

MagneW™ Two-wire PLUS+

Two-wire Electromagnetic Flowmeter

Integral type TIIS/KCs Explosion-protected Apparatus

Model MTG15A

OVERVIEW

The MagneW Two-wire PLUS+ is a high performance two wired electromagnetic flowmeter based on field proven Azbil Corporation's two-wire loop powered technologies.

The MagneW Two-wire PLUS+ offers the stable and accurate measurement with low power consumption.

FEATURES

Two-wire operation

MagneW Two-wire PLUS+ improves its noise immunity performance by 700% maximum and 250% in average. For the spike noise, MagneW Two-wire PLUS+ improves its noise immunity performance in 250% in average.

High accuracy and stable output

MagneW Two-wire PLUS+ provides high accuracy ($\pm 0.5\%$ of rate) and its output is as stable as current four wired magnetic flowmeters.

Minimum measurable process fluid conductivity

The minimum measurable process fluid conductivity is $10 \mu\text{S/cm}$. MagneW Two-wire PLUS+ maximizes two wired magflow meter applicability.

Wider range in size

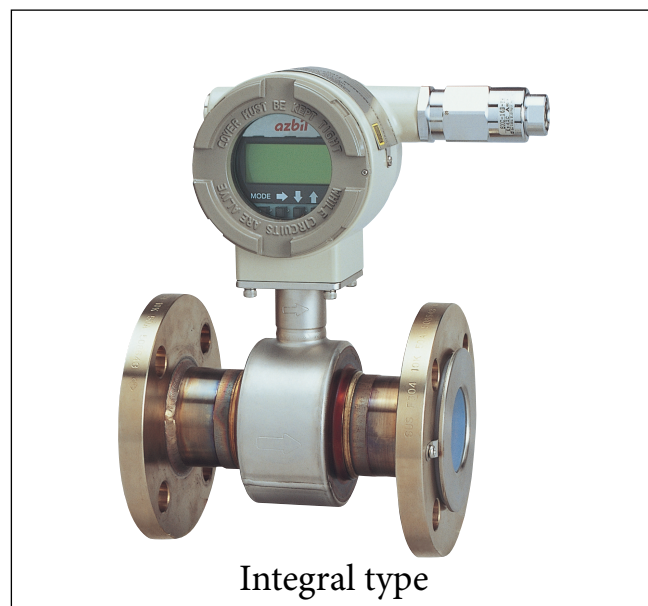
MagneW Two-wire PLUS+ offers wider range in detector size.

Detector size: 2.5 to 200 mm (0.1 to 8 inches).

Electrode status diagnostic function

The MagneW Two-wire PLUS+ offers the diagnostic function for the electrode condition.

It diagnoses the empty pipe condition or scale on electrode condition.



APPLICATION

- Corrosive liquid measurement
- Chemical solution measurement
- Drainage/waste disposal fluid measurement
- Drinking water and waste water service
- Industrial/agricultural water measurement
- Seawater measurement

The above flow measurements are applicable.

FUNCTIONAL SPECIFICATIONS

Size

Wafer style

25, 40, 50, 65, 80, 100 mm (1, 1-1/2, 2, 2-1/2, 3, 4 inches)

Flange style

2.5, 5, 10, 15, 25, 40, 50, 65, 80, 100, 150, 200 mm
(0.1, 0.2, 3/8, 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 6, 8 inches)

Flange rating

ANSI150, ANSI300, JPI150, JPI300, JIS10K, JIS20K, JIS30K

Reference flange standard

JIS; JIS B2210 (1984) ANSI; ANSI B16.5 (1988)

JPI; JPI-7S-15-93

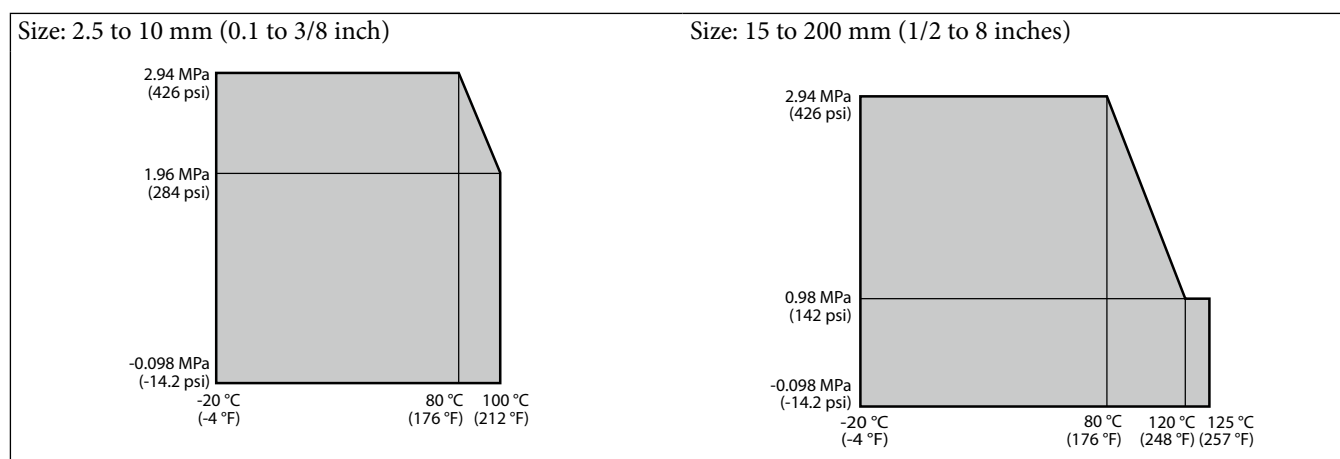
Bolt and nut

(only Wafer type) SUS304

Temperature range and pressure range of process fluid

Refer to the following.

Note: However, note that the pressure range specified for the flange has priority over the range shown in the figures.



Measurable electrical conductivity

10 μS/cm or greater

Measurable flow velocity range

0.03 to 10m/s

Measurement flow range

Size		Maximum flow velocity range is 0 to 0.3 m/s (0 to 0.98 ft/s)		Maximum flow velocity range is 0 to 10 m/s (0 to 32.8 ft/s)		Conversion factor K
		Minimum range		Maximum range		
mm	inches	m³/h	GPM	m³/h	GPM	
2.5	0.1	0 to 0.00531	0 to 0.02335	0 to 0.1767	0 to 0.778	56.59
5	0.2	0 to 0.02121	0 to 0.09337	0 to 0.7068	0 to 3.112	14.15
10	3/8	0 to 0.08483	0 to 0.3735	0 to 2.827	0 to 12.44	3.537
15	1/2	0 to 0.1909	0 to 0.8404	0 to 6.361	0 to 28.00	1.572
25	1	0 to 0.5302	0 to 2.335	0 to 17.67	0 to 77.80	0.5659
40	1-1/2	0 to 1.358	0 to 5.976	0 to 45.23	0 to 199.1	0.2210
50	2	0 to 2.121	0 to 9.337	0 to 70.68	0 to 311.2	0.1415
65	2-1/2	0 to 3.584	0 to 15.78	0 to 119.4	0 to 525.9	0.08371
80	3	0 to 5.429	0 to 23.91	0 to 180.9	0 to 796.7	0.05526
100	4	0 to 8.483	0 to 37.35	0 to 282.7	0 to 1244	0.03537
150	6	0 to 19.09	0 to 84.04	0 to 636.1	0 to 2800	0.01572
200	8	0 to 33.93	0 to 149.4	0 to 1130	0 to 4979	0.008842

Velocity V (m/s) = K × Q

K = Conversion factor = $1/3600 \times 4/(\pi D^2) \times 1000^2$ D = Size (mm) Q = Flow rate (m³/h)

Detector main body materials

Finish: None. Silver paint (thickness: 40 μm) only if an 80A or more carbon steel flange is used

Case material

Size 2.5 to 15 mm (0.1 to 1/2 inch): SCS13 stainless steel
Size 25 to 200 mm (1 to 8 inches): SUS304 stainless steel

Measuring pipe material

SUS304 stainless steel

Flange

SUS304 stainless steel

(size 2.5 to 65 mm (0.1 to 2-1/2 inches))

Carbon steel + corrosion-preventive painting
(size 80 to 200 mm (3 to 8 inches))

Process wetted materials

Lining: PFA

Electrodes

SUS316L, ASTM B574 (Hastelloy C-276 equivalent), Titanium, Tantalum, Nickel, Zirconium, Platinum-Iridium

Grounding rings

SUS316, ASTM B575 (Hastelloy C-276 equivalent), Titanium, Tantalum, Zirconium, Platinum
Wetted ring gasket: PTFE (for wetted rings other than SUS316)

Power supply

15.6 to 42 V DC (without communication)

21.05 to 42 V DC (with communication)

Current capacity: 24 mA min

Power failure

An EEPROM retains data record of totalized value when pulse output is used (retention period approximately 10 years).

Lightning protection

12 kV, 1000 A

Equipped with the lightning arrester in the power source and external output terminals.

Output signal

Analog output

4 to 20mA DC

Digital output

DE

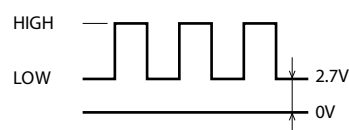
Analog or Digital output is selectable.

Pulse output

Pulse frequency: 0.0001 to 200 Hz

Pulse width: 1 ms to 1 s

LOW value: 2.7V (10mA) (Refer to the blow drawing.)



Contact output

Open collector output (30 V DC, 100mA max.)

Pulse or contact output is selectable

Communication protocol

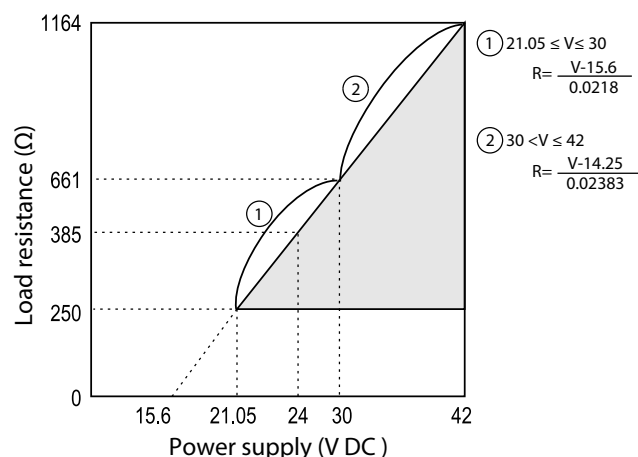
SFC communication and HART communication

HART communication

- Multidrop mode: current fixed at 12mA.
Optional Burst mode is not available.

Load resistance characteristic of communication

External power supply 21.05 to 42 V DC for communication.



Note) The load resistance of 250 Ω or more is necessary for communication.

Flow unit

Volume flow: m³, L, cm³, G (gallon), mG, kG,

B (barrel), IG (imperial gallon), mIG, kIG

Mass flow: t, kg, g, lb

Time: d, h, m, s

Display

Display: LCD

Main display: 7-segment, 8 digits

Sub display for device setting: 16 digits, 2 lines

Display contents:

Demonstrates three values simultaneously Percentage flow rate, Actual flow rate, Totalized value

Data setting

Operation by four key switches

Damping

Adjustable between 0.5 and 199.9 seconds.

Low flow cutoff

Adjustable between 0 and 10% of setting range.

Below selected value, output is driven to the zero flow rate signal level.

Dropout

Adjustable between 0 and 10% of setting range.

Below selected value, pulse output is cut.

Electrode status diagnostic

Detect empty pipe condition or scale on electrode by monitoring flow rate signal. Once the flow rate signal fluctuates over a certain threshold, the device judges that the detector is empty or scale on electrode. The Electrode status diagnostic function makes the analog output and pulse output to the values as selected in the below "Electrode status output mode" table.

The display alternately shows the output values selected and "EMPTY OR SCALE ON ELECTRODE".

There are five threshold levels to meet an environment where the device is installed. Set an appropriate threshold level from below.

SENSITIVITY HIGH

SENSITIVITY MID

SENSITIVITY LOW

SENSITIVITY LL

SENSITIVITY LLL

Default setting: OFF

Operating condition:

The following conditions must be met when using the electrode status diagnostic function.

- Diameter: 10mm or larger
- Electric conductivity of fluid: 30 μ S/cm or greater
- Grounding: Grounding resistance must be less than 100 Ω
- The noise level must be over the set threshold when the pipe is empty.
- The noise level must be under the set threshold when the process fluid flows in the detector.

"Electrode status output mode" table

Output/Display	Parameter selection in the "Electrode status output mode"		
	OFF	ZERO	HOLD
Analog 4-20mA output	Output values as the meter measures.	Analog output is fixed to 0% (4mA).	Analog output is held at its last good value.
Pulse output	Output values as the meter measures.	Pulse output is fixed to 0 (does not generate pulses).	Pulse output is held at its present state.
Display	Display the value as it measures.	Flashes the message 0% and "Empty or scale on electrode" alternately (when % flow rate is specified for the main display). Flashes the message 0.000 RATE and "Empty or scale on electrode" alternately (when actual flow rate is specified for the main display). Flashes the message XXXXXXXXX (totalized value at setup) and "Empty or scale on electrode" alternately (when totalized value is specified for the main display).	Flashes the values at its last good values and a message of "Empty or scale on electrode" alternately.

PHYSICAL SPECIFICATIONS

Ambient temperature limits

-20 to +50 °C (-4 to +122 °F)

Ambient humidity limits

10 to 90% RH

Enclosure rating

JIS C 0920 watertight model

NEMA TYPE 4X, IEC IP67

Hazardous Areas certifications

TIIS/KCs Explosion-protected apparatus

Ex de [ia] II C T4

Certificate number(TIIS)

Line size		Flange	Wafer	
			Face to face dimension	
mm	inch		code-A	code-S
2.5	1/10	TC19022	-	-
5	1/5		-	-
10	3/8		-	-
15	1/2		-	-
25	1	TC19028	TC19028	-
40	1-1/2	TC19029	TC19024	TC19029
50	2	TC19031	TC19025	TC19031
65	2-1/2	TC19030	TC19026	-
80	3	TC19032	TC19027	TC19032
100	4	TC19020	TC19021	TC19020
150	6	TC19033	-	-
200	8	TC19034	-	-

Certificate number(KCs)

Line size		Flange	Wafer	
			Face to face dimension	
mm	inch		code-A	code-S
2.5	1/10	12-AV4B0-0368	-	-
5	1/5		-	-
10	3/8		-	-
15	1/2		-	-
25	1	12-AV4B0-0377	12-AV4B0-0377	-
40	1-1/2	12-AV4B0-0378	12-AV4B0-0370	12-AV4B0-0378
50	2	12-AV4B0-0433	12-AV4B0-0371	12-AV4B0-0433
65	2-1/2	12-AV4B0-0379	12-AV4B0-0372	-
80	3	12-AV4B0-0380	12-AV4B0-0373	12-AV4B0-0380
100	4	12-AV4B0-0374	12-AV4B0-0381	12-AV4B0-0374
150	6	12-AV4B0-0375	-	-
200	8	12-AV4B0-0376	-	-

Converter case finish

Standard

Baked acrylic paint (thickness: 30 μm)

Corrosion-proof

Baked epoxy paint (thickness: 120 μm)

Color: light beige (Munsell 4Y7.2/1.3)

Converter case material

Aluminum alloy

Display cover material

Tempered glass

OPTIONAL SPECIFICATIONS

Traceability certificate

The following three documents are included.

- Traceability System Chart
- Traceability Certificate
- Test Report

Material certificate

Material certificate for electrode/grounding ring

Water free treatment

Condensation is removed from wetted surfaces.

Oil free treatment

When removed from wetted surfaces.

Gasket for plastic piping

When the detector is being mounted on plastic pipe, attach this gasket between the lining and the grounding ring, and between the grounding ring and the plastic pipe flange.

Attaching the tag number to the terminal box

Stamp the tag with the specified number and attach to the terminal box. The maximum number of characters of the tag number is 8.

Tropicalization Treatment

Protect the product in a harsh environment during transportation and/or storage.

The following treatments are applied.

- Corrosion protection
- Moisture prevention
- Mildew proofing

PERFORMANCE SPECIFICATIONS

Analog output accuracy

Size: 2.5, 5 mm (0.1, 0.2 inch)

V_s = velocity of setting range (m/s)

V_s (m/s)	Velocity during measurement $\geq V_s \times 50\%$	Velocity during measurement $\leq V_s \times 50\%$
$1.0 \leq V_s \leq 10$	$\pm 0.5\%$ of rate	$\pm 0.5\%$ of V_s
$0.3 \leq V_s \leq 1.0$	$\pm \frac{0.5}{V_s} \%$ of rate	$\pm 0.5 + \left(\frac{0.5}{V_s} \right) \%$ of V_s

Size: 10, 15 mm (3/8, 1/2 inch)

V_s = velocity of setting range (m/s)

V_s (m/s)	Velocity during measurement $\geq V_s \times 40\%$	Velocity during measurement $\leq V_s \times 40\%$
$1.0 \leq V_s \leq 10$	$\pm 0.5\%$ of rate	$\pm 0.5\%$ of V_s
$0.3 \leq V_s \leq 1.0$	$\pm \frac{0.5}{V_s} \%$ of rate	$\pm 0.4 + \left(\frac{0.5}{V_s} \right) \%$ of V_s

Size: 25 to 200 mm (1 to 8 inches)

V_s = velocity of setting range (m/s)

V_s (m/s)	Velocity during measurement $\geq V_s \times 30\%$	Velocity during measurement $\leq V_s \times 30\%$
$1.0 \leq V_s \leq 10$	$\pm 0.5\%$ of rate	$\pm 0.5\%$ of V_s
$0.3 \leq V_s \leq 1.0$	$\pm \frac{0.5}{V_s} \%$ of rate	$\pm 0.3 + \left(\frac{0.5}{V_s} \right) \%$ of V_s

Accuracy is guaranteed by the totalized flow volume under the condition of continuous flow measurement for 30 seconds or longer.

The above accuracy is guaranteed when the converter and detector are assembled at the factory and calibrated with an actual flow rate.

Additional accuracy for pulse output

Analog output accuracy + ($\pm 0.2\%$) + (± 1 pulse)

Additional accuracy for contact output

Analog output accuracy + ($\pm 1\%$)

Additional accuracy

Effect of ambient magnetic field

$\pm 0.2\%$ FS (at 400 A/m) max.

Piping vibration condition

4.9 m/s² (0.5 G) max. for integral type

Output fluctuation

When $1 \leq V_s \leq 10$ m/s: 0.1 % FS or less

When $0.3 \leq V_s \leq 1$ m/s: $0.1/V_s$ % FS or less

(Damping time constant: 3 s, clear water (conductivity: 150 μ S/cm))

Output stability

Fluid conductivity	Damping time constant	Output fluctuation range
500 μ S/cm	4 s	0.5 % or less
	2 s	1 % or less
100 μ S/cm	4 s	0.5 % or less
	2 s	1 % or less
30 μ S/cm	4 s	1 % or less
10 μ S/cm	4 s	5 % or less

Measurement conditions

Fluid: Clean water

Equipment: Factory calibration equipment

Pipe size: 50 mm

Flow velocity: 2 m/s

INSTALLATION

Electrical connection

G1/2 internal thread

Grounding

Grounding resistance should be less than 100 Ω .

Pipe connection

Wafer style (Size: 25 to 100 mm (1 to 4 inches))

Flange style (Size: 2.5 to 200 mm (0.1 to 8 inches))

Length of straight pipe

Required straight pipe length clearance on the upstream side and the downstream side, while installing the detector.

Upstream side

A minimum 5D straight pipe length is required.

A minimum 10D straight pipe length is required if a diffuser/valve/pump is installed upstream side.

Downstream side

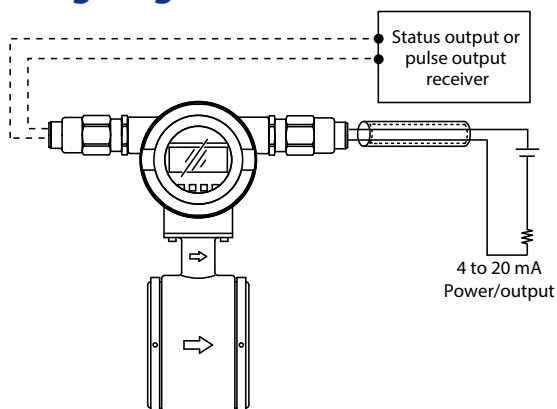
2D straight pipe length is recommended.

(Where D is the nominal bore diameter of the detector)

Upstream side	
<p>Right-angle joint detector Greater than 5 dia.</p>	<p>Diffuser with cone angle greater than 15° (If cone angle is 15° or less, considered as straight pipe) detector Greater than 10 dia.</p>
<p>T joint detector Greater than 5 dia.</p>	<p>Concentrator (considered as straight-pipe section) detector Greater than 5 dia.</p>
<p>Gate Valve (completely open) detector Greater than 5 dia.</p>	<p>Any Control Valve detector Greater than 10 dia.</p>
<p>Any pump detector Greater than 10 dia.</p>	

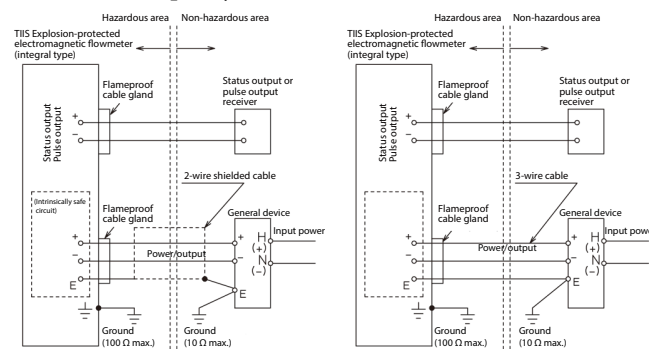
Figure 1.

Wiring diagram



Power supply specifications

- Use the following power supply. If the power supply does not meet the following specifications, this device may not work.
- Current capacity: 24 mA min.



TIIS/KCs Explosion-protected electromagnetic flowmeter (integral type) installation

Cautions for explosion-protected models

CAUTION

In accordance with the safety standards of flameproof regulation, please comply with the following instructions:

- (1) The voltage of general equipment such as the power supply and the receiver should not exceed 250VAC, 50/60Hz, 250VDC at any time at normal or abnormal operation.
- (2) The ambient temperature around the device is 50 °C (122 °F) maximum.
- (3) The process fluid temperature is 125 °C (257 °F) max. for the size of 15mm (1/2 inch) or larger.
- (4) The process fluid temperature is 100 °C (212 °F) max. for the size of 10mm (3/8 inch) or smaller.
- (5) Do not use a flameproof cable gland other than one specified by Azbil Corporation.
- (6) Wait for seven minutes after switching OFF the power supply, before opening the front cover or the terminal cover.
- (7) Do not open the case cover while the device is operating.

A specified explosion-proof performance is available only when this device is used under the conditions described above.

Notice for installation

To fully enjoy the performance of the device, please choose an appropriate location according to the following.

Notice after installation

WARNING

- When removing the device from the piping, make sure that there is no line pressure or process fluid inside of the device. Removing the device before depressurizing may result in serious injury.

CAUTION

- Do not use the device as a foothold. It may cause injury or damage of the device.

Notice for environment

- Install the flowmeter in a location with an ambient temperature of -20 °C to +50 °C (-4 °F to +122 °F) and an ambient humidity of 5 to 100%RH to prevent equipment malfunction or output errors.
- Do not install the flowmeter in a location subject to severe vibration or in a highly corrosive atmosphere. The converter and detector can be damaged. * When install some electromagnetic flowmeters in closer location, keep minimum 500 mm (20 inch) space from each flowmeter. Closer electromagnetic flowmeter installation may cause magnetic interference each other and results in output errors.
- Do not install the flowmeter in a location subject to severe vibration or in a highly corrosive atmosphere. The converter and detector can be damaged.
- When install some electromagnetic flowmeters in closer location, keep minimum 500 mm (20 inch) space from each flowmeter. Closer electromagnetic flowmeter installation may cause magnetic interference each other and results in output errors.

Notice for application

- Electrolytic bath application, process fluid with higher voltage/current
Process fluid of the electrolytic bath application is mostly with high voltage/current.
It is not a suitable application for the two wire loop powered magnetic flowmeter.
Example: Sodium hypochlorite with 200V and 30kA
Four wire magnetic flowmeter is recommended.
- Application which pipe frequently becomes empty
Both two wire magnetic flowmeter and four wire magnetic flowmeter have empty pipe detection function. The two wire magnetic flowmeter detects empty by monitoring signal fluctuation caused by empty pipe condition.
Therefore the empty pipe detection function of the two wire magnetic flowmeter sometimes does not work properly if noise level is too low or too high. The four wire magnetic flowmeter detects empty by monitoring impedance between electrodes and grounding. So the four

wire magnetic flowmeter directly monitors the empty pipe condition. If the application requires empty detection quickly and perfectly, the four wire magnetic flowmeter is recommended.

- Plastic piping or piping with liner
If the customer piping is plastic or lined with insulation material, process fluid may not be properly grounded. In such case, it is recommended to connect earth wire between upstream side grounding ring and downstream side grounding ring for better grounding.
- Slurry application
Process fluid with slurry exceeds 2% is not suitable for the two wire magnetic flowmeter. The four wire magnetic flowmeter is recommended for the fluid with slurry concentration more than 2%.
If hard particles hit the electrode, output of the two wire magnetic flowmeter may fluctuate even though the slurry concentration is less than 2%. In this case, the four wire magnetic flowmeter is recommended.
- Electrochemically homogeneous fluid Install the device where the process fluid is electrochemically homogeneous. If two kind of process fluids are mixed at the upstream side, the process fluid must be uniformly mixed.
- If there is conductive material (carbon, iron rust, etc.) on the wetted parts (electrodes, wetted rings, linings, etc.), correct measurement may not be possible.
In order to prevent deposits, control the water quality to exclude conductive material, and clean the device periodically.
- The application which the electric conductivity changes or non-homogeneous fluid Do not use the device for the following fluid conditions even if the electric conductivity, temperature, and pressure are within the device specifications. Those fluid may cause of inaccurate flow measurement.
- Fluids that have sufficient conductivity at high temperature but do not meet the conductivity requirement at room temperature (about 20 °C (68 °F)). (e.g. fatty acids and soap)
- Some fluids contain surfactant (e.g. rinse, shampoo and CWM (coal water mixture))
- Insulating adhesive materials (e.g. kaolinite, kaolin, calcium stearate)
- The analog output may fluctuate due to flow noise, which is generated by the process fluid flow. In such a case, connect the upstream grounding ring to the downstream grounding ring by a wire. The output fluctuation may be reduced.

Caution On PLC Connection

- A circuit in some PLC may affect the flow measurement and the analog output may fluctuate. In this case, make sure that the both PLC and the MagneW Two-wire PLUS+ flowmeter are properly grounded. Proper grounding solves the fluctuation problem.

MODEL SELECTION

Two-wired magnetic flowmeter

TIIS/KCs Explosion-protected apparatus, Integral model (2.5 to 200 mm (0.1 to 8 inches))

MTG15A - I II III IV V VI VII VIII IX - X XI - Options (some options can be selected per each model)

Basic model no.			Selections										Optional selections		Options	
MTG15A																
I	Line size	2.5 mm (0.1 inch) (flange type only)	002													
		5 mm (0.2 inch) (flange type only)	005													
		10 mm (3/8 inch) (flange type only)	010													
		15 mm (0.5 inch) (flange type only)	015													
		25 mm (1 inch)	025													
		40 mm (1-1/2 inches)	040													
		50 mm (2 inches)	050													
		65 mm (2-1/2 inches)	065													
		80 mm (3 inches)	080													
		100 mm (4 inches)	100													
		150 mm (6 inches) (flange type only)	150													
		200 mm (8 inches) (flange type only)	200													
		II	Lining	PFA	P											
III	Pipe connection	Wafer JIS10K	11													
		Wafer JIS16/20K	12													
		Wafer JIS30K	13													
		Wafer ANSI 150	21													
		Wafer ANSI 300	22													
		Wafer JPI 150	61													
		Wafer JPI 300	62													
		Flange JIS10K	J1													
		Flange JIS20K	J2													
		Flange JIS30K	J3													
		Flange JIS10K (for 10 mm) *1	J4													
		Flange ANSI 150	A1													
		Flange ANSI 300	A2													
		Flange JPI 150	P1													
Flange JPI 300	P2															
IV	Electrode	SUS316L	L													
		ASTM B574 (Hastelloy C-276 equivalent)	C													
		Titanium	K													
		Zirconium	H													
		Tantalum	T													
		Platinum	P													
V	Grounding ring	SUS316	S													
		ASTM B575 (Hastelloy C-276 equivalent)	C													
		Titanium	K													
		Zirconium	H													
		Tantalum	T													
		Platinum	P													
VI	Wiring connection	G1/2 right side terminal / with 1-piece flameproof cable gland	F													
		G1/2 left side terminal / with 1-piece flameproof cable gland	G													
		G1/2 with 2-piece flame proof cable gland	H													
VII	Face to face dimension	Standard	A													
		Replacement for SMT3000 (for wafer type 40 to 100 mm)	S													
VIII	Installation / Display direction	Horizontal piping / Display standard direction	A													
		Horizontal piping / Display reverse direction	B													
		Horizontal piping / Display downstream side direction	C													
		Horizontal piping / Display upstream side direction	D													
		Vertical piping / Display right side viewed from the front	E													
		Vertical piping / Display left side viewed from the front	F													
IX	Calibration	Standard	J													

Optional selections		Options	
X	Finish	Standard finish	X
2		Corrosion-proof finish	
X	Bolt and nut	None	XI
2		SUS304 (only for wafer type)	

Note)
 *1. Only for diameter of 2.5 to 10 mm.
 *2. Flange for diameter of 2.5 to 15 mm is 15 mm.
 *3. Must be selected if tagging is required

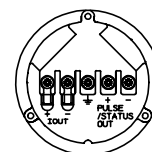
<Wiring connection>

Wiring - code F Wiring - code G Wiring - code H

<Installation / display direction>


Display direction code "A" Display direction code "B"
 Display direction code "C" Display direction code "D"
 Display direction code "E" Display direction code "F"

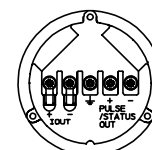
Flange type 2.5 mm

[illegible]

Terminal box

Terminal table

Symbol	Description
I.OUT	Flow rate signal
	Grounding
PULSE/ STATUS OUT	Pulse output or contact output (selectable)

[illegible]

Terminal box

Terminal table


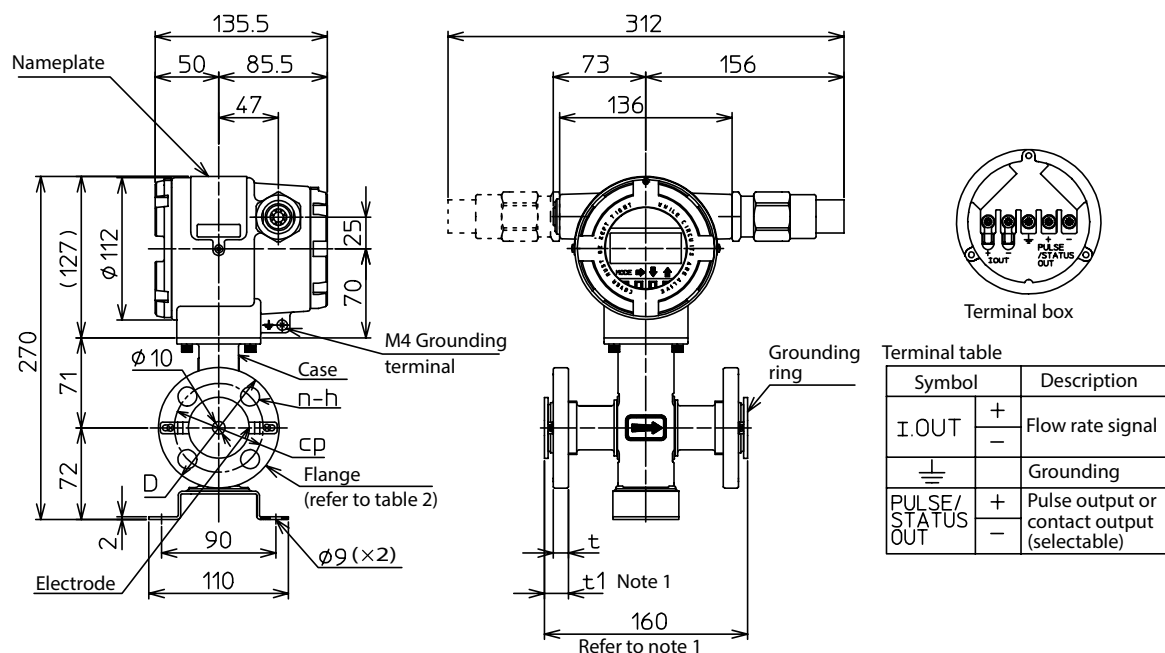
Symbol		Description
I.OUT	+	Flow rate signal
	-	
		Grounding
PULSE/ STATUS OUT	+	Pulse output or contact output (selectable)
	-	

Table 1.

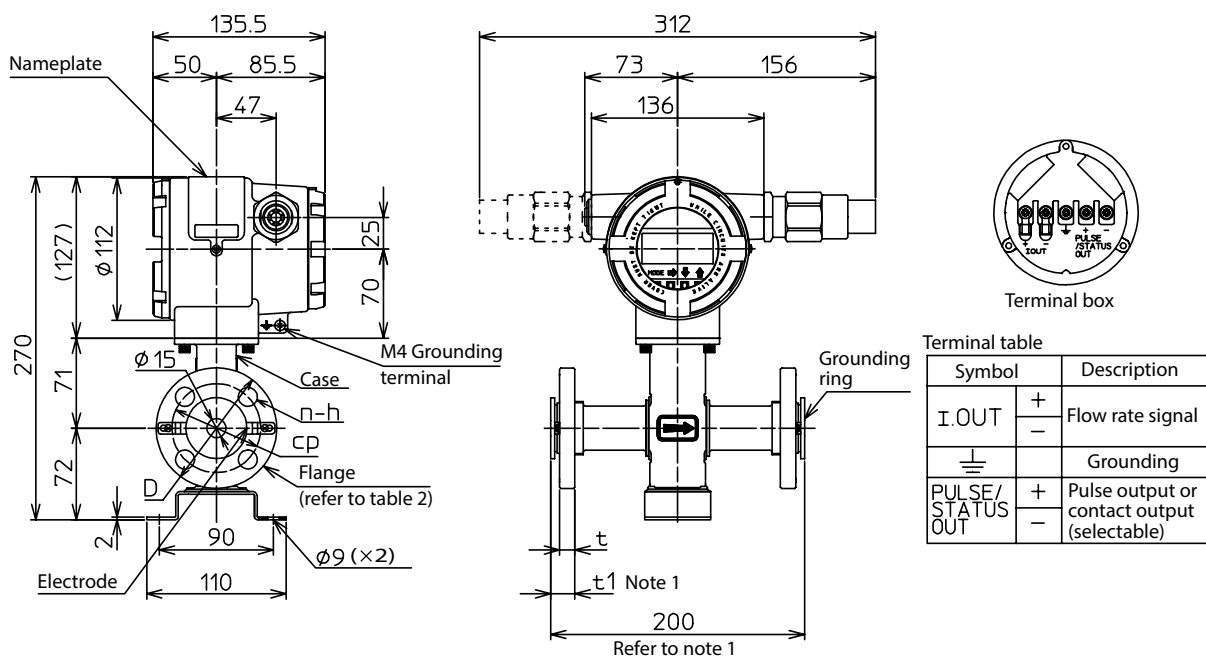
Model no.		J1	J2	J3	J4	A1	A2	P1	P2
Flange rating		JIS				ANSI		JPI	
		10K	20K	30K	10K 10 mm flange	150	300	150	300
Dimension size (mm)	D	95	95	115	90	89	95	89	95
	t	12	14	18	12	9.5	12.5	9.5	12.5
	t1	19.5	21.5	25.5	19.5	17	20	17	20
	Cp	70	70	80	65	60.5	66.5	60.5	66.5
	n	4	4	4	4	4	4	4	4
	h	15	15	19	15	16	16	16	16
	Bolt	M12	M12	M16	M12	1/2	1/2	UNC1/2	UNC1/2
Weight (kg)		6.8	7	8	6.7	6.4	6.9	6.4	6.9

Flange type 10 mm

(Unit : mm)



Flange type 15 mm



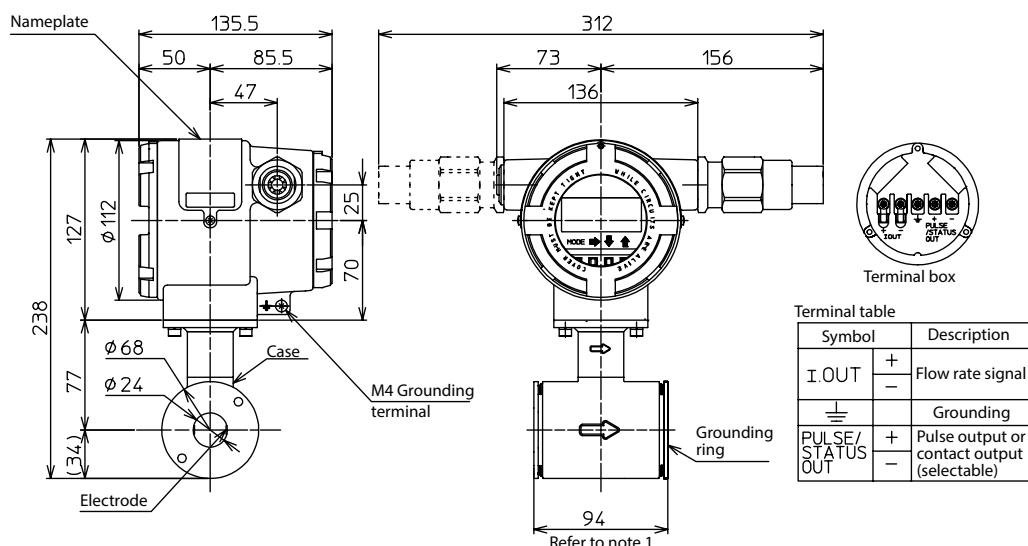
Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 2.

Model no.		J1	J2	J3	J4	A1	A2	P1	P2
Flange rating		JIS				ANSI		JPI	
		10K	20K	30K	10K 10 mm flange	150	300	150	300
Dimension size (mm)	D	95	95	115	90	89	95	89	95
	t	12	14	18	12	9.5	12.5	9.5	12.5
	t1	19.5	21.5	25.5	19.5	17	20	17	20
	Cp	70	70	80	65	60.5	66.5	60.5	66.5
	n	4	4	4	4	4	4	4	4
	h	15	15	19	15	16	16	16	16
	Bolt	M12	M12	M16	M12	1/2	1/2	UNC1/2	UNC1/2
Weight (kg)		6.8	7	8	6.7	6.4	6.9	6.4	6.9

Wafer type 25 mm

(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
length (mm)	10K	20K	30K	150	300	150	300
Bolt	M16	M16	M16	1/2 13UNC	5/8 11UNC	12 13UNC	5/8 11UNC

Flange type 25 mm

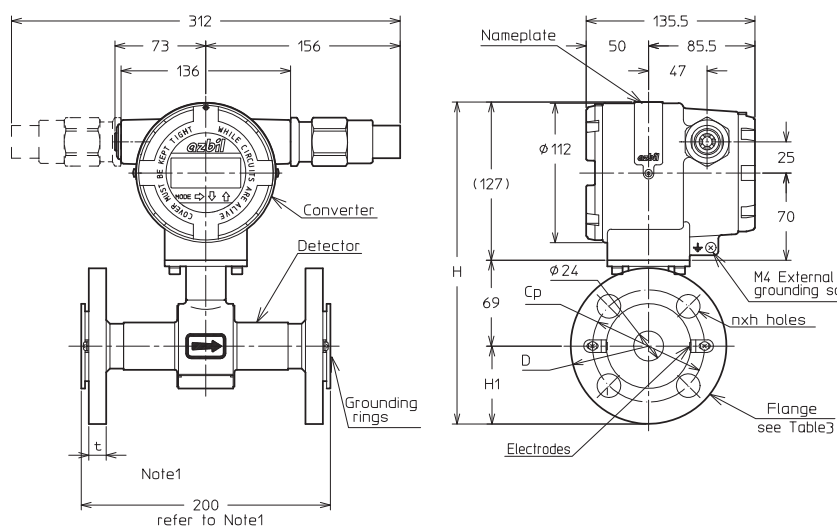


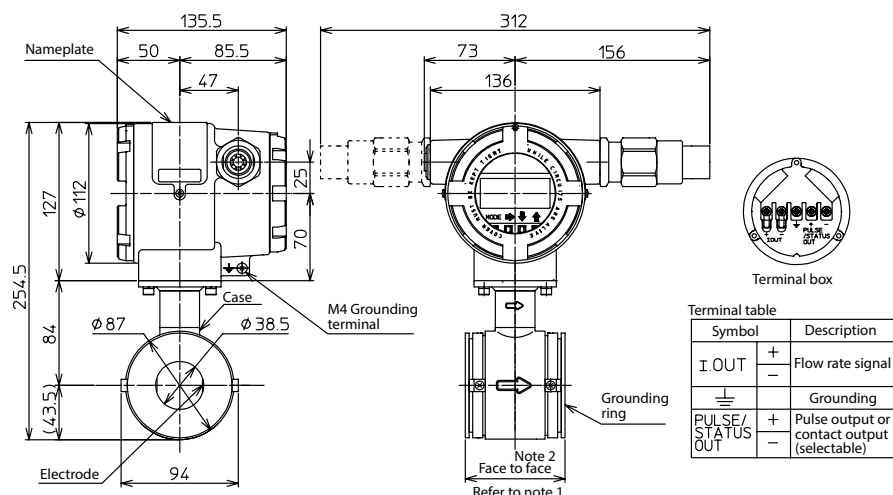
Table 3.

Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Model no.	J1	J2	J3	A1	A2	P1	P2
Flange rating	JIS			ANSI		JPI	
Dimension size (mm)	10K	20K	30K	150	300	150	300
H	259	259	261	250	258	250	258
H1	63	63	65	54	62	54	62
D	125	125	130	110	125	110	125
t	14	16	20	15	18	15	18
t1	20	22	26	21	24	21	24
Cp	90	90	95	79.4	88.9	79.4	88.9
n	4	4	4	4	4	4	4
h	19	19	19	16	19	16	19
Bolt	M16	M16	M16	1/2	5/8	UNC1/2	UNC1/2
Weight (kg)	9.2	9.5	10.3	8.6	9.6	8.6	9.6

Wafer type 40 mm

(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Note)2

Face-to-face dimension code.	Size (mm)
A	80
S	98

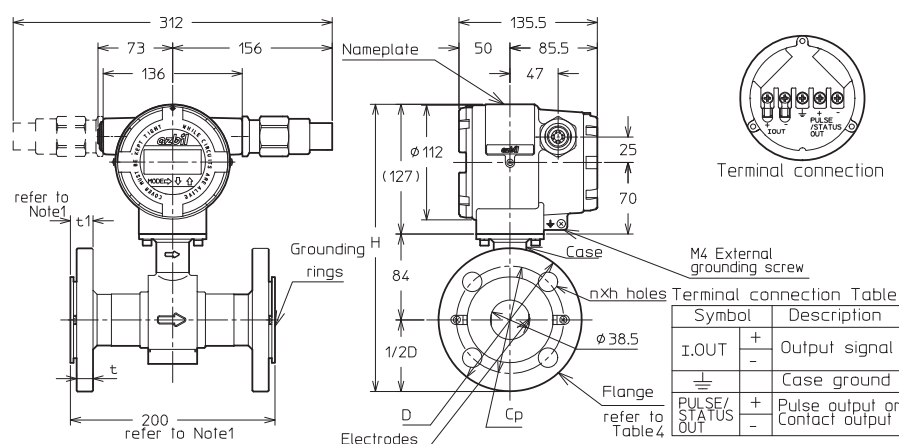
Face-to-face dimension code "A"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	200	200	200	170	210	170	210
Bolt	M16	M16	M16	1/2 13UNC	5/8 11UNC	12 13UNC	5/8 11UNC

Face-to-face dimension code "S"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	200	200	200	170	210	170	210
Bolt	M16	M16	M16	1/2 13UNC	5/8 11UNC	12 13UNC	5/8 11UNC

Flange type 40 mm



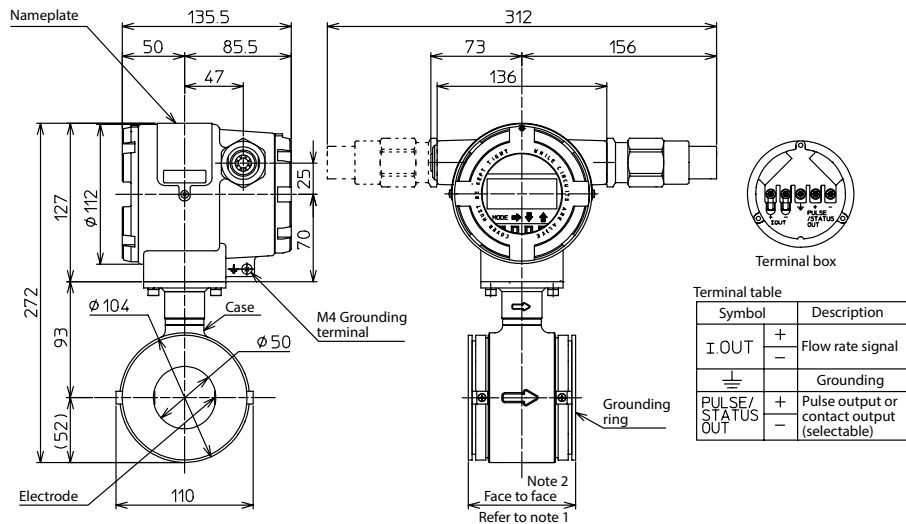
Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 4.

Model no.	J1	J2	J3	A1	A2	P1	P2
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Dimension size (mm)	H	281	281	291	273.5	288.5	273.5
	D	140	140	160	125	155	125
	t	16	18	22	18	21.5	18
	t1	22	24	28	24	27.5	24
	Cp	105	105	120	98.4	114.3	98.4
	n	4	4	4	4	4	4
	h	19	19	23	16	22	16
Bolt	M16	M16	M20	1/2	3/4	UNC1/2	UNC3/4
Weight (kg)	8.3	8.6	11.0	7.9	10.3	7.9	10.3

Wafer type 50 mm

(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Note)2

Face-to-face dimension code.	Size (mm)
A	80
S	98

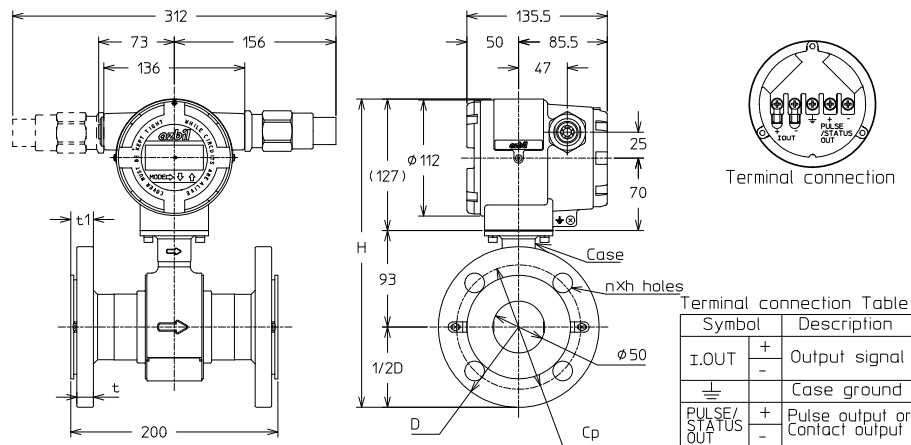
Face-to-face dimension code "A"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	200	200	200	210	210	210	210
Bolt	M16	M16	M16	5/8 11UNC	5/8 11UNC	5/8 11UNC	5/8 11UNC

Face-to-face dimension code "S"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	200	200	200	210	210	210	210
Bolt	M16	M16	M16	5/8 11UNC	5/8 11UNC	5/8 11UNC	5/8 11UNC

Flange type 50 mm



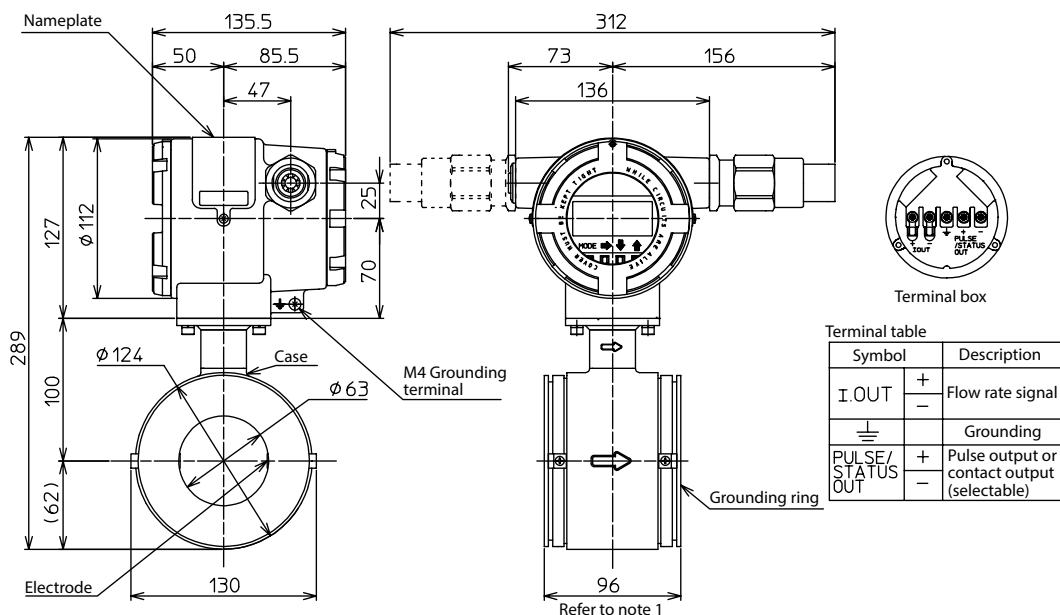
Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 5.

Model no.	J1	J2	J3	A1	A2	P1	P2
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Dimension size (mm)	H	297.5	297.5	302.5	295	302.5	295
	D	155	155	165	150	165	150
	t	16	18	22	19.5	23	19.5
	t1	22	24	28	25.5	29	25.5
	Cp	120	120	130	120.7	127	120.7
	n	4	8	8	4	8	4
	h	19	19	19	19	19	19
	Bolt	M16	M16	M16	5/8	5/8	UNC5/8
Weight (kg)	11.9	12.0	13.7	12.4	13.9	12.4	13.9

Wafer type 65 mm

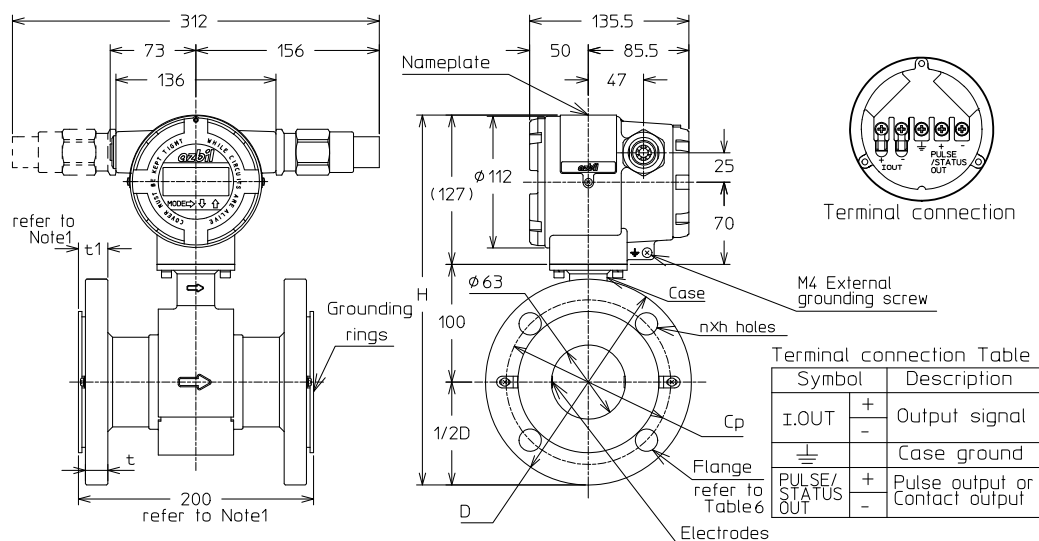
(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
length (mm)	10K	20K	30K	150	300	150	300
Screw size	200	200	200	210	240	210	240
	M16	M16	M20	5/8 11UNC	3/4 10UNC	5/8 11UNC	3/4 10UNC

Flange type 65 mm



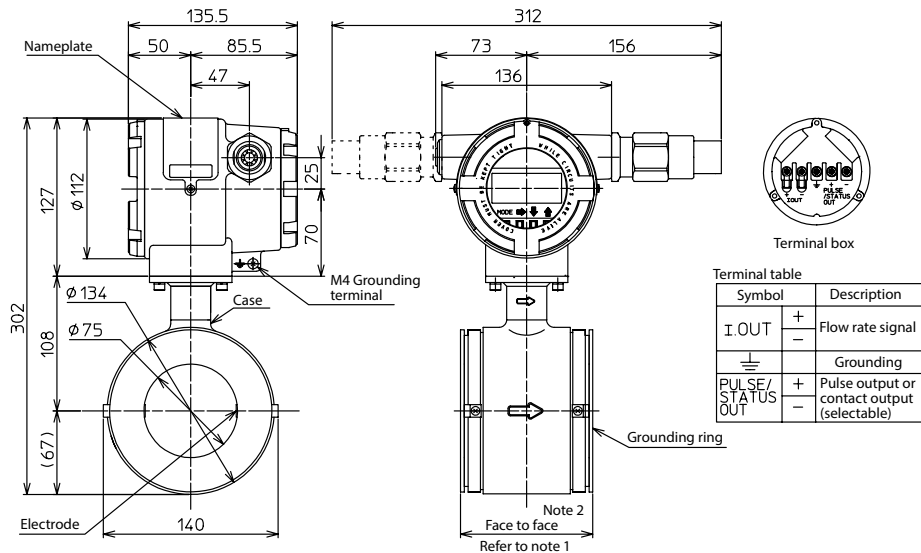
Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 6.

Model no.	J1	J2	J3	A1	A2	P1	P2
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Dimension size (mm)	H	314.5	314.5	327	317	322	317
	D	175	175	200	180	190	180
	t	18	20	26	23	26	23
	t1	24	26	32	29	32	29
	Cp	140	140	160	139.7	149.2	139.7
	n	4	8	8	4	8	4
	h	19	19	23	19	22	19
	Bolt	M16	M16	M20	5/8	5/8	UNC5/8
Weight (kg)	13.9	14.0	15.7	14.7	15.2	14.7	15.2

Wafer type 80 mm

(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Note)2

Face-to-face dimension code.	Size (mm)
A	106
S	130

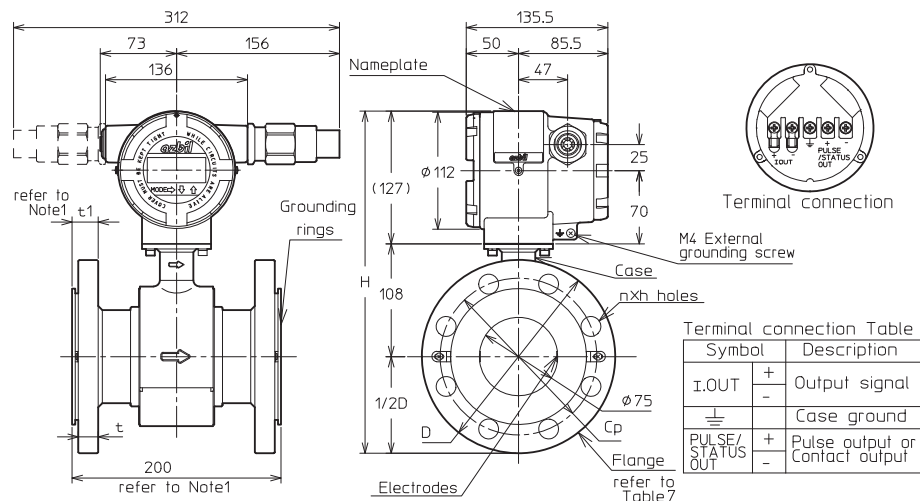
Face-to-face dimension code “A”

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	200	250	250	210	240	210	240
Bolt	M16	M20	M20	5/8 11UNC	3/4 10UNC	5/8 11UNC	3/4 10UNC

Face-to-face dimension code “S”

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	240	250	250	250	300	250	300
Bolt	M16	M16	M16	5/8 11UNC	3/4 10UNC	5/8 11UNC	3/4 10UNC

Flange type 80 mm



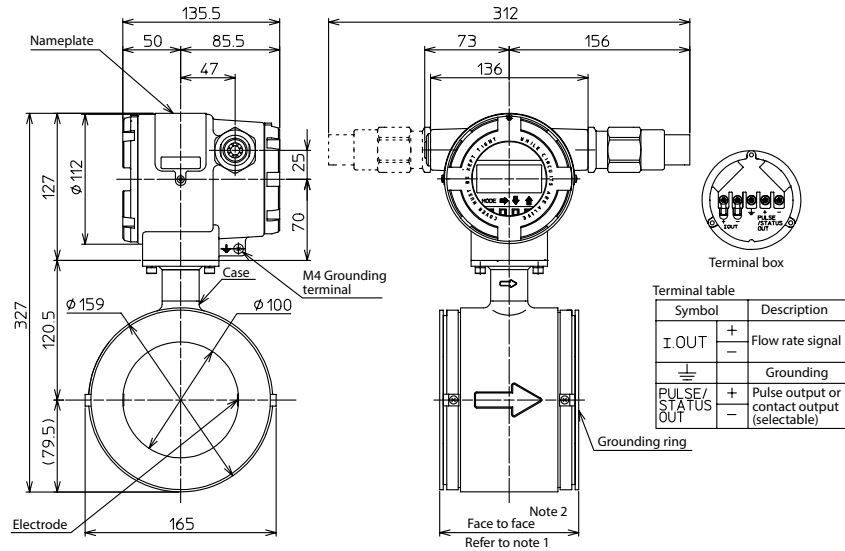
*Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)*

Table 7.

Model no.		J1	J2	J3	A1	A2	P1	P2
Flange rating		JIS			ANSI		JPI	
		10K	20K	30K	150	300	150	300
Dimension size (mm)	H	327.5	335	340	330	340	330	340
	D	185	200	210	190	210	190	210
	t	18	22	26	24.5	29	24.5	29
	t1	24	28	34	30.5	35	30.5	35
	Cp	150	160	170	152.4	168.3	152.4	168.3
	n	8	8	8	4	8	4	8
	h	19	23	23	19	22	19	22
	Bolt	M16	M20	M20	5/8	3/4	UNC5/8	UNC3/4
Weight (kg)		14.4	16.7	20.4	17.6	20.4	17.6	20.4

Wafer type 100 mm

(Unit : mm)



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Note)2

Face-to-face dimension code.	Size (mm)
A	120
S	150

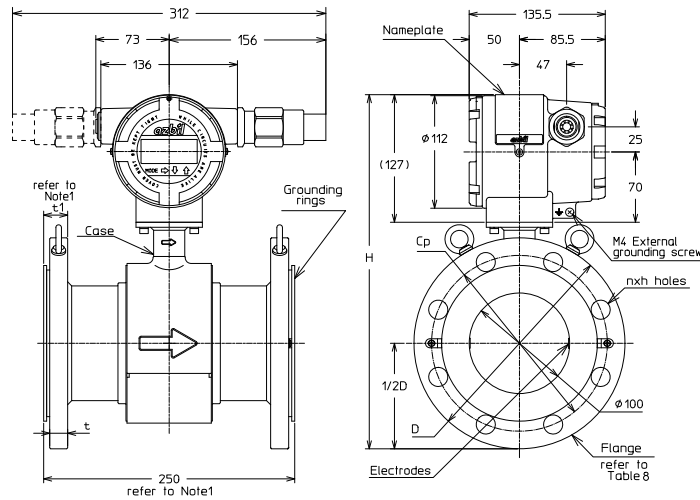
Face-to-face dimension code "A"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	240	250	310	250	300	250	300
Bolt	M16	M20	M20	5/8 11UNC	3/4 10UNC	5/8 11UNC	3/4 10UNC

Face-to-face dimension code "S"

Model no.	11	12	13	21	22	61	62
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Length (mm)	240	300	310	250	300	250	300
Bolt	M16	M20	M22	5/8 11UNC	3/4 10UNC	5/8 11UNC	3/4 10UNC

Flange type 100 mm



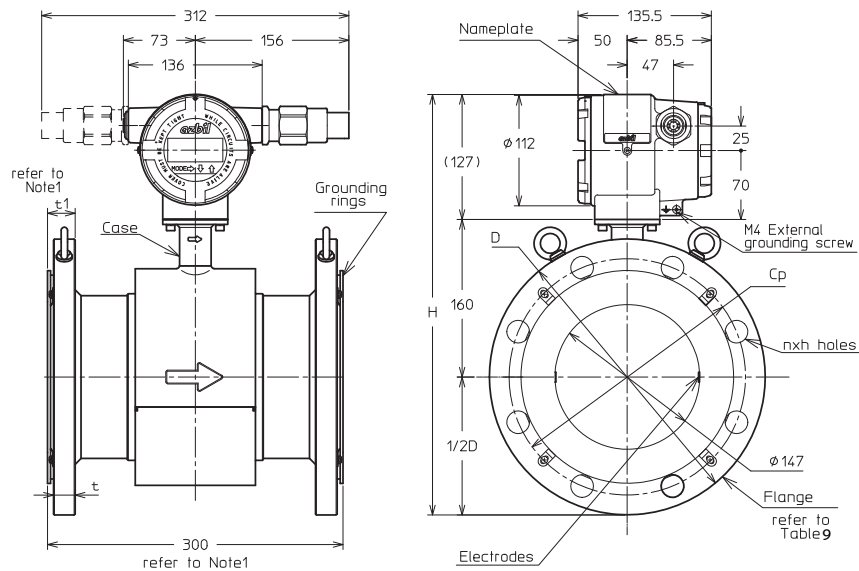
Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 8.

Model no.	J1	J2	J3	A1	A2	P1	P2
Flange rating	JIS			ANSI		JPI	
	10K	20K	30K	150	300	150	300
Dimension size (mm)	H	352.5	360	367.5	362.5	375	362.5
	D	210	225	240	230	255	230
	t	18	24	30	24.5	32.5	24.5
	t1	24	30	38	30.5	38.5	30.5
	Cp	175	185	195	190.5	200	190.5
	n	8	8	8	8	8	8
	h	19	23	25	19	22	19
	Bolt	M16	M20	M22	5/8	3/4	UNC5/8
Weight (kg)	20.2	23.7	28.6	25.2	34.0	25.2	34.0

Flange type 150 mm

(Unit : mm)

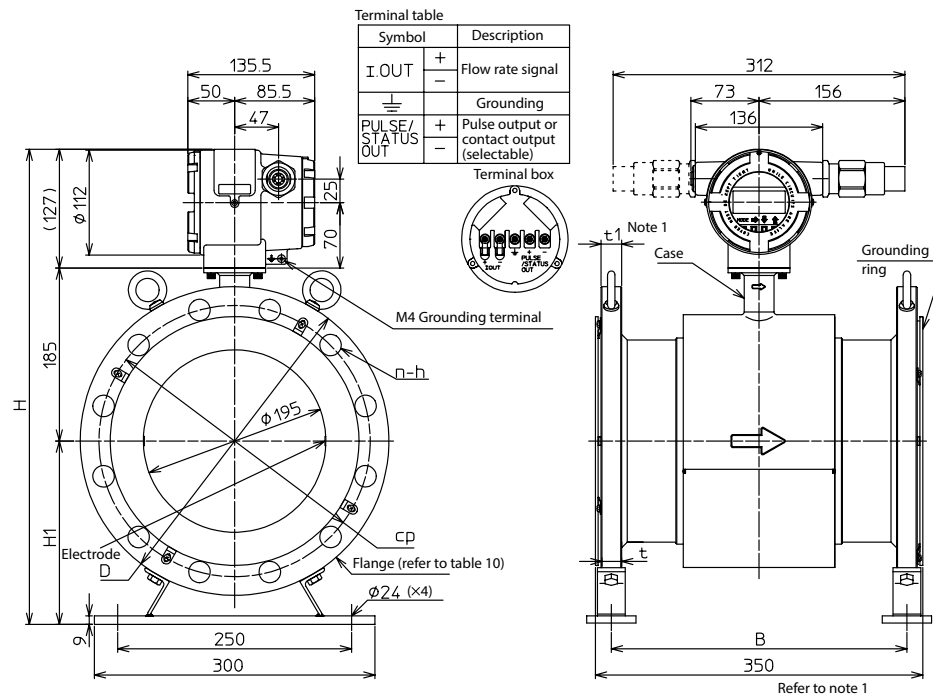


Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 9.

Model no.		J1	J2	J3	A1	A2	P1	P2
Flange rating		JIS			ANSI		JPI	
		10K	20K	30K	150	300	150	300
Dimension size (mm)	H	427	439.5	449.5	427	447	427	447
	D	280	305	325	280	320	280	320
	t	22	28	36	26	37	26	37
	t1	28	34	44	32	43	32	43
	Cp	240	260	275	241.3	269.9	241.3	269.9
	n	8	12	12	8	12	8	12
	h	23	25	27	22	22	22	22
	Bolt	M20	M22	M24	3/4	3/4	UNC3/4	UNC3/4
Weight (kg)		32.4	39.7	52.3	34.6	52.1	34.6	52.1

Flange type 200 mm



Note) 1. When grounding ring material is SUS316, gasket is not required.
When grounding ring material is other than SUS316, 3 mm of Teflon gasket is included to the dimensions. (Dimensions of gasket for plastic piping includes grounding ring)

Table 10.

Model no.		J1	J2	J3	A1	A2	P1	P2
Flange rating		JIS			ANSI		JPI	
		10K	20K	30K	150	300	150	300
Dimension size (mm)	H	508	515	531	516	537	516	537
	H1	196	203	219	204	225	204	225
	D	330	350	370	345	380	345	380
	t	22	30	40	29	42	29	42
	t1	28	36	48	35	48	35	48
	Cp	290	305	320	298.4	330.2	298.4	330.2
	n	12	12	12	8	12	8	12
	h	23	25	27	22	26	22	26
	Bolt	M20	M22	M24	3/4	7/8	UNC3/4	UNC7/8
	B	316	308	296	308	295	308	295
Weight (kg)		50	60	87	61	88	61	88

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