

**ADMAG TI Series
AXG and AXW Magnetic Flowmeter
IECEX Explosion Protection Type**



IM 01E21A03-03EN

ADMAG TI Series AXG and AXW Magnetic Flowmeter IECEX Explosion Protection Type

IM 01E21A03-03EN 1st Edition

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Revision Information

1. Introduction

This manual provides the basic guidelines for explosion protection type of ADMAG TI (Total Insight) Series AXG and AXW magnetic flowmeters. For the items which are not covered in this manual, read the applicable user's manuals and general specifications as listed in IM 01E21A21-01Z1 (Read Me First). These documents can be downloaded from the website of YOKOGAWA. To ensure correct use of the product, read these manuals thoroughly and fully understand how to operate the product before maintaining it. For method of checking the model and specifications, read the applicable general specifications in IM 01E21A21-01Z1 (Read Me First).

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



NOTE

When describing the model name like "AXG####" in this manual, "####" means any of the following.
For AXG####:

002, 005, 010, 015, 025, 032, 040, 050, 065,
080, 100, 125, 150, 200, 250, 300, 350, 400

For AXW####:

025, 032, 040, 050, 065, 080, 100, 125, 150,
200, 250, 300, 350, 400

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

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



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 the entire product.



IMPORTANT

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



NOTE

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

The following symbols are used in the product 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 read an explanation in the user's manual in order to avoid the risk of injury or death of personnel or damage to the product.

- For the protection and safe use of the product and the system in which this product is incorporated, be sure to follow the instructions and precautions on safety that is stated in user's manual as listed in IM 01E21A21-01Z1 (Read Me First) whenever you handle the product. Take special note that if you handle the product in a manner that violated these instructions, the protection functionality of the product may be damaged or impaired. In such cases, YOKOGAWA does not guarantee the quality, performance, function, and safety of product.
- Do not modify this product.
- The product 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 products.
- Note that changes in the specifications, construction, or component parts of the product 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 product.
- To ensure correct use, read this manual and the applicable user's manuals as listed in IM 01E21A21-01Z1 (Read Me First) thoroughly before starting operation. Read the general specifications as listed in IM 01E21A21-01Z1 (Read Me First) for its specification.

■ Trademark

- 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 [®].

■ For Safe Use of Product

For the protection and safe use of the product and the system in which this product is incorporated, be sure to follow the instructions and precautions on safety that is stated in user's manual as listed in IM 01E21A21-01Z1 (Read Me First) whenever you handle the product. Take special note that if you handle the product in a manner that violated these instructions, the protection functionality of the product 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 product.

2. Explosion Protection Type



WARNING

AXG### and AXW### magnetic flowmeter (Integral Flowmeter and Remote Sensor), and AXG4A and AXW4A Remote Transmitter are products which have been certified as explosion protection type products if model code for explosion protection is specified. Strict limitations are applied to the structures, installation locations, external wiring work, maintenance and repairs, etc. of these products. Sufficient care must be taken, as any violation of the limitations may cause dangerous situations. Be sure to read this manual before handling the explosion protection type products.



WARNING

The terminal box cover and display cover are locked by hexagon socket head cap screw. In the case of opening the cover, use the hexagonal wrench (nominal size 3). Read the Maintenance Manual, IM 01E22A01-02EN or IM 01E24A01-02EN, for the procedure. Before opening the cover, be sure to check that the power of flowmeter has been turned off. Once the cover is closed, be sure to re-lock the product. Be sure to lock the cover with the screw by using the hexagonal wrench after tightening the cover.



IMPORTANT

For multiple approval types:
(Transmitter Wiring Terminal: Clamp type)
For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. Apply a permanent mark in the check box of the selected approval type on the certification label on the transmitter to distinguish it from unused approval types.

2.1 Technical Data

Applicable Standard:

IEC 60079-0: 2011, IEC 60079-1: 2014,
IEC 60079-7: 2015, IEC 60079-11: 2011,
IEC 60079-31: 2013

Certificate:

IECEX FMG 17.0014X

Integral Flowmeter

- Type of Gas Atmosphere Protection
Ex db eb ia IIC T6...T3 Gb
(Transmitter Wiring Terminal: M4 screw type)
Ex db eb ia IIC T6...T3 Gb
Terminal Compartment: Ex db or Ex eb
(Transmitter Wiring Terminal: Clamp type)
- Type of Dust Atmosphere Protection
Ex tb IIIC T75°C...T130°C Db
- Enclosure:
IP66/IP67 in accordance with IEC 60529
- Maximum Surface Temperature:
See Table 2.1 and Table 2.2.
- Ambient Temperature:
See Table 2.1 and Table 2.2.
- Process Temperature:
See Table 2.1 and Table 2.2.
- Power Supply:
100 to 240 Va.c. (50/60 Hz) / 100 to 120 Vd.c.
24 Va.c. (50/60 Hz) / 24 Vd.c.
- Um: 250 V
- Current I/O: 4 to 20 mA, 32 Vd.c. max.
- Digital I/O: 30 Vd.c. max., 200 mA max.

Remote Sensor

- Type of Gas Atmosphere Protection
Ex db eb ia IIC T6...T3 Gb
- Type of Dust Atmosphere Protection
Ex tb IIIC T75°C...T150°C Db
- Enclosure:
IP66/IP67 in accordance with IEC 60529
- Maximum Surface Temperature:
See Table 2.1 and Table 2.2.
- Ambient Temperature:
See Table 2.1 and Table 2.2.
- Process Temperature:
See Table 2.1 and Table 2.2.
- Um: 250 V

Remote Transmitter

- Type of Gas Atmosphere Protection
Ex db IIC T6 Gb
(Transmitter Wiring Terminal: M4 screw type)
Ex db IIC T6 Gb or Ex db eb IIC T6 Gb
(Transmitter Wiring Terminal: Clamp type)
- Type of Dust Atmosphere Protection
Ex tb IIIC T75°C Db
- Enclosure:
IP66/IP67 in accordance with IEC 60529
- Maximum Surface Temperature: T75°C
- Ambient Temperature: -40°C to +60°C
- Power Supply:
100 to 240 Va.c. (50/60 Hz) / 100 to 120 Vd.c.
24 Va.c. (50/60 Hz) / 24 Vd.c.
- Current I/O: 4 to 20 mA, 32 Vd.c. max.
- Digital I/O: 30 Vd.c. max., 200 mA max.

Table 2.1 Temperature Table

Model	Size	Process Connection	Lining	Temperature Table	
				Integral Flowmeter	Remote Sensor
AXG002, AXG005, AXG010, AXG015	2.5 to 15 mm (0.1 to 0.5 in.)	Wafer, Flange	PFA Lining	Table A	Table C
AXG025, AXG032, AXG040, AXG050, AXG065, AXG080, AXG100, AXG125	25 to 125 mm (1 to 5 in.)	Wafer, Flange	PFA Lining	Table B [Table J]*1	Table D [Table J]*1
AXG150, AXG200, AXG250, AXG300, AXG350, AXG400	150 to 400 mm (6 to 16 in.)	Wafer, Flange	PFA Lining	Table A	Table C
AXG015, AXG025, AXG032, AXG040, AXG050, AXG065, AXG080, AXG100, AXG125	15 to 125 mm (0.5 to 5 in.)	Clamp, Union, Butt Weld Joint	PFA Lining	Table E	Table F
AXG002, AXG005, AXG010, AXG015, AXG025, AXG040, AXG050, AXG080, AXG100, AXG150, AXG200	2.5 to 200 mm (0.1 to 8 in.)	Wafer	Ceramics Tube	Table G	Table H
AXW025, AXW032, AXW040, AXW050, AXW065, AXW080, AXW100, AXW125	25 to 125 mm (1 to 5 in.)	Flange	PTFE Lining	Table I	Table I
AXW150, AXW200, AXW250, AXW300, AXW350, AXW400	150 to 400 mm (6 to 16 in.)	Flange	PTFE Lining	Table J	Table J

*1: When process connection code EA4 is specified, temperature table is changed to table in [].
The process connection code EA4 is available for AXG025, AXG040, AXG050, AXG080, and AXG100.

Table 2.2 Ambient Temperature and Process Temperature

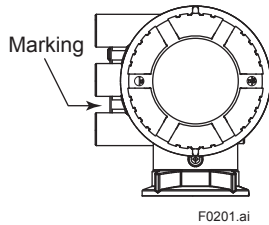
Table No.	Ambient Temperature	Temperature Class	Maximum Surface Temperature	Process Temperature
A	-40°C to +60°C	T6	T75°C	-40°C to +75°C
		T5	T90°C	-40°C to +90°C
		T4	T120°C	-40°C to +120°C
		T3	T130°C	-40°C to +130°C
B	-40°C to +45°C	T6	T75°C	-40°C to +50°C
	-40°C to +60°C	T5	T90°C	-40°C to +75°C
		T4	T120°C	-40°C to +120°C
		T3	T130°C	-40°C to +130°C
C	-40°C to +60°C	T6	T75°C	-40°C to +75°C
		T5	T90°C	-40°C to +90°C
		T4	T120°C	-40°C to +120°C
		T3	T150°C	-40°C to +150°C
D	-40°C to +45°C	T6	T75°C	-40°C to +50°C
	-40°C to +60°C	T5	T90°C	-40°C to +75°C
		T4	T120°C	-40°C to +120°C
		T3	T150°C	-40°C to +150°C
E	-10°C to +45°C	T6	T75°C	-10°C to +50°C
	-10°C to +60°C	T5	T90°C	-10°C to +75°C
		T4	T120°C	-10°C to +120°C
		T3	T130°C	-10°C to +130°C
F	-10°C to +45°C	T6	T75°C	-10°C to +50°C
	-10°C to +60°C	T5	T90°C	-10°C to +75°C
		T4	T120°C	-10°C to +120°C
		T3	T150°C	-10°C to +150°C
G	-10°C to +60°C	T6	T75°C	-10°C to +75°C
		T5	T90°C	-10°C to +90°C
		T4	T120°C	-10°C to +120°C
		T3	T130°C	-10°C to +130°C
H	-10°C to +60°C	T6	T75°C	-10°C to +75°C
		T5	T90°C	-10°C to +90°C
		T4	T120°C	-10°C to +120°C
		T3	T150°C	-10°C to +150°C
I	-10°C to +45°C	T6	T75°C	-10°C to +50°C
	-10°C to +60°C	T5	T90°C	-10°C to +75°C
		T4	T120°C	-10°C to +120°C
		T3	T130°C	-10°C to +120°C
J	-10°C to +60°C	T6	T75°C	-10°C to +75°C
		T5	T90°C	-10°C to +90°C
		T4	T120°C	-10°C to +100°C
		T3	T150°C	-10°C to +100°C

2.2 Cable Entry

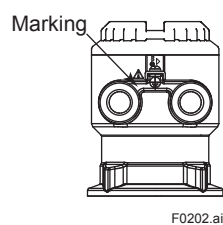
The type of cable entry is stamped near the cable entry port according to the following codes.

Marking	Screw Size
M	ISO M20 x 1.5 Female
N	ASME 1/2 NPT Female

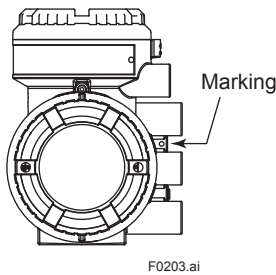
Integral Flowmeter



Remote Sensor



Remote Transmitter



2.3 Installation

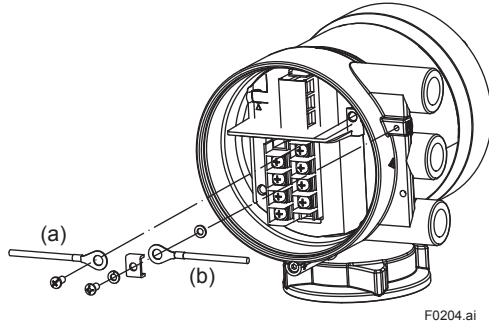
Read the Installation Manual, IM 01E22A01-01EN (for AXG#### and AXG4A) or IM 01E24A01-01EN (for AXW#### and AXW4A), for basic installation procedure.

- All wiring shall comply with IEC 60079-14, and local electric codes and requirements.
- Unused apertures shall be closed with suitable certified blanking elements.
(The plug attached is certified.)
- If the magnetic flowmeter is mounted in an area in the presence of combustible dust, it shall be installed in such a way that the risk from electrostatic discharges and propagating brush discharges caused by rapid flow of dust is avoided.
- The sensor is not surrounded by pipe insulation material.
- Cable glands, adapters and/or blanking elements with a suitable IP rating shall be of Ex db IIC/Ex tb IIC or Ex eb IIC/Ex tb IIC certified by IECEx and shall be installed so as to maintain the specific degree of protection (IP code) of the product.
- Take care the following warning marking “POTENTIAL ELECTROSTATIC CHARGING HAZARD”.
- In order to prevent the grounding conductor from loosening, the conductor must be secured to the terminal, tightening the screw with appropriate torque. Care must be taken not to twist the conductor.
- For multiple types of protection for terminal compartment, permanently mark the protection type installed. Once the type is marked, it cannot be changed.
- If the product is installed as the protection type Ex e, terminate all the cable finish with crimp terminal of a rod shape which of conductor length is 5 to 6 mm and cross section is 0.8 to 2.5 mm², and connect them reliably.
- For the installation of multi protection type, tick the box of the selected type of protection type on the label in order to avoid confusion.
e.g. In the case of selecting “db”, not “eb”
Ex db eb ia IIC T6...T3 Gb
Ex tb IIC T75°C...T130°C Db
Terminal Compartment: ☒Ex db ☐Ex eb

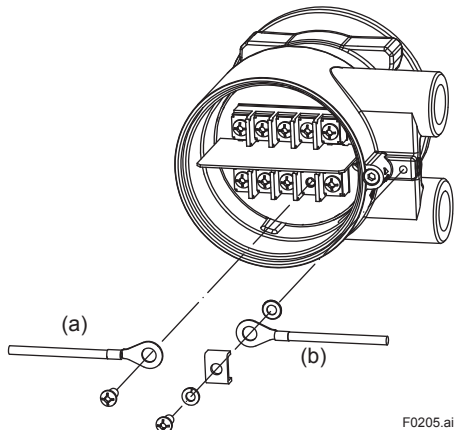
The grounding terminals are located on the inside and outside of the terminal area.
Connect the cable to the grounding terminal in accordance with wiring procedure (a) or (b).

- (a) Internal grounding terminal
(b) External grounding terminal

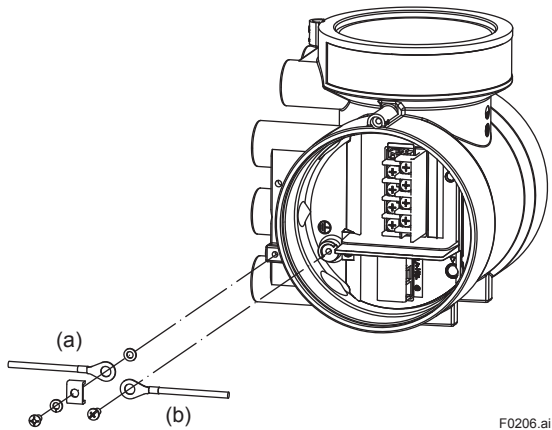
Integral Flowmeter



Remote Sensor



Remote Transmitter



2.4 Operation

When installation of explosion protection type product, read installation manual, IM 01E22A01-01EN (for AXG### and AXG4A) or IM 01E24A01-01EN (for AXW### and AXW4A).

Integral Flowmeter, Remote Sensor and Remote Transmitter

- Take care not to generate mechanical spark when access to the product and peripheral devices in hazardous locations.
- Take care the following warning marking "POTENTIAL ELECTROSTATIC CHARGING HAZARD".

Take care the following warning marking when opening the cover.

Integral Flowmeter and Remote Transmitter

- Take care the following warning marking "AFTER DE-ENERGIZING, DELAY 20 MINUTES BEFORE OPENING".

Remote Sensor

- Take care the following warning marking "DE-ENERGIZING BEFORE OPENING".

2.5 Maintenance and Repair

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

For maintenance of explosion protection type product, read maintenance manual, IM 01E22A01-02EN (for AXG### and AXG4A) or IM 01E24A01-02EN (for AXW### and AXW4A).

2.6 Name Plate

Example for name plates of Integral Flowmeter,
Remote Sensor or Remote Transmitter.

Integral Flowmeter

ADMAG AXG MAGNETIC FLOWMETER					
MODEL: SUFFIX:	STYLE:	METER FACTOR: L: H:	FLUID PRESS: FLUID TEMP: AMB. TEMP:	SUPPLY: VAC~ 50/60Hz 40VA 13W VDC~ 13W	NO.: TAG NO.:
SIZE: mm			MPa MAX. °C °C	OUTPUT:	
YOKOGAWA ◆ Made in *1, Yokogawa Electric Corporation Tokyo 180-8750 JAPAN					

IECEx FMG 17.0014X
Ex db eb ia IIC T6...T3 Gb
Ex tb IIIC T75°C...T150°C Db
□ Ex db □ Ex eb
Um250V IP66/IP67

⚠ READ / USEZ IM 01E22A01-01
WARNING:
AFTER DE-ENERGIZING, DELAY 20 MINUTES BEFORE OPENING
POTENTIAL ELECTROSTATIC CHARGING HAZARD READ IM 01E21A03-03

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Remote Sensor

ADMAG AXG MAGNETIC FLOWMETER					
MODEL: SUFFIX:	STYLE:	METER FACTOR: L: H:	FLUID PRESS: FLUID TEMP: AMB. TEMP:	SUPPLY: VAC~ 50/60Hz 40VA 13W VDC~ 13W	NO.: TAG NO.:
SIZE: mm			MPa MAX. °C °C	OUTPUT:	
YOKOGAWA ◆ Made in *1, Yokogawa Electric Corporation Tokyo 180-8750 JAPAN					

IECEx FMG 17.0014X
Ex db eb ia IIC T6...T3 Gb
Ex tb IIIC T75°C...T150°C Db
□ Ex db □ Ex eb
Um250V IP66/IP67

⚠ READ / USEZ IM 01E22A01-01
WARNING:
DE-ENERGIZING BEFORE OPENING
POTENTIAL ELECTROSTATIC CHARGING HAZARD READ IM 01E21A03-03

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Remote Transmitter

ADMAG AXG MAGNETIC FLOWMETER					
MODEL: SUFFIX:	STYLE:	OUTPUT:	NO.: TAG NO.:	IECEx FMG 17.0014X □ Ex db IIC T6 Gb □ Ex db eb IIC T6 Gb Ex tb IIIC T75°C...T150°C Db IP66/IP67 READ / USEZ IM 01E22A01-01 WARNING: AFTER DE-ENERGIZING, DELAY 20 MINUTES BEFORE OPENING POTENTIAL ELECTROSTATIC CHARGING HAZARD READ IM 01E21A03-03	
SUPPLY: VAC~ 50/60Hz 40VA 13W VDC~ 13W		AMB. TEMP: °C	COMB NO.:		
YOKOGAWA ◆ Made in *1, Yokogawa Electric Corporation Tokyo 180-8750 JAPAN					

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- MODEL: Specified model code
- SUFFIX: Suffix codes of the model code
- STYLE: Specified style code
- SIZE: Nominal size of apparatus
- METER FACTOR:
Sensor constant number of apparatus
- SUPPLY: Power supply voltage of apparatus
- OUTPUT: Output signal of apparatus
- FLUID TEMP.: Fluid temperature of apparatus
- FLUID PRESS: Fluid pressure of apparatus
- AMB. TEMP.: Ambient temperature
- NO.: Manufacturing serial number
- No.: IECEx FMG 17 0014X:
IECEx type examination certificate number
- Protection type and temperature class for gas
Ex db eb ia IIC T6...T3 Gb
Ex db IIC T6 Gb
Ex db eb IIC T6 Gb:
- Protection type and maximum surface temperature for dust
Ex tb IIIC T75°C...T130°C Db
Ex tb IIIC T75°C...T150°C Db
Ex tb IIIC T75°C Db:
- Um: Maximum r.m.s. a.c. or d.c. voltage
- ENCLOSURE: Enclosure protection code
- ⚠ **WARNING:** Warning to apparatus
- YOKOGAWA ◆: Name of manufacturer

*1: The product-producing country

2.7 Specific Condition of Use

Integral Flowmeter, Remote Sensor and Remote Transmitter

- Electrostatic charges on the non-metallic parts (excluding glass parts) or coated parts of the product shall be avoided.
- The flameproof joints differ from the standard values in IEC 60079-1. Only personnel authorized by the manufacturer of the product can repair the flameproof joints.

Integral Flowmeter and Remote Sensor

- The applicable temperature class, ambient temperature range and process temperature range of the product are shown in Table 2.1 and Table 2.2.
- The property class of the fasteners used to fasten the transmitter enclosure onto the neck part is at least A2-70.
- In the case the electrodes and/or grounding rings are made of titanium, the sensor should be kept away from impacts and frictions in hazardous locations.
- From the safety point of view, the intrinsically safe circuit of the AXG and AXW series shall be assumed to be connected to earth.
- The product shall be installed as overvoltage category II.

Revision Information

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