## We create value together with customers at their site through human-centered automation.



We solve issues in a wide array of industries, from oil refining, chemical, iron and steel, pulp and paper to automobiles, electrical/electronic, semiconductor, and foods and beverages, through the provision of products, solutions, instrumentation, engineering and maintenance service to support optimal operation of the customers' facilities throughout their lifecycle. Collaborating with people involved in production, we develop advanced measurement and control technologies, and strive to realize a production site where workers can develop their own skills in safety, thus creating new value for our customers.



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## Azbil Corporation Advanced Automation Company

1-12-2 Kawana, Fujisawa Kanagawa 251-8522 Japan URL: https://www.azbil.com CA2-5100

# **Flowmeters** Selection Guide



# We offer a wide variety of flowmeters to meet your specific needs.

The flow rate is the most basic measurement in a process. A variety of methods of measuring the flow rate have been developed to cover a broad spectrum of fluid characteristics and measuring environments. We have released the following four types of flowmeters to provide longer operating life, good maintainability, and saving energy as customers require: electromagnetic, differential pressure, vortex, and thermal. From these, you can select the best for your specific needs.





Water Chemicals Slurry	Electromagnetic Flowmeter маалмая з маала з мта 5 F1x1000 5
Gas Steam Water Oil Chemicals	Differential Pressure Flowmeter GTX/JTD 7
Gas Steam HP LP	D.P. Flowmeter for Steam and Gas MVC10_ 9 MVC3_A 9
Gas Steam Water Oil Chemicals	Vortex Flowmeter <sup>AX2</sup> 11 <sup>MVF(Gas)</sup> 11
Gas	Thermal Flowmeter CMS 13 CMG 13 F4Q 15 F4H 15 MPC 17





## **Electromagnetic Flowmeter**

MagneW<sup>™</sup> PLUS+ Series Model MGG\_ \_ \_/MGS\_ \_ \_

#### Features

The MagneW PLUS+ electromagnetic flowmeter offers high performance, and high reliability based on the azbil Group's field-proven technologies. The model MGG14C converter provides expanded flow rate and process measurement capabilities when used with the new selection of MagneW PLUS+ detectors. FM nonincendive model is suitable for use in Class I / II / III, Division 2, Groups A, B, C, D, F, and G or non-hazardous locations only. General model is suitable for use in non hazardous locations.

Diameter Setting range Power supply Enclosure Installation type Explosion-proof structure Case material Lining material Fluid temperature Ambient temperature

> Electrical conductivity of fluid Applicable fluids

Output

Accuracy

EMC conformity



NNK

## **Electromagnetic Flowmeter for Open Channel Flowmeter Detector**

MagneW™ PLUS+ Series

Model NNK140/941

The MagneW PLUS+ Open Channel Flowmeter is designed for both open channel and closed channel flow measurement. In open channel measurements, the MagneW provides accurate flow measurement even at minimal flow rates and is not affected by tidal levels or hydrostatic pressure changes. The detector is obstruction-less and has no moving parts, resulting in trouble-free operation and reduced maintenance costs. Unlike other open channel flowmeter designs, the MagneW provides an output that is linear with the flow rate.

#### Standard specifications

Diameter Setting range Power supply Enclosure Installation type Explosion-proof structure Case material Lining material Fluid temperature Ambient temperature Output

Electrical conductivity of fluid Applicable fluids

Accuracy EMC conformity

3 Flowmeters Selection Guide

2.5, 5, 10, 15, 25, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100 mm
0 to 0.1 m/s (minimum), 0 to 10 m/s (maximum)
90 to 130 Vac, 190 to 250 Vac, 47 to 63 Hz
Detector: watertight (IEC IP67), submersible (IEC IP68) Converter: waterproof (NEMA 4X, IEC IP66)
Integral/ remote
TIIS/ FM explosion-proof, FM nonincendive
Detector: SUS304, aluminum alloy, carbon steel
Converter: aluminum alloy
PFA, polyurethane rubber, chloroprene rubber, ETFE
-40 to +160°C (lined with PFA)
-40 to +120°C (lined with ETFE)
-25 to +60°C
4 to 20 mAdc
Pulse output : open collector, contact output : open collector
300 $\mu S/m$ (3 $\mu S/cm)$ or more
Water, sewage, chemicals, slurry, food, highly viscosity liquid
$\pm 0.5~\%$ of reading (flow rate of more than 20 % of setting range), $\pm 0.35~\%$ of reading (flow rate of more than 20 % of setting range)
EN61326



50, 100, 200, 400, 600 mm
0 to 0.3 m/s (minimum), 0 to 10 m/s (maximum)
90 to 130 Vac, 47 to 63 Hz, 110 Adc ±10%, 24 Vdc ±10%
Detector: submersible (IEC IP68) Converter: waterproof (NEMA 4X, IEC IP66)
Remote
(N.A.)
Detector: PVC Converter: aluminum alloy
PVC
0 to +40°C
0 to +40°C
4 to 20 mAdc
Pulse and contact outputs: open collector
300 µS/m (3 µS/cm) or more
Water, sewage
±1 % (Detector only), ±2 % (Combined with dummy)
N.A.



Calibrator

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azbil





MagneW™Two-wire PLUS+ Series Model MTG\_\_\_

## Features

In the past, users had to make big sacrifices in functionality and performance to take advantage of two-wire simplicity, but this is no longer the case. The innovative design of the MTG18A delivers performance equal to current four-wire magnetic flowmeters. Azbil group released the world's first two-

wire loop powered magnetic flowmeter in 1992. Now we've taken the experience gained with the SMT3000 and developed the most innovative two-wire magnetic flowmeter on the market. Introducing the MagneW Two-wire PLUS+, delivering fourwire functionality with two-wire simplicity. The major advantage of two-wire magnetic flowmeter technology is that it provides the end-user with a lower cost of ownership due to lower cost of flowmeter installation. Not only is the electrical installation more economical, but it can be simpler and easier to back up in the event of a power outage. In addition, replacement of existing twowire and four-wire flowmeters can be implemented with little electrical work.

## Diameter Setting range Power supply Enclosure Installation type Explosion-proof structure Case material Lining material

Fluid temperature Ambient temperature

> Output Electrical conductivity of fluid

Applicable fluids

Accuracy EMC conformity

# **Smart Calibrator**

Model F1X1000

#### Overview

#### The F1X1000 Smart Calibrator is used for adjusting and checking the condition of electromagnetic flowmeters.

- The F1X1000 checks/adjusts the following: - Zero and span
- Linearity, using 25%-step output of the set span
- Converter accuracy at any of flow rate or flow velocity
- Gain calibration

#### Features

(1) The F1X1000 calibrator calibrates/adjusts any type of electromagnetic flowmeter manufactured by Azbil Corporation.

MGG Calibration(FLEX)FLEX+	MGG10,MGG14,MGF,MGP
KIX Calibration	KIX18,KIX19,KIX20
KIC Calibration	KIC18,KIC20
MTG Calibration	MTG11, MTG15, MTG18, MTG14

(2) The F1X1000 is a compact and lightweight hand-held calibrator, and thus is easy to carry. It enables calibration in a minimal amount of space.

(3) Battery powered, so no power supply is needed.

(4) The F1X1000 calibrator is driven by the excitation circuit of an AC powered electromagnetic flowmeter, model MG\_, or KI\_ converter, so no AC adaptor is necessary.



Input Output Ambient temperature Ambient humidity Accessories Housing Battery life Weight Accuracy Flow velocity Flow rate

#### Standard specifications

2.5, 5, 10, 15, 25, 40, 50, 65, 80, 100, 150, 200 mm
0 to 0.3 m/s (minimum), 0 to 10 m/s (maximum)
24 Vdc ±10%
Detector: watertight (IEC IP67) Converter: watertight (NEMA 4X, IEC IP67)
Integral/ remote
TIIS/FM/CSAExplosion-proof FM/CSA/ATEX Nonincendive NEPSI Increased safety and Dust ignition proof
Detector: SUS304, aluminum alloy
Converter: aluminum alloy
PFA
-20 to +130°C (lined with PFA)
-20 to +60°C
4 to 20 mAdc
Pulse and contact outputs: open collector
1000 $\mu\text{S/m}$ (10 $\mu\text{S/cm})$ or more
Water, chemicals, high viscosity liquids
$\pm 0.5~\%$ of reading (flow rate of more than 30 % or 40 % of setting range)
EN61326

Two AA batteries or power from the excitation circuit of the calibrated converter $% \left( {{{\rm{C}}}_{{\rm{c}}}} \right)$
Excitation current from the connected converter
Simulated signal voltage
10 to 40 °C
10 to 90 % RH
Signal cable and excitation cable
ABS resin
10 hours continuous operation by alkaline batteries
Approx. 300 g (without batteries)
±0.1 % (adjusts a converter to within ±0.1 %)
00.00 to 12.50 m/s (settable in 0.01 increments)
-99999 to +99999 (floating point 5 digits)



## **Differential Pressure Transmitters**

Advanced Transmitter

Model GTX\_\_\_/ Model JTD\_\_\_

#### Features

The Advanced Transmitter is a microprocessorbased smart transmitter that features high performance and excellent stability. Capable of measuring gas, liquid, vapor, and liquid levels, it transmits 4 to 20 mA DC analog and digital signals.

Diam	eter			
Prim	ary ele	emen	ts	
Setti	ng ran	ge		
Powe	er sup	ply		
Enclo	osure			
Insta	llatior	ı type		
Explo struc	osion- ture	proof		
				-

Case material

Fluid temperature Ambient temperature

Output

Applicable fluids Accuracy

EMC comformity





15 to 3000 mm
Orifice plate, venturi, flow nozzle
0.1 kPa to 14 MPa for differential pressure flowmeter
16 to 42 Vdc
Watertight (IEC IP67)
Impulse line connection or direct mount
TIIS/ FM/ ATEX/ IEC Ex/ NEPSI/ KCs intrinsic safety and explosion-proof, nonincendive
Meter body: SUS316, SUS316L Case: aluminum alloy
-40 to +110°C
-25 to +60°C
4 to 20 mAdc
Contact output: open collector
Gas, steam, liquid
±0.04 % of rate with orifice plate
EN 61326







Model MVC10

#### Features

Model MVC10\_ conducts air,  $CO_2$ , or  $N_2$  gas compensation without any external instruments. This all-inone transmitter achieves reduced engineering cost while guaranteeing complete accuracy as a flow measurement system.

Diameter Power supply Enclosure Installation type Explosion-proof structure Case material Fluid temperature

Ambient temperature Output Applicable fluids

Accuracy EMC conformity



# **Multivariable Steam Flowmeter**

Model MVC3\_A

#### Features

Model MVC3\_A conducts saturated steam density compensation without any external instruments. This all-in-one transmitter achieves reduced engineering cost while guaranteeing complete accuracy as a flow measurement system.

Diameter Power supply Enclosure Installation type Explosion-proof structure Fluid temperature Ambient temperature

Output

Applicable fluids Accuracy EMC conformity

50, 65, 80, 100, 150 mm
90 to 250 Vac
Detector: IEC IP54 Converter: IEC IP54
Integral
N.A.
Detector: SCS13, SUS316 Converter: aluminum alloy, polycarbonate
-15 to +70°C
-15 to +50°C
4 to 20 mAdc
Pulse output : open collector
Compressed air, N <sub>2</sub> gas, CO <sub>2</sub> gas
±3 % of reading
ΝΔ

25, 40, 50, 80, 100, 150 mm
16.7 to 45 Vdc
IEC IP67
Integral/ remote
TIIS explosion-proof
+100 to +215°C
-15 to +65°C
4 to 20 mAdc
Pulse output : open collector
Saturated steam
±3 % of reading
N.A.





# **Multivariable Vortex Flowmeters**

Model AX2\_\_\_

#### Features

Standard	
Model	

Diameter

Process fluid

temperature

Measurement of the volumetric flow rate and mass flow rate of liquids, gases, and steam with a single unit. Three output signals for improved measurement

efficiency and lower costs. Highly accurate mass flow rate measurement by compensating for temperature and pressure.

Insertion models for large-diameter (125 mm or larger) pipes.

Process fluids Power supply Output Display

Ambient temperature

Data setting method

Communication Explosion-proof structure





# **Vortex Gas Flowmeter**

Model MVF\_\_\_\_

#### Features

By using the high-sensitivity and high-speed response Micro thermal flow sensor for the detection of vortex frequency, the MVF is able to offer a wide rangeability of 100:1\*. Temperature and pressure compensation functions are built in, so there is no need for costly external devices.

\* at 0.5 MPa

Diameter Power supply Enclosure Installation type Case material Fluid temperature

Ambient temperature Output

Applicable fluids Accuracy EMC conformity

## specifications

Integral, Remote
15, 25, 40, 50, 80, 100, 150, 200 mm (inline model), 125 to 1800 mm (insertion model)
Standard model: -50 to +260°C High-temperature model: -50 to +400°C Cryogenic-temperature model: -200 to +50°C
Standard operating temperature: -40 to +60°C, Transportation and storage temperature: -40 to +85°C
Various gases, liquids, and steam that do not corrode SUS316L
12 to 36 Vdc (2-wire system), 12 to 36 Vdc, 300 mA max. (multiple outputs), 85 to 240 Vac, 50/60 Hz, 2 W (multiple outputs)
Analog (4 to 20 mA DC), pulse (semi-conductor relay, pulse width: 50 ms), alarm (semi-conductor relay), frequency
LCD, 16 characters × 2 lines
With 6 keys on the device, or by an included magnet, or by communication
HART communication
FM/ FMC/ ATEX/ IEC Ex

50, 80, 100, 150 mm
24 Vdc ± 10 %
IEC IP67
Integral
Detector: SUS304 Converter: aluminum alloy (ADC 12)
-15 to +60°C
-15 to +60°C
4 to 20 mAdc
Pulse output : open collector
Air, $N_2,Ar,O_2,CO_2,natural gas,methane,propane,butane,otherinertgases$
Actual: 2 % of reading. Normal: 3.3 % of reading
EN 61326







Model CMS\_\_\_\_

#### Features

The CMS is a highly reliable gas mass flowmeter that uses the micro thermal flow sensor as its sensing element. The micro thermal flow sensor is a MEMS sensor capable of measuring ultralow flow rates. The integration of the Micro thermal flow sensor and advanced channel design technology has achieved high accuracy and high rangeability at a low cost.

Diameter Setting range Power supply Installation type Case material

Fluid temperature

Ambient temperature

Output Applicable fluids Accuracy

EMC conformity



**Gas Flow Monitor** Model CMG\_\_\_

#### Features

The CMG is a flowmeter designed to measure the fuel flow to a gas burner. Its sensing element is the micro thermal flow sensor. The monitor displays instantaneous or totalized flow. Available outputs include alarm, instantaneous flow (analog output), totalizer pulse (NPN open collector) and event, for management of combustion air/ fuel ratio

Diameter	
Setting range	
Power supply	
Enclosure	
Installation type	
Case material	

Fluid temperature Ambient temperature

Output

Applicable fluids	
Accuracy	
EMC conformity	

### Standard specifications

1/4", 1/2"
0 to 0.5 L/min , 0 to 2000 L/min
11.4 to 25.2 Vdc
Integral
Detector: SUS303 / SUS316
Converter: polycarbonate
-10 to +60°C
-10 to +60°C
4 to 20 mAdc, 0 to 5 Vdc, 1 to 5 Vdc
Pulse output (open collector)
Air, N <sub>2</sub> , Ar, O <sub>2</sub> , CO <sub>2</sub> , city gas, methane, propane, butane, H <sub>2</sub> , He
3 % of reading , 5 % of reading
EN61326-1,EN61326-2-3

15, 25, 40, 50 mm
0 to 2 m <sup>3</sup> /h (minimum), 0 to 150 m <sup>3</sup> /h (maximum)
100/200 Vac (85 to 110 %), 24 Vdc ± 10 %
JIS IP54
Integral
Detector: aluminum alloy or SCS13 Converter: PBT + GF 30 %
-10 to +60°C
-10 to +60°C
4 to 20 mAdc, 1 to 5 Vdc
Pulse output (open collector), alarm (electromagnetic relay)
Air, city gas, methane, propane, butane
4 % of reading , 6 % of reading
EN61010-1, EN61326-1, EN61326-2





Model F4Q\_\_\_\_

#### Features

Model F4Q is a high-performance digital mass flow controller that incorporates a micro thermal flow sensor developed by Azbil Corporation as it detection component. It is an excellent choice for controlling the atmosphere in an industrial furnace requiring a highly accurate gas flow over a wide range, or for controlling the combustion of a burner requiring high-speed control for a flammable gas flow supplied at low pressure.

#### Standard sp

Diameter Setting range Power supply Types Material of gas-contacting parts Ambient temperature

Applicable fluids Accuracy EMC conformity

Output

## **Compact Digital Mass Flow Controller** Model F4H\_\_\_\_

massflow controller.

and 1% SP high accuracy.

functions for IoT compatibility.

The F4H is a next-generation standard

The F4H is a digital mass flow controller

equipped with the micro thermal flow sensor

that achieves 0.3 s high-speed controllability

Those are 50% smaller than our conventional

models, and all models have communications

Features

Diameter Setting range Power supply Case material Fluid temperature Ambient temperature Output Applicable fluids Accuracy EMC conformity



15 Flowmeters Selection Guide

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1/4", 1/2"
0 to 200 mL/min (minimum) , 0 to 500 L/min (maximum)
24 Vdc
Integrated display model, separate display model
SUS316, fluorocarbon resin, fluororubber
-10 to +60°C
0 to 5 Vdc, 1 to 5 Vdc, 4 to 20 mAdc
Pulse output (open collector)
Air, N <sub>2</sub> , Ar, O <sub>2</sub> , CO <sub>2</sub> , city gas, methane, propane, butane
1 % SP, 1.5 % SP, 2 % FS
EN 61326-1, EN 61326-2-3

/4 ~	
0 to 50 mL/min (minimum), 0 to 20 L/min (maximum)	ium)
22.8 to 25.2Vdc(F4H0020 23.5 to 25.2Vdc)	
Body material : SUS316	
-10 to +50°C (F4H0020 -10 to 40°)	
-10 to +50°C (F4H0020 -10 to 40°)	
0 to 5 Vdc, 1 to 5 Vdc, 4 to 20 mA	
Air, N <sub>2</sub> , Ar, O <sub>2</sub> , CO <sub>2</sub> , H <sub>2</sub> , He	
1%SP, 2%SP	
EN61326-1, EN61326-2-3	





# **Panel Mount Mass Flow Controller**

Model MPC\_\_\_\_

#### Features

The MPC is a highly reliable gas mass flow controller that uses the micro thermal flow sensor. The integration of the micro thermal flow sensor and advanced channel design technology has achieved high accuracy and high rangeability at a low cost.

iameter	1/8"
etting range	0 to 0.5 L/min (minimum) , 0 to 20 L/min (maximum)
ower supply	22.8 to 25.2 Vdc
ase material	Detector: brass (nickel-plated)
uid temperature	-10 to +50°C
mbient temperature	-10 to +50°C
utout	0 to 5 Vdc, 1 to 5 Vdc
uthat	Pulse output (open collector)
pplicable fluids	Air, N <sub>2</sub> , Ar, CO <sub>2</sub>
ccuracy	2 % FS
MC conformity	EN61326-1, EN61326-2-3

# **Calibration Facility for water**

The flow calibration rig in Kyoto has the only two-stage elevated water tank system in Japan. At a height of 35m, the tanks are also the highest in Japan. It can run eight systems simultaneously, and its weighing system with maximum flow of 5,000m<sup>3</sup>/h makes this calibration rig the largest of its kind in Japan.



