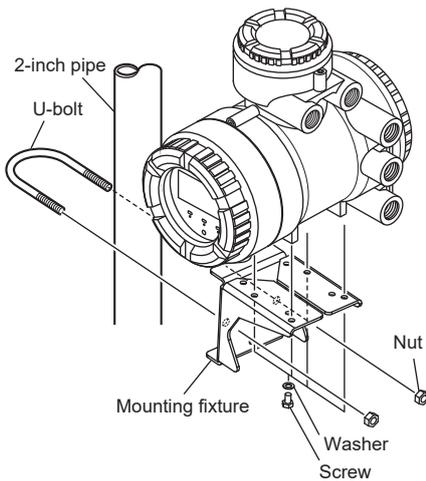
IMPORTANT

Install the instrument in a location where it is not exposed to direct sunlight. For ambient temperature, read the applicable general specifications as listed in Table 1.1. The instrument may be used in an ambient humidity where the RH ranges from 0 to 100%. However, avoid long-term continuous operation at relative humidity above 95%.

3.4.2 Mounting of AXW4A Transmitter

AXW4A Remote Transmitter can be mounted on a 2-inch pipe in a vertical or horizontal position depending on the installation site.

● Vertical Pipe Mounting

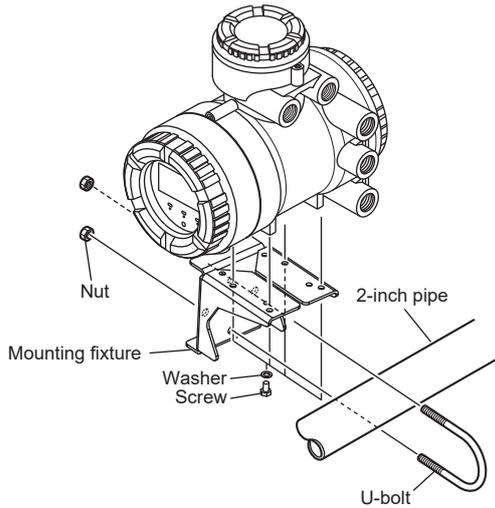


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Figure 3.4.1 2-inch Pipe Vertical Mounting

1. Fix the instrument on the mounting fixture using four screws.
2. Fix the mounting fixture with the instrument installed on a 2-inch pipe using a U-bolt.

● Horizontal Pipe Mounting



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Figure 3.4.2 2-inch Pipe Horizontal Mounting

1. Fix the instrument on the mounting fixture using four screws.
2. Fix the mounting fixture with the instrument installed on a 2-inch pipe using a U-bolt.

3.4.3 Mounting of AXG1A Transmitter

AXG1A Remote Transmitter can be mounted using surface mounting, 2-inch pipe mounting, or panel mounting.

● Surface Mounting (Wall Mounting)

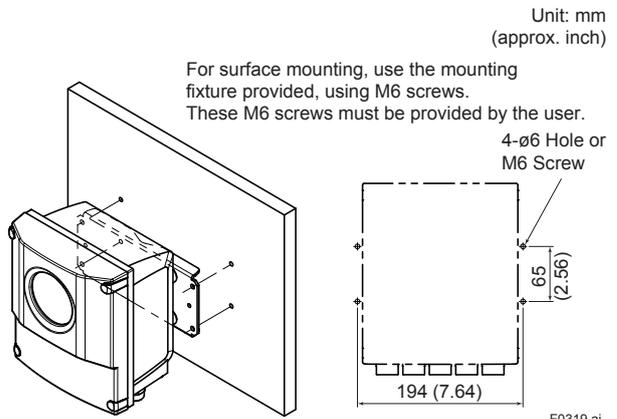


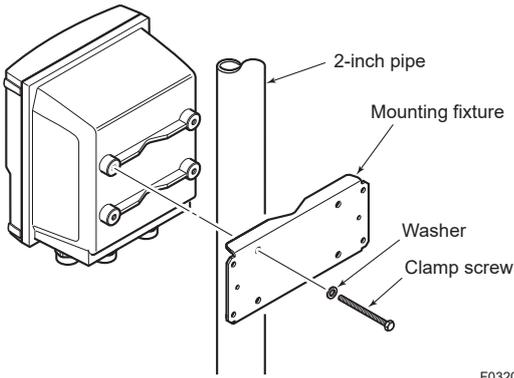
Figure 3.4.3 Surface Mounting



IMPORTANT

Mounting fixture on equipment intended to be mounted on a wall or ceiling shall withstand a force of four times the weight of the equipment (AXG1A: 3.5 kg (7.7 lb)).

● 2-inch Pipe Mounting

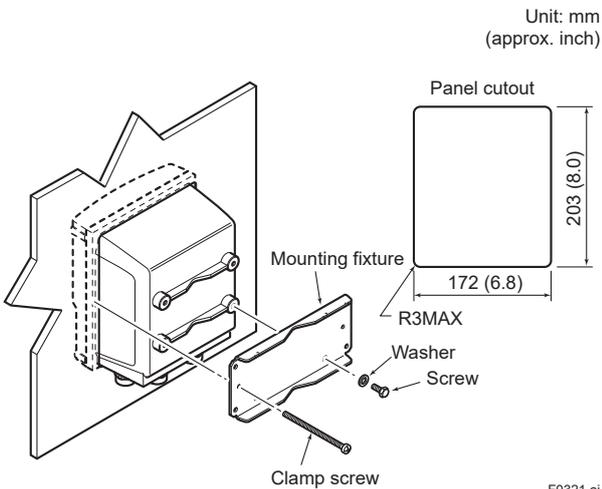


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Figure 3.4.4 2-inch Pipe Mounting

1. Pass the four clamp screws through the mounting fixture.
2. position it on the 2-inch pipe, and then fasten the AXG1A in place.

● Panel Mounting



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Figure 3.4.5 Panel Mounting

1. Fit the AXG1A into the panel.
2. Attach the mounting fixture to the AXG1A using the screw and the washer, and secure the instrument with the two clamp screws.

3.4.4 Mounting of AXFA11 Transmitter

AXFA11 Remote Transmitter can be mounted using surface mounting, 2-inch pipe mounting, or panel mounting, by the same process of AXG1A. Please refer 3.4.3. for the process.



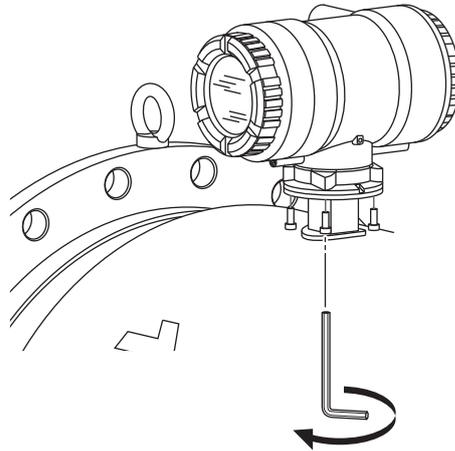
IMPORTANT

Mounting fixture on equipment intended to be mounted on a wall or ceiling shall withstand a force of four times the weight of the equipment (AXFA11: 3.4 kg (7.5 lb)).

3.5 Changing Direction of Electrical Connection

3.5.1 Integral Flowmeter

- (1) The following tool is required.
 - Hexagonal wrench (nominal size 5)
- (2) Turn off the power to the flowmeter.
- (3) Using the wrench, unscrew the four hexagonal bolts at the neck of transmitter.



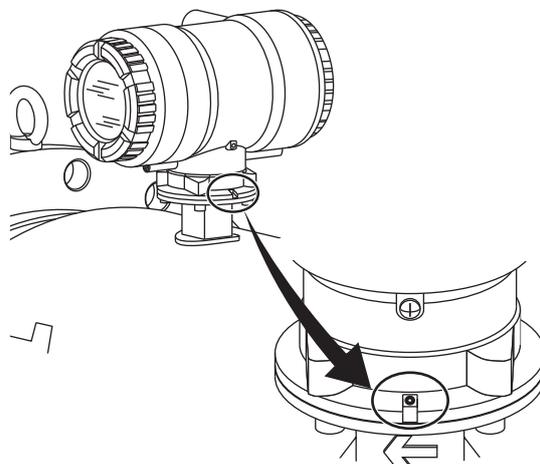
AXW Integral Flowmeter

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CAUTION

Do not loosen the screw at the opposite side of electrical connection (see the figure below).



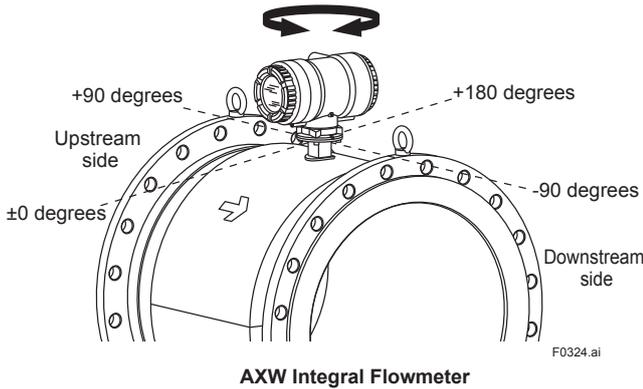
F0323.ai

- (4) Rotate the transmitter in the desired direction. The direction can be changed to -90 degrees, +90 degrees or +180 degrees.

 **NOTE**

The transmitter and the terminal box can be rotated -90 degrees to +180 degrees at every 90 degrees from the arrow mark indicating the flow direction. Do not exceed these angle.

- (5) Tighten diagonally the four hexagonal bolts with the hexagonal wrench, and then be sure to check that the transmitter was firmly fixed to the sensor.



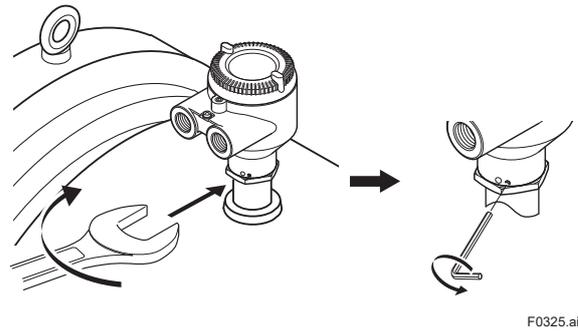
3.5.2 Remote Sensor (Style: S1)

 **IMPORTANT**

The following types can not be changed direction of electrical connection after delivery.

- Submersible Type (Model: AXW□□□W)
- For District Heating and Cooling or Condensation-proof (Optional code: DHC)

- (1) The following tools are required.
 - Hexagonal wrench (nominal size 1.5)
 - Spanner (nominal size 46)
- (2) Turn off the power to the flowmeter.
- (3) Using the spanner, loosen the hexagonal nuts at the neck of remote sensor.

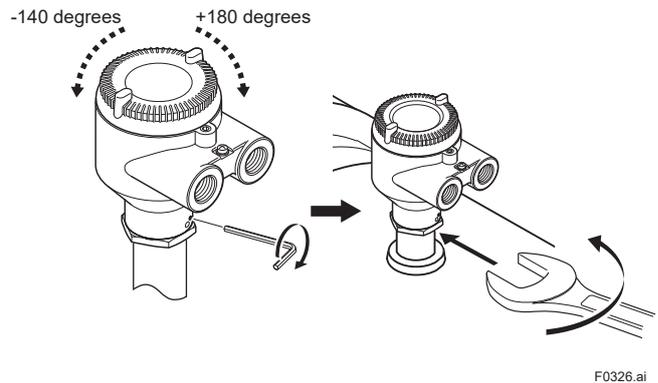


- (4) Using the hexagonal wrench, loosen the screw at the neck.
- (5) Rotate the terminal box in the desired direction.

 **NOTE**

The terminal box can be rotated -140 degrees to +180 degrees from the arrow mark indicating the flow direction. Do not exceed these angle.

- (6) Using the hexagonal wrench, retighten the screw at the neck.



- (7) Using the spanner, retighten the hexagonal nut at the neck, and then be sure to check that the terminal box was firmly fixed to the sensor.

3.5.3 Remote Sensor (Style: S2)

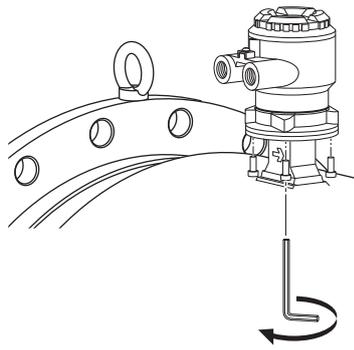


IMPORTANT

The following types can not be changed direction of electrical connection after delivery.

- Submersible Type (Model: AXW□□□W)
- For District Heating and Cooling or Condensation-proof (Optional code: DHC)

- (1) The following tools are required.
 - Hexagonal wrench (nominal size 5)
- (2) Turn off the power to the flowmeter.
- (3) Using the wrench, unscrew the four hexagonal bolts at the neck of remote sensor.



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AXW Remote Sensor

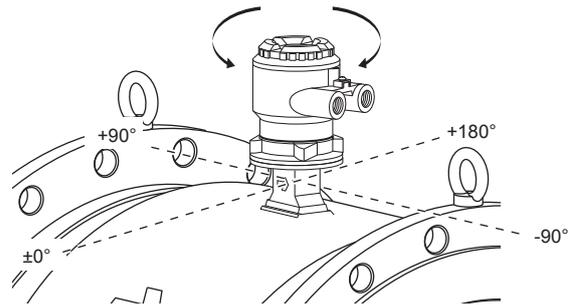
- (4) Rotate the transmitter or the terminal box in the desired direction. The direction can be changed to -90 degrees, +90 degrees or +180 degrees.



NOTE

The terminal box can be rotated -90 degrees to +180 degrees at every 90 degrees from the arrow mark indicating the flow direction. Do not exceed these angle.

- (5) Tighten diagonally the four hexagonal bolts with the hexagonal wrench, and then be sure to check that the terminal box was firmly fixed to the sensor.



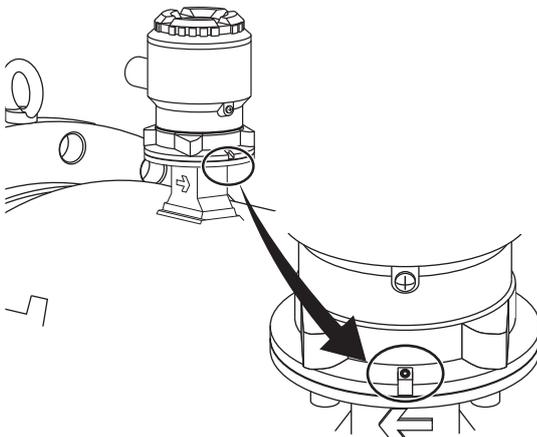
AXW Remote Sensor

F0329.ai



CAUTION

Do not loosen the screw at the opposite side of electrical connection (see the figure below).



F0328.ai

3.6 Changing Direction of Display Unit

(1) Removing the Cover

- The following tool is required.
Hexagonal wrench (nominal size 3)
- Turn off the power to the flowmeter.
- Using the wrench, loosen the cover locking screw (1) (See Figure 3.6.1 and Figure 3.6.2) clockwise to unlock the cover. Upon shipment from the manufacturing plant, the cover is locked. Hold the flowmeter with your hand. Remove the cover by rotating it counterclockwise.

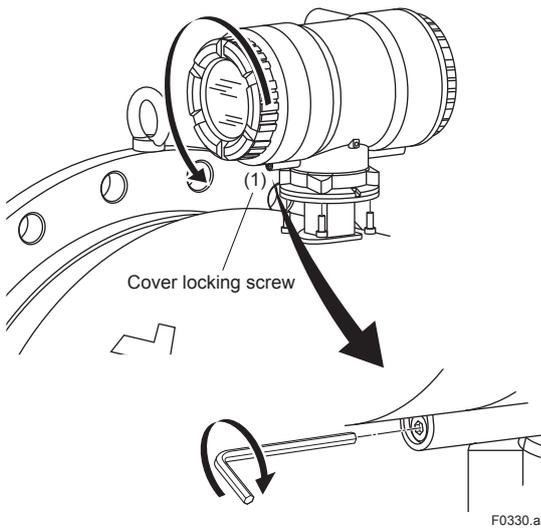


Figure 3.6.1 Removing the Display Cover (Integral Flowmeter)

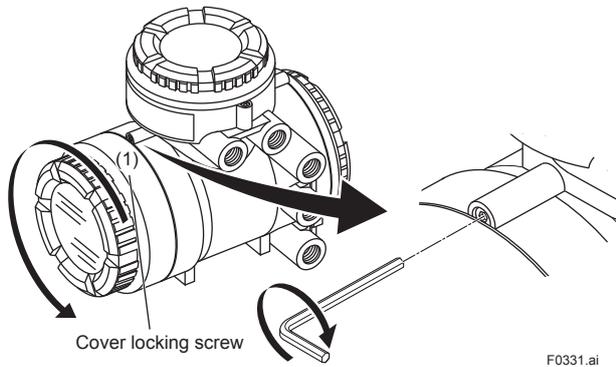


Figure 3.6.2 Removing the Display Cover (AXW4A Remote Transmitter)

(2) Changing Display Unit Direction 90 degrees

- Hold the display unit with your hand and loosen the two mounting screws.
- Rotate the display unit 90 degrees clockwise and confirm the assembling position, taking care of the connector and wire of the display unit. At this time, do not remove the connector.
- Secure the display unit using its two mounting screws.

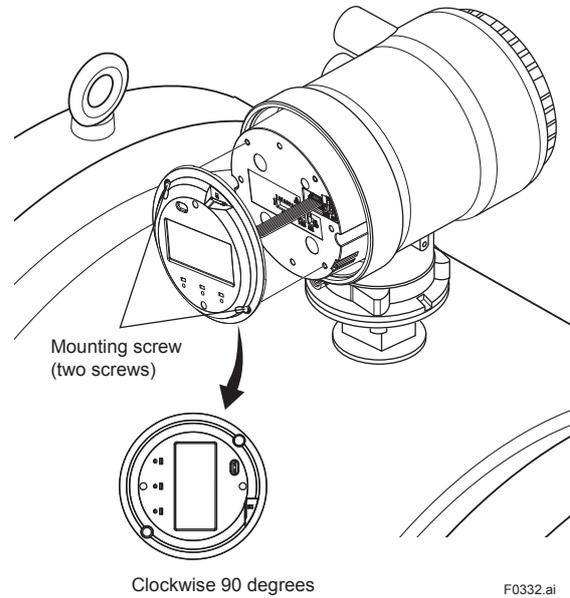


Figure 3.6.3 Changing Display Unit Direction 90 degrees



IMPORTANT

To preserve the safety, do not touch the electrical circuit and cable of shaded area.

(3) Installing the Cover

- Install the cover to the flowmeter by rotating the cover clockwise.
- Tighten cover locking screw (1) (See Figure 3.6.1 and Figure 3.6.2) counterclockwise using a hexagonal wrench (nominal size 3) to lock the cover.



IMPORTANT

Be sure to screw the cover firmly into the housing without any space between them.

4. Wiring



WARNING

The wiring of the magnetic flowmeter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to wiring.



CAUTION

Once all wiring is completed, check the connections before applying power to the instrument. Improper arrangements or wiring may cause a unit malfunction or damage.

4.1 Wiring Precautions

Be sure to observe the following precautions when wiring:



CAUTION

- When opening the terminal box, wait for more than 20 minutes after turning off the power.
- In cases where the ambient temperature exceeds 50°C, use external heat resistant wiring with a maximum allowable temperature of 70°C or above.
- Do not connect cables outdoors in wet weather in order to prevent damage from condensation and to protect the insulation, e.g. inside the terminal box of the flowmeter.
- Before turning the power on, tighten the terminal box cover securely.
- For the remote type, do not splice the cable between the transmitter and the sensor terminal when it is too short. Replace it with a complete cable of the appropriate length.
- For the remote type, ground the remote sensor and the transmitter separately.
- Terminate all the cable finish with crimp terminal of a round or rod shape (depending on the shape of the terminal block), and connect them reliably.
- Always route the power and output signal cables in separate steel conduit tubes, except when the power supply voltage is 24 V and four-core cables are used for wiring. For the remote type, route the excitation cable and the signal cable in separate steel conduit tubes. Keep conduits or flexible tubes watertight using sealing tape.
- If there is any unused electrical connection, use the blanking plug to cover which comes with this instrument or which is supplied by YOKOGAWA. The blanking plug should be fastened into the unused electrical connection without any mistake. If not, stated enclosure protection is not applicable. One or two blanking plug is provided depending on the specifications (24 V for power supply voltage or I/O selection).
- The signal cables must be routed in separate steel conduit tubes 16 (JIS C 8305) or flexible conduit tubes 15 (JIS C 8309).
- When waterproof glands or union equipped waterproof glands are used, avoid tightening the glands with an excessive torque.
- For the instruction of removing/installing the housing covers and handling the locking screws, read Section 4.4 and Section 4.5.



IMPORTANT

For the remote type, prepare the excitation cable (supplied by customer) and the signal cable of almost the same length. It is recommended to lay them together closely.

4.2 Cables

4.2.1 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:

- With no gland option:
 6.5 to 12 mm (0.26 to 0.47 in.)
- With waterproof gland (optional code EG, EG□, EU, EU□, EW):
 For excitation cable:
 10.5 or 11.5 mm (0.41 or 0.45 in.)
 For power and input/output cable:
 7.5 to 12 mm (0.30 to 0.47 in.)
- With plastic gland (optional code EP, EP□):
 6 to 12 mm (0.24 to 0.47 in.)

Nominal Cross Section:

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

Excitation cable for submersible use and optional code DHC:

Heat resistant vinyl resin sheath cable
 Outer diameter ø 10.5 mm

In case of power cable, Green/Yellow covered conductor shall be used only for connection to PROTECTIVE CONDUCTOR TERMINALS. Conform to IEC227, IEC245 or equivalent national authorization.

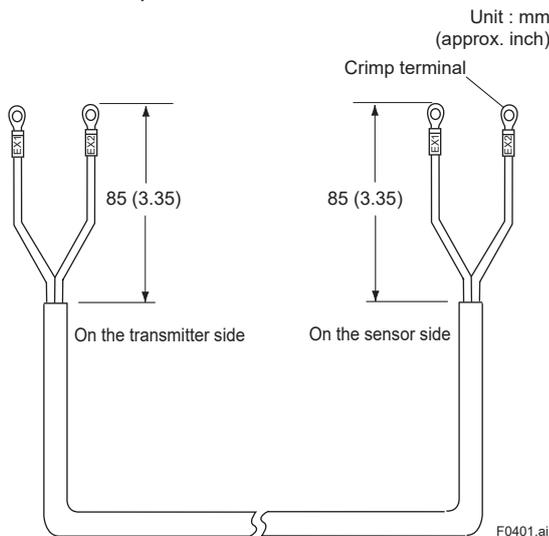


Figure 4.2.1 Cable Finish for Excitaiton Cable



NOTE

- For excitation cable and power cable, always use a crimp terminal with an insulation cover.
- Use crimp tools supplied by the manufacturer of the crimp terminal you want to use to connect the crimp terminal and cable.
- Use crimp tools that are appropriate for the diameter of the cable to be connected.

4.2.2 Dedicated Signal Cable (AX01C)

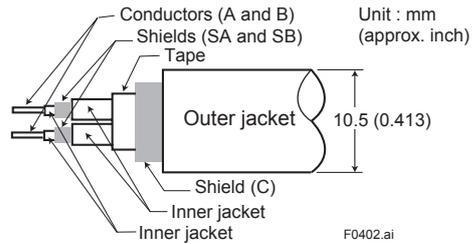


Figure 4.2.2 Dedicated Signal Cable

The flow signal is transmitted via this dedicated cable. The cable is constructed with double shielding over the two conductors, and heat-resistant vinyl is used for the outer jacket material.

Finished diameter: 10.5 mm (0.413 in.)

Maximum length:

- Combination with the AXG1A/AXFA11 transmitter:
 200 m (660 ft)
- Combination with the AXW4A transmitter:
 100 m (330 ft)

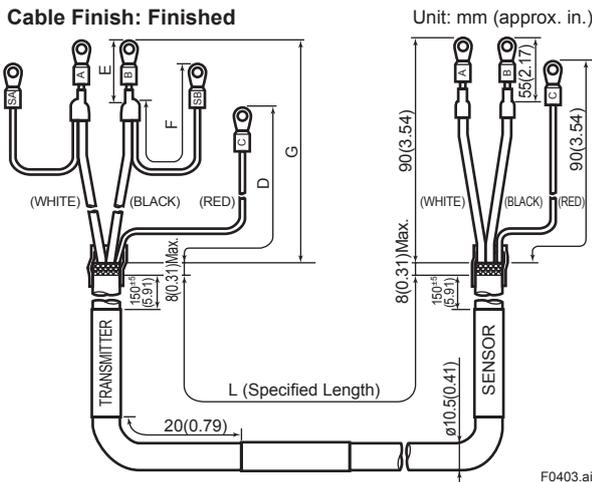
Maximum temperature: 80°C (176°F)



IMPORTANT

If the cable is longer than required, cut off any extra length rather than coiling it up, and terminate the conductors as shown in Figure 4.2.3.

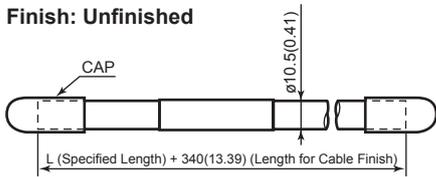
Avoid using junction terminal boards to extend the cable length, as this will interrupt the shielding.



F0403.ai

Specification Code	Length				Description
	D	E	F	G	
AX01C-C□□□	60 (2.4)	25 (1.0)	70 (2.8)	50 (2.0)	For AXW4A
AX01C-B□□□	70 (2.8)	25 (1.0)	50 (2.0)	60 (2.4)	For AXG1A
AX01C-D□□□	70 (2.8)	25 (1.0)	50 (2.0)	60 (2.4)	For AXFA11

Cable Finish: Unfinished



F404.ai

Figure 4.2.3 Cable Finish for Signal Cable

CAUTION

- As crimp terminals A, B, SA, SB and C have their own electrical potentials, securely insulate them so as not to come in contact with one another.
- To prevent a shield from coming in contact with another shield or the case, cover each shield with a vinyl tube or wrap it in vinyl tape.

4.2.3 Recommended Cable for Modbus communication

3-Wire cable (twisted pair and Common) with shield should be used.

Wire gauge: AWG24 or wider
Characteristic Impedance of cable: 100Ω or more

4.2.4 Recommended Cable for FOUNDATION fieldbus communication

Fieldbus type-A specification cable should be used.

4.3 Electrical Connections

This instrument is of watertight construction as stipulated in JIS C 0920. It is shipped with a wiring bracket (waterproof gland, waterproof gland with union or a plastic gland attached), only in cases where an optional specification is selected for the electrical connection. Cable gland has the following kinds depending on the type and size.

Integral Type Flowmeter

AXW (Size: 500 to 1000 mm (20 to 40 in.))

Optional Code	Description
EG2	2 pcs. of waterproof gland, and a blanking plug
EG3	3 pcs. of waterproof gland
EU2	2 pcs. of waterproof gland with union joint, and a blanking plug
EU3	3 pcs. of waterproof gland with union joint
EP2	2 pcs. of plastic gland, and a blanking plug
EP3	3 pcs. of plastic gland

Remote Sensor

AXW (Size: 500 to 1800 mm (20 to 72 in.))

Optional Code	Description
EW	2 pcs. of waterproof gland with JIS G3/4 female
EG	2 pcs. of waterproof gland
EU	2 pcs. of waterproof gland with union joint

Remote Transmitter

AXW4A

Optional Code	Description
EG4	4 pcs. of waterproof gland, and a blanking plug
EG5	5 pcs. of waterproof gland
EU4	4 pcs. of waterproof gland with union joint, and a blanking plug
EU5	5 pcs. of waterproof gland with union joint
EP4	4 pcs. of plastic gland, and a blanking plug
EP5	5 pcs. of plastic gland

Remote Transmitter

AXG1A

Optional Code	Description
EW5	5 pcs. of waterproof gland with JIS G3/4 female
EG5	5 pcs. of waterproof gland
EU5	5 pcs. of waterproof gland with union joint
EP5	5 pcs. of plastic gland

Remote Transmitter

AXFA11G

Optional Code	Description
EW	5 pcs. of waterproof gland with JIS G3/4 female
EG	5 pcs. of waterproof gland
EU	5 pcs. of waterproof gland with union joint
EP	5 pcs. of plastic gland



IMPORTANT

Apply a blanking plug to the unused electrical connection. Seal the electrical connections properly comply to usage state.

4.3.1 When waterproof property is necessary (Wiring using waterproof glands)



IMPORTANT

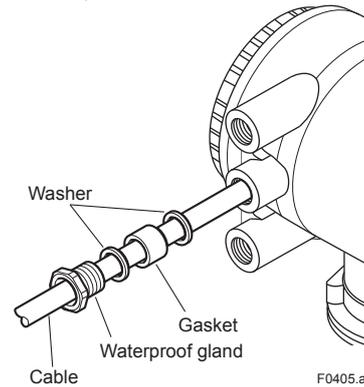
To prevent water or condensation from entering the transmitter housing, waterproof glands are recommended. Do not over-tighten the glands or damage to the cables may result. Tightness of the gland can be checked by confirming that the cable is held firmly in place.

For working on the conduit or the flexible tubes (G1/2), remove the waterproof gland and attach them directly to the electrical connection.

(1) Waterproof Gland

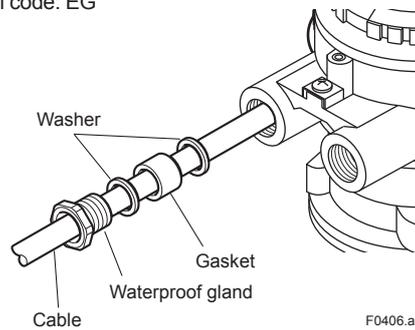
Integral Flowmeter

Optional code: EG2, EG3



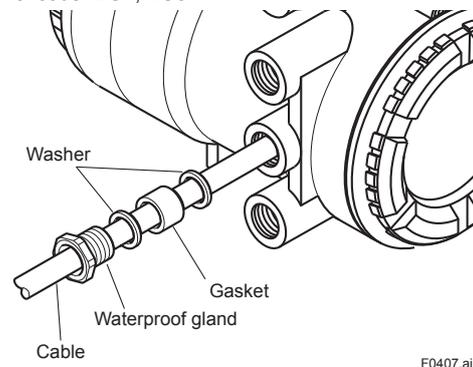
Remote Sensor

Optional code: EG



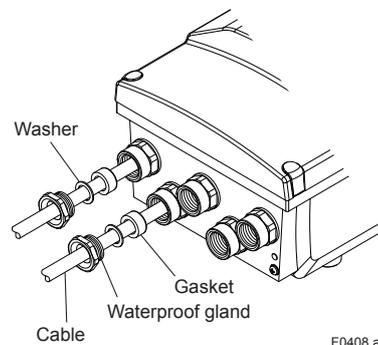
Remote Transmitter (AXW4A)

Optional code: EG4, EG5



Remote Transmitter (AXG1A/AXFA11)

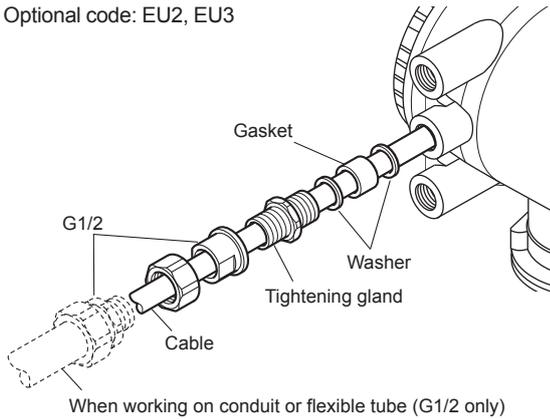
Optional code: EG5 (AXG1A), EG (AXFA11)



(2) Waterproof Gland with Union Joint

Integral Flowmeter

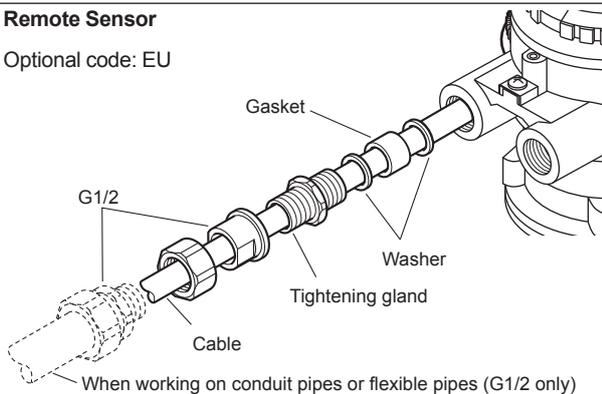
Optional code: EU2, EU3



F0409.ai

Remote Sensor

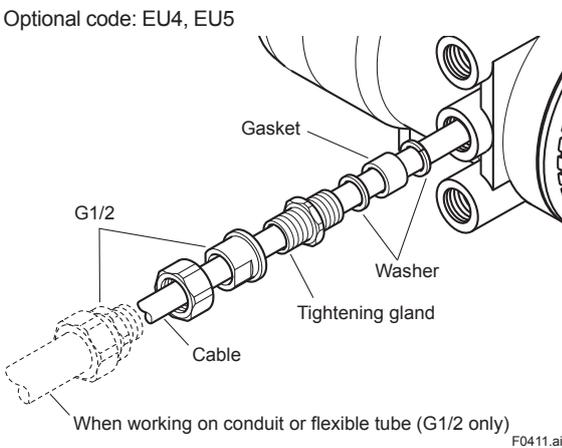
Optional code: EU



F0410.ai

Remote Transmitter (AXW4A)

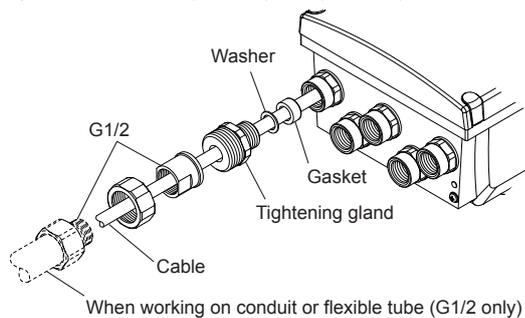
Optional code: EU4, EU5



F0411.ai

Remote Transmitter (AXG1A/AXFA11)

Optional code: EU5 (AXG1A), EU (AXFA11)

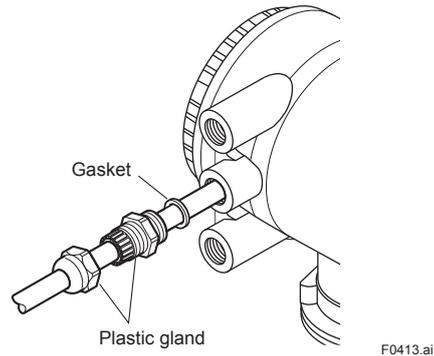


F0412.ai

(3) Plastic Gland

Integral Flowmeter

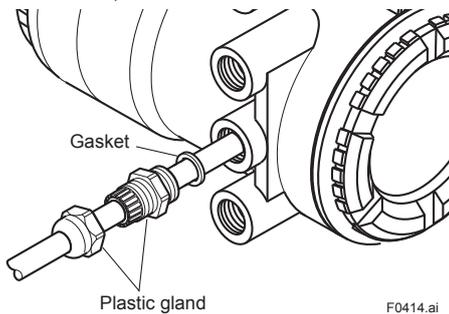
Optional code: EP2, EP3



F0413.ai

Remote Transmitter (AXW4A)

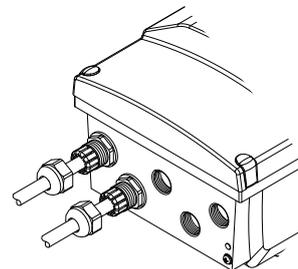
Optional code: EP4, EP5



F0414.ai

Remote Transmitter (AXG1A/AXFA11)

Optional code: EP5 (AXG1A), EP (AXFA11)

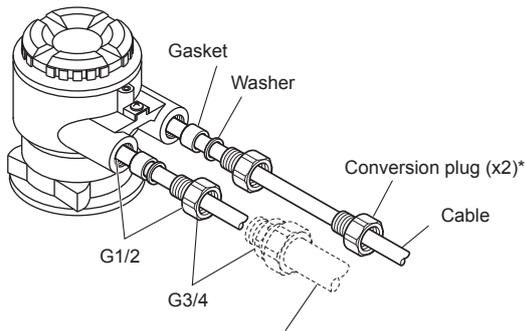


F0415.ai

(4) Waterproof Gland with JIS G3/4 Female

Remote Sensor

Optional code: EW



When working on conduit or flexible tube (G3/4)

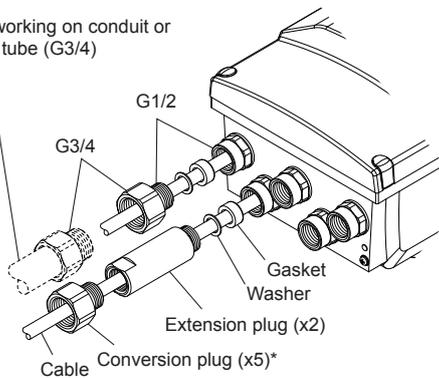
* When connecting G1/2, remove the conversion plug and connect directly to electrical connection.

F0416.ai

Remote Transmitter (AXG1A/AXFA11)

Optional code: EW5 (AXG1A), EW (AXFA11)

When working on conduit or flexible tube (G3/4)



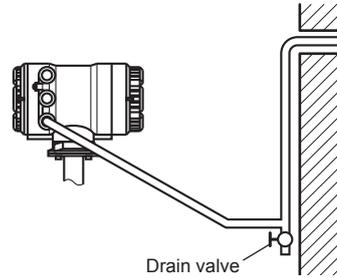
* When connecting G1/2, remove the conversion plug and connect directly to electrical connection.

F0417.ai

4.3.2 Conduit Wiring

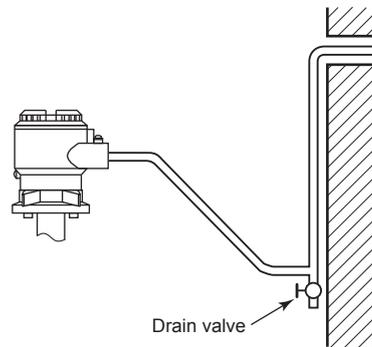
When wiring the conduits, utilize the waterproof gland to prevent water from flowing in through the conduit. Place the conduit pipe on an angle as shown in the following figures.

Install a drain valve at the low end of the vertical pipe, and open the valve regularly.



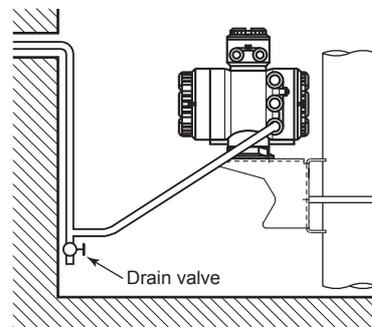
F0418.ai

Figure 4.3.1 Integral Flowmeter



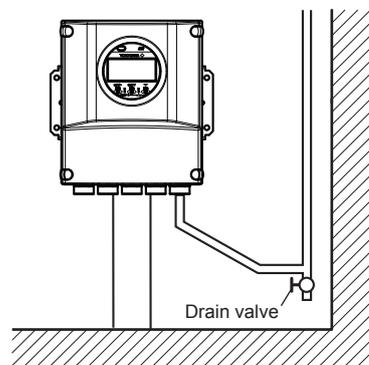
F0419.ai

Figure 4.3.2 Remote Sensor



F0420.ai

Figure 4.3.3 Remote Transmitter (AXW4A)



F0421.ai

Figure 4.3.4 Remote Transmitter (AXG1A/AXFA11)

4.4 Connecting to External Instruments of Integral Flowmeter and Remote Transmitter

4.4.1 Wiring Precautions for Power Supply Cables

When connecting to the power supply, observe the points below. Failure to comply with these warnings may result in an electric shock or damage to the instrument.

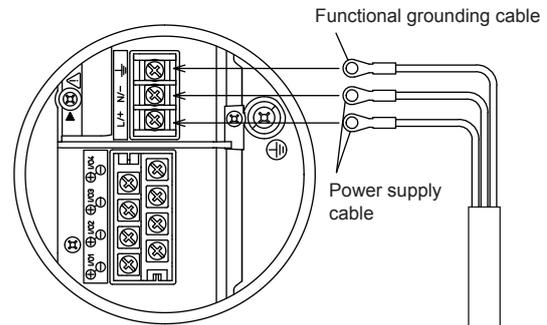


WARNING

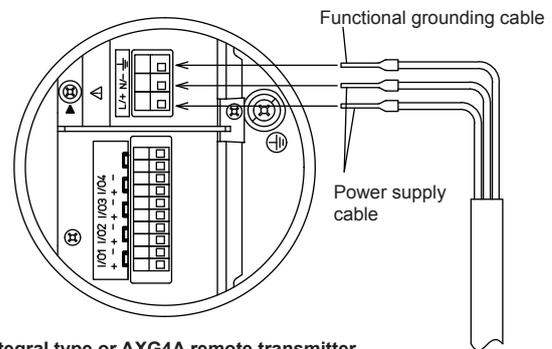
- Ensure that the power supply is off in order to prevent electric shocks.
- When opening the cover, wait for more than 20 minutes after turning off the power.
- Ensure the protective grounding terminal is grounded before turning on the power.
- Terminate all the cable finish with round or rod shaped crimp terminal (depending on the shape of the terminal block) with insulation cover, and connect them reliably.
- Install an external switch or circuit breaker as a means to turn the power off (capacitance: 15A, conforming to IEC60947-1 and IEC60947-3). Locate this switch either near the instrument or in other places facilitating easy operation. Affix a “Power Off Equipment” label to this external switch or circuit breaker.

Wiring Procedure

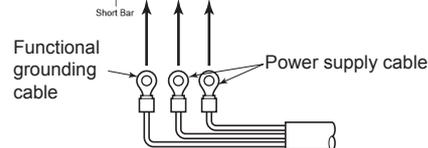
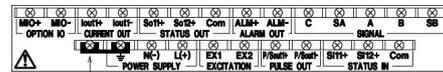
1. Check the instrument's power is off, then remove the terminal cover (transparent).
2. Wire the power supply cable and the functional grounding cable to the power supply terminals.
3. Install the terminal cover.



Integral type or AXG4A remote transmitter
M4 Screw Type



Integral type or AXG4A remote transmitter
Clamp Type (Optional code CT)



AXG1A remote transmitter

F0422.ai

Figure 4.4.1 Power Cable Wiring

4.4.2 DC Power Connection

When using DC power as the power supply for the transmitter, pay attention to the following points.

(1) Connecting Power Supply



IMPORTANT

Do not connect power supply with reversed polarities.

L/+ terminal: connect to + (power supply)

N/- terminal: connect to - (power supply)



IMPORTANT

For the 24 V power supply version (power supply code 2), power supply with 100 to 240 V AC and 100 to 120 V DC cannot be connected.

The wrong connection results in a damage to the transmitter.

(2) Required Power Supply Voltages



IMPORTANT

- For the 24 V power supply version (power supply code 2), the specification of 24 V (–15% to +20%) is the supply voltage between the terminals on the transmitter. Because of voltage drop by cable resistance, the supply voltage must be applied within the range of Figure 4.4.2.
- For AXFA11, read the applicable user's manual as listed in Table 1.1.

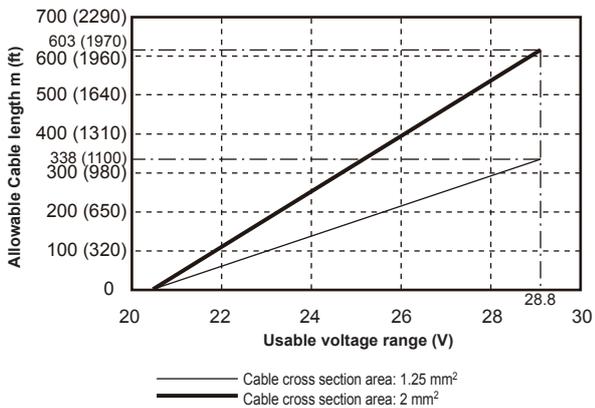


Figure 4.4.2 Supply Voltage and Power Supply Cable Length (Integral Flowmeter and AXW4A Remote Transmitter)

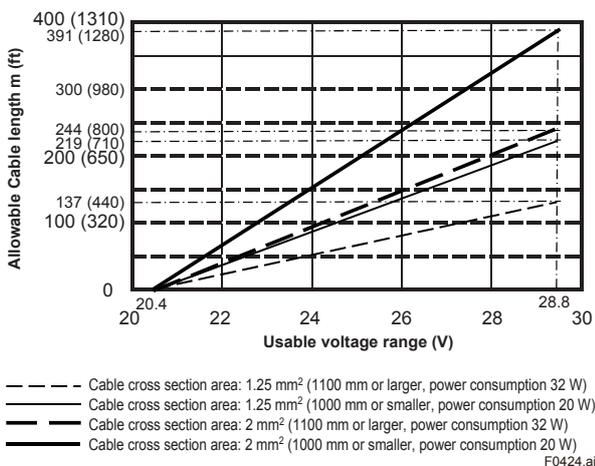


Figure 4.4.3 Supply Voltage and Power Supply Cable Length (AXG1A Remote Transmitter)

(3) Setting Power Supply Frequency



IMPORTANT

Upon shipment from the manufacturing plant, the local commercial power frequency is set to 49 Hz, and power synchronization is set to asynchronization. Do not change the following parameter.

Display Menu Path (AXW/AXW4A/AXG1A):
 Device setup ▶ Detailed setup ▶ AUX calculation ▶ Power sync on/off
 Device setup ▶ Detailed setup ▶ AUX calculation ▶ Set power freq

4.4.3 Grounding



WARNING

For the wiring of protective grounding, terminate the cable finish with round shaped crimp terminal with insulation cover (for M4 screw), and connect it to the protective grounding terminal reliably.



CAUTION

The grounding should satisfy Class D requirements (grounding resistance, 100 Ω or less).



IMPORTANT

A lightning protector is built-in for integral flowmeter or AXW4A/AXG1A remote transmitter. When the lightning protection is needed, the ground should satisfy Class C requirements (grounding resistance, 10 Ω or less). For AXFA11, read the applicable user's manual as listed in Table 1.1.

- The protective grounding terminals (⊕) are located on the inside and outside of the terminal area. Either terminal can be used.
- Use 600 V vinyl insulation wires as the grounding wires.

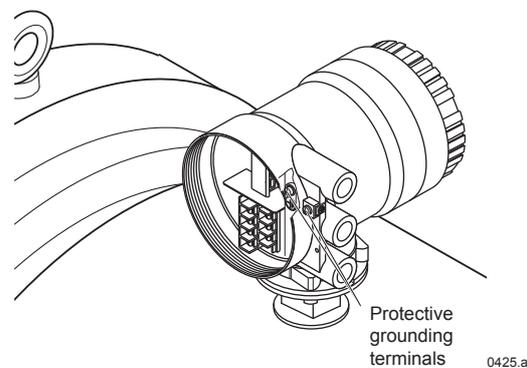
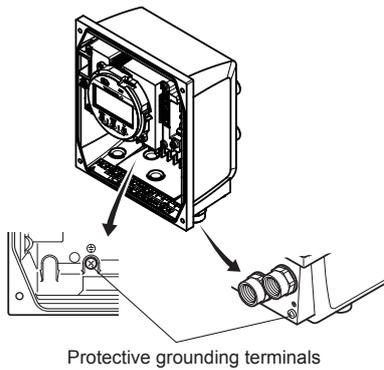


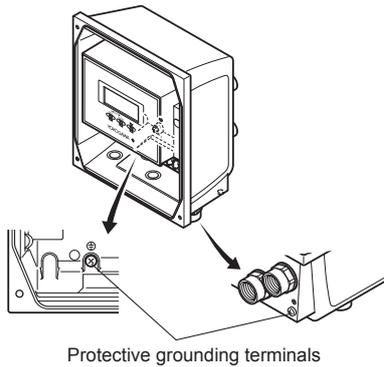
Figure 4.4.3 Position of Protective Grounding Terminal (Integral Type and AXG4A Remote Transmitter)



Protective grounding terminals

F0426.ai

Figure 4.4.4 Position of Protective Grounding Terminal (AXG1A Remote Transmitter)



Protective grounding terminals

F0427.ai

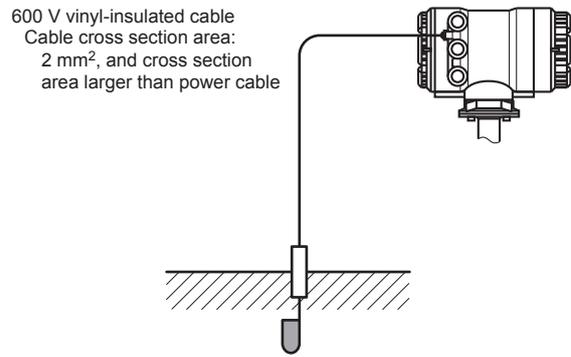
Figure 4.4.5 Position of Protective Grounding Terminal (AXFA11 Remote Transmitter)



IMPORTANT

Improper grounding may result in an adverse effect on the flow measurement. Ensure that the instrument is properly grounded.

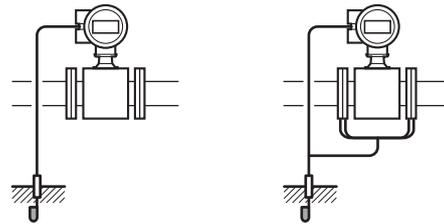
The electromotive force of the magnetic flowmeter is minute and it is easily affected by noise, and the reference electric potential is the same as that of the measuring fluid. Therefore, the reference electric potential (terminal potential) of the sensor and transmitter also need to be the same as that of the measuring fluid. Moreover, the potential must be the same as the ground. The magnetic flowmeter is equipped with an grounding ring that makes a connection with the charge of the measured fluid for grounding and protects the lining. Grounding rings are supplied with the instruments when specified with dedicated optional code.



600 V vinyl-insulated cable
Cable cross section area:
2 mm², and cross section
area larger than power cable

Grounding Resistance: 10 Ω or less (Class C requirements)
Note: When lightning protection performance by the built-in lightning protectors is not required, grounding resistance 100 Ω or less (Class D requirements) can be applied.

F0428.ai



In case grounding rings are used.

In case grounding rings are not used.
(Available only for metal piping)

F0429.ai

Figure 4.4.6 Grounding (Integral Flowmeter)

4.4.4 Connecting to External Instruments



WARNING

- Before wiring with external instruments, be sure to turn off the power supply of the magnetic flowmeter.
- Be sure the power supply of the external instruments is turned off, and then start wiring.

Read Section 4.6 for connection to external instruments.

4.4.5 Wiring Procedures

(1) For Integral Flowmeter and AXW4A Remote Transmitter

1) Removing the Cover

Loosen the cover locking screw (1 and 3) (See Figure 4.4.5 and Figure 4.4.6) clockwise using a hexagonal wrench (nominal size 3) to unlock the cover. Upon shipment from the manufacturing plant, the cover is unlocked. Hold the flowmeter with your hand and remove the cover by turning it in the direction of the arrow as shown below.

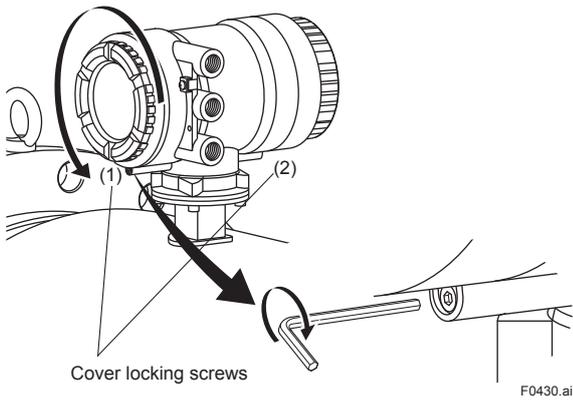


Figure 4.4.7 Removing the Terminal Box Cover for Integral Flowmeter

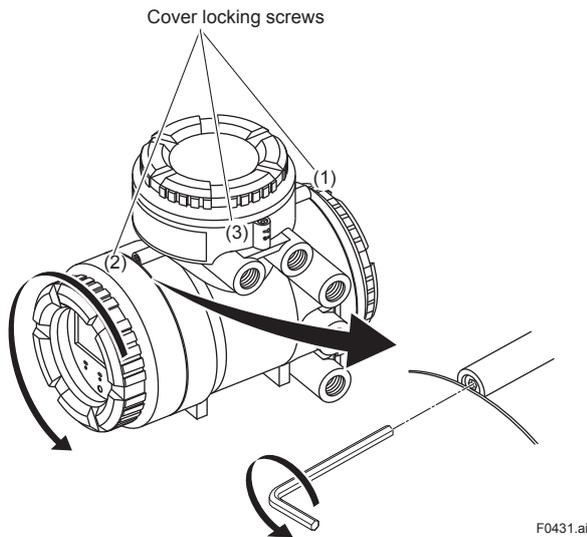


Figure 4.4.8 Removing the Terminal Box Cover for AXW4A Remote Transmitter

2) Terminal Configuration

When the cover is removed, the connection terminals will be visible. The description of the terminal symbols is shown in Figure 4.4.7 or Figure 4.4.8.

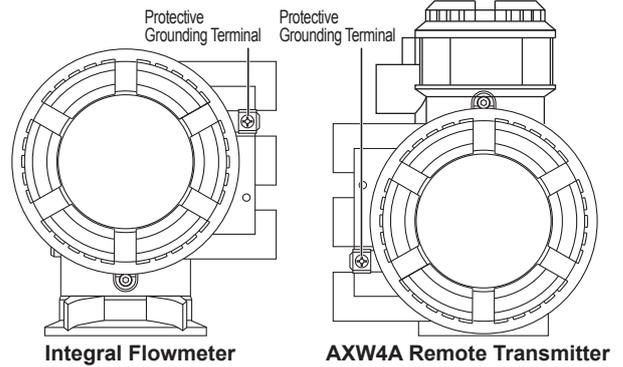
3) Wiring Procedure

1. Check the instrument's power is off.
2. Wire the signal cable and excitation cable to each terminal.
3. Install the terminal cover.

4) Installing the Cover

Install the cover to the flowmeter by turning it clockwise. Tighten the cover locking screw (1 and 3) (See Figure 4.4.5 and Figure 4.4.6) counterclockwise using a hexagonal wrench (nominal size 3) to lock the cover.

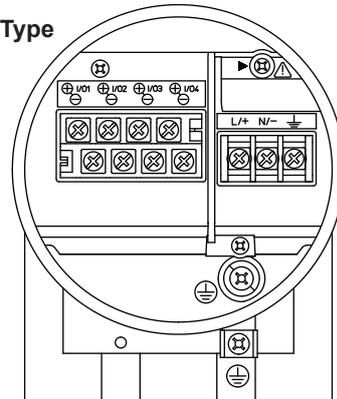
(2) Terminal Configuration (Integral Flowmeter and AXW4A Transmitter)



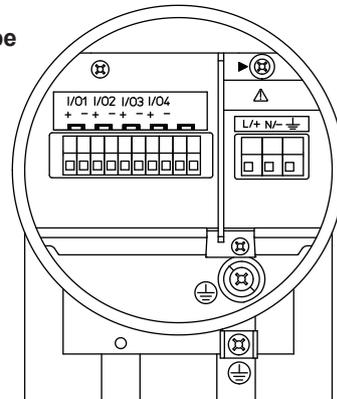
Integral Type/AXW4A Remote Transmitter:

<To be wired to Power Supply and I/Os>

M4 Screw Type



Clamp Type

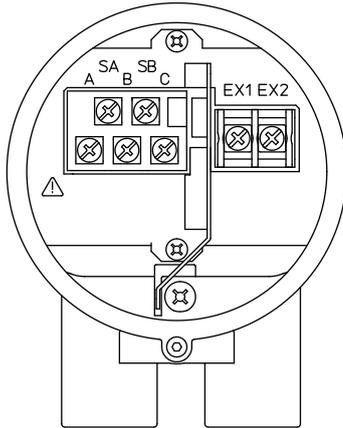


Terminal Symbol	Description
▶	Shorting Screw (Need to be fixed for normal operation)
⊕	Functional Grounding
N/- L/+	<input type="checkbox"/> Power Supply
I/O4 - I/O4 + I/O3 - I/O3 + I/O2 - I/O2 + I/O1 - I/O1 +	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Refer to <input type="checkbox"/> Input/Output Table
⊕	Protective Grounding (Inside and outside of the terminal box)

Figure 4.4.9 Terminal Configuration (Integral Flowmeter and AXW4A Remote Transmitter)

AXW4A Remote Transmitter:

<To be wired to Remote Sensor>



Terminal Symbol	Description
SA SB A B C	Flow Signal Input
EX1 EX2	Excitation Current Output

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Figure 4.4.10 Terminal Configuration (AXW4A Remote Transmitter)

■ BRAIN, HART

Converter, Communication, I/O		Connection Terminal			
BRAIN	HART	I/O1	I/O2	I/O3	I/O4
-D	-E	Iout1 Active	P/Sout1 Passive	-	-
-H	-J	Iout1 Active	P/Sout1 Passive	Sin No-voltage	P/Sout2 Passive
-K	-L	Iout1 Active	P/Sout1 Passive	Sin No-voltage	P/Sout2 Active (Without resistor)

■ Modbus

Communication and I/O code	Connection Terminal					
Modbus	I/O1 +/-	I/O2 +/-	I/O3 +	I/O3 -	I/O4 +	I/O4 -
-M	-	P/Sout1 Passive	-	Modbus C(Common)	Modbus B(D1)	Modbus A(D0)
-P	Iout2 Active	P/Sout1 Passive	-			

■ FOUNDATION Fieldbus

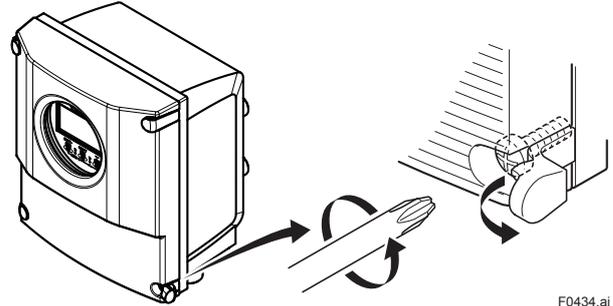
Communication and I/O code	Connection Terminal			
Fieldbus	I/O1	I/O2	I/O3	I/O4
-F	Fieldbus (Passive)	P/Sout (Passive)	-	-

Iout1: Current output with BRAIN/HART communication
 Iout2: Current output without BRAIN/HART communication
 P/Sout1: Pulse output or status output
 P/Sout2: Pulse output or status output
 Sin: Status input
 Modbus: Modbus communication
 Fieldbus: FOUNDATION fieldbus communication
 The position of Converter, Communication, I/O code:
 Integral Type: AXW □□□ G-■□□□□□-□□□□-□□□
 Remote Transmitter: AXW4A-□□□□□□□□■□□□

(3) For AXG1A Remote Transmitter

1) Removing the Cover

While supporting the front of the cover with your hand, flip the connecting screw protective cover over, and remove the four connecting screws.

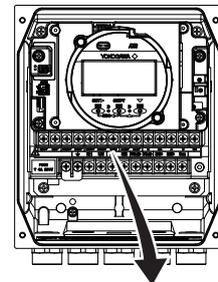


F0434.ai

Figure 4.4.11 Removing the Front Cover (AXG1A Remote Transmitter)

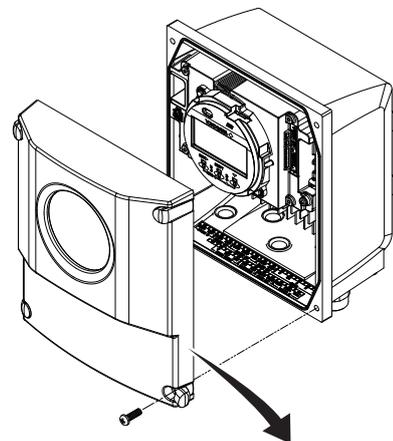
2) Terminal Configuration

When the cover is removed, the connection terminals will be visible as shown below.



MIO+	MIO-	Iout+	Iout-	So1+	So12+	Com	ALM+	ALM-	C	SA	A	B	SB	OP
				N(-)	L(+)	EX1	EX2	P/Sout+	P/Sout-	SI1+	SI12+	Com		

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MIO+	MIO-	Iout+	Iout-	So1+	So12+	Com	ALM+	ALM-	C	SA	A	B	SB	OP
				N(-)	L(+)	EX1	EX2	P/Sout+	P/Sout-	SI1+	SI12+	Com		

F0436.ai

Figure 4.4.12 Terminal Configuration (AXG1A Remote Transmitter)

Table 4.4.1 Terminal Symbols (AXG1A Remote Transmitter)

Terminal Symbol	Description
SIGNAL <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">C</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">SA</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">A</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">B</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">SB</div> </div>	Flow signal input
ALARM OUT <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">ALM+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">ALM-</div> </div>	Alarm output
STATUS OUT <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">So11+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">So12+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">COM</div> </div>	Status output (Two outputs)
CURRENT OUT <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">Iout1+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">Iout1-</div> </div>	Current output 4–20 mA DC
OPTION IO <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">MIO+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">MIO-</div> </div>	Option input/output
STATUS IN <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">SI11+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">SI12+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">COM</div> </div>	Status input (Two inputs)
PULSE OUT <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">P/Sout1+</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">P/Sout1-</div> </div>	Pulse output
EXCITATION <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">EX1</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">EX2</div> </div>	Excitation current output
POWER SUPPLY <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px; margin-right: 5px;">N(-)</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 5px;">L(+)</div> </div>	Power supply
	Functional grounding
	Protective grounding (Outside of the terminal)

BRAIN, HART

Communication and I/O code		Connection Terminal						
BRAIN	HART	ALM Passive	So11, So12 Passive	Iout1 Active	MIO	Si11, Si12 No-voltage	P/Sout1 Passive	
D0	J0	●	●	●	-	●	●	
D2	J2	●	●	●	Iin Active	●	●	
D3	J3	●	●	●	P/Sout2 Passive	●	●	
D4	J4	●	●	●	P/Sout2 Active (Without resistor)	●	●	
D5	J5	●	●	●	P/Sout2 Active (With resistor)	●	●	
D6	J6	●	●	●	Iout2 Active	●	●	
B0	H0	●	-	●	-	-	●	
B2	H2	●	-	●	Iin Active	-	●	
B3	H3	●	-	●	P/Sout2 Passive	-	●	
B4	H4	●	-	●	P/Sout2 Active (Without resistor)	-	●	
B5	H5	●	-	●	P/Sout2 Active (With resistor)	-	●	
B6	H6	●	-	●	Iout2 Active	-	●	

Iout1: Current output with BRAIN/HART communication
 Iout2: Current output
 Iin: Current input
 P/Sout1: Pulse output or status output
 P/Sout2: Pulse output or status output
 Si11, Si12: Status input (Two inputs)
 So11, So12: Status output (Two outputs)
 The position of Communication and I/O code:
 Remote Transmitter:
 AXG1A-G000□□□■□□



IMPORTANT

Do not wire the terminal without terminal symbols in terminal layout labels.

3) Installing the Cover

While supporting the front of the cover with your hand, flip the connecting screw protective cover over, and tighten the four connecting screws.

(4) For AXFA11 Remote Transmitter

1) Removing the Cover

While supporting the front of the cover with your hand, flip the connecting screw protective cover over, and remove the four connecting screws.

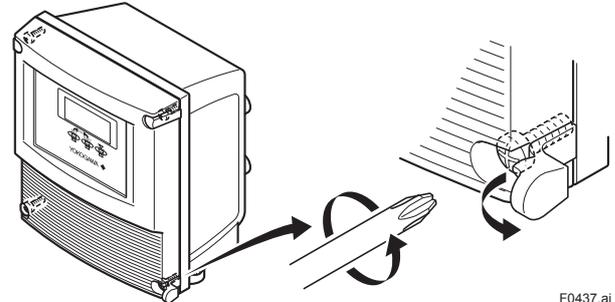


Figure 4.4.13 Removing the Front Cover (AXFA11 Remote Transmitter)

2) Terminal Configuration

When the cover is removed, the connection terminals will be visible as shown below.

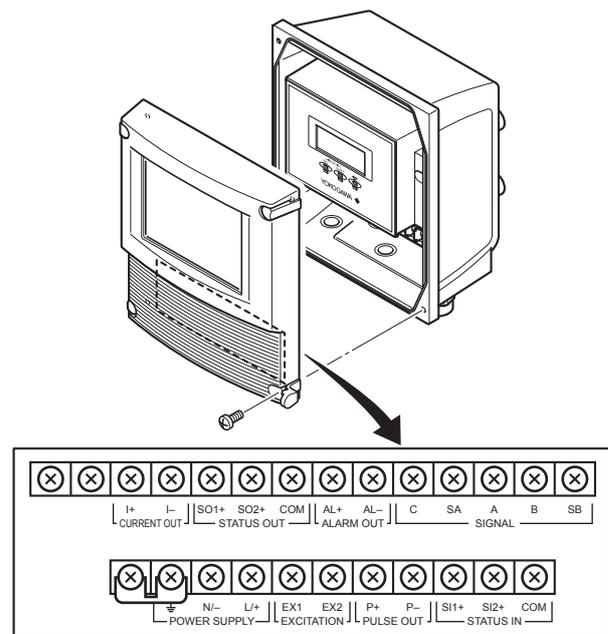
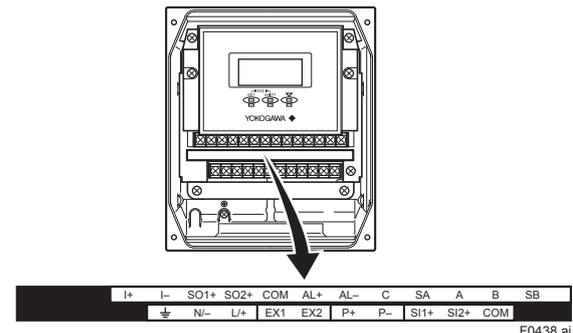


Figure 4.4.14 Terminal Configuration (AXFA11 Remote Transmitter)

Table 4.4.2 Terminal Symbols (AXFA11 Remote Transmitter)

Terminal Symbol	Description
SIGNAL C SA A B SB	Flow signal input
ALARM OUT AL+ AL-	Alarm output
STATUS OUT SO1+ SO2+ COM	Status output (Two outputs)
CURRENT OUT I+ I-	Current output 4–20 mA DC
STATUS IN SI1+ SI2+ COM	Status input (Two inputs)
PULSE OUT P+ P-	Pulse output
EXCITATION EX1 EX2	Excitation current output
POWER SUPPLY L/+ N/-	Power supply
	Functional grounding
	Protective grounding (Outside of the terminal)



IMPORTANT

Do not wire the terminal without terminal symbols in terminal layout labels.

3) Installing the Cover

While supporting the front of the cover with your hand, flip the connecting screw protective cover over, and tighten the four connecting screws.

4.5 Connecting to Remote Sensor and Remote Transmitter (Sensor Side)



WARNING

Before wiring, be sure that the power supply to magnetic flowmeter has been turned off to prevent an electrical shock.

(1) Removing the Cover

Loosen the cover locking screw (1) (See Figure 4.5.1) clockwise using a hexagonal wrench (nominal size 3) to unlock the cover. Upon shipment from the manufacturing plant, the cover is unlocked. Hold the sensor with your hand and remove the cover by turning it in the direction of the arrow as shown below.

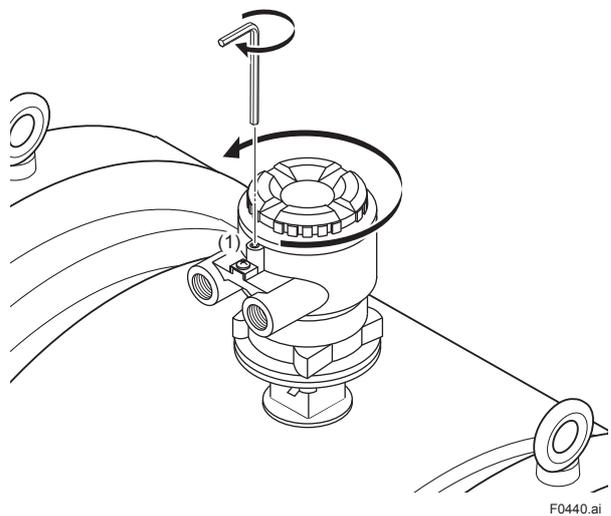


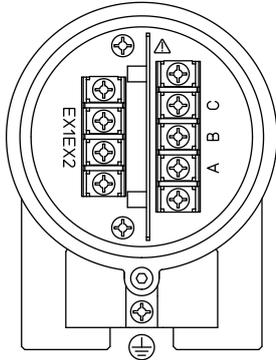
Figure 4.5.1 Removing the Terminal Box Cover (Remote Sensor)

(2) Terminal Configuration

When the cover is removed, the connection terminals will be visible as shown below.

Remote Sensor:

<To be wired to Remote Transmitter>



Terminal Symbol	Description
A B C	Flow Signal Output
EX1 EX2	Excitation Current Input
	Protective Grounding (Outside of the terminal box)

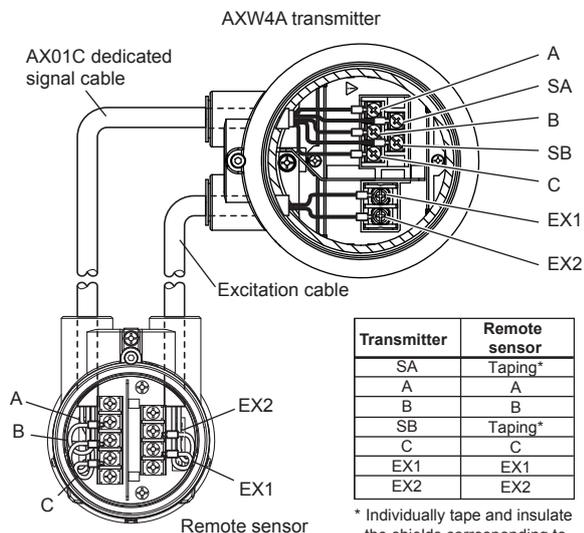
F0441.ai

Figure 4.5.2 Terminal Configuration (Remote Sensor)

(3) Wiring of Remote Sensor and Remote Transmitter

1) Connection with AXW4A Remote Transmitter

Connect wiring as shown in the figure below.



Transmitter	Remote sensor
SA	Taping*
A	A
B	B
SB	Taping*
C	C
EX1	EX1
EX2	EX2

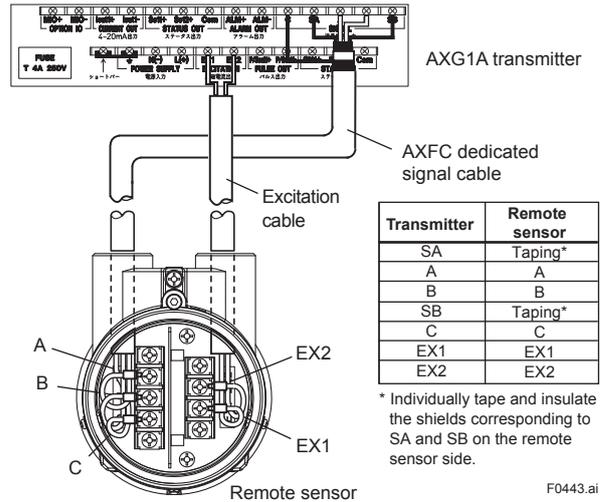
* Individually tape and insulate the shields corresponding to SA and SB on the remote sensor side.

F0442.ai

Figure 4.5.3 Wiring Diagram (AXW4A Remote Transmitter)

2) Connection with AXG1A Remote Transmitter

Connect wiring as shown in the figure below.



Transmitter	Remote sensor
SA	Taping*
A	A
B	B
SB	Taping*
C	C
EX1	EX1
EX2	EX2

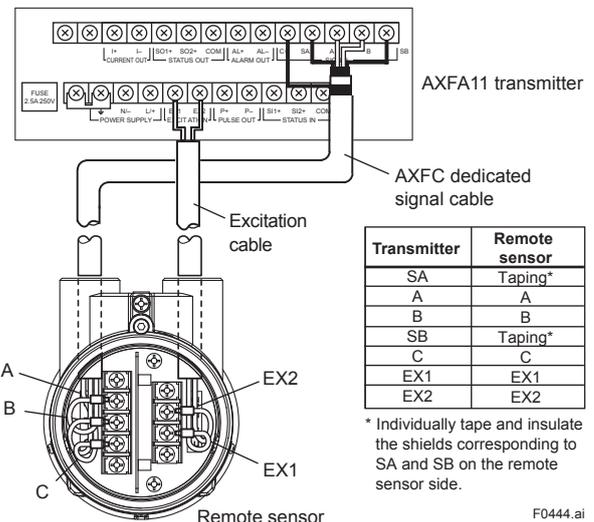
* Individually tape and insulate the shields corresponding to SA and SB on the remote sensor side.

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Figure 4.5.4 Wiring Diagram (AXG1A Remote Transmitter)

3) Connection with AXFA11 Remote Transmitter

Connect wiring as shown in the figure below.



Transmitter	Remote sensor
SA	Taping*
A	A
B	B
SB	Taping*
C	C
EX1	EX1
EX2	EX2

* Individually tape and insulate the shields corresponding to SA and SB on the remote sensor side.

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Figure 4.5.5 Wiring Diagram (AXFA11 Remote Transmitter)

(4) Grounding

WARNING

For the wiring of protective grounding, terminate the cable finish with round shaped crimp terminal with insulation cover (for M4 screw), and connect it to the protective grounding terminal reliably.

CAUTION

The grounding should satisfy Class D requirements (grounding resistance, 100 Ω or less).

IMPORTANT

Improper grounding may result in an adverse effect on the flow measurement. Ensure that the instrument is properly grounded.

The electromotive force of the magnetic flowmeter is minute and it is easy to be affected by noise. Therefore, be sure to ground according to Figure 4.5.6. The reliable grounding equalize the reference electric potentials (terminal potential) of the sensor and the transmitter, the measuring fluid potential and the ground potential, and then reduce the affection by noise. The grounding rings make a connection between the measured fluid and the ground and protects the flared face of lining. Grounding rings are supplied with the instruments when specified with dedicated optional code.

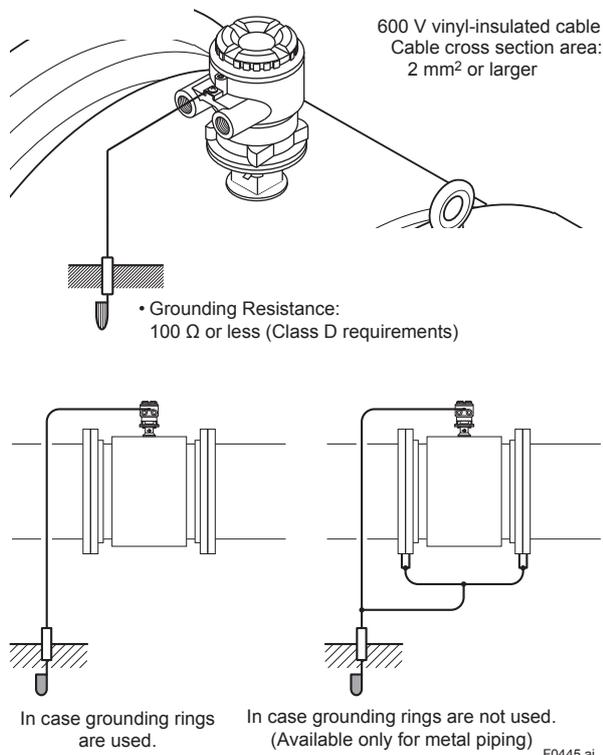


Figure 4.5.6 Grounding (Remote Sensor)

(5) Installing the Cover

Install the cover to the terminal box by turning it clockwise. Tighten the cover locking screw (1) (See Figure 4.5.1) counterclockwise using a hexagonal wrench (nominal size 3) to lock the cover.

4.6 Input and Output

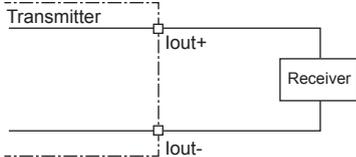
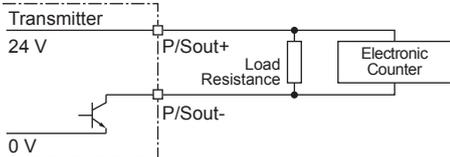
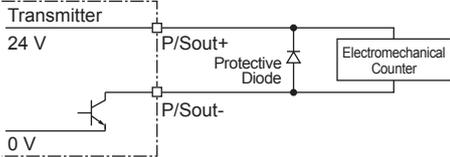
This section provides descriptions of the specification and wiring of the input and output signals.

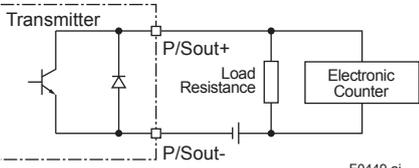
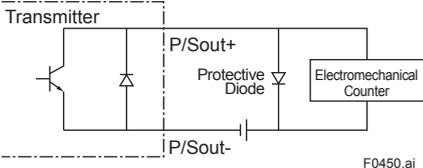
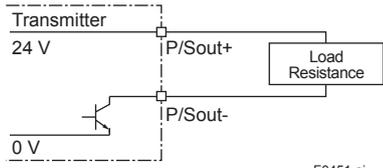
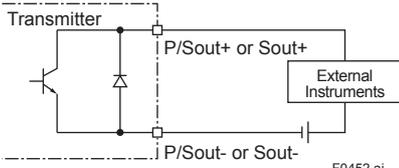
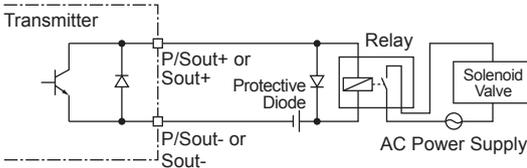
In accordance with the communication and I/O code specified, the function assigned to each terminal is different. For the specification and terminal configuration, read Section 4.4 and the applicable general specifications as listed in Table 1.1. For AXFA11, read the applicable user's manual as listed in Table 1.1.

(1) Output Signal

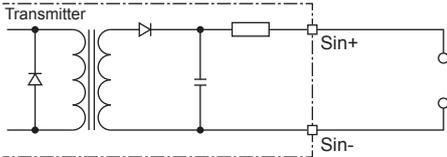
Galvanic isolation:

All circuits for inputs, outputs and power supply are galvanically isolated from each other.

Output signal type	Specification										
Active current output [Iout]:	One or two current outputs are available depending on the specification. Depending on the measured value, the active current output delivers 4 to 20 mA.										
	<table border="1"> <tr> <td>Output current</td> <td>4 to 20 mA DC</td> </tr> <tr> <td>Load resistance</td> <td>750 Ω or less (Integral flowmeter or AXW4A), 1 kΩ (AXG1A)</td> </tr> <tr> <td>Load resistance for BRAIN communication</td> <td>250 to 450 Ω</td> </tr> <tr> <td>Load resistance for HART communication</td> <td>230 to 600 Ω</td> </tr> <tr> <td>Current output accuracy</td> <td>±8 μA (±0.05% of span)</td> </tr> </table>	Output current	4 to 20 mA DC	Load resistance	750 Ω or less (Integral flowmeter or AXW4A), 1 kΩ (AXG1A)	Load resistance for BRAIN communication	250 to 450 Ω	Load resistance for HART communication	230 to 600 Ω	Current output accuracy	±8 μA (±0.05% of span)
	Output current	4 to 20 mA DC									
	Load resistance	750 Ω or less (Integral flowmeter or AXW4A), 1 kΩ (AXG1A)									
	Load resistance for BRAIN communication	250 to 450 Ω									
	Load resistance for HART communication	230 to 600 Ω									
Current output accuracy	±8 μA (±0.05% of span)										
 <p style="text-align: right;">F0446.ai</p>											
<p>Figure 4.6.1 Connection diagram: Active current output [Iout]</p>											
Active pulse output [P/Sout]:	Connection of an electronic counter Observe that maximum allowable voltage and voltage polarity are correct when wiring.										
	<table border="1"> <tr> <td>Load resistance</td> <td>1 kΩ or more</td> </tr> <tr> <td>Internal power supply</td> <td>24 V DC ±20%</td> </tr> <tr> <td>Maximum pulse rate</td> <td>10,000 pulses/s</td> </tr> <tr> <td>Maximum frequency output rate</td> <td>12,500 Hz</td> </tr> </table>	Load resistance	1 kΩ or more	Internal power supply	24 V DC ±20%	Maximum pulse rate	10,000 pulses/s	Maximum frequency output rate	12,500 Hz		
	Load resistance	1 kΩ or more									
	Internal power supply	24 V DC ±20%									
	Maximum pulse rate	10,000 pulses/s									
	Maximum frequency output rate	12,500 Hz									
 <p style="text-align: right;">F0447.ai</p>											
<p>Figure 4.6.2 Connection diagram: Active pulse output [P/Sout] (Electronic counter)</p>											
Connection of an electromechanical counter											
<table border="1"> <tr> <td>Maximum current</td> <td>150 mA or less</td> </tr> <tr> <td>Average current</td> <td>30 mA or less</td> </tr> <tr> <td>Internal power supply</td> <td>24 V DC ±20%</td> </tr> <tr> <td>Maximum pulse rate</td> <td>2 pulses/s</td> </tr> <tr> <td>Pulse width</td> <td>20, 33, 50, 100 ms</td> </tr> </table>	Maximum current	150 mA or less	Average current	30 mA or less	Internal power supply	24 V DC ±20%	Maximum pulse rate	2 pulses/s	Pulse width	20, 33, 50, 100 ms	
Maximum current	150 mA or less										
Average current	30 mA or less										
Internal power supply	24 V DC ±20%										
Maximum pulse rate	2 pulses/s										
Pulse width	20, 33, 50, 100 ms										
 <p style="text-align: right;">F0448.ai</p>											
<p>Figure 4.6.3 Connection diagram: Active pulse output [P/Sout] (Electromechanical counter)</p>											
When Communication and I/O code DG or JG is specified, upon shipment from the manufacturing plant, the output is set for electromechanical counter. If the output is set for electronic counter, the following parameter is change from "For magnetic counter" to "Normal". For detailed parameter setting, read the user's manual of the applicable communication type as listed in Table 1.1.											
Display Menu Path (AXW/AXW4A/AXG1A): Device setup ▶ Detailed setup ▶ Pulse/Status out ▶ PO2/SO2 ▶ Active pulse											

Output signal type	Specification								
<p>Passive pulse output [P/Sout]:</p>	<p>Connection of an electronic counter Maximum voltage and correct polarity must be observed for wiring.</p> <table border="1" data-bbox="448 246 1418 365"> <tr> <td>Maximum load current</td> <td>200 mA or less</td> </tr> <tr> <td>Power supply</td> <td>30 V DC or less</td> </tr> <tr> <td>Maximum pulse rate</td> <td>10,000 pulses/s</td> </tr> <tr> <td>Maximum frequency output rate</td> <td>12,500 Hz</td> </tr> </table>  <p style="text-align: right;">F0449.ai</p> <p>Figure 4.6.4 Connection diagram: Passive pulse output [P/Sout] (Electronic counter)</p> <p>Connection of an electromechanical counter</p>  <p style="text-align: right;">F0450.ai</p> <p>Figure 4.6.5 Connection diagram: Passive pulse output [P/Sout] (Electromechanical counter)</p>	Maximum load current	200 mA or less	Power supply	30 V DC or less	Maximum pulse rate	10,000 pulses/s	Maximum frequency output rate	12,500 Hz
Maximum load current	200 mA or less								
Power supply	30 V DC or less								
Maximum pulse rate	10,000 pulses/s								
Maximum frequency output rate	12,500 Hz								
<p>Active status output [P/Sout]:</p>	<p>Because of connecting to a transistor, observe that maximum allowable current, voltage polarity and output current level are correct.</p> <table border="1" data-bbox="448 913 1418 974"> <tr> <td>Load resistance (External instruments)</td> <td>1 kΩ or more</td> </tr> <tr> <td>Internal power supply</td> <td>24 V DC ±20%</td> </tr> </table>  <p style="text-align: right;">F0451.ai</p> <p>Figure 4.6.6 Connection diagram: Active status output [P/Sout]</p>	Load resistance (External instruments)	1 kΩ or more	Internal power supply	24 V DC ±20%				
Load resistance (External instruments)	1 kΩ or more								
Internal power supply	24 V DC ±20%								
<p>Passive status output [P/Sout or Sout]: [So11 or So12]: [ALM]:</p>	<p>Because of connecting to a transistor, observe that maximum allowable voltage, voltage polarity and maximum allowable current are correct.</p> <table border="1" data-bbox="448 1261 1418 1332"> <tr> <td>Maximum load current</td> <td>200 mA or less</td> </tr> <tr> <td>Power supply</td> <td>30 V DC or less</td> </tr> </table>  <p style="text-align: right;">F0452.ai</p> <p>Figure 4.6.7 Connection diagram: Passive status output [P/Sout or Sout]</p> <p>A relay must be connected in series to switch alternating voltage.</p>  <p style="text-align: right;">F0453.ai</p> <p>Figure 4.6.8 Connection diagram: Passive status output [P/Sout or Sout] (Solenoid valve)</p>	Maximum load current	200 mA or less	Power supply	30 V DC or less				
Maximum load current	200 mA or less								
Power supply	30 V DC or less								

(2) Input signals

Input signal type	Specification						
Status input [Sin]: [Si11 or Si12]:	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <h2 style="color: red; margin: 0;">IMPORTANT</h2> </div> </div> <hr style="border: 1px solid red;"/> <p>The status input detects a signal without voltage. Loading voltage during the switching status "Close" may result in damage on the electrical circuit.</p> <hr style="border: 1px solid red;"/> <p>The status input is used for connecting to the following no-voltage contacts.</p> <table border="1" data-bbox="446 488 1420 577"> <thead> <tr> <th>Switching status</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td>Closed</td> <td>200 Ω or less</td> </tr> <tr> <td>Open</td> <td>100 kΩ or more</td> </tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;">  <p style="font-size: small; margin-top: 5px;">F0454.ai</p> </div> <p>Figure 4.6.9 Connection diagram: Status input [Sin]</p>	Switching status	Resistance	Closed	200 Ω or less	Open	100 kΩ or more
Switching status	Resistance						
Closed	200 Ω or less						
Open	100 kΩ or more						

5. Basic Operating Procedures

5.1 Operation by Display unit

The parameter settings from display unit can be carried out using the three IR (infra-red) switches - namely, the [SET] [SHIFT] and [▼] switches. The IR switches enable the user to set parameters from the outside of the glass of the display cover.

This section provides descriptions of basic parameter configuration and operation procedures of IR switches. This instrument can be also operated using the dedicated handheld terminal or the FieldMate (Versatile Device Management Wizard). For operation in details, read the user's manual of the applicable communication type (for AXW/AXW4A) or the hardware/software edition (for AXFA11) as listed in Table 1.1.

WARNING

Be sure to enable the write protect function to prevent the overwriting of parameters after finishing parameter setting.

In rare cases, the IR switches may respond unexpectedly to water drops or extraneous substances sticking on the surface of display panel, due to the operating principal. The possibility of malfunction arises after rain or cleaning operation near the place where the flowmeter is installed. Turning on and off the flashlight etc. towards the IR switch may also be a cause of malfunction.

Read Section 6.3 for the hardware write protect function, and the user's manual of applicable communication type as listed in Table 1.1 for the software write protect function.

IMPORTANT

Operate the display unit under the condition where direct sunlight, etc... do not shine to the IR switches directly when the parameter setting operation is carried out.

NOTE

- Always keep the cover closed and operate the setting switches from the outside of the glass window.
- If dirt, dust or other substances surfaces on the glass of display cover, wipe them clean with a soft dry cloth.
- The operation with dirty gloves may cause a switch response error.

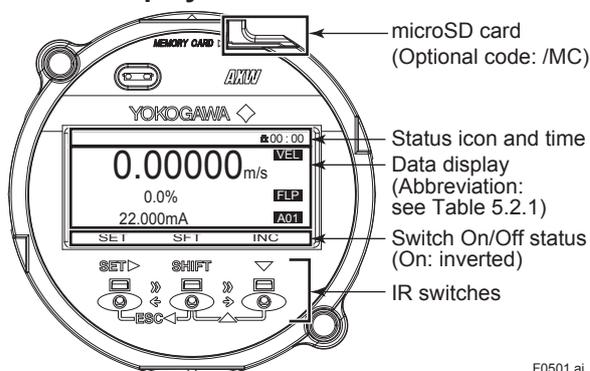
NOTE

The language on the display is set to "English" as default at the factory shipment. Select the adequate language referring to the Subsection 5.2.2. The menu pass of the display on this manual is selected to "English".

5.2 Display and Basic Configuration

The display unit of AXW Integral Flowmeter and AXW4A/AXG1A Remote transmitter has various functions below.

5.2.1 Display



F0501.ai

(1) Basic operation of IR switches

The operation from display panel is done by using the three IR switches; [SET], [SHIFT] and [▼]. The combination of the two switches provides a different function, and the function is indicated on the display.

IR switch (Note 1)	Indicate of switch (Note 2)	Function
[SET▶]	SET	<ul style="list-style-type: none"> • Apply parameter (Note 3) • Enter data (Note 3) • Move to next menu
[SHIFT]	SFT	<ul style="list-style-type: none"> • Move cursor right (Numeric type parameter)
[▼]	INC	<ul style="list-style-type: none"> • Move cursor down (Select type parameter) • Increment value (Numeric type parameter) • Change position of decimal point (Numeric type parameter)
[SHIFT] + [▼] (= [▲])	DEC	<ul style="list-style-type: none"> • Move cursor up (Select type parameter) • Decrement value (Numeric type parameter)
SHIFT + SET▶ (= [ESC◀])	ESC	<ul style="list-style-type: none"> • Cancel • Back to previous menu

Note 1: [A] + [B] (= [C]): The function is changed to switch [C] when switch [B] is pushed while pushing switch [A].

Note 2: [SET], [SFT], [INC], [DEC] and [ESC] indicate the assigned function in accordance with display mode at that time.

Note 3: "Apply" and "Enter" are executed by pushing a switch twice. If a switch after first pushing a switch.

(2) Status icons

Icon	Contents	Icon	Contents
	Write protect Invalid		Write protect Valid
	Device Busy		Device Fault
	Ready for microSD card		Accessing microSD card
	Disable to access microSD card		Uploading parameters
	Downloading parameters		Trend graph executing
	BRAIN communication		HART communication
	Modbus communication		FOUNDATION fieldbus communication
	System alarm occurs		Setting alarm occurs
	Process alarm occurs		Information occurs
	Warning occurs		Operation level: Operator
	Display Damping Valid		Operation level: Specialist
	Operation level: Maintenance		

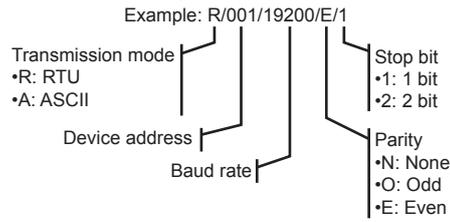
(3) Data indication part

The process values are available to select 8 items maximum on the display. It is possible to indicate 4 items maximum on the display at the same time, and the rest 4 items are able to show by scrolling.

Table 5.2.1 Abbreviation table of process values to be indicated on the display.

Abbreviation	Contents
FLP(*1)	Flow rate %
PRV(*1)	Process value
VEL(*1)	Flow velocity
VFL(*1)	Volumetric flow
MFL(*1)	Mass flow
FLB	Flow rate in % bar graph
TL1(*1)	Totalization value 1
TL2(*1)	Totalization value 2
TL3(*1)	Totalization value 3
TAG	Tag No. (PD tag for FOUNDATION fieldbus type)
LTG	Long Tag (for HART communication type only)
COM	Communication protocol
ADH	Adhesion diagnostic Level (Alarm at Level 4)
AO1(*1)	Analog output value 1
TC1	Count value of totalizer 1
TC2	Count value of totalizer 2
TC3	Count value of totalizer 3
MOD	Information of Modbus communication setting Display example (*2): R/001/19200/E/1
FR	AI1 Flow rate
FRP	AI1 Flow rate (%)
FRB	AI1 Flow rate (%Bar)
AI1	AI1.OUT
AI2	AI2.OUT
AI3	AI3.OUT
IT1	IT1.OUT
IT2	IT2.OUT
AR	AR.OUT

- *1: Available to display the online trend graph.
- *2: Explanation of display example



F0502.ai

5.2.2 Basic Configuration for Display

For parameter setting from display panel, configurable parameters differ by the three operational levels specified in Table 5.2.2, and a passcode is needed to enter into Setting mode. No passcode requires for “Operator”, and a passcode corresponding to each level requires for “Maintenance” or “Specialist”.

For parameter in details, read the user’s manual of applicable communication type as listed in Table 1.1.

Table 5.2.2 Parameter setting from display panel and operation level

Operation Level	Reading parameters	Writing parameters
Operator	All parameters	Parameters related with basic display settings including display language.
Maintenance	All parameters	Parameters allowed for Operator level. Parameters related with Zero adjustment.
Specialist	All parameters	All Parameters

The following parameters are available to “Operator” level without passcode.

(1) Display Language Setting

Display Menu Path:
Device setup ▶ Language

The language on the display is set to “English” as default at the factory shipment. Select the adequate language.

The selectable display language is different by the model and suffix code (display code) specified when ordering.

Position of the display code:

Integral Type:

AXW□□□G-□□□□□□-□□□□-□■□

Remote Transmitter:

AXW4A-□□□□□□□□□■

AXG1A-G000□□□□1■

Display code	Selectable display language
1	English, French, German, Italian, Spanish, Portuguese, Japanese, or Russian
2	English or Chinese

(2) Display Contrast Setting (shading)

Display Menu Path:
Device setup ▶ Detailed setup ▶ Display set ▶ Optional config ▶ Contrast

Available to change the contrast of the display.

Setting item	Contents
-5 to +5	Set the contrast of the display (The value is small: Low, and the value is big: High)

(3) Display Line Setting

Display Menu Path:
 Device setup ▶ Detailed setup ▶ Display set ▶ Optional config ▶
 Line mode

Available to select the number of lines of process value to be indicated on the display.

Up to four lines can be displayed at the same time. The character size changes depending on the number of line.

Setting item	Contents
1 line(big)	Number of displayable process value : One (without unit)
1 line	Number of displayable process value : One (with unit)
2 line	Number of displayable process values : Two
3 line	Number of displayable process values : Three
4 line	Number of displayable process values : Four

Table 5.2.3 Display line setting and display example

Lines of display	Example 1	Example 2
1 line(big)		
		* Not indicate the Flow noise status. * Indicate 32 characters of the Long Tag.
1 line		
		* Indicate 32 characters of the Long Tag.
2 line		
		* Indicate 32 characters of the Long Tag.
3 line		
		* Indicate 32 characters of the Long Tag in the first line. * Indicate 16 characters in the first half of 32 characters of the Long Tag in the second and third lines.
4 line		
		* Indicate 16 characters in the first half of 32 characters of the Long Tag only

(4) Date Display Formant Setting

Display Menu Path:
 Device setup ▶ Detailed setup ▶ Display set ▶ Optional config ▶
 Format date

The date display format can be specified below.

Setting item	Contents
MM/DD/YYYY	Displays the date in "month/day/year".
DD/MM/YYYY	Displays the date in "day/month/year".
YYYY/MM/DD	Displays the date in "year/month/day".

The date needs to be set every time when the power is turned on.

In case the date is not set:

- BRAIN communication: Date counting starts from the date stored in the memory.
- HART communication: Date counting starts from 1900/01/01 00:00:00, according to HART specification.

(5) Inverse Display Setting

Display Menu Path:
 Device setup ▶ Detailed setup ▶ Display set ▶ Optional config ▶
 Inversion

Available to change from normal display to white/black reverse display.

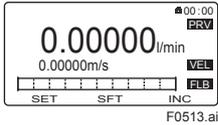
Setting item	Contents
Normal	Characters in the display is Black.
Inverse	Outline characters

5.3 Display Mode and Setting Mode

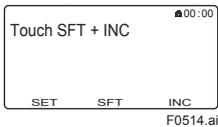
The device runs in the Display Mode when the power is turned on. For check or change of parameters, the Setting Mode must be activated. The following procedure explains how to change to the Setting Mode. For the function of IR switches, read Subsection 5.2.1.

[Procedure]

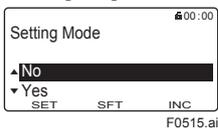
- 1) Keep touching [SET] switch for few seconds.



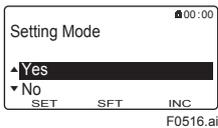
- 2) Touch [SFT] + [INC] switches.



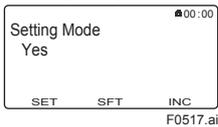
- 3) "No" is selected. Touch [INC] switch and select "Yes".



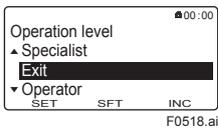
- 4) Touch [SET] switch.



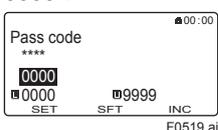
- 5) "Yes" is blinking. Touch [SET] switch again.



- 6) The screen moves to the menu of Operation Level.



- 7) Select an appropriate operation level by moving the cursor with [INC] or [DEC] switch. Passcode is not necessary for "Operator". For "Maintenance" and "Specialist", passcode is necessary for each. For passcode setting, [SFT] is for position change, and [INC] is for number, then twice [SET] is for entry completion. The default passcode at the factory shipment is set to "0000".



- 8) When the Operation Level is determined, the screen moves to "Device setup" as the Setting Mode where parameters can be configured.
- 9) After completing parameter setting, push [ESC] switch. The screen returns to the Display Mode.

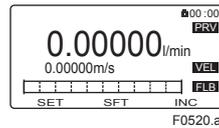


NOTE

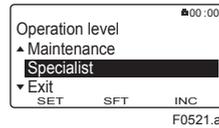
In the case of Ind soft rev, follow the procedure bellow.

Communication	Ind soft rev
HART, BRAIN, Modbus	R2.01.02 or later
FOUNDATION Fieldbus	R1.01.01 or later

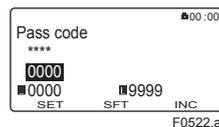
- 1) Turn on the power and wait for several seconds to move to display mode.



- 2) Keep touching [SET] switch for two seconds. The screen moves to the menu of Operation Level.



- 3) Select an appropriate operation level by moving the cursor with [INC] or [DEC] switch. Passcode is not necessary for "Operator". For "Maintenance" and "Specialist", passcode is necessary for each. For passcode setting, [SFT] is for position change, and [INC] is for number, then twice [SET] is for entry completion. The default passcode at the factory shipment is set to "0000".



- 4) When the Operation Level is determined, the screen moves to "Device setup" as the Setting Mode where parameters can be configured.
- 5) After completing parameter setting, push [ESC] switch. The screen returns to the Display Mode.

[Passcode Confirmation and Change]

The confirmation and change of the passcode are allowed only by parameter setting from the display unit.

Display Menu Path:
 Device setup ▶ Detailed setup ▶ Access cfg ▶ Chg mainte
 Device setup ▶ Detailed setup ▶ Access cfg ▶ Chg special

- (1) Passcode for "Maintenance" operation level
 To change the passcode (Maintenance code), "Maintenance" or "Specialist" as the operational level is required.
- (2) Passcode for "Specialist" operation level
 To change the passcode (Specialist code), "Maintenance" or "Specialist" as the operational level is required.



IMPORTANT

Display Menu Path:
 Device setup ▶ Wizard

When parameters are changed in the Wizard of Easy setup, "Setting download" in the menu of each parameter must be executed after parameter is changed. Without the execution, any parameter changed is not stored into the device.



NOTE

If 10 minutes past without operation in the Setting Mode, the screen goes back to the Display Mode.

5.4 Parameter Setting from Display Panel

This section explains how to specify the parameters from display panel. Select "Specialist" at the Operation Level referring to Section 5.3. And select the parameters to be specified in the Setting Mode.

When setting parameters on FOUNDATION fieldbus type, set appropriate MODE_BLK.Target on resource block, transducer block or function block to "O/S". Parameter, "All block target mode" can simplify the operation on the display. By setting this parameter, resource block, transducer block or function block can be set to O/S or reset to the former setting at a time. The procedure to use the parameter is as follows.

1. Set "O/S" on parameter "All block target mode".
2. Set the target parameter on display.
3. Set "Restore" on parameter "All block target mode".

Menu paths on display (there are 5 paths to reach):
 Device setup ▶ Block mode ▶ All block target mode
 Device setup ▶ Diag/service ▶ All block target mode
 Device setup ▶ Wizard ▶ All block target mode
 Device setup ▶ Detailed setup ▶ All block target mode
 Device setup ▶ Detailed setup ▶ Fieldbus info ▶ All block target mode



NOTE

For the device with the ordering information specified at ordering, the specified parameters (flow span and unit, tag number, etc.) are stored in the device at the factory shipment. Without the ordering information specified, parameter setting needs to be done by user.

Parameter form

There are three types of parameter form below.

Type	Example of display	Contents
Select type		Select the adequate data from among alternatives which are determined in advance.
Numeric type		Specify the data with a combination of number and a decimal point into each digit.
Alphanumeric type		Configure the data with a combination of alphanumeric characters. (Tag No., Special unit, etc...)

The alphanumeric type indicates alphanumeric characters in the following order.

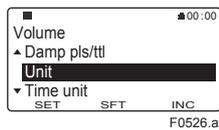
0123456789ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz!#\$%&'()*+,-./:;<=>?@[^_`{|}~"space"

5.4.1 Setting example of Select type Data: Flow rate unit

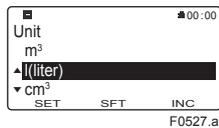
The following is the procedure of changing the flow rate unit as Select type parameter.

The flow rate unit needs to be specified with "Physical unit" and "Time unit" individually. When the flow rate unit needs to be set "/min", select "l (liter)" at the Physical unit and "/min" at the Time unit.

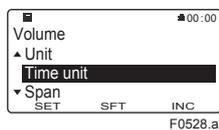
Display Menu Path:
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Unit
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Time Unit



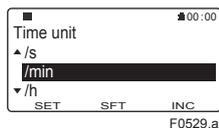
Specify the Physical unit for volumetric flow. Move cursor with [INC] and [DEC] according to the menu path above, and select the "unit" then push [SET].



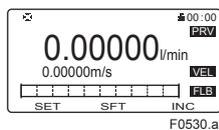
Move cursor with [INC] and [DEC], and select the "l (liter)" then push [SET]. As the selected unit is blinking, push [SET] to determine. The screen returns to the setting page.



Specify the Time unit for volumetric flow. Move cursor with [INC] and [DEC] according to the menu path above, and select the "Time unit" then push [SET].



Move cursor with [INC] and [DEC], and select the "/min" then push [SET]. As the selected unit is blinking, push [SET] to determine. The screen returns to the setting page after the setting.



After completing the parameter setting, push [ESC] then the screen returns to the Display Mode.

NOTE

Be sure to set the Flow rate unit in the beginning when the Flow rate unit and Flow span value are changed at the same time.

When the unit is changed, the value of flow rate span is converted to related values automatically according to the unit change.

5.4.2 Setting example of Numeric type Data: Flow rate span

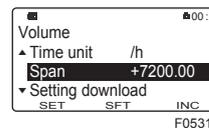
The following is the procedure of changing the Flow rate span as Numeric type parameter.

Display Menu Path:
Device setup ▶ Detailed setup ▶ Pro var ▶ Volume ▶ Span

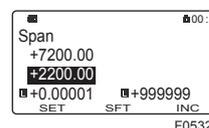
NOTE

Be sure to set the Flow rate unit in the beginning when the Flow rate unit and Flow span value are changed at the same time.

When the unit is changed, the value of flow rate span is converted to related values automatically according to the unit change.



Specify the Flow rate span unit. Move cursor with [INC] and [DEC] according to the menu path above, and select the "Span" then push [SET].

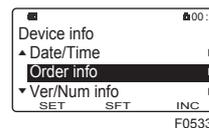


The switch's functionality of setting the Flow rate span is as below:
Plus/minus and numeric change: [INC]
Movement on digits: [SFT]
Determination of parameter: [SET]
▮: Minimum value
▮: Maximum value
Push [SET] to decide while the value of Flow rate span is blinking. The screen returns to the setting page after the setting.

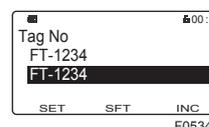
5.4.3 Setting Example of Alphanumeric type Data: Tag No.

The following is the procedure of changing the Tag No. as Alphanumeric type parameter.

Display Menu Path:
Device setup ▶ Detailed setup ▶ Device info ▶ Order info ▶ Tag No.



Specify the Tag No.. Move cursor with [INC] and [DEC] according to the menu path above, and select the "Order info" then push [SET].



For Tag No., up to 8 characters can be entered from display panel. The switch's functionality of setting the Flow rate span is as below:
Plus/minus and numeric change: [INC]
Movement on digits: [SFT]
Determination of parameter: [SET]
Available characters: ASCII characters
Push [SET] to decide while the value of Tag No. is blinking. The screen returns to the setting page after the setting.

5.5 microSD Card Setting

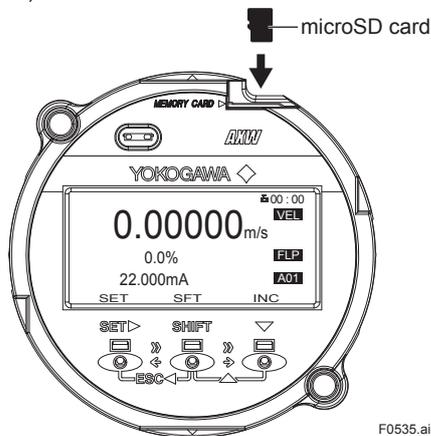
For the device with optional code MC, by setting the dedicated microSD card into the slot on the display unit, the parameter setting can be stored into it. The stored data can be restored to the device. For the detailed function, read the user's manual of applicable communication type as listed in Table 1.1.

WARNING

Use only micro SD cards sold by YOKOGAWA. Operation cannot be guaranteed when other cards are used.

(1) Installing microSD Card

Carefully insert the dedicated microSD card into the slot on the display unit until the slot holds the card. (see Figure 5.5).



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Figure 5.5 microSD setting

(2) Removing microSD Card

The microSD is released from the slot by pushing it. To prevent from losing the microSD card, be careful to handle the card.

IMPORTANT

If the microSD card is removed without execution of "Unmount" on parameter setting, it may result in the corruption of stored data and the abnormal operation of device.

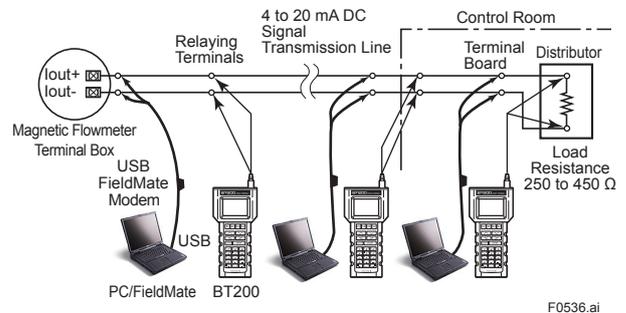
Display Menu Path:
Device setup ▶ microSD ▶ Unmount

5.6 BRAIN Configuration Tool

The connection of the BRAIN configuration tool (BRAIN TERMINAL (BT200) or FieldMate (Versatile Device Management Wizard)) is shown as below. Read the user's manual of BT200 (IM 01C00A11-01E) for the operation, and the user's manual of BRAIN communication type as listed in Table 1.1 for the detailed parameter setting via BRAIN communication.

The communication signal is superimposed onto the 4 to 20 mA DC analog signal to be transmitted. The BRAIN configuration tool can interface with this device from the control room, this device site, or any other wiring termination point in the loop, provided there is a minimum load resistance of 250 Ω between the connection and the receiving instrument.

To communicate, it must be connected in parallel with this device, and the connections must be non-polarized. See Figure 5.6.



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Figure 5.6 Connecting the BRAIN Configuration Tool

IMPORTANT

Communication signal is superimposed on analog output signal. It is recommended to set a low-pass filter (approximately 0.1s) to the receiver in order to reduce the output effect from communication signal. Before online-communication, confirm that communication signal does not give effect on the upper system.

IMPORTANT

Restrictions exist with regard to the distance over which communication is possible. Read the general specifications as listed in Table 1.1.

5.7 HART Configuration Tool

The connection of the HART configuration tool (FieldMate (Versatile Device Management Wizard)) is shown as below. Read the user's manual of HART communication type as listed in Table 1.1 for the detailed parameter setting via HART communication.



NOTE

- For more details regarding the operations of the HART configuration tool, read the manual of HART configuration tool.
- When using FieldMate, be sure that the revision is R3.02.00 or later.



NOTE

Parameters on HART configuration tool are displayed in English only. Even if any language other than English is selected as “display language” from display panel, parameters are displayed in English on HART configuration tool.

5.7.1 Connections with HART Configuration Tool

The HART configuration tool can interface with this device from the control room, this device site, or any other wiring termination point in the loop, provided there is a minimum load resistance of 230 Ω between the connection and the receiving instrument. To communicate, it must be connected in parallel with this device, and the connections must be non-polarized. Read Figure 5.7.

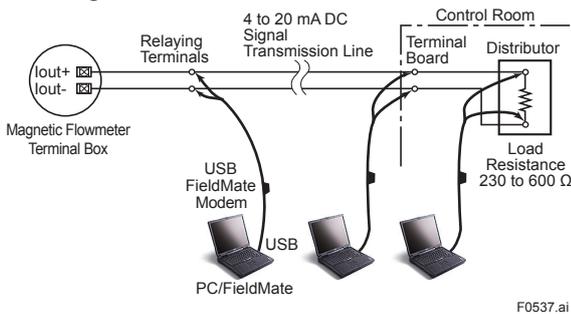


Figure 5.7 Connecting the HART Configuration Tool



IMPORTANT

Communication signal is superimposed on analog output signal. It is recommended to set a low-pass filter (approximately 0.1s) to the receiver in order to reduce the output effect from communication signal. Before online-communication, confirm that communication signal does not give effect on the upper system.

5.7.2 HART Configuration Tool and DeviceRevision



IMPORTANT

Protocol revision supported by HART configuration tool must be the same protocol revision or later than that of the device. If it is not, communication error occurs.

(1) Device Description (DD) and Device Revision

Before using the HART configuration tool, confirm that the DD (Device Description) of this device is installed in the configuration tool.

If correct DD is not installed to the configuration tool, install a correct DD from the HART official site, otherwise, contact the respective vendors of the configuration tool for its upgrade information.

The device revision is as follows.

DD Revision	AXW4A: 1 or later AXG1A: 1 or later
Device Type (transmitter)	AXW4A (0x371B) AXG1A (0x371C)
Device Revision (Transmitter)	AXW4A: 1 AXG1A: 2

• Confirmation of DD revision

- Turn on the power of the configuration tool under the standalone condition.
- Confirm the device revision from the installed DD file name according to the procedure provided for the configuration tool.

DD file name is four digits, upper two digits are device revision and lower two digits are DD revision.



NOTE

Device revision of DD file is given in hexadecimal.

• Confirmation of Device revision

Connect the configurator to this device and confirm the revision by the following parameter.

HART Communication Menu Path:	
Device root menu	► Detailed setup
Device information	► HART setup ► Fld dev rev

(2) Device Type Manager (DTM) and Device Revision

When configuring the parameters by FieldMate, use the DTM (Device Type Manager) of the following table.

DTM Name	AXW HART 7 DTM AXG1A FDT2.0 HART7 DTM
DTM Revision	AXGWA: 5.6.4.0 or later AXG1A: 5.8.1.0 or later
Device Type (Transmitter)	AXW4A (0x371B) AXG1A(0x371C)
Device Revision (Transmitter)	AXW4A: 1 AXG1A: 2

* : The DTM is included in Yokogawa DTM Library HART 6.5 or later.



NOTE

The DTM revision can be confirmed by “DTM setup”. Device Files is a Media included in FieldMate. The user registration site provides Device Files with the latest update programs.

(URL: <https://voc.yokogawa.co.jp/PMK/>)

When updating the DTM, following operation by “DTM setup” is required.

- Update DTM catalog
- Assign corresponding DTM to the device.

For details, read the user’s manual of FieldMate.

5.8 Modbus Configuration Tool

The connection of the Modbus configuration tool is shown as below.

Read the user’s manual of Modbus communication type as listed in Table 1.1 for the detailed parameter setting via Modbus communication.

5.8.1 Connections with Modbus Configuration Tool

The Modbus configuration tool is connected to the transmitter instead of Modbus host.

RS-485 USB Adaptor is required to connect transmitter to PC.

See Figure 5.8.

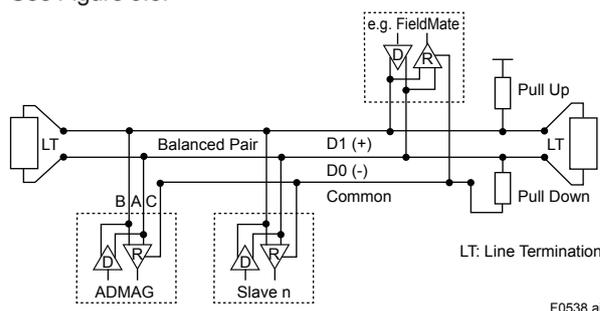


Figure 5.8 Connecting the Modbus Configuration tool

5.8.2 Modbus Configuration Tool and Device Revision

When configuring the parameters by FieldMate, use the DTM (Device Type Manager) of the following table.

DTM name	AXW4A Modbus DTM
DTM Revision	1.0.1.0 or later
Device type	AXW4A
Device Revision	1



NOTE

The DTM revision can be confirmed by “DTM setup”. Device Files is a Media included in FieldMate. The user registration site provides Device Files with the latest update programs.

(URL: <https://voc.yokogawa.co.jp/PMK/>)

When updating the DTM, following operation by “DTM setup” is required.

- Update DTM catalog
- Assign corresponding DTM to the device.

For details, read the user’s manual of FieldMate.

5.9 FOUNDATION fieldbus Configuration Tool

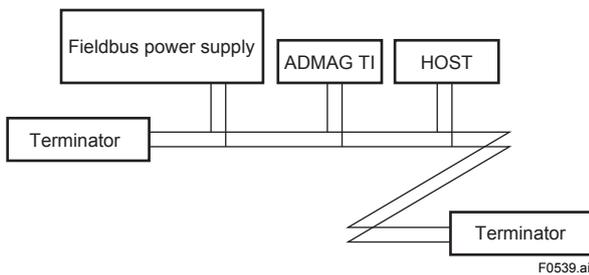
The connection of the FOUNDATION fieldbus configuration tool is shown as below.

Read the user's manual of Modbus communication type as listed in Table 1.1 for the detailed parameter setting via FOUNDATION fieldbus communication.

5.9.1 Connection with FOUNDATION fieldbus Configuration Tool

Connect the devices as shown in Figure below. Connect the terminators at both ends of the trunk, with a minimum length of the spur laid for connection.

The polarity of signal and power must be maintained.



5.9.2 FOUNDATION fieldbus Configuration Tool and Device Revision

(1) If the host supports DD (Device Description), the DD of the AXG/AXW needs to be installed.

Check if host has the following directory under its default DD directory.

If you do not have the DD or capabilities files, you can download them from our web page:

<http://www.yokogawa.com/fld/>

The device revision is as follows.

DD Revision	1 or later
Device Type	AXG4A (0x0016), AXW4A (0x0017)
Device Revision	1

Read 5.7.2 HART Configuration Tool and Device Revision. for the confirmation of DD revision.

(2) Device Type Manager (DTM) and Device Revision

When configuring the parameters by FieldMate, use the DTM (Device Type Manager) of the following table.

Device	AXG4A	AXW4A
DTM Name	AXG4A FF DTM	AXW4A FF DTM
DTM Revision	3.9.2.1 later	3.9.2.1 later
Device Type	AXG4A(0x0016)	AXW4A(0x0017)
Device Revision	1	1

* : The DTM is included in Yokogawa DTM Library 7.8 or later.



NOTE

The DTM revision can be confirmed by "DTM setup". Device Files is a Media included in FieldMate. The user registration site provides Device Files with the latest update programs.

(URL: <https://partner.yokogawa.com/japan/fieldmate/>)

When updating the DTM, following operation by "DTM setup" is required.

- Update DTM catalog
- Assign corresponding DTM to the device.

For details, read the user's manual of FieldMate.

6. Operation

After the installation of sensor into process piping, the wiring of input/output terminals, the configuration of required parameters, and the zero adjustment prior to operation, the flowmeter outputs a flow signal from its terminals as soon as the fluid is sent in the pipe.

CAUTION

If any damages, such as cracks, breakage or destruction on the glass of the display occurs, stop using it and replace the cover. If it is used with damaged glass, it may cause injury, electric shock, malfunction, and specified protection performance of the housing is not provided.

6.1 Pre-operation Zero Adjustment

Zero adjustment is carried out to ensure that the output for zero flow is 0% (i.e., 4 mA). Although adjustment to zero is performed at the manufacturing plant prior to shipment, this procedure must be carried out once again following the installation of piping in order to match the magnetic flowmeter to its operating conditions. This section describes the zero adjustment procedure using the display unit. For AXFA11, read the applicable user's manual as listed in Table 1.1.

IMPORTANT

- Zero adjustment should be carried out before actual operation. Note that parameter setting or change cannot be carried out during execution of zero adjustment (i.e., for approximately 30 seconds).
- Zero adjustment should only be carried out when the sensor has been filled with measurement fluid and the fluid velocity is completely zero by closing the valve.
- Each time that the fluid being measured is changed, be sure to carry out zero adjustment with the new fluid.

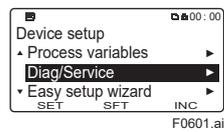
6.2 Zero Adjustment from Display Unit

A procedure of executing zero adjustment is as follows;

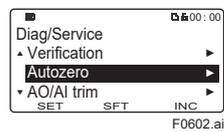
Display Menu Path:
 Device setup ▶ Diag/Service ▶ Autozero ▶ Execute
 Device setup ▶ Diag/Service ▶ Autozero ▶ Result ▶ Zero value

Enter the Setting Mode. (Read Section 5.3)

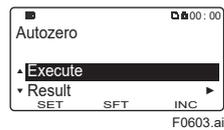
For FOUNDATION fieldbus type, set mode of all transducer blocks to "O/S" (Out of Service) before the adjustment. After the adjustment, set mode of all transducer blocks to "Auto".



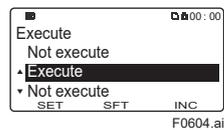
Select "Diag/Service" according to the menu path above.



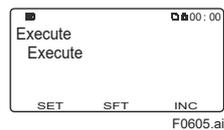
Select "Autozero".



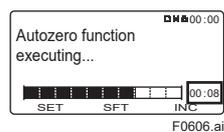
Select "Execute".



Select "Execute".

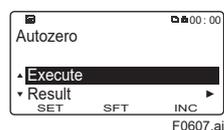


When "Execute" blinks, touch [SET] to execute.



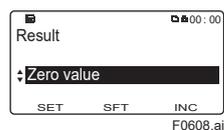
Autozero starts, and the progress is displayed with a remaining time and a bar graph. Wait for the completion.

← The time remaining until the end.

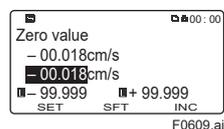


After Autozero finished, the display returns to "Autozero" menu.

• Confirmation of zero adjustment result



For the result of Autozero, select "Result" and then "Zero value".



Result of Autozero is indicated as on the left.

NOTE

When the zero adjustment result exceeds defined value, the warning [092: AZ warn] is indicated.

Zero adjustment can be executed with the following parameter.

BRAIN Communication:
B50:AUTOZERO EXE
HART Communication Menu Path:
Device root menu ▶ Basic setup ▶ Autozero ▶ Autozero Exe
Modbus Communication:
Register Address: 40361
FOUNDATION fieldbus Communication:
Device Configuration ▶ STB ▶ Device Configuration ▶
Maintenance ▶ Autozero ▶ Autozero Execute

6.3 Hardware Switch Setting

6.3.1 Integral Type and AXW4A Remote Transmitter

NOTE

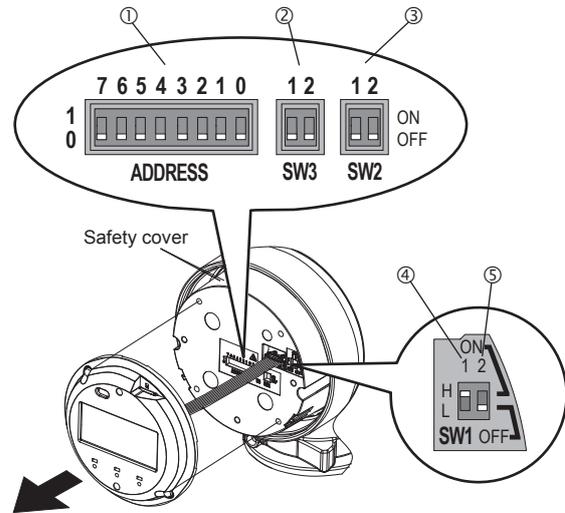
The integral type is explained as an example. Pay same attention to the AXW4A remote transmitter.

IMPORTANT

- Removing and installing the cover are necessary for hardware switches. Perform removing and installing the cover as described in Section 3.6. When opening the cover, wait for more than 20 minutes after turning off the power. This work must be carried out by the trained personnel having knowledge of safety standard.
- To preserve the safety, do not touch the electrical circuit and the cables except the setting switches.
- When installing the cover, in order to contact the housing and the cover, be sure to screw it firmly into the housing without any space between them.

- (1) Remove the cover.
- (2) While holding the display by hand, loosen the two mounting screws.

- (3) While holding the display by hand (careful for connecting cable), set the switches. Never remove connector in this case.



- ① Address switch (ADDRESS)
 - ② Pull up and Pull down switch (SW3)
 - ③ Line termination switch (SW2)
 - ④ Burnout switch (SW1-1)
 - ⑤ Write protect switch (SW1-2)
- *For FOUNDATION fieldbus communication: Simulation switch
 *For FOUNDATION fieldbus communication: Write lock switch
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Figure 6.3.1 Hardware switches

- (4) Taking care not to entangle the cables, tighten the two screws on the display.
- (5) Install the cover.

WARNING

To prevent electric shock and maintain performance, do not remove the safety cover.

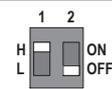
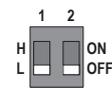
NOTE

The hardware switches are adjacent. Special care should be taken when making switch settings. Accordingly, special care should be taken when making switch settings.

● **Setting of Burnout Switch (Except FOUNDATION fieldbus communication)**

The burnout function sets the direction of current output in situations where the CPU has become damaged. Upon shipment from the manufacturing plant, the burnout direction is set to High (i.e., >21.6 mA); however, in cases where the optional codes C1 or C2 have been specified, the output direction will be set to Low (i.e., <2.4 mA). Modification of the burnout direction must be carried out using the burnout switch (i.e., SW1-1) (See Figure 6.3.1).

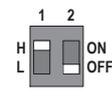
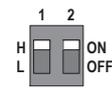
Table 6.3.1 Burnout switch (SW1-1)

Position of Switch	Burnout Direction	Burnout Output	Description
	High	> 21.6 mA	When optional code C1 or C2 is not specified, the setting is "High".
	Low	< 2.4 mA	When optional code C1 or C2 is specified, the setting is "Low".

● **Setting of Write Protect Switch (Except FOUNDATION fieldbus communication)**

The write protect function is to prevent the overwriting of parameters. Write protection can be carried out using either the write protect switch (SW1-2) (See Figure 6.3.1) or software function with parameter setting. If either of these items is activated, the overwriting of parameters will be prohibited.

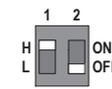
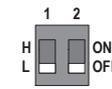
Table 6.3.2 Write protect switch (SW1-2)

Position of Switch	Write Protect Function
	OFF (Factory setting) Parameter can be overwritten.
	ON Parameter can not be overwritten.

● **Setting of Simulation Switch (Only for FOUNDATION fieldbus communication)**

The simulation function simulates the input of a function block and lets it operate as if the data was received from the transducer block. It is possible to conduct testing for the downstream function blocks or alarm processes. A SIMULATE_ENABLE switch is mounted in the transmitter amplifier. This is to prevent the accidental operation of this function. When this is switched on, simulation is enabled. (See table below) To initiate the same action from a remote terminal, if REMOTE LOOP TEST SWITCH is written to the SIM_ENABLE_MSG parameter (index 2922) of the resource block, the resulting action is the same as is taken when the above switch is on. Note that this parameter value is lost when the power is turned OFF. In simulation enabled status, an alarm is generated from the resource block, and other device alarms will be masked; for this reason the simulation must be disabled immediately after using this function.

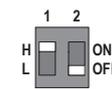
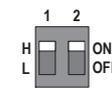
Table 6.3.3 Simulation Switch (SW1-1)

Position of Switch	Simulation Function
	ON: Simulation function enabled.
	OFF: Simulation function disabled.

● **Setting of Write Lock Function Switch (Only for FOUNDATION fieldbus communication)**

The transmitter is provided with a write lock function to restrict write operations to blocks and prevent inadvertent writing of parameter data. To enable this function, use the write lock switch (Hard W Lock) or the WRITE_LOCK (index 1034) (Soft W Lock). To enable write lock function, set parameter in Feature Selection of Resource Block. Read IM 01E21A02-03EN ADMAG TI Series AXG, AXW Magnetic Flowmeter FOUNDATION Fieldbus Communication Type 5.12.

Table 6.3.4 Write Lock Switch (SW1-2)

Position of Switch	Write Lock Function
	OFF: Write Lock function disabled. (It depends on the setting in Feature Selection.)
	ON: Write Lock function enabled. (It depends on the setting in Feature Selection.)



NOTE

- If the hardware switch is set to “ON”, the condition of preventing parameter overwriting kept until the switch is set to “OFF”.
- For the software write protect, read the user’s manual of applicable communication type as listed in Table 1.1.

● **Setting of Address Switch (ADDRESS)**

This switch is only available for the product with Modbus communication.

For the product with Modbus communication, it is necessary to set the device address.

The device address can be set using either the address switch (ADDRESS) (See Figure 6.3.1) or software function with parameter setting.

- Address Switch (Position 7)
By using the address switch (Position 7), select the device address to be used from the device address specified by either the hardware switch or the parameter setting.

Table 6.3.3 Address switch (Position 7)

Position of Switch	Description
	The device address set by Address Switch (Position 0 to 6) is used.
	The device address set by parameter setting is used. Factory setting.

- Address Switch (Position 0 to 6)
By using the address switch (Position 0 to 6), the device address is set.
Setting range: 1 to 127
If the address switch is set to 0, the device address is automatically converted to 1.
Setting example:
If only the address switch “position 6” is set to 1, the resulting the device address is 64.
 $(1 * 2^6 + 0 * 2^5 + 0 * 2^4 + 0 * 2^3 + 0 * 2^2 + 0 * 2^1 + 0 * 2^0)$

● **Setting of Line Termination Switch (SW2)**

This switch is only available for the product with Modbus communication.

Line terminations of two ends on the bus are required to communicate Modbus.

One termination mode can be set using the line termination switch (SW2) (See Figure 6.3.1).

Table 6.3.4 Line termination switch (SW2)

Position of Switch	Termination mode	Description
	Bus end	Available when both SW2-1 and SW2-2 are “ON”. (Resistance is 150 Ω)
	Not bus end	Available when both SW2-1 and SW2-2 are “OFF”. Factory setting.

Both SW2-1 and SW2-2 must be set at the same position.

● **Setting of Pull up and Pull down Switch (SW3)**

This switch is only available for the product with Modbus communication.

When the bus is in an idling state, it becomes unstable potentially without setting D1 for “pull up” and D0 for “pull down”.

Pull up and pull down mode can be set using the pull up and pull down switch (SW3) (See Figure 6.3.1).

Table 6.3.5 Pull up and pull down switch (SW3)

Position of Switch	Pull up and Pull down mode	Description
	Used	Available when both SW3-1 and SW3-2 are “ON”. (Resistance : 600 Ω, Pull-up voltage: +5 V)
	Not used	Available when both SW3-1 and SW3-2 are “OFF”. Factory setting.

Both SW3-1 and SW3-2 must be set at the same position.

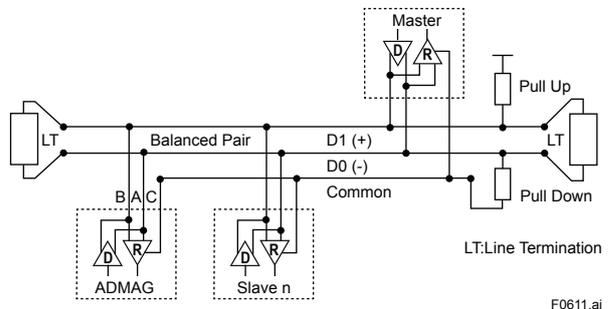


Figure 6.3.2 Modbus connection

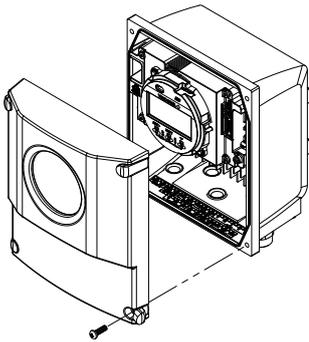
6.3.2 AXG1A Remote Transmitter



IMPORTANT

- Removing and installing the cover are necessary for hardware switches. Perform removing and installing the cover as described in Subsection 4.4.5. When opening the cover, wait for more than 20 minutes after turning off the power. This work must be carried out by the trained personnel having knowledge of safety standard.
- To preserve the safety, do not touch the electrical circuit and the cables except the setting switches.

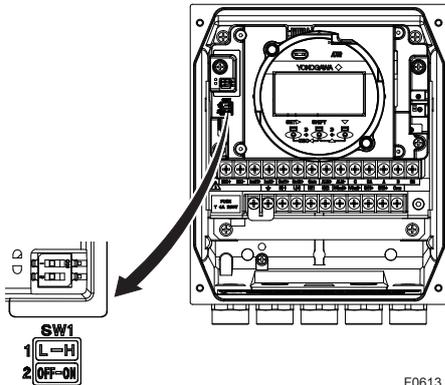
(1) Remove the cover (See Figure 6.3.3).



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Figure 6.3.3 Removing the cover

(2) Set the switches.



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Figure 6.3.4 Hardware switches

(3) Install the cover.



NOTE

On the front of the amplifier, the burnout switch (i.e., Switch 1-1) and the write protect switch (i.e., Switch 1-2) are located adjacent to each other. Accordingly, special care should be taken when making switch settings.

(1) Setting of Burnout Switch

The burnout function sets the direction of current output in situations where the CPU has become damaged. Upon shipment from the manufacturing plant, the burnout direction is set to High (i.e., >21.6 mA); however, in cases where the optional codes C1 or C2 have been specified, the output direction will be set to Low (i.e., <2.4 mA). Modification of the burnout direction must be carried out using the burnout switch (i.e., Switch 1-1) (See Figure 6.3.4).

Table 6.3.6 Burnout switch (Switch 1-1)

Position of Switch	Burnout Direction	Burnout Output	Description
	High	>21.6 mA	When optional code C1 or C2 is not specified, the setting is "High".
	Low	<2.4 mA	When optional code C1 or C2 is specified, the setting is "Low".

(2) Setting of Write Protect Switch

The write protect function is to prevent the overwriting of parameters.

Write protection can be carried out using either the write protect switch (Switch 1-2) (See Figure 6.3.4) or software function with parameter setting.

If either of these items is activated, the overwriting of parameters will be prohibited.

Table 6.3.7 Write protect setting switch (Switch 1-2)

Position of Switch	Write Protect Function
	OFF (Factory setting) Parameter can be overwritten.
	ON Parameter can not be overwritten.



NOTE

- If the hardware switch is set to "ON", the condition of preventing parameter overwriting kept until the switch is set to "OFF".
- For write protect by parameter (software), read the user's manual of applicable communication type as listed in Table 1.1.

6.3.3 AXFA11 Remote Transmitter

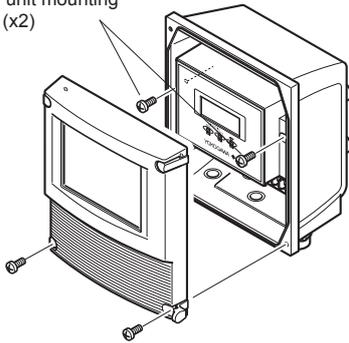


IMPORTANT

- Removing and installing the cover are necessary for hardware switches. Perform removing and installing the cover as described in Subsection 4.4.5. When opening the cover, wait for more than 20 minutes after turning off the power. This work must be carried out by the trained personnel having knowledge of safety standard.
- To preserve the safety, do not touch the electrical circuit and the cables except the setting switches.

(1) Loosen the two display unit mounting screws while supporting it with your hand (See Figure 6.3.5).

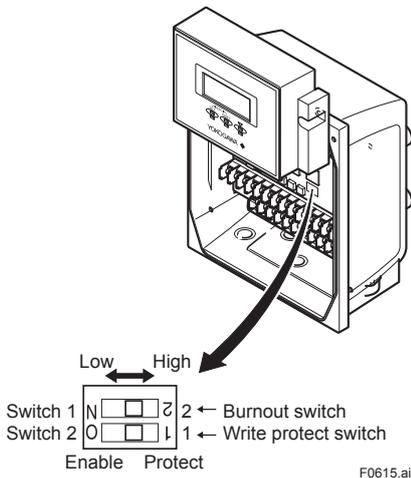
Display unit mounting screws (x2)



F0614.ai

Figure 6.3.5 Removing Mounting Screws of Display Unit

(2) Taking care of the connector and cable connecting to the display unit, move the display unit as shown in Figure 6.3.6, and set the switches. Never remove connector in this case.



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Figure 6.3.6 Hardware switches

- (3) After setting the switches, taking care not to entangle the cables, install the display unit with two mounting screws.
- (4) Install the cover.



NOTE

On the front of the amplifier, the burnout switch (i.e., Switch 1) and the write protect switch (i.e., Switch 2) are located adjacent to each other. Accordingly, special care should be taken when making switch settings.

(1) Setting of Burnout Switch

The burnout function sets the direction of current output in situations where the CPU has become damaged. Upon shipment from the manufacturing plant, the burnout direction is set to High (i.e., 25 mA); however, in cases where the optional codes C1 have been specified, the output direction will be set to Low (i.e., 0 mA). Modification of the burnout direction must be carried out using the burnout switch (i.e., Switch 1) (See Figure 6.3.6).

Table 6.3.8 Burnout switch (Switch 1)

Position of Switch	Burnout Direction	Burnout Output	Description
Low High 	High	25 mA	When optional code C1 is not specified, the setting is "High".
Low High 	Low	0 mA	When optional code C1 is specified, the setting is "Low".

(2) Setting of Write Protect Switch

The write protect function is to prevent the overwriting of parameters. Write protection can be carried out using either the write protect switch (Switch 2) (See Figure 6.3.6) or software function with parameter setting. If either of these items is activated, the overwriting of parameters will be prohibited.

Table 6.3.9 Write protect setting switch (Switch 2)

Position of Switch	Write Protect Function
 Enable Protect	Enable (Factory setting) Parameter can be overwritten.
 Enable Protect	Protect Parameter can not be overwritten.



NOTE

- If the hardware switch is set to "Protect", the condition of preventing parameter overwriting kept until the switch is set to "Enable".
- For AXFA11, read the user's manual of applicable communication type as listed in Table 1.1.

7. Errors and Countermeasures (Display unit)

The error messages are described in the following tables.

For AXFA11, read the applicable user's manual as listed in Table 1.1.

Explanation of NE107 status:

NE107 status		Status of the device
F	Failure	Device malfunction, Parts malfunction
C	Function Check	The output signal is temporarily invalid for the local operation or manual operation.
S	Out of Specification	The device works in out of specification. The output signal is uncertain for the process or the ambience.
M	Maintenance Required	The maintenance is required in the near future.
N	No Effect	Other issue

■ System Alarm

Device breaks down and causes abnormal measurement.

Device replacement is needed.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
F	010:Main CPU FAIL	CPU (Main board) failure was detected.	Contact Yokogawa service center.
F	011:Rev calc FAIL	Failure of reverse calculation was detected.	Contact Yokogawa service center.
F	012:Main EEP FAIL	Failure of EEPROM (Main board) was detected.	Turn on the power again within the temperature range. If the problem does not improve, contact Yokogawa service center.
F	013:Main EEP dflt	EEPROM (Main board) was reseted to default values.	Contact Yokogawa service center.
F	014:Snsr bd FAIL	Failure of sensor board was detected.	Contact Yokogawa service center.
F	015:Snsr comm ERR	Communication error of sensor was detected.	Contact Yokogawa service center.
F	016:AD 1 FAIL[Sig]	Failure of A/D transmitter 1 [flow velocity signal] was detected.	Contact Yokogawa service center.
F	017:AD 2 FAIL[Excit]	Failure of A/D transmitter 2 [Exciting current] was detected.	Contact Yokogawa service center.
F	018:Coil open	Coil of sensor was disconnected.	Turn off the power, check coil of sensor and excitation cable.
F	019:Coil short	Coil of sensor was shorted.	Contact Yokogawa service center.
F	020:Exciter FAIL	Failure of excitation circuit was detected.	Contact Yokogawa service center.
F	021:PWM 1 stop	Error of pulse width modulation 1 was detected.	Contact Yokogawa service center.
F	022:PWM 2 stop	Error of pulse width modulation 2 was detected.	Contact Yokogawa service center.
F	023:Opt bd mismatch	Mismatch of option board was detected.	Contact Yokogawa service center.
F	024:Opt bd EEP FAIL	Failure of EEPROM (option board) was detected.	Contact Yokogawa service center.
F	025:Opt bd A/D FAIL	Failure of A/D (option board) was detected.	Contact Yokogawa service center.
F	026:Opt bd SPI FAIL	Failure of SPI (option board) was detected.	Contact Yokogawa service center.
F	027:Restore FAIL	Restore of parameters was failed.	Retry parameter restoration.
F	028:Ind bd FAIL	Failure of indicator board was detected.	Check the ambient temperature of display is within the range. If the problem does not improve, contact Yokogawa service center.
F	029:Ind bd EEP FAIL	Failure of EEPROM (indicator board) was detected.	Turn on the power again within the temperature range. If the problem does not improve, contact Yokogawa service center.
F	030:LCD drv FAIL	Failure of LCD driver was detected.	Contact Yokogawa service center.
F	031:Ind bd mismatch	Mismatch of Indicator board was detected.	Contact Yokogawa service center.
F	032:Ind comm ERR	Communication error of indicator board was detected.	Check connection of Indicator & main board.
F	033:microSD FAIL	Failure of microSD card was detected.	Change microSD card.
F	244:Amp EEP FAIL	Amplifier EEPROM failed.	Replace electrical parts such as the amplifier. Or replace the device.
C	249:SoftDL Incmplt	Software download is incomplete.	Check the cables, power supply and MTB SoftDL Error (MTB.SOFTDL_ERROR).
C	250:SoftDL FAIL	Software download has failed.	Check the download file and MTB SoftDL Error (MTB.SOFTDL_ERROR).
F	251:Abnml Boot PRS	Abnormal boot processing was detected at the starting time.	Check the cables, power and MTB SoftDL Error (MTB.SOFTDL_ERROR).
F	335:IT1 ttl bkup ERR	IT1 Total Backup has failed. Last IT1 Output.Value (IT1.LAST.VALUE) is not saved.	Contact the nearest sales office or service center.
F	339:IT2 ttl bkup ERR	IT2 Total Backup has failed. Last IT2 Output.Value (IT2.LAST.VALUE) is not saved.	Contact the nearest sales office or service center.

■ Process Alarm

The device works normally and some issue of process causes abnormal measurement.

Maintenance work is needed.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
S	050:Signal overflow	Failure of input signal was detected.	Check signal cable and grounding.
S	051:Empty detect	Empty inside of sensor was detected. (Empty pipe detection)	Fill flow tube with fluid.
N	052:H/L HH/LL alm	Flow rate exceeded upper limit or lower limit.	Check flow rate and setting value.
S	053:Adh over lv 4	The resistance value of the electrodes exceeded Level 4. (Adhesion detection of insulation to electrode)	Clean electrodes.
N	364:AI1 HH Alarm	High High Alarm has occurred.	Check the AI1 Output.Value (AI1.OUT.VALUE) and configuration of AI1 Hi Hi Lim (AI1.HI_HI_LIM), AI1 Hi Hi Pri (AI1.HI_HI_PRI).
N	365:AI1 LL Alarm	Low Low Alarm has occurred.	Check the AI1 Output.Value (AI1.OUT.VALUE) and configuration of AI1 Lo Lo Lim (AI1.LO_LO_LIM), AI1 Lo Lo Pri (AI1.LO_LO_PRI).
N	366:AI1 Hi Alarm	High Alarm has occurred.	Check the AI1 Output.Value (AI1.OUT.VALUE) and configuration of AI1 Hi Lim (AI1.HI_LIM), AI1 Hi Pri (AI1.HI_PRI).
N	367:AI1 Lo Alarm	Low Alarm has occurred.	Check the AI1 Output.Value (AI1.OUT.VALUE) and configuration of AI1 Lo Lim (AI1.LO_LIM), AI1 Lo Pri (AI1.LO_PRI).
N	368:AI2 HH Alarm	High High Alarm has occurred.	Check the AI2 Output.Value (AI2.OUT.VALUE) and configuration of AI2 Hi Hi Lim (AI2.HI_HI_LIM), AI2 Hi Hi Pri (AI2.HI_HI_PRI).
N	369:AI2 LL Alarm	Low Low Alarm has occurred.	Check the AI2 Output.Value (AI2.OUT.VALUE) and configuration of AI2 Lo Lo Lim (AI2.LO_LO_LIM), AI2 Lo Lo Pri (AI2.LO_LO_PRI).
N	370:AI2 Hi Alarm	High Alarm has occurred.	Check the AI2 Output.Value (AI2.OUT.VALUE) and configuration of AI2 Hi Lim (AI2.HI_LIM), AI2 Hi Pri (AI2.HI_PRI).
N	371:AI2 Lo Alarm	Low Alarm has occurred.	Check the AI2 Output.Value (AI2.OUT.VALUE) and configuration of AI2 Lo Lim (AI2.LO_LIM), AI2 Lo Pri (AI2.LO_PRI).
N	372:AI3 HH Alarm	High High Alarm has occurred.	Check the AI3 Output.Value (AI3.OUT.VALUE) and configuration of AI3 Hi Hi Lim (AI3.HI_HI_LIM), AI3 Hi Hi Pri (AI3.HI_HI_PRI).
N	373:AI3 LL Alarm	Low Low Alarm has occurred.	Check the AI3 Output.Value (AI3.OUT.VALUE) and configuration of AI3 Lo Lo Lim (AI3.LO_LO_LIM), AI3 Lo Lo Pri (AI3.LO_LO_PRI).
N	374:AI3 Hi Alarm	High Alarm has occurred.	Check the AI3 Output.Value (AI3.OUT.VALUE) and configuration of AI3 Hi Lim (AI3.HI_LIM), AI3 Hi Pri (AI3.HI_PRI).
N	375:AI3 Lo Alarm	Low Alarm has occurred.	Check the AI3 Output.Value (AI3.OUT.VALUE) and configuration of AI3 Lo Lim (AI3.LO_LIM), AI3 Lo Pri (AI3.LO_PRI).
N	392:PID HH Alarm	High High Alarm has occurred.	Check the PID Output.Value (PID.OUT.VALUE) and configuration of PID Hi Hi Lim (PID.HI_HI_LIM), PID Hi Hi Pri (PID.HI_HI_PRI).
N	393:PID LL Alarm	Low Low Alarm has occurred.	Check the PID Output.Value (PID.OUT.VALUE) and configuration of PID Lo Lo Lim (PID.LO_LO_LIM), PID Lo Lo Pri (PID.LO_LO_PRI).
N	394:PID Hi Alarm	High Alarm has occurred.	Check the PID Output.Value (PID.OUT.VALUE) and configuration of PID Hi Lim (PID.HI_LIM), PID Hi Pri (PID.HI_PRI).
N	395:PID Lo Alarm	Low Alarm has occurred.	Check the PID Output.Value (PID.OUT.VALUE) and configuration of PID Lo Lim (PID.LO_LIM), PID Lo Pri (PID.LO_PRI).

■ Setting Alarm

The device works normally but parameter setting error occurs.
Parameter setting is needed.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
S	060:Span cfg ERR	Setting error of flow span was detected. (fulfill "0.05 m/s < Span < 16 m/s")	Check or change span parameter setting.
S	061:PV F cfg ERR	PV was set to flow noise.	Check or change PV FLOW SEL parameter setting.
S	062:AO 1 4-20 lmt	Setting error of Current output 1 was detected. (fulfill "LRV < HRV")	Check or change Analog output 1 parameter setting.
S	063:AO 2 4-20 lmt	Setting error of Current output 2 was detected. (fulfill "LRV < HRV")	Check or change Analog output 2 parameter setting.
N	065:H/L cfg ERR	Setting error of ararm high/low limit function was detected. (fulfill "Hi Alarm - Lo Alarm > H/L Hys" and "HH Alarm - LL Alarm > HH/LL Hys")	Check and change H/L, HH/LL parameter setting.
S	066:Density cfg ERR	Setting error of density value was detected when PV was set to mass flow rate.	Check and change Density parameter setting.
S	067:Pls 1 cfg ERR	Setting error of Pulse output 1 was detected.	Change Pulse output 1 parameter setting.
S	068:Pls 2 cfg ERR	Setting error of Pulse output 2 was detected.	Check and change Pulse output 2 parameter setting.
C	069:Nomi size cfg	Configuration error of nominal size was detected. (fulfill "0.99 mm < nominal size < 3000.10 mm (0.01 inch < nominal size < 120.10 inch)")	Check and change nominal paramter setting.
C	070:Adh cfg ERR	Setting error of electrode adhesion detection function wasdetected. (fulfill "Level1 < Level2 < Level3 < Level4")	Check and change adhesion parameter setting.
C	071:FLN cfg ERR	Setting error of flow noise verification function wasdetected. (fulfill "Level1 < Level2 < Level3 < Level4")	Change flow noise paramter setting.
C	072:Log not start	Data logging failed to start.	Insert microSD card.
C	247:RB O/S Mode	Resource Block is in O/S mode.	Change the RB Block Mode.Target (RB.MODE_BLK.Target) to Automode.
C	300:AI1 O/S Mode	AI1 Block is in O/S mode.	Change the AI1 Block Mode.Target (AI1.MODE_BLK.Target) to Auto or other mode.
C	301:AI1 Man Mode	AI1 Block is in Man mode.	Change the AI1 Block Mode.Target (AI1.MODE_BLK.Target) to Auto or other mode.
C	302:AI1 Not Schedule	AI1 Block is not scheduled.	ScheduleAI1 Block.
C	303:AI1 Simulate Act	AI1 block is in simulation mode.	Change the AI1 Simulation En/Disable (AI1.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	304:AI2 O/S Mode	AI2 Block is in O/S mode.	Change the AI2 Block Mode.Target (AI2.MODE_BLK.Target) to Auto or other mode.
C	305:AI2 Man Mode	AI2 Block is in Man mode.	Change the AI2 Block Mode.Target (AI2.MODE_BLK.Target) to Auto or other mode.
C	306:AI2 Not Schedule	AI2 Block is not scheduled.	ScheduleAI2 Block.
C	307:AI2 Simulate Act	AI2 block is in simulation mode.	Change the AI2 Simulation En/Disable (AI2.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	308:AI3 O/S Mode	AI3 Block is in O/S mode.	Change the AI3 Block Mode.Target (AI3.MODE_BLK.Target) to Auto or other mode.
C	309:AI3 Man Mode	AI3 Block is in Man mode.	Change the AI3 Block Mode.Target (AI3.MODE_BLK.Target) to Auto or other mode.
C	310:AI3 Not Schedule	AI3 Block is not scheduled.	ScheduleAI3 Block.
C	311:AI3 Simulate Act	AI3 block is in simulation mode.	Change the AI3 Simulation En/Disable (AI3.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	328:PID O/S Mode	PID Block is in O/S mode.	Change the PID Block Mode.Target (PID.MODE_BLK.Target) to Auto or other mode.
C	329:PID Man Mode	PID Block is in Man mode.	Change the PID Block Mode.Target (PID.MODE_BLK.Target) to Auto or other mode.
C	330:PID Not Schedule	PID Block is not scheduled.	Schedule PID Block.
C	331:PID Bypass Mode	PID Block is in Bypass mode.	Change the parameter of Bypass (PID.BYPASS) to OFF.
C	332:IT1 O/S mode	IT1 Block is in O/S mode.	Change the IT1 Block Mode.Target (IT1.MODE_BLK.Target) to Auto or other mode.
C	333:IT1 Man mode	IT1 Block is in Man mode.	Change the IT1 Block Mode.Target (IT1.MODE_BLK.Target) to Auto or other mode.
C	334:IT1 Not Schedule	IT1 Block is not scheduled.	Schedule IT1 Block.
C	336:IT2 O/S Mode	IT2 Block is in O/S mode.	Change the IT2 Block Mode.Target (IT2.MODE_BLK.Target) to Auto or other mode.
C	337:IT2 Man Mode	IT2 Block is in Man mode.	Change the IT2 Block Mode.Target (IT2.MODE_BLK.Target) to Auto or other mode.
C	338:IT2 Not Schedule	IT2 Block is not scheduled.	Schedule IT2 Block.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
C	340:DI1 O/S Mode	DI1 Block is in O/S mode.	Change the DI1 Block Mode.Target (DI1.MODE_BLK.Target) to Auto or other mode.
C	341:DI1 Man Mode	DI1 Block is in Man mode.	Change the DI1 Block Mode.Target (DI1.MODE_BLK.Target) to Auto or other mode.
C	342:DI1 Not Schedule	DI1 Block is not scheduled.	ScheduleDI1 Block.
C	343:DI1 Simulate Act	DI1 block is in simulation mode.	Change the DI1 Simulation En/Disable (DI1.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	344:DI2 O/S Mode	DI2 Block is in O/S mode.	Change the DI2 Block Mode.Target (DI2.MODE_BLK.Target) to Auto or other mode.
C	345:DI2 Man Mode	DI2 Block is in Man mode.	Change the DI2 Block Mode.Target (DI2.MODE_BLK.Target) to Auto or other mode.
C	346:DI2 Not Schedule	DI2 Block is not scheduled.	ScheduleDI2 Block.
C	347:DI2 Simulate Act	DI2 block is in simulation mode.	Change the DI2 Simulation En/Disable (DI2.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	348:DI3 O/S Mode	DI3 Block is in O/S mode.	Change the DI3 Block Mode.Target (DI3.MODE_BLK.Target) to Auto or other mode.
C	349:DI3 Man Mode	DI3 Block is in Man mode.	Change the DI3 Block Mode.Target (DI3.MODE_BLK.Target) to Auto or other mode.
C	350:DI3 Not Schedule	DI3 Block is not scheduled.	ScheduleDI3 Block.
C	351:DI3 Simulate Act	DI3 block is in simulation mode.	Change the DI3 Simulation En/Disable (DI3.SIMULATE.SIMULATE_ENABLE) to Disabled.
C	352:AR O/S Mode	AR Block is in O/S mode.	Change the AR Block Mode.Target (AR.MODE_BLK.Target) to Auto or other mode.
C	353:AR Man Mode	AR Block is in Man mode.	Change the AR Block Mode.Target (AR.MODE_BLK.Target) to Auto or other mode.
C	354:AR Not Scheduled	AR Block is not scheduled.	Schedule AR Block.
C	359:No FB Scheduled	No Function Block is scheduled.	Schedule Function Block or check the LAS communication.
C	360:STB O/S Mode	Sensor Transducer Block is in O/S mode.	Change the STB Block Mode.Target (STB.MODE_BLK.Target) to Auto mode.
C	361:DTB O/S Mode	Diagnostic Transducer Block is in O/S mode.	Change the DTB Block Mode.Target (DTB.MODE_BLK.Target) to Auto mode.
C	362:MTB O/S Mode	Maintenance Transducer Block is in O/S mode.	Change the MTB Block Mode.Target (MTB.MODE_BLK.Target) to Auto mode.
C	363:LTB O/S Mode	LCD Transducer Block is in O/S mode.	Change the LTB Block Mode.Target (LTB.MODE_BLK.Target) to Auto mode.

■ **Warning**

The device works normally and measurement is also normal but warning occurs.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
S	080:AO 1 saturate	Saturation of Analog output 1 was detected.	Check process value and current output 1 parameter setting.
S	081:AO 2 saturate	Saturation of Analog output 2 was detected.	Check process value and current output 2 parameter setting.
S	082:Pls 1 saturate	Saturation of Pulse output 1 was detected.	Check process value and pulse output 1 parameter setting.
S	083:Pls 2 saturate	Saturation of Pulse output 2 was detected.	Check process value and pulse output 2 parameter setting.
S	084:AI saturate	Saturation of Analog input was detected.	Check current input value and current input parameter setting.
C	085:Cable miscon	Misconnection of cable was detected.	Check the signal cable and excitation cable connection.
C	086:Coil insulation	Insulation deterioration of coil was detected.	Contact Yokogawa service center.
M	087:Adhesion lv 3	The resistance value of electrode exceeded Level 3. (Adhesion detection of insulation to electrode)	Recommend cleaning electrode.
N	088:LC warn	Decrease of conductivity was detected.	Check fluid conductivity.
M	089:Insu detect	Insulation deterioration of electrode was detected.	Contact Yokogawa service center.
C	092:AZ warn	Result of Autozero adjustment [Mag Flow Zero] exceeded 10 cm/s.	Check fluid is stopped when executing auto-zero adjustment.
C	093:Verif warn	Interruption of verification function was detected.	Execute Verification again.
C	094:Fact noise warn	Fluctuation of flow became larger.	Check the fluid.
C	095:Simulate active	Test mode was executed for any of Flow velocity, Volumetric flow rate, Mass flow rate, Calorie, Current output, Pulse output, Status input, Status output.	Release simulation or test mode.
S	096:AO 1 fix	It was detected that fixed value is set to Current output 1.	Check current output 1 is test mode or not.
S	097:AO 2 fix	It was detected that fixed value is set to Current output 2.	Check current output 2 is test mode or not.
S	098:Pls 1 fix	It was detected that fixed value is set to Pulse output 1.	Check pulse output 1 is test mode or not.
S	099:Pls 2 fix	It was detected that fixed value is set to Pulse output 2.	Check pulse output 2 is test mode or not.
S	100:AI fix	It was detected that fixed value is set to Current input.	Check current input is test mode or not.
C	101:Param restore run	Restore function of parameter is running.	—
N	102:Disp over	Number of digits available for display exceeded the limit.	Check Display format parameter.
N	103:SD size warn	Free space of microSD card decreased to less than 10%.	microSD card may run out of memory space.
M	104:Bkup incmplt	Parameter backup failed.	Retry parameter backup.
S	105:SD mismatch	Mismatch of microSD card was detected.	Change microSD card.
M	106:SD removal ERR	Removal of microSD card failed.	Remove microSD in appropriate procedure.
N	131:Trans mismatch	Mismatch of sensor and transmitter was detected.	Contact Yokogawa service center.

■ **Information**

The device works normally and measurement is also normal. Just reference information.

NE107 Status	Error Message	Error Description	Countermeasure
	Display		
N	120:Watchdog	Error of Watchdog timer was detected.	Contact Yokogawa service center.
N	121:Power off	Power-off was detected.	—
N	122:Inst power FAIL	Instantaneous power failure was detected.	—
N	123:Param bkup run	Parameter backup is running.	—
N	124:Data log run	Data log is running.	—
N	130:DevID not enter	No data entry of Device ID was detected.	Contact Yokogawa service center.
N	132:Modbus cfgupdate	The Modbus configuration has been changed, but the device is not operating according to its configuration.	Restart Modbus communication.
N	133:G/A mismatch	As a result of self-test, inconsistency of internal circuit was detected.	Contact Yokogawa service center.
N	246:Simulate SW OFF	Writing to parameters is locked.	Change the RB Write Lock (RB. WRITE_LOCK) to Not Locked or turn off the hardware write lock switch, depending on RB Feature Selection (RB.FEATURE_SEL).
N	248:Simulate SW ON	Software or hardware simulation switch is ON.	Delete the value of MTB Sim Enable Message (MTB.SIM_ENABLE_MSG) or turn off the hardware simulation switch.

Revision Information

- Title : ADMAG TI Series AXW Magnetic Flowmeter [Size: 500 to 1800 mm (20 to 72 in.)]
Installation Manual
- Manual No. : IM 01E25A01-01EN

Edition	Date	Page	Revised Item
1st	June 2017	—	New publication
2nd	Oct. 2018	1 2 7 9 25 33 41 47 48 49, 50 52 to 54	Add new manual number for Modbus communication type. Add trademark informations (HART, Modbus). Revise the table for blanking plug quantity. Add the installation location precautions. Add the explanation of cable for Modbus communication. Add the table for connection terminal for Modbus communication type. Add the explanations for Modbus communication. Add the explanation of Modbus configuration tool. Add the information of parameter for Modbus communication. Add the explanation of hardware switch setting for Modbus communication type. Revise the table of error messages.
3rd	July 2019	Front page 1 2 3 7 6 8 10 to 16, 21 19 21 25 25 to 28, 30 33, 34, 36 38 41, 42, 44 47, 48 51 52 55 to 59	Change to style 2, Add AXG1A Add AXG1A. Add Fieldbus to Trademarks. Add EN number to (1). Add Fieldbus to *2. Add AXG1A to Table 1.2. Add AXG1A Revise figures of Remote converter. Add AXG1A to 3.4.3. Revise figures of Remote converter. Add 4.2.4 Add AXG1A to 4.3. Add AXG1A and Fieldbus. Add AXG1A Fieldbus and AXG1A. Add Fieldbus and AXG1A. Add Fieldbus. Add AXG1A. Revise Section7.
4th	Dec. 2019	3 11 34	(1) General: add items for safety. Mounting orientation: Revise IMPORTANT. FOUNDATION fieldbus: Revise code.
5th	Mar. 2020	45	5.3 Change the procedure from Display Mode to Setting Mode and add a note of software rev.