User's Manual

ADMAG TI Series AXG###, AXW###, AXG4A, AXW4A, **ADMAG AXG1A Magnetic Flowmeter**



IM 01E21A11-01EN

Read Me First (Optional Code EC)

This manual contains important information for safe operation of this product with CE marking and common information among user's manuals on this product. Should thoroughly read this manual prior to other manuals before using this product.

■ 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. Personnel responsible for normal daily operation and maintenance of the product.
- This manual is part of the product. Keep on safe place for future reference.

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



To ensure to use this product correctly, read the applicable manuals and general specifications in the following table. The documents are available to be downloaded from the following YOKOGAWA's web page. https://www.yokogawa.com/fld/

Document No.	Document Title						
IM 01E21A11-01EN	ADMAG TI Series AXG###, AXW###, AXG4A, AXW4A, AXG1A Magnetic Flowmeter Read Me First (Optional Code EC)						
IM 01E21A21-02EN	ADMAG TI Series AXG/AXW Magnetic Flowmeter Safety Manual						
IM 01E21A03-02EN	ADMAG TI Series AXG and AXW Magnetic Flowmeter ATEX Explosion Protection Type						
IM 01E21A03-03EN	ADMAG TI Series AXG and AXW Magnetic Flowmeter IECEx Explosion Protection Type						
IM 01E22A01-01EN	ADMAG TI Series AXG Magnetic Flowmeter Installation Manual						
IM 01E22A01-02EN	ADMAG TI Series AXG Magnetic Flowmeter Maintenance Manual						
IM 01E21A02-01EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter BRAIN Communication Type						
IM 01E21A02-02EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter HART Communication Type						
IM 01E21A02-03EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter FOUNDATION fieldbus Communication Type						
IM 01E21A02-04EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter PROFIBUS PA Communication Type						
IM 01E21A02-05EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter Modbus Communication Type						
IM 01E21A02-06EN	ADMAG TI Series AXG, AXW Magnetic Flowmeter EtherNet/IP Communication Type						
IM 01E22C02-01EN	ADMAG TI Series AXG1A Magnetic Flowmeter Remote Transmitter BRAIN Communication Type						
IM 01E22C02-02EN	ADMAG TI Series AXG1A Magnetic Flowmeter Remote Transmitter HART Communication Type						
IM 01E24A01-01EN	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)] Installation Manual						
IM 01E24A01-02EN	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 1800 mm (1 to 72 in.)] Maintenance Manual						
GS 01E22A01-01EN	ADMAG TI Series AXG Magnetic Flowmeter						
GS 01E24A01-01EN	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)]						
GS 01E22C01-01EN	ADMAG TI Series AXG1A Magnetic Flowmeter Remote Transmitter						
GS 01E21F02-01EN	ADMAG TI Series AXG/AXW Magnetic Flowmeter FOUNDATION Fieldbus communication Type						
GS 01E21F02-02EN	ADMAG TI Series AXG/AXW Magnetic Flowmeter EtherNet/IP Communication Type						
GS 01E21F02-03EN	ADMAG TI Series AXG/AXW Magnetic Flowmeter PROFIBUS PA Communication Type						
GS 01E22A11-03EN	ADMAG TI Series AXG Magnetic Flowmeter Remote Sensor Pulp & Paper Application Type						
GS 01E22A21-04EN	ADMAG TI Series AXG Magnetic Flowmeter Marine Approval Type						
GS 01E24A21-04EN	ADMAG TI Series AXW Magnetic Flowmeter [Size: 25 to 400 mm (1 to 16 in.)] Marine Approval Type						

Note: When combining IECEx Flameproof and CE marking, it is limited to applications mounted on seagoing vessels.

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 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 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 this manual 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.

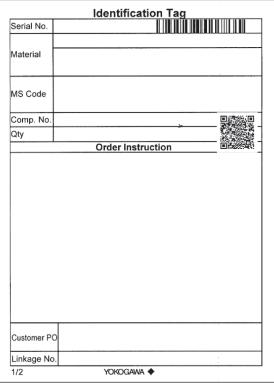
- When installing protection and/or safety as lightning
 protection devices and equipment for the product
 and control system or designing or installing separate
 protection and/or safety circuits for fool-proof design
 and fail-safe design of the processes and lines that use
 the product and the control system, the user should
 implement these using additional devices and equipment.
- Should use the parts specified by YOKOGAWA when replacing. Contact YOKOGAWA's service office for fuse replacement.
- This product 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 product.

■ Notes for the Identification Tag

An exclusive user's manual might be attached to products whose suffix code or optional codes contain code "Z". Read it along with their standard manual.

The Identification Tag which is attached on packing box. Keep the Identification Tag with this document.

Identification Tag <Sample>



F01.ai

■ 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 are stated in this manual 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.
- This product conforms to IP66/IP67 (EN60529) and NEMA Type 4X.
- This product is designed for indoor and outdoor use.
- Some parts of this product include the restricted substances of RoHS Directive, but their applications are under the exemption of the directive.
- Morocco conformity mark
 This conformity mark indicates that the product complies with Moroccan safety and EMC requirements (except AXG500, AXW500-1800).



WARNING

- Purpose of Use
 - This product is the Magnetic Flowmeter for use of measuring the liquid flow. Do not use this product for other purposes.
- 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 product and poses a
 potential shock hazard.
- Connect the Functional Grounding Terminal Connect the functional grounding to stabilize the flow rate indication.
- Do Not Operate with Defective Protective Grounding

Do not operate the product 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 product 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.
- Do Not Remove the Transmitter Cover
 The cover should be removed by YOKOGAWA's qualified personnel only. Opening the cover is dangerous, because some areas inside the product have high voltages.
- Ground the Product before Making External Connections

Connect the protective grounding before connecting to the item under measurement or control unit.



WARNING

Damage to the Protection

Operating the product in a manner neither described in this manual nor the applicable manuals listed in the front page may damage the product's protection.

Installation, Wiring, and Maintenance

- The magnetic flowmeter is a heavy product. 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.
- When the magnetic flowmeter is processing hot fluids, the product 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 product has been taken off the piping line for maintenance and so forth.
- Do not apply excessive weight, for example, a person stepping on the magnetic flowmeter.
- 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.
- The magnetic flowmeter must be installed within the specification conditions.
- The magnetic flowmeter should be installed away from electrical motors, transformers, and other power sources in order to avoid interference with measurement
- In cases where the ambient temperature exceeds 50°C, use external heat resistant wiring with a maximum allowable temperature of 70°C or more.
- When wiring the conduits, pass the conduit through the cable entry, 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.
- When opening and closing the cover, be sure to handle the cover carefully so that there are no damage and foreign matter adhesion at its threads and O-ring.
- Do not open the cover in wet weather or humid environment. When the cover is open, stated enclosure protection is not applicable.
- Do not connect cables outdoors in wet weather in order to prevent condensation and to protect the insulation, e.g. inside the terminal box of the flowmeter.
- Ensure that the power supply is off in order to prevent electric shocks.
- When opening the terminal box, wait for more than 20 minutes after turning off the power.
- Install an external switch or circuit breaker as a means to turn the power off (capacitance: 15 A, conforming to EN60947-1, IEC60947-2 and EN60947-3). Locate this switch either near the product or in other places facilitating easy operation. Affix a "Power Off Equipment" label to this external switch or circuit breaker.



WARNING

Installation, Wiring, and Maintenance

- 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)
- 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.
- 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.
- This product employs the parts which are affected by a function damage caused by static electricity. Thus, you should do the anti-static 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 product 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 cable entry, use the blanking plug to cover which comes with this product or which is supplied by YOKOGAWA. The blanking plug should be fastened into the unused cable entry without any mistake. If not, stated enclosure protection is not applicable. Explosion protection type must be wired in accordance with specific requirement (local legal regulations) in order to preserve the effectiveness of their explosion protected features.
- Maintenance of this product should be implemented in a maintenance service shop where the necessity 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).

- For Explosion Protection type, maintenance shall be implemented only when there is no explosive atmosphere present.
- All procedures relating to installation must comply with the electrical code of the country where it is used.



WARNING

 For Communication and I/O Suffix Code P0(EtherNet/IP), the device can be supported as a range of warranty only when the device is installed and used in Control and Field network. Operator must have the responsibility for IT security of equipment that is connected with the device, and this device must not connect with IT network.

In addition, parameter configuration can be locked by hardware switch.

IMPORTANT

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

• 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: AXG4A, AXW4A: 13 W AXG1A: 32 W

Ambient Temperature:

-40 to 60°C (-40 to 140°F)

Note: Minimum value is limited according to minimum fluid temperature of sensor's or transmitter's specification. Display operating range is –20 to 60°C (–4 to 140°F). Refer to the applicable user's manual for Explosion protection type.

Ambient Humidity:

0 to 100%

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

■ EMC

- This product conforms to EN61326-1, EN61326-2-3, EN61326-2-5, EN61000-3-2, and EN61000-3-3 (EMC standard).
- Performance Specification during immunity test Flow rate output: Output fluctuation within ±5% of default (1 m/s) span
- This product conforms to the standard specifications of CIP for EtherNet/IP communication.



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

■ Safety Requirements

This product conforms to EN safety class I (with Protective grounding terminal), Installation Category (Overvoltage Category) II, No Measurement Category ("O"(Other)), Micro Pollution degree 2, Macro Pollution degree 4. Altitude at installation Site Max. 2000 m above sea level.

The following models are conformed to EN61010-1 and EN61010-2-030.

Product	Model	Size
Integral	AXG###	2.5 to 400 mm
Flowmeter	AXW###	25 to 400 mm
Remote	AXG###	2.5 to 400 mm
Sensor	AXW###	25 to 400 mm
	AXG4A	-
Remote Transmitter	AXG1A	-
Hansinitto	AXW4A	-

■ PED (Pressure Equipment Directive)

Note: Applicable only when CE marking (optional code EC) is selected.

(1) Technical Data

• Module: H

Type of Equipment: Piping
Type of Fluid: Liquid and Gas
Group of Fluid*4: 1 and 2

Use: General-purpose, Submersible, and Explosion Protection

PROCESS		DN*1 PS*		S*	PS-DN		
MODEL	CONNECTION	(mm)	(bar)	(MPa)	(bar·mm)	(MPa·mm)	CATEGORY*2, *4
AXG002	Wafer, Flange	2.5	40	4	100	10	Sound Engineering Practice (SEP)*3
AXG005	Wafer, Flange	5	40	4	200	20	Sound Engineering Practice (SEP)*3
AXG010	Wafer, Flange	10	40	4	400	40	Sound Engineering Practice (SEP)*3
AXG015	Wafer, Flange	15	40	4	600	60	Sound Engineering Practice (SEP)*3
AXG025 AXW025	Wafer, Flange	25	40	4	1000	100	Sound Engineering Practice (SEP)*3
AXG032 AXW032	Wafer, Flange	32	40	4	1280	128	II
AXG040 AXW040	Wafer, Flange	40	40	4	1600	160	II
AXG050 AXW050	Wafer, Flange	50	40	4	2000	200	II
AXG065 AXW065	Wafer, Flange	65	40	4	2600	260	II
AXG080 AXW080	Wafer, Flange	80	40	4	3200	320	II
AXG100 AXW100	Wafer, Flange	100	40	4	4000	400	III
AXG125	Wafer	125	20	2	2500	250	II
AXW125	Flange	125	40	4	5000	500	III
AXG150	Wafer	150	20	2	3000	300	II
AXW150	Flange	150	40	4	6000	600	Ш
AXG200	Wafer	200	20	2	4000	400	Ш
AXW200	Flange	200	40	4	8000	800	III
AXG250 AXW250	Flange	250	20	2	5000	500	III
AXG300 AXW300	Flange	300	20	2	6000	600	III
AXG350 AXW350	Flange	350	18	1.8	6300	630	III
AXG400 AXW400	Flange	400	16	1.6	6400	640	III

- *1: PS: Maximum allowable pressure for the pipe DN: Nominal size
- *2: For details, see Table 6 covered by ANNEX II of Directive 2014/68/EU.
- *3: Article 4, paragraph 3 of Directive 2014/68/EU
- *4: Models classified in categories I or II shall not be used for unstable gases of Group 1.

• Use: Hygienic, and Hygienic Explosion Protection

MODEL	DN*1	N*1 PS*		PS.	·DN	CATEGORY*2, *4
WIODEL	(mm)	(bar)	(MPa)	(bar·mm) (MPa·mm)		CATEGORT
AXG015	15	10	1	150	15	Sound Engineering Practice (SEP)*3
AXG025	25	10	1	250	25	Sound Engineering Practice (SEP)*3
AXG032	32	10	1	320	32	I
AXG040	40	10	1	400	40	1
AXG050	50	10	1	500	50	1
AXG065	65	10	1	650	65	I
AXG080	80	10	1	800	80	I
AXG100	100	10	1	1000	100	1
AXG125	125	10	1	1250	125	II

- PS: Maximum allowable pressure for the pipe DN: Nominal size
- *2: For details, see Table 6 covered by ANNEX II of Directive 2014/68/EU.
- *3: Article 4, paragraph 3 of Directive 2014/68/EU
- *4: Models classified in categories I or II shall not be used for unstable gases of Group 1.

(2) Installation



WARNING

- Tighten the bolts of the piping joints according to the prescribed torque values.
- Take measures to protect the flowmeters from forces caused by vibration channeled through the piping.

(3) Operation



WARNING

- The product should be operated with the temperature and pressure of the fluid under normal operating conditions.
- The ambient temperature should be that of normal operating conditions.
- Take measures to prevent excessive pressure such as water hammer, etc. To avoid water hammer prevent the pressure from exceeding the PS (maximum allowable pressure) by setting the system's safety valves, etc. appropriately.
- Should external fire occur, take safety measures at the device itself or system-wide prevent it having an effect on the flowmeters.
- Avoid using fluids exceeding the corrosion proof limitations of the lining and electrodes.
- Take measures not to abrade the metal pipe, and avoid abrading the lining by using fluids such as slurry and sand are contained.

■ Explosion Protection Type

NOTE

For explosion protection type, be sure to read the applicable user's manual.

■ Information on EU WEEE Directive

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

This product is intended to be sold and used only as a part of equipment which is excluded from WEEE

Directive, such as large-scale stationary industrial tools, a large-scale fixed installation and so on, and, therefore, subjected to the exclusion from the scope of the WEEE Directive. The product should be disposed of in accordance with local and national legislation/regulations.

■ Authorized Representative in EEA

In relation to the CE Marking, the authorized representative for this product in the EEA (European Economic Area) is: Yokogawa Europe B.V. Euroweg 2, 3825 HD Amersfoort, The Netherlands

■ Warranty and Disclaimer

- Except as specified in the warranty terms, YOKOGAWA shall not provide any warranty for the product.
- YOKOGAWA shall not be liable for any indirect or consequential loss incurred by either using or not being able to use the product.

■ Trademarks:

- 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.
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■ Revision Information

ADMAG TI Series

AXG###, AXW###, AXG4A, AXW4A, AXG1A

Magnetic Flowmeter

Read Me First (Optional Code EC)

Manual No.: IM 01E21A11-01EN

Edition	Date	Page	Revised Item
1st	Oct. 2018	_	New Publication
2nd	Oct. 2018	_	Added Modbus spec.
3rd	Mar. 2019	_	Deleted Modbus spec.
4th	July 2019	_	Added Modbus spec., AXG1A and FOUNDATION fieldbus
5th	Nov. 2020	_	Revise document number and title of BRAIN, HART communication type.
6th	May 2021	_	Added PROFIBUS PA communication type.
7th	Sep. 2021	_	Added document number and title for Pulp & Paper application
8th	Dec. 2021	-	Added document number and title for Marine Approval Type and IECEx Explosion Protection Type
9th	Feb. 2022	_	Fixing the title
10th	Apr. 2022	_	Added EtherNet/IP communication type.



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