

Magnetic Flowmeter

ADMAG Series

ADMAG ***AXF***™

ADMAG ***AXW***™

ADMAG ***AXR***®

ADMAG ***CA***

AXF™ Verification Tool

Bulletin 01E00A01-01EN

www.yokogawa.com

vigilantplant.®
The clear path to operational excellence

YOKOGAWA 

Your process has evolved; has your flow measurement ?

Advanced Technology + Quality = Reliability

ADMAG Series

Responding to your process needs, ADMAG series continues to evolve. Continuing to adapt to your process requirements and continual reliable operation.

ADMAG AXW
Robust Large Size



ADMAG AXR
Two-wire Magnetic Flowmeter
with Dual Frequency Excitation



ADMAG AXF
Enhanced Dual Frequency Excitation
Adhesion Diagnosis



ADMAG CA
Capacitance Electrode
Conductivity: 5µS/cm→0.01µS/cm



ADMAG AE
Integral type
Ex-proof type



ADMAG AM
Dual Frequency Excitation



YEW MAG
Digital Signal Processing



1983

ADMAG History

01 Stable Measurement

02 User Friendly

03 Long Life

Present

Features

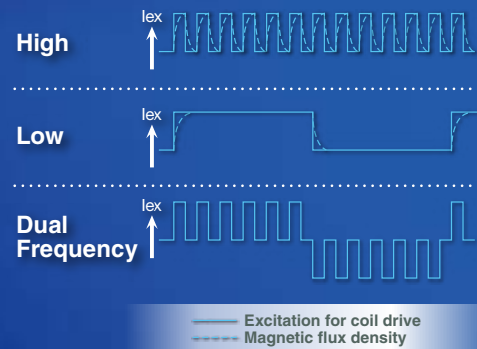
01

Stable Measurement

High Quality/ High Performance

Dual Frequency Excitation Method

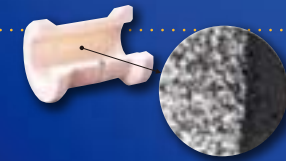
Dual Frequency Excitation is an innovative method that superimposes high frequencies on low frequencies, and utilizes all the advantages of both while eliminating the disadvantages. This ensures excellent flow noise immunity and fast response times, while maintaining high accuracy and high zero stability.



Electrode Variation

Platinum-Alumina Cermet Electrode

The electrode is made from Pt-alumina powder and is molded with the ceramic flowtube creating a leak-free single piece body design as the electrode is chemically bonded with the liner.



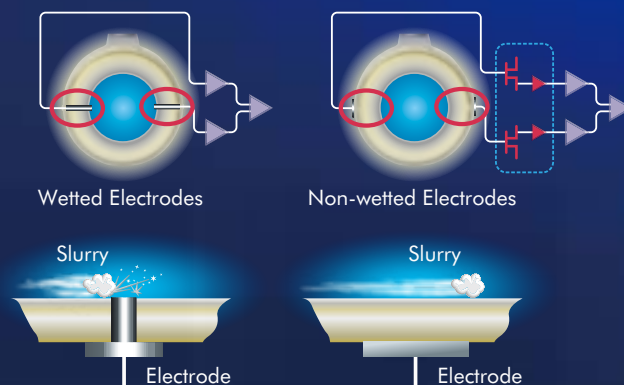
Replaceable Electrode

Fouled electrode can be easily removed for cleaning, allowing for and less down time.



Capacitance Electrode

Flow is detected by non-wetted electrodes installed on the outside of the flowtube. With non-wetted electrodes, high frequency excitation and a high impedance circuit, stable flow measurement of extremely low conductive or coating fluids is possible.

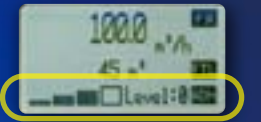
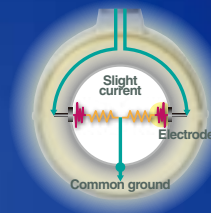


User Friendly

02

Self Diagnostics

With Advanced diagnostics, such as a 4 level Adhesion diagnostic and empty pipe detection, uninterrupted flow can be ensured with minimal downtime.



3-line Full Dot-matrix LCD

A full dot-matrix LCD indicator can display up to 3 lines and is available in multiple languages.

Alarm Indication

When the unit has an alarm, a clear message is displayed along with a solution.

Meaning of Alarm

-10 %

12345678 m³

Solution

Process Alarm
31-Empty Pipe

Fill flow tube with fluid

Rotatable Neck and Display

The housing along with the LCD displays can be easily rotated to facilitate access and adjust the viewing position.



Long Life

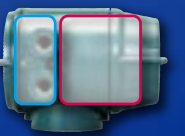
Robust Structure

The ADMAG series have a casting neck with reinforcement bar, designed to achieve higher vibration resistance.



Dual Compartment Housing

The converter housing completely separates the main electrical components from the rear terminals, isolating them from any moisture.



Verification Tool

The Verification Tool verifies flowmeters without having to remove from the process. Standard and Enhanced verification is available. Results can be printed and saved.



03



ADMAG AXF™

Versatile

Superior

The AXF magnetic flowmeter is a sophisticated product with outstanding reliability and ease of operation, developed on the basis of decades of fieldproven experience. Dual Frequency Excitation method ensures greater stability, higher noise immunity and quicker response even the most difficulty of applications.

- **Construction**
 - Integral flowmeter
 - Remote type flowtube/ Remote type converter
- **Wiring**
 - Four-wire
- **Type & Size:**
 - General-purpose use: 2.5 to 400 mm (0.1 to 16 inch)
 - Explosion proof type: 2.5 to 400 mm (0.1 to 16 inch)
 - Submersible type: 15 to 400 mm (0.5 to 16 inch)
 - Sanitary type: 15 to 125 mm (0.5 to 5.0 inch)

AXF Functionality

Standard features such as the Dual Frequency Excitation and the advanced diagnostics, including the electrode adhesion detection, not only allow for an uninterrupted clean flow signal, but also minimize downtime and reduce routine maintenance. For the highly difficult slurry applications, the AXF can utilize an Enhanced Dual Frequency Excitation mode, giving a greater signal to noise ratio and reducing the effects of process noise.

Wall mount, pipe mount or the all in one integral type convertor configuration, along with HART/ BRAIN/ FOUNDATION fieldbus communication and the front display infra-red switches, for easy user configurability, the AXF has the flexibility to meet both your installation and operational requirements.

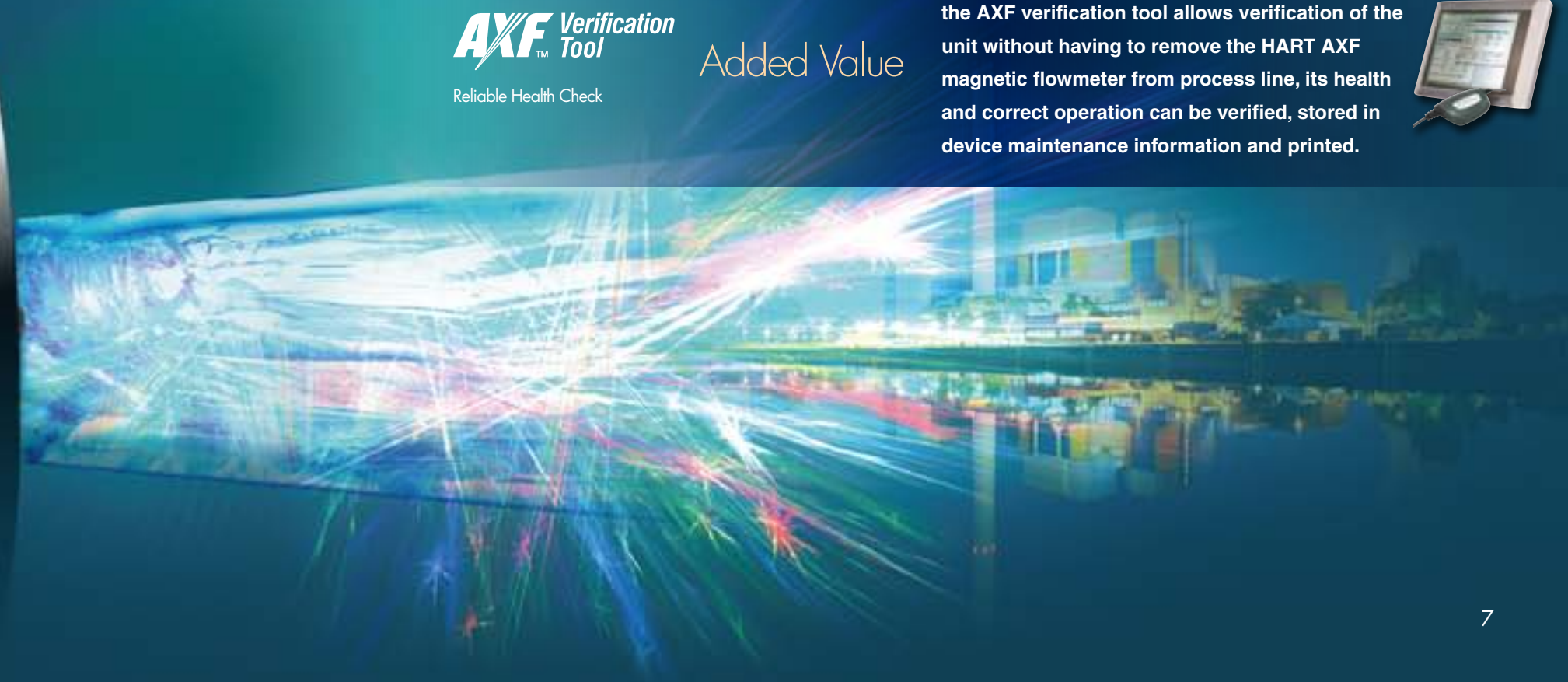
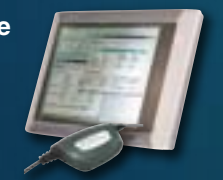


AXF™ Verification Tool

Reliable Health Check

Added Value

As an optional function of FieldMate Advanced, the AXF verification tool allows verification of the unit without having to remove the HART AXF magnetic flowmeter from process line, its health and correct operation can be verified, stored in device maintenance information and printed.





ADMAG AXW™

Dependable Large Size

The AXW magnetic flowmeter is ideal for industrial process lines, and water supply / sewage applications. With outstanding reliability and ease of operation, developed on decades of field-proven experience, the AXW will increase user benefits while reducing total cost of ownership.

- Construction
 - Remote type flowtube
- Wiring
 - Four-wire
- Type
 - General-purpose use
 - Submersible type
- Size
 - 500 to 1800 mm (20 to 72 inch)

Standard



Efficient

The AXR two-wire magnetic flowmeter can be installed in a loop powered system without any additional power source, thus drastically reducing the initial installation cost and ongoing operational expense. The AXR is the worlds only two-wire magnetic flowmeter which employs the noise free “Dual Frequency Excitation method”, achieving excellent process stability at a low operating cost.

- Construction
 - Integral flowmeter
- Wiring
 - Two-wire
- Type
 - General-purpose use
 - Explosion proof type
- Size
 - 25 to 200 mm
 - (1.0 to 8.0 inch)



ADMAG AXR®

Superior Two-wire

ADMAG CA

Capacitance magnetic flowmeter with non-wetted electrodes

The CA capacitance magnetic flowmeter employs non-wetted electrodes, which are mounted outside a ceramic pipe to detect and measure the electromotive force generated in fluids through the capacitance of the pipe.

In addition, the CA employs an advanced high-frequency excitation method that reduces flow noise in low conductivity fluids.

The adoption of these technologies have resolved the problems that were essentially unavoidable with conventional magnetic flowmeters, providing stable flow measurement with ultra-low conductivity fluids, adhesive fluids, and abrasive/ concentrated slurries.

Specialized

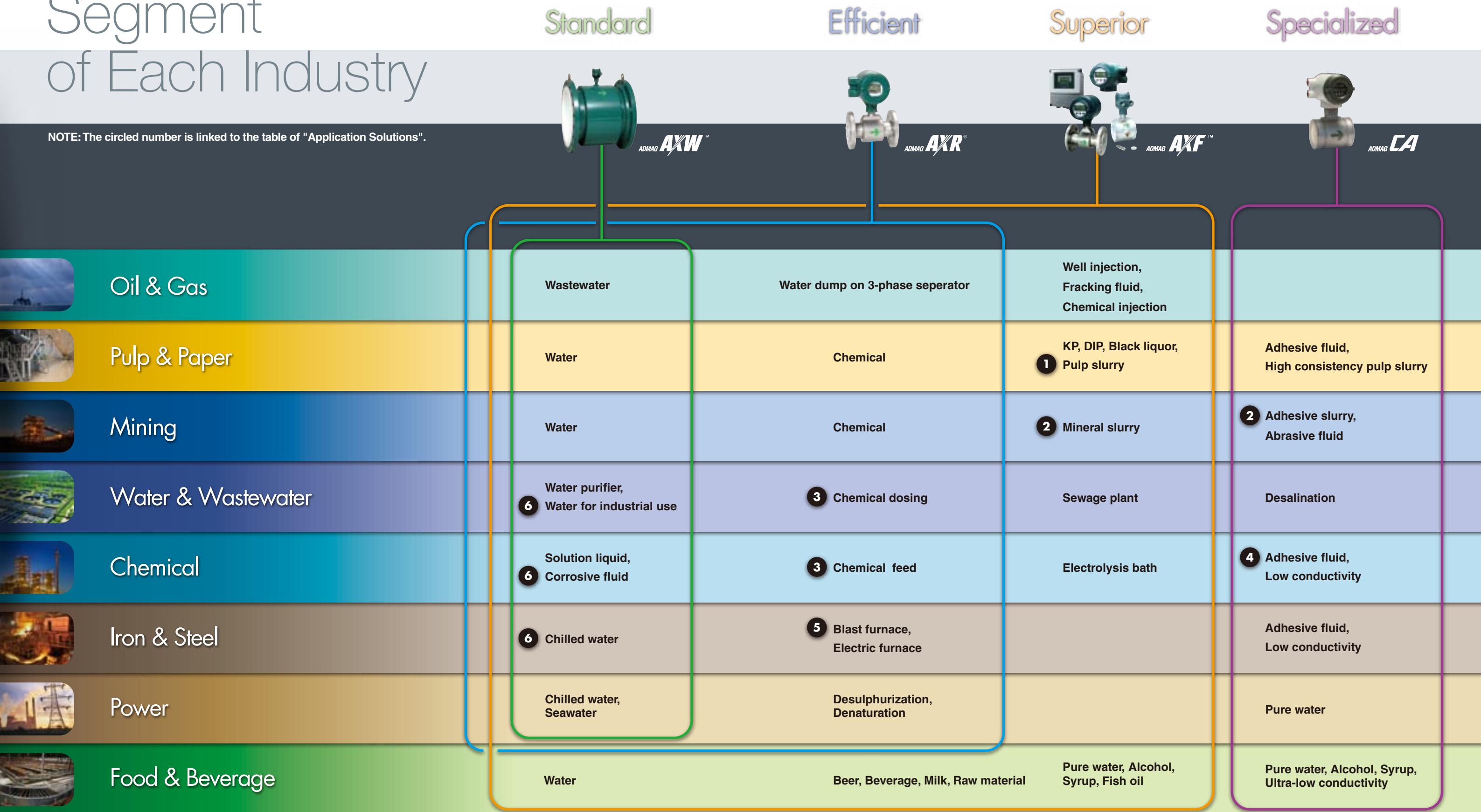
- **Construction**
 - Integral flowmeter
- **Wiring**
 - Four-wire
- **Type & Size**
 - General-purpose use: 15 to 200 mm (0.5 to 8.0 inch)
 - Explosion proof type: 15 to 100 mm (0.5 to 4.0 inch)

Application Solutions

Industry	Application	Difficulty	Key Solution	Benefit	Model
The circled number is linked to the table of "Segment of Each Industry".					
Pulp & Paper	- Blow line	- Slurry noise - Liner abrasion	- The ceramic lined AXF to enable accurate and stable flow measurement of the aggressive slurry - Dual Frequency Excitation	- Stable measurement	ADMAG AXF Ceramic liner
	- Circulation/ extraction line	- High temperature - High pressure - High consistency alkali - Adhesive fluid	- Dual Frequency Excitation - Reliable flow tube design with the PFA liner - The electrode coating diagnostics function - Metal hat grounding rings		ADMAG AXF PFA liner
Mining	- Abrasive slurry	- Slurry noise - Liner abrasion	- Dual Frequency Excitation (Enhanced) - Ceramic liner - Metal hat grounding rings (PFA liner)	- Maintenance-free	ADMAG AXF
	- High consistency adhesive slurry fluids	- Insulation between fluid and electrodes by liner adhesion	- Non-wetted electrode	- Stable measurement	ADMAG CA
Chemical Water & Wastewater	- Chemical feed (NaCl injection)	- Spike noise	- Dual Frequency Excitation to provide the stable measurement close to four-wire magnetic flowmeter - Two-wire technology to reduce the initial instrumentation cost and power consumption	- Cost reduction	ADMAG AXF ADMAG AXR
Chemical	- Recycled oil containing water	- Ultra-low conductivity - The composition of the components (oil and water) is unstable. - Adhesive fluid	- Ability to measure the ultra-low conductivity fluids to 0.01 μS/cm - Non-wetted electrode - Stable output with varying levels of oil and impurities	- Maintenance-free	ADMAG CA
Iron & Steel	- Dust collection water	- Adhesive fluid	- Dual Frequency Excitation to provide the stable measurement close to four-wire magnetic flowmeter - Two-wire technology to reduce the initial instrumentation cost and power consumption - Mirror finished PFA liner	- Stable measurement - CO ₂ emission reduction - Maintenance frequency reduction	ADMAG AXR
Power Iron & Steel	- Chilled water	- Variation of the process temperature and the flow volume.	- Dual Frequency Excitation to provide the stable measurement close to four-wire magnetic flowmeter - Two-wire technology to reduce the initial instrumentation cost and power consumption	- Cost reduction (Install & running) - Stable and accurate process control	ADMAG AXR

Segment of Each Industry

NOTE: The circled number is linked to the table of "Application Solutions".



Low ← **Difficulty of application** → High

Conductivity, Slurry, Abrasive, Viscosity

Our Answer For Your Requirements

Many applications can be served by ADMAG. Some of these applications or process conditions are explicitly harsh and demanding, and require customized solutions

Liner Variation

The ADMAG series reinforces your process requirements with a large range of liners from the chemical resistant Fluorocarbon PFA and ultra-pure Alumina Ceramic liners, to the slurry resistant and cost effective range of rubber liners.

Liner Material	Industry	Application	Resistance Properties
Alumina Ceramics	Chemical, Food & Beverage etc.	Alcohol, Adhesive fluid, Coal mine, Acid etc.	Abrasion, Heat, Pressure
Fluorocarbon PFA	Chemical, Food & Beverage, Pulp & Paper etc	Acid, Alkali, Pulp slurry, Corrosive fluid etc.	Chemical, Heat, Adhesion
Fluorocarbon PTFE	Pulp & Paper, Chemical, Water & Wastewater etc	White water (Pulp & Paper), Corrosive Fluid etc.	Corrosion, Chemical
Natural Hard Rubber	Water & Wastewater etc.	Oily Wastewater etc	Oil, Corrosion, Chemical
Natural Soft Rubber	Construction, Mining etc.	Shielding machine, Mineral, Slurry fluid etc.	Abrasion, Chemical
Polyurethane Rubber	Water & Wastewater etc.	Wastewater, Potable water etc.	Abrasion
EPDM Rubber	Water & Wastewater etc.	Ozone water etc.	Ozone, Chemical

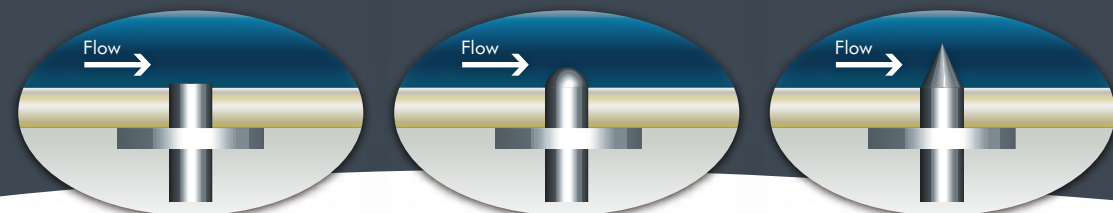
Metal Hat Grounding Ring

Slurry applications, such as a blow line service in a pulp and paper industry or the transportation line in a mining application, can be extremely abrasive on the process lines. With high density slurries, the leading edge of the flowtube liner is exposed to abrasive flow, even more so with high process temperatures, as this tends to soften the liner and possibly making it more vulnerable to abrasion. Metal hats have been designed to protect the magnetic flowmeter leading edge at the entrance of the flow tube and helps prolong the flow tubes lifespan while maintaining uninterrupted flow measurement.



Custom Designed Electrode

In some processes, adhesion and/or scaling can occur inside the flowtube. Scaling may be due to the characteristics of the process fluid. This electrode fouling may cause measurement error by blocking the electrical signal measuring the flow rate. In the worst case, frequent maintenance may be necessary to ensure continual accuracy. These problems can be overcome by using custom designed electrodes with features such as cone extensions or hemispherical extensions.



Specifications

Superior

Standard

Efficient

Specialized



Series		AXF™	AXW™	AXR™	CA™
Wiring		Four-wire	Four-wire	Two-wire	Four-wire
Lineup	Size	2.5 to 400 mm (0.1 to 16 inch)	500 to 1800 mm (20 to 72 inch)	25 to 200 mm (1.0 to 8.0 inch)	15 to 200 mm (0.5 to 8.0 inch)
	Construction	Integral and Remote	Remote	Integral	Integral
	Use Type	• General-purpose use • Explosion proof type • Submersible type • Sanitary type	• General-purpose use • Submersible type	• General-purpose use • Explosion proof type	• General-purpose use • Explosion proof type
	Communication	• BRAIN • HART • FOUNDATION fieldbus • Profibus	• BRAIN • HART (Combined with AXFA11 converter)	• BRAIN • HART	• BRAIN
Basic Specifications	Liner Material	• Ceramics • Fluorocarbon PFA • Natural Soft Rubber • Polyurethane Rubber • EPDM Rubber	• Fluorocarbon PTFE • Natural Hard Rubber • Natural Soft Rubber • Polyurethane Rubber	• Fluorocarbon PFA	• Ceramics
	Electrode Material	• JIS SUS316L (AISI 316L SS/ EN 1.4404 Equivalent) • Hastelloy C-276 Equivalent • Platinum-iridium • Tantalum • Titanium • Tungsten Carbide	• JIS SUS316L (AISI 316L SS Equivalent) • Hastelloy C-276 Equivalent	• JIS SUS316 (AISI 316 SS/ EN 1.4404 Equivalent) • Hastelloy C-276 Equivalent • Platinum-iridium • Tantalum	• Non-wetted type
	Excitation Type	• Dual Frequency • Enhanced Dual Frequency	• Low Single Frequency	• Dual Frequency	• High Single Frequency
	Accuracy	• ±0.35% of rate • ±0.2% of rate(option)	• ±0.35% of rate (1000 mm and below) • ±0.5 % of rate (1100 mm and above)	• ±0.5% of rate	• ±0.5% of rate
Applications	Low Conductivity Fluid	• Min. 1 to 5 μS/cm	• Min. 20 μS/cm (1000 mm and below) • Min. 50 μS/cm (1100mm and above)	• Min. 10 μS/cm	• Min. 0.01 μS/cm (100mm and below) • Min. 1 μS/cm (150mm and above)
	Slurry Fluid	Middle concentration	Low concentration	Low concentration	High concentration
	Adhesive Fluid	• Diagnostics • Replaceable electrode (option)	• Diagnostics • Large size electrode	• Diagnostics • Large size electrode	• Non-wetted electrode
	Low Flow Fluid	• Min. Span 0.1 m/s	• Min. Span 0.1 m/s (1000 mm and below) • Min. Span 0.3 m/s (1100mm and above)	• Min. Span 0.3 m/s	• Min. Span 0.5 m/s
	Short Time Batch	Min. Damping 0.1 sec.	Min. Damping 0.1 sec.	Min. Damping 1 sec.	Min. Damping 1 sec.
Features	Dual Frequency Excitation	○	—	○	—
	Electrode				
	Cermet Electrode	○	—	—	—
	Replaceable Electrode	○	—	—	—
	Capacitance Electrode	—	—	—	○
	Self Diagnostics	○	○	○	○
	3-line Full Dot-matrix LCD	○	○	○	—
	Alarm Indication	○	○	○	○
	Rotatable Neck, Display	○	○	○	○
	Robust Structure	○	○	○	○
Dual Compartment Housing	○	—	○	○	
Verification Tool	○	—	—	—	
SIL	—	—	○	—	

Refer to the GS sheets for the detailed specifications.

<http://www.admagxf.com/>



ADMAG

Search



vigilantplant®

The clear path to operational excellence

SEE
CLEARLY

KNOW
IN ADVANCE

ACT
WITH AGILITY

VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

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