Panasonic

EWA1
Air Flow Monitor
User's Manual

WUME-EWA1-2

Cautions for Your Safety

Read the manual carefully before installing, running and maintenance for proper operation.
Before using, master the knowledge of the equipment, safety information and all of other notes.
This manual uses three safety flags to indicate different levels of danger.

⚠ **DANGER**	A handling error could cause death or serious injury and when the warning emergency (degree of urgency) at the time of the dangerous outbreak requires.
⚠ **WARNING**	A handling error could cause serious physical injury to an operator and in the worst case could even be fatal.
⚠ **CAUTION**	A handling error could cause serious physical injury to an operator or damage to the equipment.

Caution for Use

⚠ **DANGER**	●Do not use for the usage required the safety such as nuclear power, railway, aviation, vehicle, play equipment and so on. ●Do not remodel the product. ●This is not for sanitary use. Do not use for food, beverage, medicinal solution and so on. ●This specification is not explosion protection. Do not use this in areas with inflammable gas.

Usage Environment, Measurable fluids

⚠ **CAUTION**	●Do not use for fluid except air (compressed air using in factory). ●Use within the temperature range (-10 to +60℃), humidity range (max. 90%RH) and pressure range (atmospheric pressure to 1MPa). ●Do not use in air with corrosive gas (chlorine, hydrogen sulfide etc.) and do not use for fluid with corrosive gas. ●This product is not totally waterproof construction. (IP64) ●Apart from noise resource as much as possible. In case of install the place near noise resource, ground the shield of external connection cable. ●When it is exposed the direct sun, it is recommended to mount sun shade.

Caution for operations

⚠ **CAUTION**	●Open valve slowly or it may break down.

Caution for storage

⚠ **DANGER**	●Keep the place where is no fire and no direct sun. ●Do not place the flammable and heat generator near the product. ●Keep the place where the temperature is the range of -20 to +70℃ with no condensing.

Caution for piping

⚠ **WARNING**	●Do not use this product as a step or do not get on this product. ●Do not hold the display part when carrying this product.
⚠ **CAUTION**	●Install a device that disturbs flow such as an adjusting valve to downstream of this product. ●When it is installed to new piping, be sure to wash pipe enough before installing. ●Vertical piping is recommended for measuring the fluid with much mist or dust. When installing to the horizontal pipe, turn up the display. ●Do not install to the place where strong forces of compression and tension are added. ●Install the product Depending on the flow direction as indicated on the products. ●Do not add excess power by dropped or hit. ●Do not add power except the rotated direction when rotating the display part. ●Do not touch the ultrasonic sensor.

Caution for wiring

⚠ **DANGER**	●Wire correctly according to the instructions. ●Use within the ratings. ●Do not use with voltage excess the permissive load.
⚠ **CAUTION**	●Do not wire with power wires. ●Do not add tension to the external connection cable. ●Do not submerge the external connection cable during wiring. ●Do not short when connecting power supply line of the external connection cable to external power supply. Use the external power supply that has short-circuited protector. ●Be sure to stop the external power supply during wiring. ●Do not touch and wire with wet hand.

Disassemble/Check

⚠ **CAUTION**	●Do not dismantle or remodel the product. ●Pilot lamp is blinking when flow is exist. If the lamp is not blinking, please contact us. ●When the product is used for fluid with much mist or dust, confirm it regularly and clean it. ●Do not touch the ultrasonic sensor when check.

Copyright and trademark

Introduction

Thank you very much indeed for purchasing
'Air Flow Monitor EWA1 series'.
In this manual, we explain the usage of
'Air Flow Monitor EWA1 series' in detail.
Please use it correctly after understanding the content enough.

Table of Contents

Chapter 1 Unit's Outline

1.1 Check the Packing

Make sure to check the packing parts.

Packing parts	Quantity						
Air Flow Monitor (main unit)	1						
M4 hex wrench	1						
Positioning collar (For medium pipe size type and large pipe size type)	Medium pipe size (all)		4	ϕ23.5×25			
	Large pipe size	AEWA1100	2	ϕ19×25			
		AEWA1150		ϕ23×30			
		AEWA1200		ϕ23×30			
Flange packing (Only for medium pipe size type)	Medium pipe size	AEWA1040	2	ϕ140×ϕ49			
		AEWA1050	2	ϕ155×ϕ61			
		AEWA1065	2	ϕ175×ϕ84			
		AEWA1080	2	ϕ185×ϕ90			
Bolt set (bolt, nut, washer) (Only for medium pipe size type)	Medium pipe size			bolt	length	nut	washer
		AEWA1040	4 sets	M16	180	8	8
		AEWA1050	4 sets	M16	180	8	8
		AEWA1065	4 sets	M16	210	8	8
		AEWA1080	8 sets	M16	210	16	16
Installation instructions	1						


Main unit


Positioning collar


Hex wrench


Flange packing


Bolt set

1.2 Product Name and Model Number

1.2.1 Main Unit

Product name	Pipe size	Model No.	Accessories
Air Flow Monitor (Small pipe size type)	25A (1B)	AEWA1025	M4 hex wrench: 1 Installation instructions: 1
	32A (1 1/4B)	AEWA1032	
Air Flow Monitor (Medium pipe size type)	40A (1 1/2B)	AEWA1040	Positioning collar: 4 M4 hex wrench: 1 Flange packing: 2 Bolt set: 1 (bolt, nut, washer) Installation instructions: 1
	50A (2B)	AEWA1050	
	65A (2 1/2B)	AEWA1065	
	80A (3B)	AEWA1080	
Air Flow Monitor (Large pipe size type)	100A (4B)	AEWA1100	Positioning collar:2 M4 hex wrench: 1 Installation instructions: 1
	150A (6B)	AEWA1150	
	200A (8B)	AEWA1200	

1.2.2 Option

Product name	Model No.	Cable length
Connection cable	AEWA1C05	5m
	AEWA1C20	20m

1.3 Measurement Items

●Small pipe size type, Medium pipe size type

Measurement items	Display	Unit (With normal conversion)	Data range (Display range)
Integrated direct flow	Main display	Nm^3 *1	0 to 99999999.9
Integrated reverse flow	Main display	Nm^3 *1	0 to -9999999.9
Trip integrated flow (Only direct flow display mode)	Main display	Nm^3 *1	0 to 9999999.9
Instant flow	Main display	NL/min *2	0 to 99999.99
	Sub display	NL/min *2	0 to 999.99 (Up to 200Nm^3/h) 0 to 9999.9 (200 to 2000 Nm^3/h) 0 to 9999 (Over 2000Nm^3/h)
Temperature	Sub display	℃	-30.0 to 80.0
Pressure	Sub display	kPa	0 to 9999.9

*1 Without normal conversion: m^3
*2 Without normal conversion: L/min

●Large pipe size type

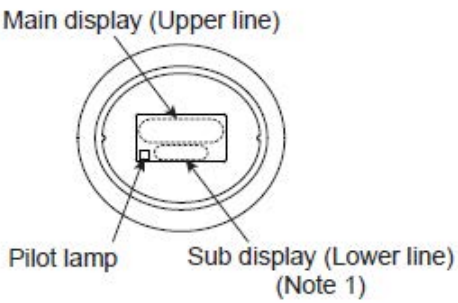
Measurement items	Display	Unit (With normal conversion)	Data range (Display range)
Integrated direct flow	Main display	Nm^3 *1	0 to 9999999999
Integrated reverse flow	Main display	Nm^3 *1	0 to -999999999
Trip integrated flow (Only direct flow display mode)	Main display	Nm^3 *1	0 to 999999999
Instant flow	Main display	NL/min *2	0 to 9999999
	Sub display	Nm^3/h *3	0 to 9999.9 (Up to 2000Nm^3/h) 0 to 99999 (Over 2000Nm^3/h)
		<for 200A> x10Nm^3/h *3	
Temperature	Sub display	℃	-99.9 to 99.9
Pressure	Sub display	kPa	0 to 9999.9

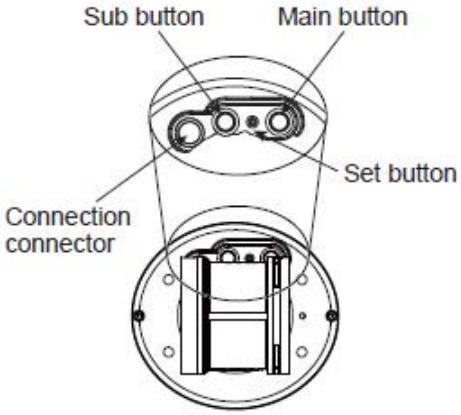
*1 Without normal conversion: m^3
*2 Without normal conversion: L/min
*3 Without normal conversion: m^3/h or ×10m^3/h

Chapter 2 Parts Name

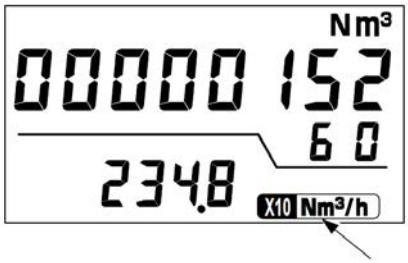
2.1 Parts Names

Common

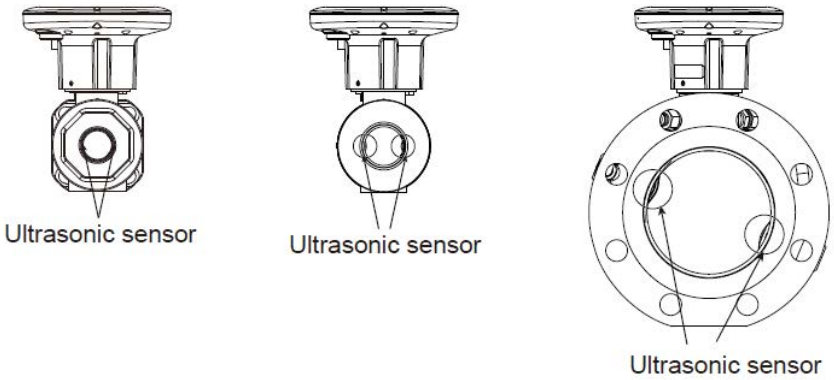




Note1) Unit seal is put on the sub display (lower) of AEWA1200. Do not peel off the seal.



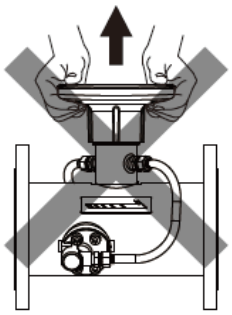
Small pipe size type | Medium pipe size type | Large pipe size type



Chapter 3 Installation

It is recommended to set the settings before installing. Refer to ‘Chapter 5 Settings’ for setting.
This product can be installed with horizontal piping and vertical piping in indoor or the outdoors where is not exposed the direct sunlight

<Warning>
Do not hold the display part when carrying.



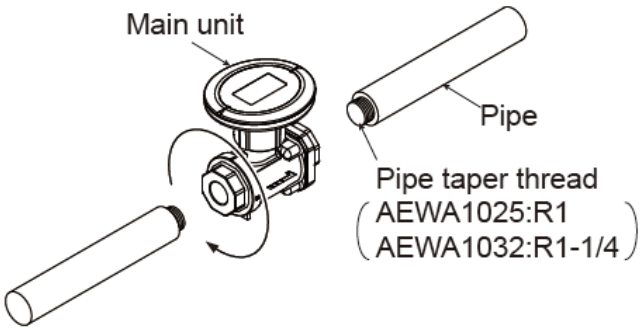
<Cautions for installation>
1) When installing this to the horizontal pipe, turn up the display.
2) This product is not waterproof construction.
3) Caution not to enter the abnormal materials such as welding tip, dust or seal adhesive when piping. When it is installed to new piping, be sure to wash pipe enough before installing.
4) Do not install to the place where strong forces of compression and tension are added.
5) Do not touch the internal of this product (ultrasonic sensor) and do not add an excess power by dropped or hit.

<How to install>
1. Match the direct flow direction and the arrow mark on the main unit.

2. Adjust the center axis of main unit and the pipe and install according to the below.

Small pipe size type

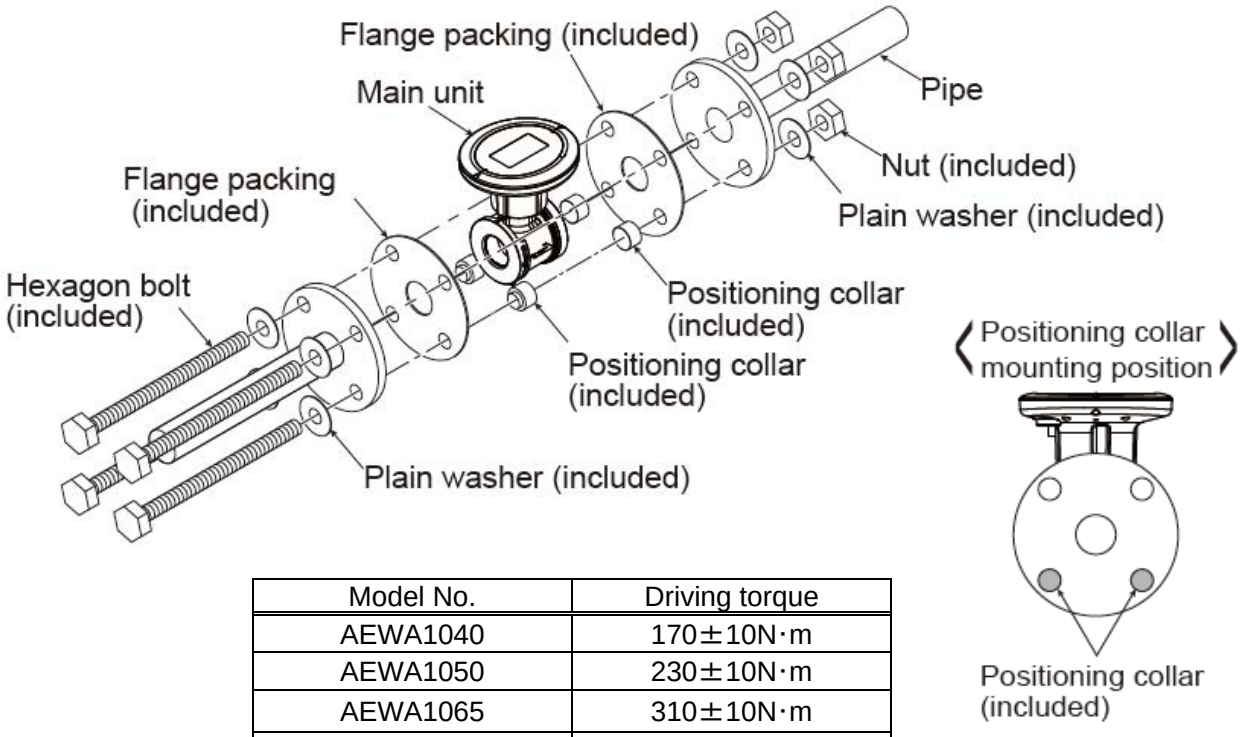
・Install by driving the pipe taper thread.
・Wind up seal tape for avoiding air leak at installing.



Model No.	Driving torque
AEWA1025	37±1N·m
AEWA1032	48±1N·m

Medium pipe size type

・Install by inserting with using the bolt set (included).
・If you put on the positioning collar (included) as this figure and install this according to the positioning collar, it can reduce the gap of the center.



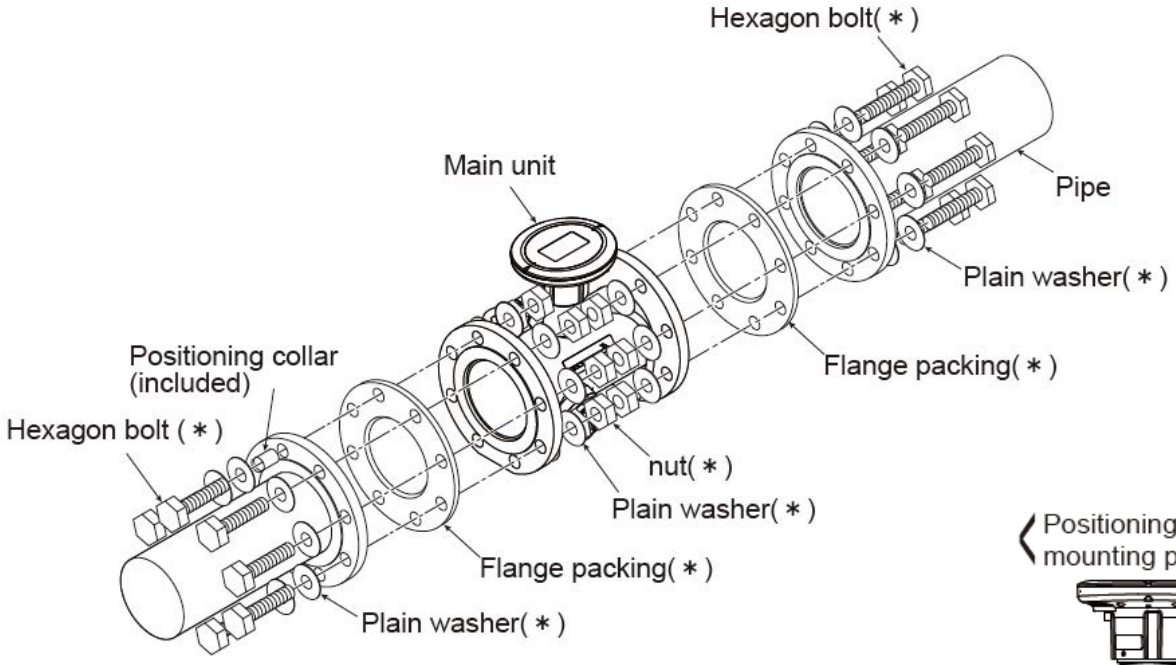
Model No.	Driving torque
AEWA1040	170±10N·m
AEWA1050	230±10N·m
AEWA1065	310±10N·m
AEWA1080	170±10N·m

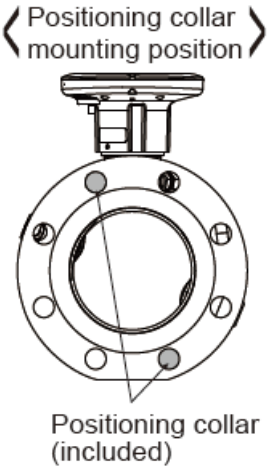
Note1) Tighten it equally not to become uneven clamping.
Note2) Do not let the flange packing enter inside the pipe.

Large pipe size type

・Install by flange with using bolts and nuts.
Please prepare bolts, nuts, flange packing and so on (with ∗ mark).

・If you put on the positioning collar (included) as this figure and install this according to the positioning collar, it can reduce the gap of the center.



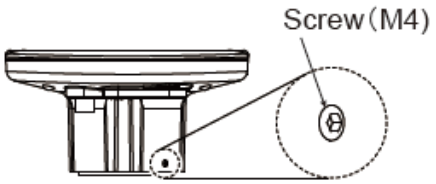


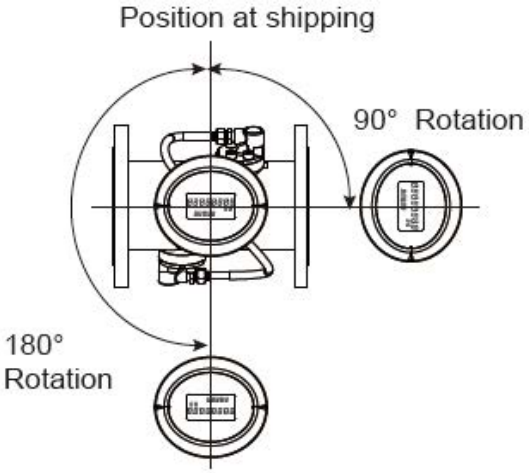
Model No.	Hexagon bolt	Driving torque
AEWA1100	M16(L=65mm): 16 sets	140±10N·m
AEWA1150	M20(L=75mm): 16 sets	300±10N·m
AEWA1200	M20(L=75mm): 24 sets	250±10N·m

Note1) Tighten it equally not to become uneven clamping.
Note2) Do not let the flange packing enter inside the pipe.

Rotation of Display

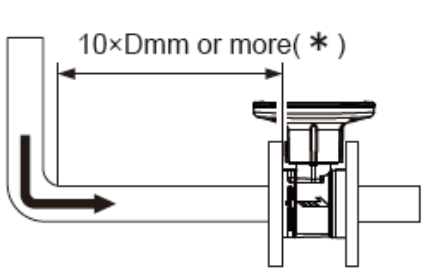
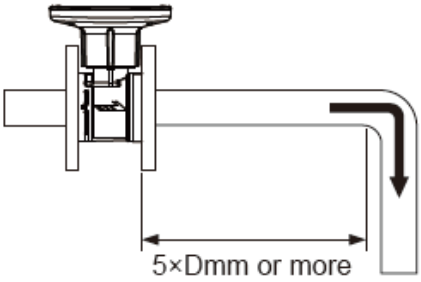
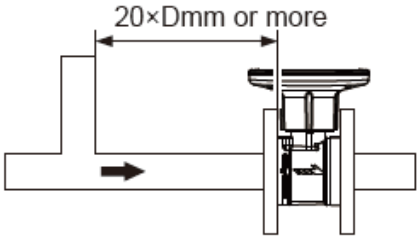
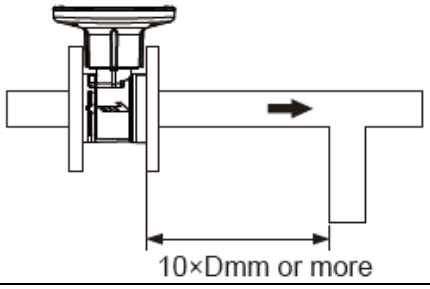
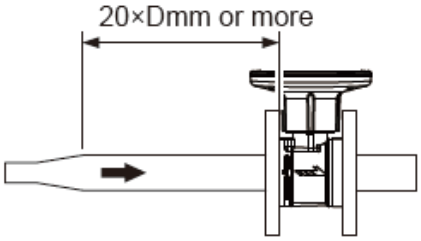
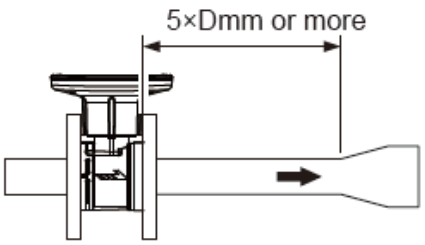
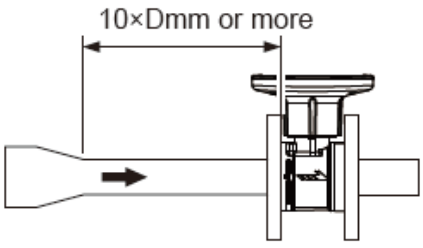
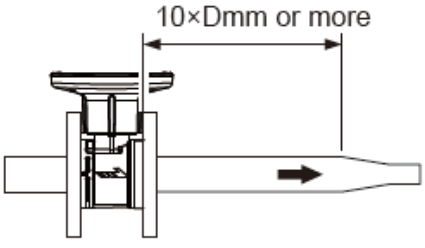
If you loosen the screw (M4) at the side of the display part (downside of button), the display part can be rotated as you like.
After rotated the display part, be sure to tighten up the screw to fix it.





The length of straight pipe parts is shown in the below depending on the pipe work condition.
(Common to horizontal piping and vertical piping)

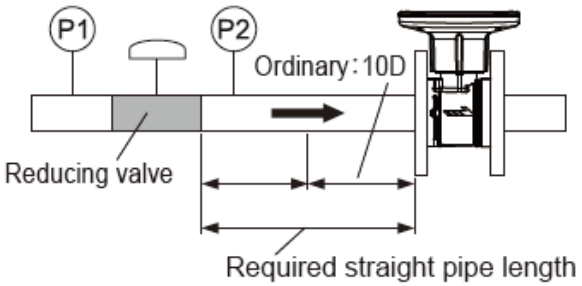
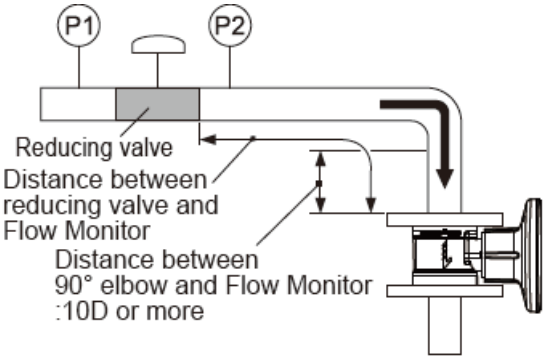
It is recommended the length of straight pipe as below depending on the piping conditions.
(Common to horizontal piping and vertical piping)
When ‘direct/reverse flow’ is selected at Display/Output select [F1], use the length for upstream to both of upstream and downstream.

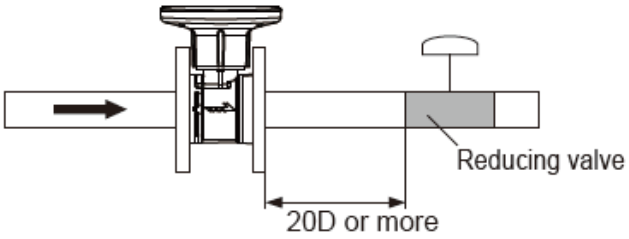
Condition	Upstream	Downstream
90° elbow Full-bore valve full-open		
Junction pipe		
Expansion pipe		
Reducing pipe		

*Min. 20 x D mm for small pipe size type (D: pipe size)

In case of installing this product to the place near reducing valve or adjusting valve, ultrasonic noise may generate inside the pipe. Keep strictly the required straight pipe length as below.
Especially, in case of installing this product to the downstream side of a reducing valve, it has big restrictions. (If it doesn't meet the required condition, it may not measure.)

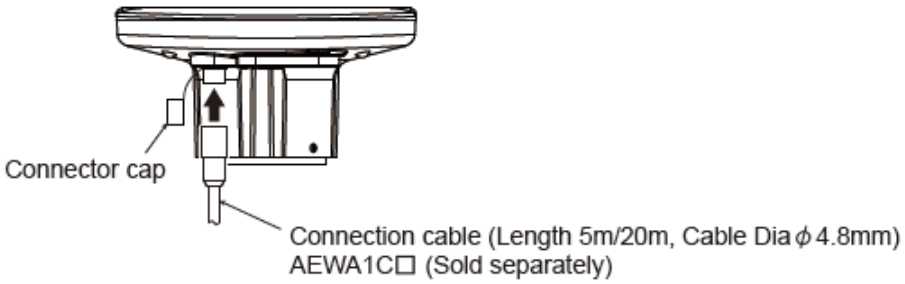
$$\text{Required straight pipe length(mm)} = 10D + \left(\text{Differential pressure(kPa)} \times D \times \frac{\text{Usage max. flow rate(m/s)}}{20\text{(m/s)}} \times (0.8)^{\text{elbow number}} \right)$$

When install to downstream side of a reducing valve	
No elbow	With elbow (Ultrasonic noise is reduced by elbow. When there are several elbows, the required straight length will be short.)
 <calculation example> Ex.1) Pipe size: 50A, Flow rate:10m/s, No elbow P1:25kPa、P2:2.5kPa 500＋[(25－5)×50×10/20]=1,000(mm) Ex. 2) Pipe size:50A, Flow rate:10m/s,No elbow P1:160kPa、P2:10kPa 500＋[(160－10)×50×10/20]=4,250(mm)	 <calculation example> Ex. 1) Pipe size:50A, Flow rate:10m/s, Elbow:1 point P1:160kPa、P2:10kPa 500＋[(160－10)×50×10/20×0.8]=3,500(mm)

When install to upstream side of reducing valve


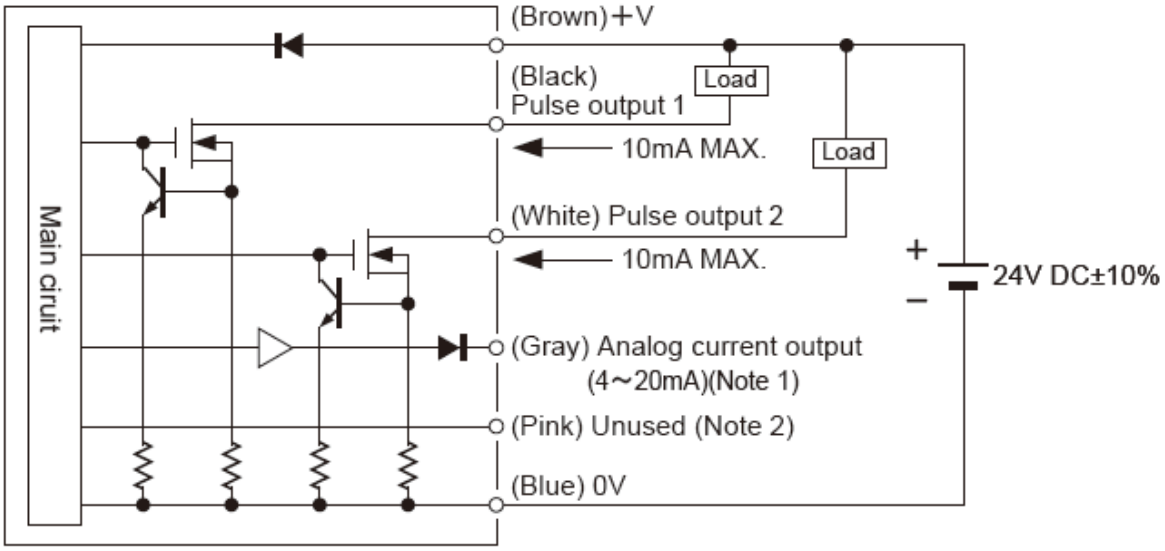
Chapter 4 How to Connect

Remove the connector cap on the back of the display and insert the connection cable, AEWA1C☐.
(Sold separately)



<Notice>
In order to avoid noise, wire as short as possible and ground shield of the connection cable.

●Input/Output circuit diagrams

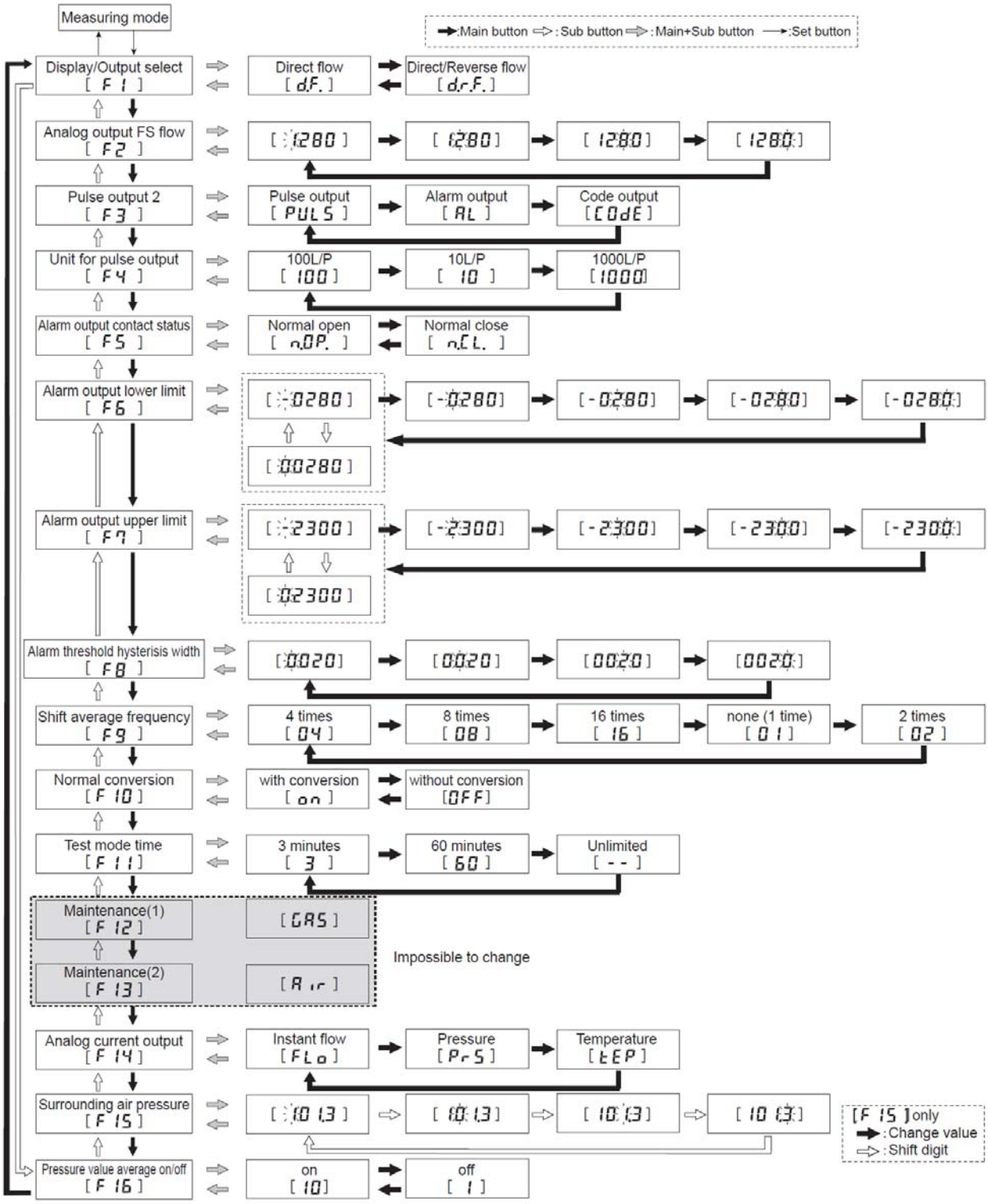


Note 1) Maximum resistive load should be 400Ω.
Note 2) Pink lead wire is not used. Be sure to be insulated.

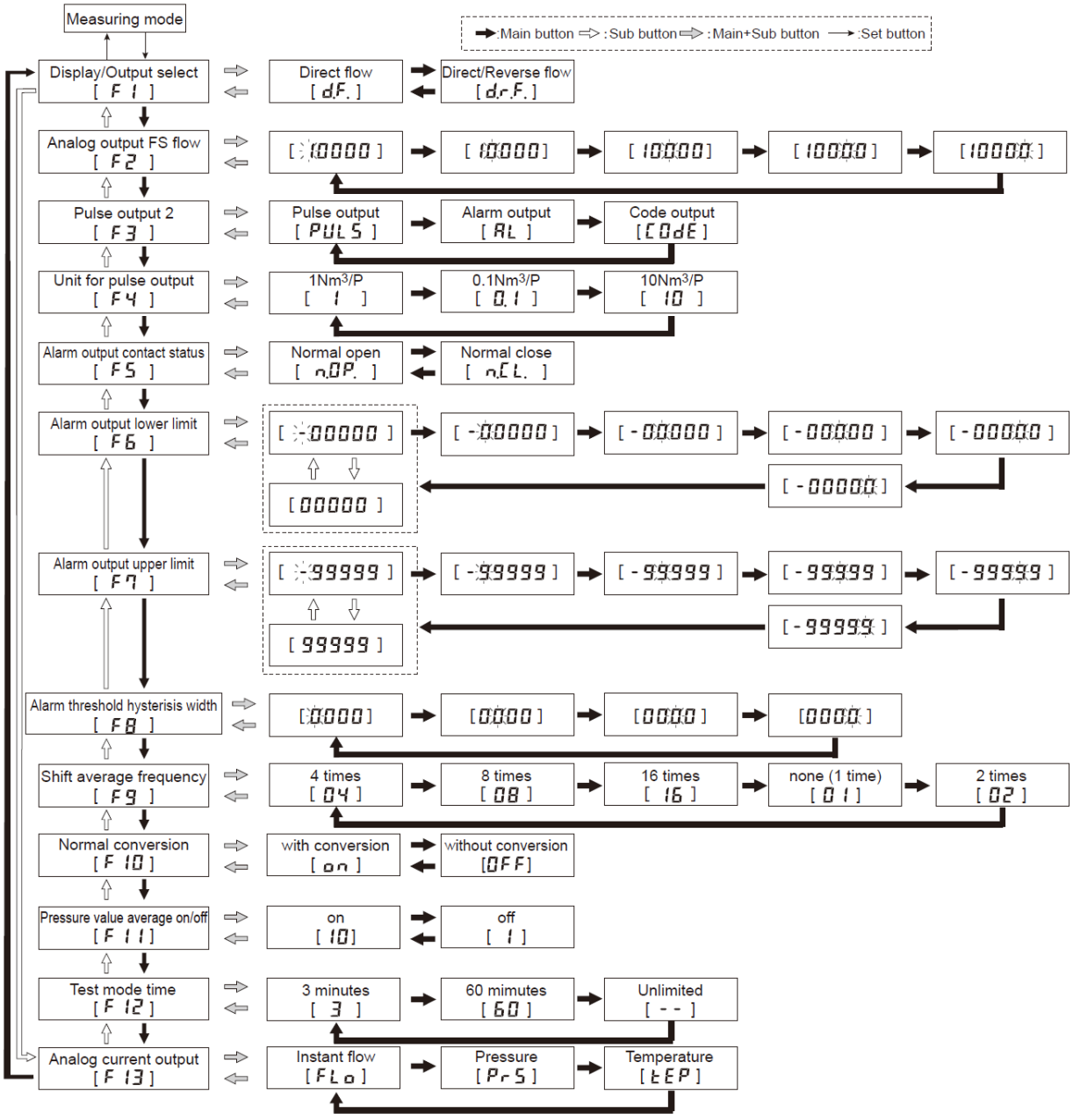
Chapter 5 Settings

5.1 Setting flow chart

Small pipe size type, Medium pipe size type



Large pipe size type



<Initial value list>

Display		Setting Item	Initial value (Factory setting)
Small / Medium pipe size type	Large pipe size type		
F1	F1	Display/Output select	Direct flow
F2	F2	Analog output FS flow	AEWA1025: 300(Nm^3/h) AEWA1032: 600(Nm^3/h) AEWA1040: 700(Nm^3/h) AEWA1050: 1,200(Nm^3/h) AEWA1065: 2,000(Nm^3/h) AEWA1080: 2,500(Nm^3/h) AEWA1100: 5,000(Nm^3/h) AEWA1150: 10,000(Nm^3/h) AEWA1200: 20,000(Nm^3/h)
F3	F3	Pulse output 2	Pulse output
F4	F4	Unit for pulse output (Note1)	Small pipe/Medium pipe: 100 (NL/pulse) Large pipe: 1(Nm^3/pulse)
F5	F5	Alarm output contact status	Normal open
F6	F6	Alarm output lower limit	Small pipe/Medium pipe: 00000(Nm^3/h) Large pipe: 00000(Nm^3/h)
F7	F7	Alarm output upper limit	Small pipe/Medium pipe: 09999(Nm^3/h) Large pipe: 99999(Nm3/h)
F8	F8	Alarm threshold hysteresis width	0000(Nm^3/h)
F9	F9	Shift average frequency	4
F10	F10	Normal conversion (Note2)	ON
F11	F12	Test mode time	3 (min.)
F12	—	Maintenance (1)	—
F13	—	Maintenance (2)	—
F14	F13	Analog current output	Instant flow
F15	—	Surrounding air pressure (Note3)	101.3kPa
F16	F11	Pressure value average on/off	on (10 times)

Note 1) <For large pipe size type>
When unit for pulse output is set to '0.1Nm^3/pulse', it can't detect correctly over 3,600Nm^3/h.

Note 2) <For small pipe size type and medium pipe size type>
When normal conversion is set to 'with conversion (on)', unit for pulse output can't be set to '10NL/pulse'.

Note 3) <For small pipe size type and medium pipe size type>
Use with setting the surrounding air pressure to '101.3kPa (initial)' except using at the high altitude place.

5.2 Setting Item Explanation

Display/Output select	[F1] (all models)

Select 'direct flow' or 'direct/reverse flow' for display and output.

- When selecting 'direct flow', it displays 'integrated direct flow' or 'trip integrated flow' on the main display.
- When selecting 'direct reverse flow', it displays 'integrated direct flow' or 'integrated reverse flow' on the main display but trip function is not available.

Analog output FS flow	[F2] (all models)

Set full-scale flow (FS flow) for analog output.

- In case of set to 'instant flow' at analog current output, it is recommended to set FS flow for analog current output according to using max. flow. Having margin for FS flow is recommended.
- When selecting 'on' at normal conversion, set with normal conversion value.
  Refer to 10.5 Normal Flow Conversion Value (Nm^3/h) [Conversion example] about normal conversion.

Pulse output 2	[F3] (all models)

Select 'pulse output (available only for direct/reverse flow mode), 'alarm output' or 'code output (not available)'.

- When selecting 'pulse output', set the unit for pulse output. However, in case of set to 'direct flow' at display/output select, you can not use the reverse flow pulse output.
  In case of set to 'direct flow', unit for pulse output for pulse ouput 1 and pulse output 2 is common.
- When selecting 'alarm output', it output and stops alarm with setting flow. In this case, set alarm output contact status, alarm output lower limit, alarm output upper limit and alarm threshold hysteresis width.

Unit for pulse output	[F4] (all models)

Select unit for pulse output from below table.

Type	Unit for pulse output
Small pipe size type Medium pipe size type	1,000 / 100 / 10 (Unit: L/pulse or NL/pulse)
Large pipe size type	10 / 1 / 0.1 (Unit: Nm^3/pulse or m^3/pulse)

- When using pulse output 1 (direct flow pulse output) and pulse output 2 (reverse flow pulse output), set to the unit for pulse output according to the using environment.
  Unit for pulse output is common to pulse output1 and pulse output 2.
- In case of set to 'on' at normal conversion, it can't set to '10NL/pulse' and set to '100NL/pulse' for small pipe size type or medium pipe size type.
  For large pipe size type, when it is set to '0.1Nm^3/pulse', it can't output correctly over 3,600Nm^3/h.

Alarm output contact status	[F5] (all models)

Select 'normal open' or 'normal close' for flow limit alarm output contact status.

Alarm output lower limit	[F6] (all models)

Set the lower limit for flow limit alarm output.

- In case of set to 'with conversion', set with normal conversion value.

Alarm output upper limit	[F7] (all models)

Set the upper limit for flow limit alarm output.

- In case of set to 'with conversion', set with normal conversion value.

Alarm threshold hysteresis width	[F8] (all models)

Set the hysteresis width for flow limit in order to stop alarm.

- In case of set to 'with conversion', set with normal conversion value.

  Ex.) For medium pipe size type

  <Setting> upper limit: 1,000Nm^3/h lower limit: 200 Nm^3/h hysteresis width: 10Nm^3/h

  It output alarm when it exceeds 1,000Nm^3/h it stop alarm when it bellow 990Nm^3/h at upstream side.
  It output alarm when it below 200Nm^3/h and it stops alarm when it exceeds 210Nm^3/h at downstream side.

Shift average frequency [F9] (all models)

Select ‘none (01)’, ‘2 times (02)’, ‘4 times (04)’, ‘8 times (08)’ or ‘16 times (16)’ for shift average frequency.

・It adopts the value of shift average the latest selected frequency for instant flow and output.
It is not necessary to change the shift average frequency for normal use.

Normal conversion [F10] (all models)

Select ‘with conversion (on)’ or ‘without conversion (off)’ for normal conversion function.

・When selecting ‘on’, unit for upper line is ‘Nm^3’ and unit for lower line is ‘Nm^3/h’ or ‘NL/min’.
Integrated flow and instant flow are displayed with normal flow and it uses normal flow for output signal.

・When selecting ‘off’, it measures the actual flow and unit for upper line is ‘m^3’ and unit for lower line is ‘m^3/h’ or ‘L/min’. Integrated flow and instant flow are displayed with actual flow and it uses actual flow for output signal.

・Normal conversion is the function that it converts normal flow (flow at 0℃, 1 atm) according to temperature (T) and air pressure (kPa) measured with flow.

・It converts internal as below.

$$Qn = \frac{T_0}{(T_0+T)} \times \frac{(P_1+P)}{P_0} \times Qr$$

Qn : Normal flow (Nm^3/h)
T_0 : 273.15(K) (Absolute temperature for 0℃)
T : Fluid temperature (℃)
P_1 : Surrounding air pressure
- ・For small and medium pipe size type, surrounding air pressure can be set at setting mode[F15]
- ・For large pipe size type, it is fixed to 101.33(kPa).

P : Fluid pressure (gauge pressure) (kPa)
P_0 : 101.33 (kPa abs) (Absolute pressure for 1atm)
Qr : Actual flow(m^3/h)

・It is recommended to set output constant when using both of external output and normal conversion.
Refer to 10.5 Normal Flow Conversion Value (Nm^3/h)[Conversion example] about normal conversion.

Test mode time [F11] (Small / Medium pipe size type) [F12] (Large pipe size type)

Select from ‘3 mins (3)’, ‘60 mins (60)’ or ‘Unlimited (--)’ for test mode time.

Maintenance [F12,F13] (Small / Medium pipe size type) [No indication] (Large pipe size type)

＊This is for maintenance. Do not change the settings.

Analog current output [F14] (Small / Medium pipe size type) [F13] (Large pipe size type)

Select ‘instant flow (Flo)’, ‘pressure (PrS)’ or ‘temperature (tEP)’ for analog current output.

・When selecting ‘instant flow’, it output current according to the max flow of analog output.
In case of select ‘direct flow’, it output 4mA at 0 flow.
In case of select ‘direct/reverse flow’, it output 12mA at 0 flow.

・When selecting ‘pressure’, it output 4mA at atmospheric pressure and 20mA at 1000kPa.

・When selecting ‘temperature’, it output 4mA at -10℃ and 20mA at +60℃.

Surrounding air pressure [F15] (Small / Medium pipe size type) [No indication](Large pipe size type)

Set surrounding air pressure in usage environment with absolute pressure.

・101.3[kPa] (standard atmospheric pressure) is set at factory.
In case of using at the place that is high above sea level, change the setting value.

Pressure value average on/off [F16] (Small / Medium pipe size type) [F11] (Large pipe size type)

Select ‘on (10)’ or ‘off (1)’ for pressure value average. Normally select ‘on’.

・When selecting ‘on’, it adopts the shift average value of latest 10 times measured value .

Chapter 6 Display of Measuring Value

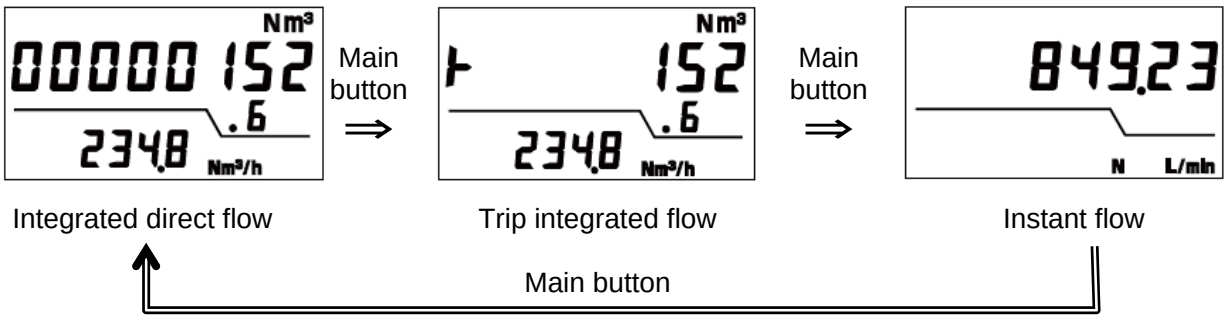
6.1 Measuring Mode (Normally)

6.1.1 Display of main display (Upper line)

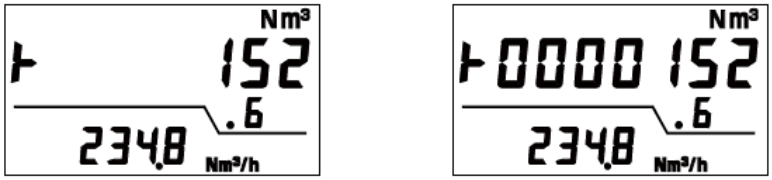
●When 'Direct flow' is selected

・Push main button to display in order of integrated direct flow, trip integrated flow and instant flow.

・Push main button and sub button at the same times, trip integrated flow is cleared with display of trip integrated flow.



・Trip integrated flow is exceeded 9999999.9, it will display 0000000.0 without zero suppression and it will continue to measure.

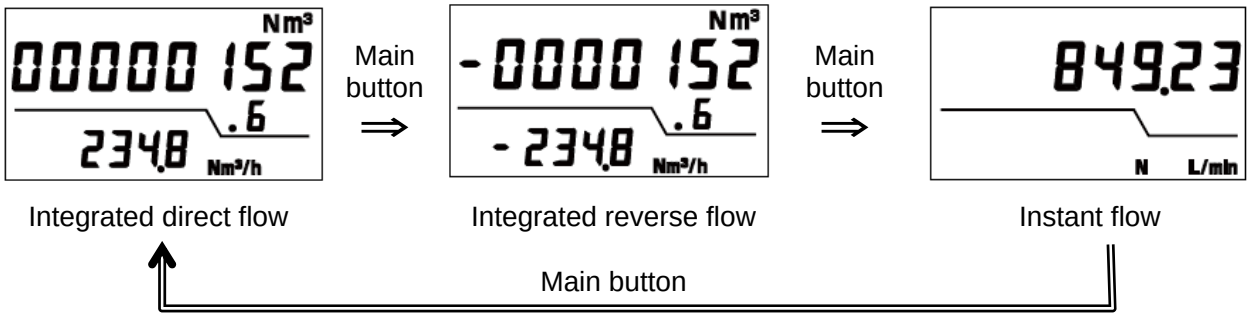


Witout overflow
(Trip integrated flow value 152.6Nm^3)

Overflow
(Trip integrated flow value 0000152.6Nm^3)

●When 'Direct/Reverse flow' is selected

・Push main button to display in order of integrated direct flow, integrated reverse flow and instant flow.



6.1.2 Display of sub display (Lower line)

●During one of integrated direct flow, trip integrated flow, integrated reverse flow is displayed

・Push sub button to display in order of instant flow, pressure, temperature and maintenance (Note 1).
It passes 1 minute during pressure or temperature or maintenance is displayed, it automatically shifts to instant flow display.
Note1) '0' is displayed for maintenance display. (small pipe size type, medium pipe size type)
Large pipe size type doesn't have maintenance display.

●During instant flow is displayed

・It displays nothing.

6.2 Test Mode

Test mode is a function that low flow cutoff is removed temporarily.

・Use test mode without flow.
Push sub button for 3 or more seconds, and it shifts to test mode. It will be possible to measure minute flow.

・During test mode, unit on sub display is blinking every 0.5 second.
(With conversion: 'Nm^3/h', 'kPa', '°C', 'NL/min' Without conversion: 'm^3/h', 'kPa', '°C', 'L/min')

・You can select test mode time from 3 minutes, 60 minutes, unlimited. After passing the selected time, it automatically shifts to measuring mode.
In addition, push sub button for 3 or more seconds again during test mode, it shifts to measuring mode.

・If instant flow is displayed (+)0.1 or more, or if pilot lamp is blinking, there is a possibility to leak at downstream side. (Note1)

・If instant flow is displayed '- (minus)', there is a possibility to leak at upstream side. (Note1)

・During test mode, instant flow is displayed by rounding off to two decimal places.
Ex.) Display '0.00(Nm^3/h)' means 0 to 0.004(Nm^3/h).
Display '-0.00(Nm^3/h)' means -0.004 to 0(Nm^3/h).

Note1) Because displayed value has influence of offset of zero flow and internal convection flow it shows the possibility.

6.3 Setting Mode

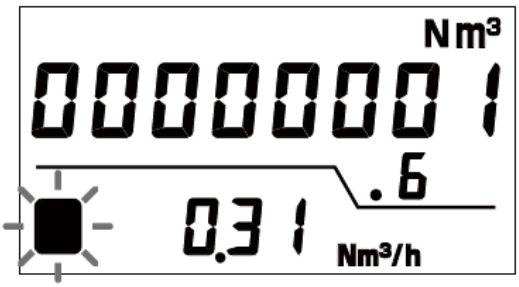
Push set button to shift to setting mode.
In order to shift to measuring mode from setting mode, push set button again.
When there is no operation for 3 minutes at setting mode, it will shift to measuring mode automatically.
Note1) Push set button with sharp point may cause damage. Push with the included hex wrench.

・You can change and set at setting mode.

・Refer to 'Chapter 5 settings' for setting mode.

6.4 How to Start Running

When start measuring, open valve slowly and check the pilot lamp blinking.
Pilot lamp blinking shows that the fluid flows.

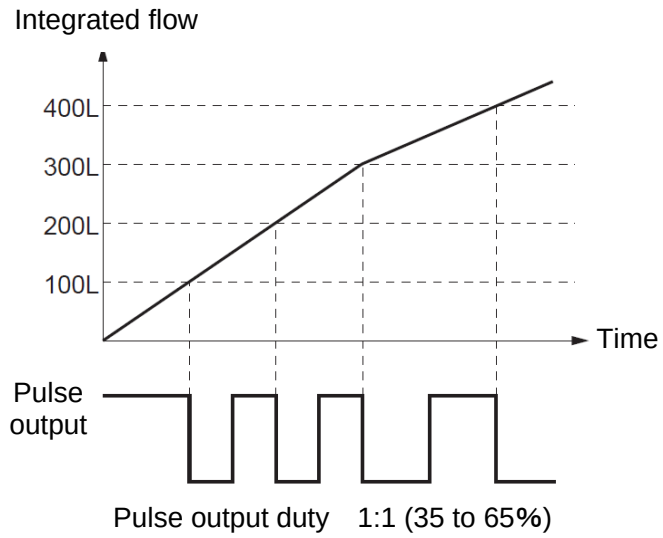


Chapter 7 Output Functions

7.1 Pulse Output 1

7.1.1 Pulse output (Direct flow pulse)

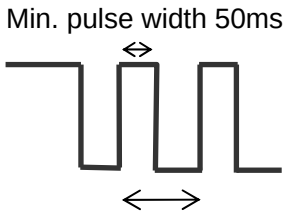
It output pulse every time to reach the setting integrated direct flow.



【Pulse output width】

It output minimum pulse for full scale flow.

However with large pipe size type when '0.1Nm^3/pulse' is set, it output shorter pulse than minimum pulse width and it may not detect correctly according to using condition (3600Nm^3/h or more).



Min. cycle T=100ms

Max. output frequency f=10Hz

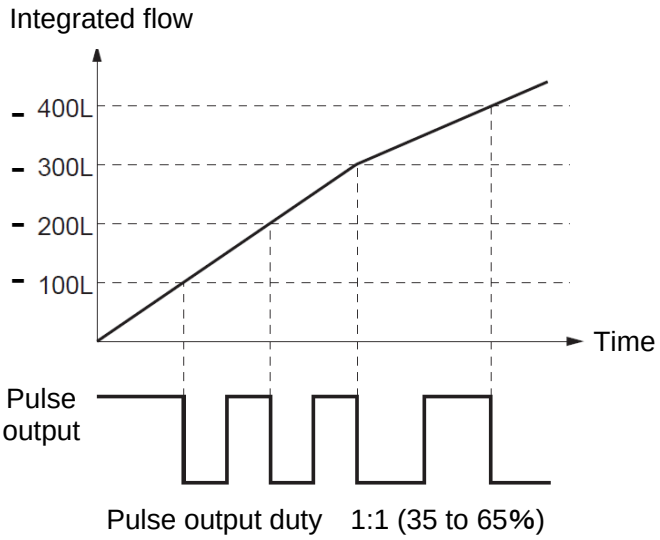
Note 1) You can select unit for pulse output at setting mode.

7.2 Pulse Output 2

You can select 'pulse output (reverse flow)' (only for direct/reverse flow mode) or 'alarm output'.

7.2.1 Pulse output (Reverse flow pulse)

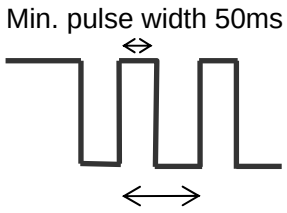
It output pulse every time to reach the setting integrated reverse flow.



【Pulse output width】

It output minimum pulse for full scale flow.

However with large pipe size type when '0.1Nm^3/pulse' is set, it output shorter pulse than minimum pulse width and it may not detect correctly according to using condition (3600Nm^3/h or more).



Min. cycle T=100ms

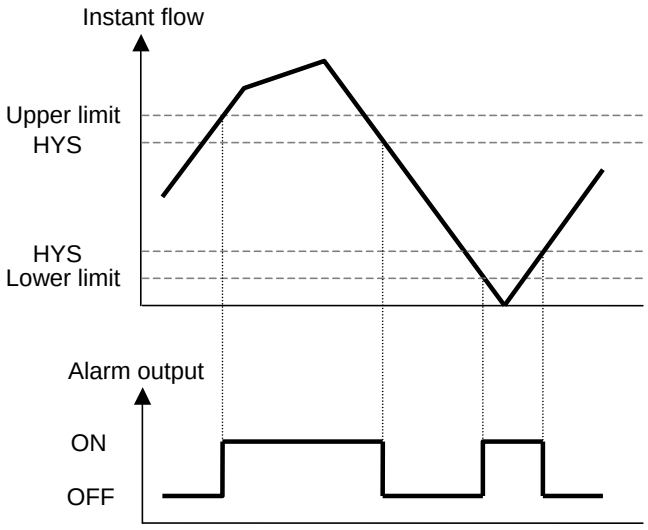
Max. output frequency f=10Hz

Note 1) You can select unit for pulse output at setting mode.

7.2.2 Alarm output by flow limited

It output alarm and it stops output alarm with setting instant flow.

It controls on or off the alarm output by setting the upper limit, lower limit and hysteresis width to control on or off the alarm output.

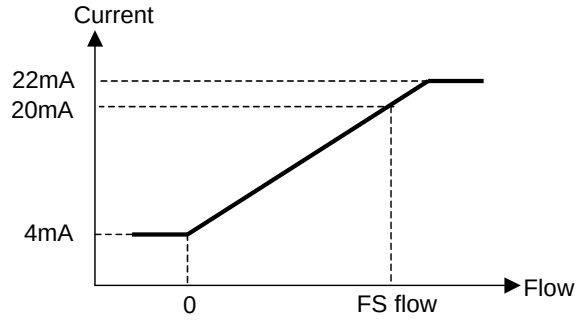


7.3 Analog Current Output

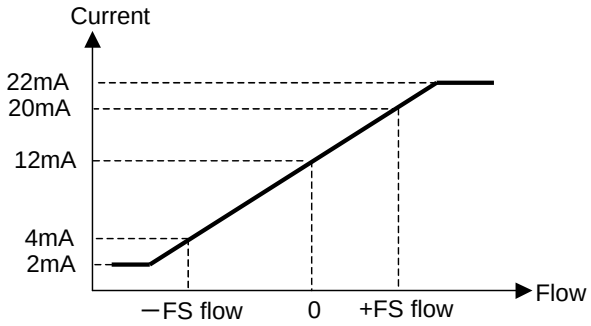
Select ‘instant flow’, ‘pressure’ or ‘temperature’ for analog current output.

7.3.1 Instant flow

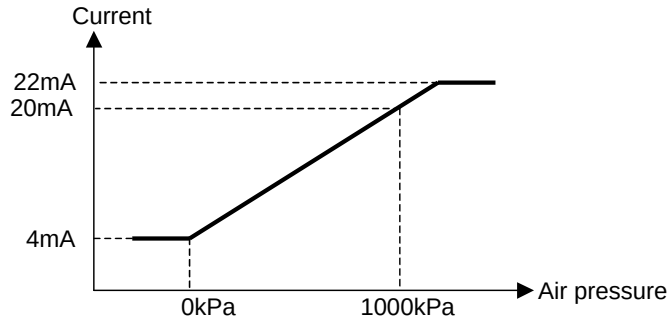
・Direct flow mode



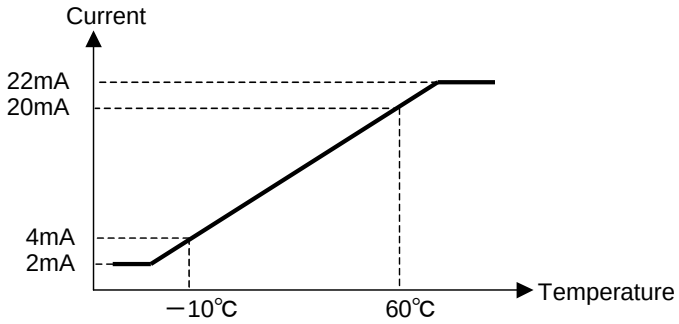
・Direct/Reverse flow mode



7.3.2 Air pressure



7.3.3 Temperature

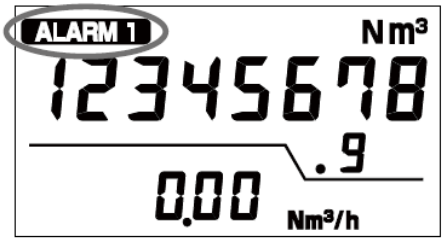


7.4 Alarm Output

7.4.1 Measuring error

When ultrasonic signal is small or when it doesn't receive the signal, 'ALARM1' turns on and it displays '0.00' and stop integrating with the last value display and output 4mA for analog output.

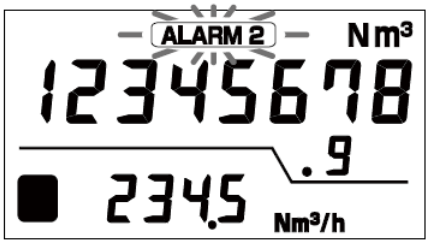
Check the conditions if there is foreign material to interrupt passing ultrasonic signal or not, if some liquid such as oil is attached or remained on the ultrasonic sensor and inside of the unit or not.
When 'ALARM1' turns on even if there is no foreign material or foreign material is removed, please contact us.



Note1) When install and start measuring, 'ALARM1' sometimes turns on because the pressure suddenly changes from atmospheric pressure.
If the fluid is stable, 'ALARM1' will turn off. (It is not malfunction.)

7.4.2 Lead wire (pink) error

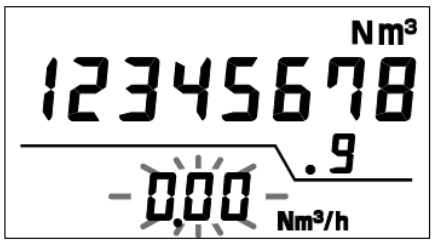
When lead wire (pink) is shorted, 'ALARM2' is blinking.
If short circuit of lead wire (pink) is removed, 'ALARM2' will turn off in 1 minute.

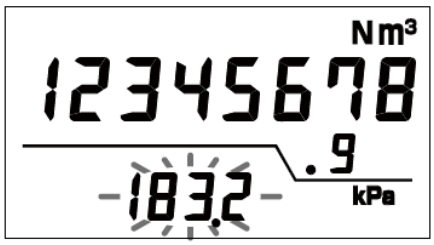


7.4.3 Pressure error

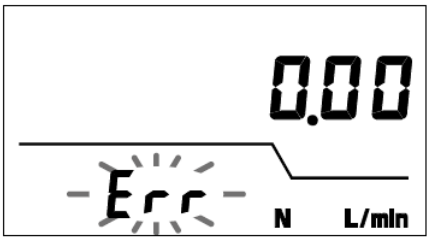
When it detects abnormal pressure value, it displays as blow according to the main display.

●When one of ‘integrated direct flow’, ‘trip integrated flow’, ‘integrated reverse flow’ is displayed.
Instant flow and pressure is blinking on sub display.





●When ‘instant flow’ is displayed.
‘Err’ is blinking on sub display.

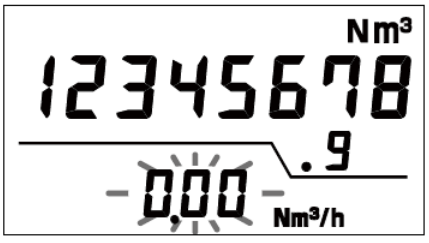


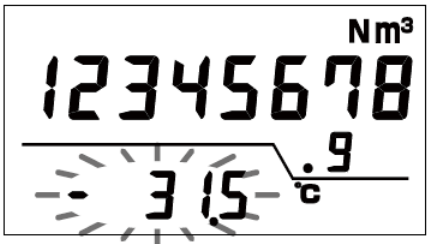
When it detects an abnormal pressure value, it displays ‘0’ for instant flow, the last value for pressure and it output 4mA for analog output.
On main display, it stops integrating for integrated flow with the last value.
Please contact us when pressure error is displayed.

7.4.4 Temperature error

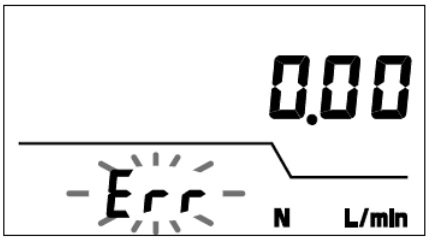
When it detects abnormal temperature value, it displays as below according to the main display.

●When one of ‘integrated direct flow, trip integrated flow, integrated reverse flow’ is displayed.
Instant flow and temperature is blinking on sub display.





●When ‘instant flow’ is displayed.
‘Err’ is blinking on sub display.



When it detects an abnormal temperature value, it displays ‘0’ for instant flow, the last value for temperature and it output 4mA for analog output.
On main display, it stops integrating for integrated flow with the last value.
Check that the flow fluid is air. Please contact us when temperature error is displayed during using for air.

Chapter 8 Working at Voltage Interruption

●Detection of voltage interruption

・When power supply voltage becomes 18±1.1V or less, it decides voltage interruption and stop measuring and turn off the display.

●Recovery the voltage interruption

・When power supply voltage becomes 18±1.1V or more, it start measuring again and turn on the display.

・It memorize integrated flows every 5 minutes after power on. When it recovers from voltage interruption it read the memorized integrated flows and starts integrating from the value.

・When it recovers from voltage interruption, it displays integrated flow on main display. If using with trip integrated flow, trip integrated flow is cleared.

Chapter 9 Trouble Shooting

●Immediately after install

Phenomenon	Factors	Check point
Lighting ALARM1	Gas except air flows.	Confirm 'Cautions for Your Safety' and 'Chapter 10 Specifications'.
	Using without specification range (Install condition, pressure, temperature and so on)	
	Foreign material is attached inside of measuring part or ultrasonic sensor.	Check and remove the existence of a foreign material.
	Large electrical noise source is existed near the product.	Remove noise source or shield this product. When using the connection cable, ground the shield. Refer to 'Chapter 4 How to Connect'.
Blinking ALARM2	Lead wire (pink) is shorted.	Check the lead wire (pink) is not shorted. Check the wiring, disconnection etc.
It doesn't integrate after install.	During adjusting for pressure change	Check that the line between main display and sub display is blinking. It will stop blinking for 1 minute and start integrating.
Minus value is displayed for instant flow.	The direction of fluid flow is reverse from the flow of the product.	Check the direction of arrow on the side of this product and flow direction.

●During measuring

Phenomenon	Factors	Check point
Blinking ALARM2	Lead wire (pink) is shorted.	Check the lead wire (pink) is not shorted. Check the wiring, disconnection etc.
Instant flow, Pressure, 'Err' on sub display is blinking.	Trouble of pressure sensor	Please contact us.
Instant flow, temperature, 'Err' on sub display is blinking.	Gas except air flows.	Confirm 'Cautions for Your Safety' and 'Chapter 10 Specifications'.
Instant flow is unstable.	Air pressure changes frequently.	This product works correctly. It is recommended to install to the place with small air pressure change in order to measure more correctly.
	There is pulsation.	This product works correctly. It is recommended to install to the place with small pulsation in order to measure more correctly.
	There is a governor near this product.	This product works correctly. It is recommended to install to the place apart from a governor in order to measure more correctly. Refer to 'Chapter 3 Installation'.
'0' is not displayed for Instant flow when there is no flow.	There is convection inside the pipe.	This product works correctly.
	During test mode	Check that unit on sub display is blinking. Refer to '6.2 Test mode'.

Phenomenon	Factors	Check point
Instant flow value is too big.	The length of straight pipe is not enough.	Depending on the piping condition, establish the straight pipe of necessary length on this product upstream and downstream. Refer to 'Chapter 3 Installation'.
	Set to 'Normal flow (Nm^3)' display	Check the setting for your use. Refer to 'Chapter 5 Settings'.
Instant flow value seems not to be changed.	Excess flow over specifications is flowing.	Use within the specification range. Refer to 'Chapter 10 Specifications'.
Instant flow value is too small.	The length of straight pipe is not enough.	Depending on the piping condition, establish the straight pipe of necessary length on this product upstream and downstream. Refer to 'Chapter 3 Installation'.
	Set to 'Actual flow (m^3)' display	Check the setting for your use. Refer to 'Chapter 5 Settings'.
The line between main display and sub display is blinking.	During adjusting for air pressure change	It will stop blinking for 1 minute and start integrating.
Upper digit '0' for integrated flow is not displayed.	Trip integrated flow is displayed.	This product works correctly. Push main button and sub button at the same time to shift to integrated direct flow.

Please contact us if the trouble is not solved with this instruction.

Chapter 10 Specifications

10.1 Rating

Small pipe size type, Medium pipe size type

Model No	AEWA1025	AEWA1032	AEWA1040	AEWA1050	AEWA1065	AEWA1080
Pipe size	25A (1B)	32A (1 1/4B)	40A (1 1/2B)	50A (2B)	65A (2 1/2B)	80A (3B)
Measurable fluids	Air (Compressed air)					
Pressure range	0 to 1MPa (Gauge pressure)					
Flow range (Actual flow)	-0.6 to-35 m^3/h or 0.6 to 35 m^3/h	-1.1 to -65 m^3/h or 1.1 to 65 m^3/h	-1.3 to -80 m^3/h or 1.3 to 80 m^3/h	-2.5 to -150 m^3/h or 2.5 to 150 m^3/h	-4 to -240 m^3/h or 4 to 240 m^3/h	-5 to -300 m^3/h or 5 to 300 m^3/h
Power supply	24VDC±10%					
Power consumption	40mA or less					

Large pipe size type

Model No	AEWA1100	AEWA1150	AEWA1200
Pipe size	100A (4B)	150A (6B)	200A (8B)
Measurable fluids	Air (Compressed air)		
Pressure range	0 to 1MPa (Gauge pressure)		
Flow range (Actual flow)	-10 to -500 m^3/h or 10 to 500 m^3/h	-24 to -1200 m^3/h or 24 to 1200m^3/h	-40 to -2000 m^3/h or 40 to 2000 m^3/h
Power supply	24VDC±10%		
Power consumption	40mA or less		

10.2 Performance

Small pipe size type, Medium pipe size type

Model No		AEWA1025	AEWA1032	AEWA1040	AEWA1050	AEWA1065	AEWA1080
Accuracy	±5%R.S.	-0.6 to -3.5 m^3/h or 0.6 to 3.5 m^3/h	-1.1 to -6.5 m^3/h or 1.1 to 6.5 m^3/h	-1.3 to -8 m^3/h or 1.3 to 8 m^3/h	-2.5 to -15 m^3/h or 2.5 to 15 m^3/h	-4 to -24 m^3/h or 4 to 24 m^3/h	-5 to -30 m^3/h or 5 to 30 m^3/h
	±2%R.S.	-3.5 to -35 m^3/h or 3.5 to 35 m^3/h	-6.5 to -65 m^3/h or 6.5 to 65 m^3/h	-8 to -80 m^3/h or 8 to 80 m^3/h	-15 to -150 m^3/h or 15 to 150 m^3/h	-24 to -240 m^3/h or 24 to 240 m^3/h	-30 to -300 m^3/h or 30 to 300 m^3/h
Normal conversion accuracy	±2.5%R.S. (At dry air (90%RH or less), normal temperature,0.5MPa)						
Low flow cutoff	Within ±0.09 m^3/h	Within ±0.16 m^3/h	Within ±0.2 m^3/h	Within ±0.4 m^3/h	Within ±0.6 m^3/h	Within ±0.8 m^3/h	
Pressure loss	Extremely small (same as straight pipe)						
Response time	500ms						
Detection method	Ultrasonic						

Large pipe size type

Model No		AEWA1100	AEWA1150	AEWA1200
Accuracy	±5%R.S.	-10 to -50 m^3/h or 10 to 50 m^3/h	-24 to -120 m^3/h or 24 to 120 m^3/h	-40 to -200 m^3/h or 40 to 200m^3/h
	±2%R.S.	-50 to -500 m^3/h or 50 to 500m^3/h	-120 to -1200 m^3/h or 120 to 1200 m^3/h	-200 to -2000 m^3/h or 200 to 2000 m^3/h
Normal conversion accuracy	±2.0%R.S. (At dry air (90%RH or less), normal temperature, 0.3MPa)			
Low flow cutoff	Within ±2.6 m^3/h	Within ±5.0 m^3/h	Within ±9.0m^3/h	
Pressure loss	Extremely small (same as straight pipe)			
Response time	500ms			
Detection method	Ultrasonic			

●Pulse output 1, Pulse output 2

Output type	Open drain output
Output mode	Pulse output 1: Direct flow pulse
	Pulse output 2: Reverse pulse, Flow limit alarm
Unit for pulse output	<small pipe size, medium pipe size> 10, 100, 1000 NL/pulse or L/pulse <large pipe size> 0.1, 1, 10Nm^3/pulse or m^3/pulse *When 0.1Nm^3/pulse is selected, it doesn't output correctly over 3600Nm^3/h.
Pulse output duty	1:1 (35 to 65%)
Max. inflow current	10mA
Max. applied voltage	24VDC or less
Residual voltage	1V or less (at inflow current 10mA)
Overcurrent protection	Available

●Analog current output

Output mode (select with buttons)		Instant flow, Air pressure, Temperature	
Output current		4 to 20mA	
Accuracy		±0.1mA	
Instant flow	Zero point	Direct flow mode	4mA (Within reverse to low flow cut off)
		Direct/Reverse flow mode	12mA (Within low flow cutoff)
	Full-scale flow (initial value) (set with buttons)	Small pipe size type	AEWA1025: 300 Nm^3/h AEWA1032: 600 Nm^3/h
		Medium pipe size type	AEWA1040: 700 Nm^3/h AEWA1050: 1200 Nm^3/h AEWA1065: 2000 Nm^3/h AEWA1080: 2500 Nm^3/h
		Large pipe size type	AEWA1100: 5000 Nm^3/h AEWA1150: 10000 Nm^3/h AEWA1200: 20000 Nm^3/h
Air pressure		0kPa: 4mA , 1Mpa: 20mA	
Temperature		-10℃: 4mA , +60℃: 20mA	
External load		400Ω or less	

●Display

Main display (select with buttons)	Direct flow mode	Integrated direct flow (Nm^3,m^3) Trip integrated flow (Nm^3,m^3) Instant flow (NL/min,L/min)
	Direct/Reverse mode	Integrated direct flow (Nm^3,m^3) Reverse integrated flow (Nm^3,m^3) Instant flow (NL/min,L/min)
Sub display (select with buttons)	Instant flow (Nm^3/h,m^3/h), Air pressure (kPa), Temperature(℃), Gas type *1	
Error display	ALARM1 (lighting): Ultrasonic signal is small or can't be received. Sub display (blinking): Air pressure error, Temperature error	

*1) '0' is displayed for gas type.

10.3 Using Environment

Using ambient temperature	-10 to +60℃ (-20 to +70℃ at storage)
Using ambient humidity	90%RH or less, with non-condensing and non-frosting
Protective construction	IP64 (IEC)

10.4 Install / Construction

Small pipe size type

Model No		AEWA1025	AEWA1032
Connection method		Pipe taper thread R1	Pipe taper thread R1-1/4
Grounding method		Direct grounding	
Fastening torque	Set screw	0.6±0.1 N･m	
	Pipe	37±1 N･m	48±1 N･m
Material	Measuring pipe	Aluminum alloy, PPS, Phloro silicone rubber (Gas contact part)	
	Display case	Aluminum alloy	
	Display window	Hardened glass	
	Setting buttons	EPDM	
	Power supply connector	PPS	
	Ultrasonic sensor	Epoxide (External of gas contact part: Resin)	
	Positioning collar	POM	
Weight		About 1.5kg	About 1.4kg

Medium pipe size type

Model No		AEWA1040	AEWA1050	AEWA1065	AEWA1080
Connection method		Wafer (Insert by JIS10K flange)			
Grounding method		Direct grounding			
Fastening torque	Set screw	0.6±0.1 N･m			
	Pipe	170±10 N･m	230±10 N･m	310±10 N･m	170±10 N･m
Material	Measuring pipe	Aluminum alloy, PPS, Phloro silicone rubber (Gas contact part)			
	Display case	Aluminum alloy			
	Display window	Hardened glass			
	Setting buttons	EPDM			
	Power supply connector	PPS			
	Ultrasonic sensor	Epoxide (External of gas contact part: Resin)			
	Positioning collar	POM			
	Bolt set	SS400			
	Flange packing	Non-asbestos joint sheet			
Weight		About 1.0kg	About 1.2kg	About 1.4kg	About 1.7kg

Large pipe size type

Model No		AEWA1100	AEWA1150	AEWA1200
Connection method		JIS10K flange		
Grounding method		Direct grounding		
Fastening torque	Set screw	0.6±0.1 N･m		
	Pipe	140±10 N･m	300±10 N･m	250±10 N･m
Material	Measuring pipe	Stainless alloy, PPS, Phloro silicone rubber (Gas contact part)		
	Display case	Aluminum alloy		
	Display window	Hardened glass		
	Setting buttons	EPDM		
	Power supply connector	PPS		
	Shielded tube	Aluminum		
	Ultrasonic sensor	Epoxide (External of gas contact part: Resin)		
	Positioning collar	POM		
Weight		About 10.3kg	About 18.3kg	About 24.4kg

●Connection cable (sold separately)

Type	0.2mm^2 6-core cabtyre cable oil resistance, heat resistance PVC black
Standard length	5m,20m
Wiring length	Up to 100m with cable of 0.3mm^2 or more
Classification (coloration)	Brown: +V Blue: 0V Black: Open drain output 1 White: Open drain output 2 Gray: Analog current output (Pink: unused)

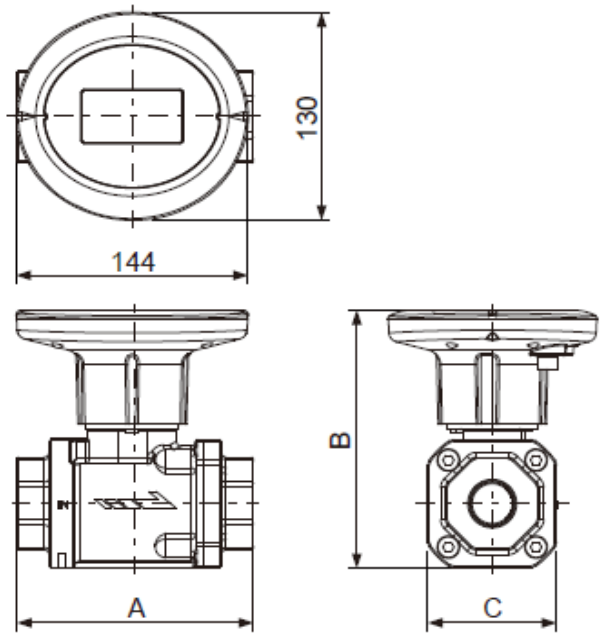
10.5 Normal Flow Conversion Value (Nm^3/h) [Conversion example]

Model No.	Air pressure (MPa)	0 (Atmospheric pressure)		0.5		0.7		0.98	
	Temp.(℃)	0	30	0	30	0	30	0	30
AEWA1025	0.6m^3/h	0.6	0.5	3.6	3.2	4.7	4.3	6.4	5.8
	35m^3/h	35	32	210	190	280	250	370	330
AEWA1032	1.1m^3/h	1.1	1.0	6.5	5.9	8.7	7.8	12	11
	65m^3/h	65	59	390	350	510	460	690	630
AEWA1040	1.3m^3/h	1.3	1.2	7.7	7.0	10	9.3	14	13
	80m^3/h	80	72	470	430	630	570	850	770
AEWA1050	2.5m^3/h	2.5	2.3	15	13	20	18	27	24
	150m^3/h	150	135	890	800	1,180	1,070	1,600	1,440
AEWA1065	4m^3/h	4.0	3.6	24	21	32	29	43	39
	240m^3/h	240	220	1,420	1,280	1,900	1,710	2,560	2,310
AEWA1080	5m^3/h	5.0	4.5	30	27	40	36	53	48
	300m^3/h	300	270	1,780	1,600	2,370	2,140	3,200	2,880
AEWA1100	10m^3/h	10	9.0	59	53	79	71	110	96
	500m^3/h	500	450	2,970	2,670	3,950	3,560	5,340	4,810
AEWA1150	24m^3/h	24	22	140	130	190	170	260	230
	1,200m^3/h	1,200	1,080	7,120	6,420	9,490	8,550	12,810	11,540
AEWA1200	40m^3/h	40	36	240	210	320	290	430	390
	2,000m^3/h	2,000	1,800	11,870	10,700	15,820	14,250	21,340	19,230

< Calculating formula>
Refer to the setting for Normal conversion (p.14).

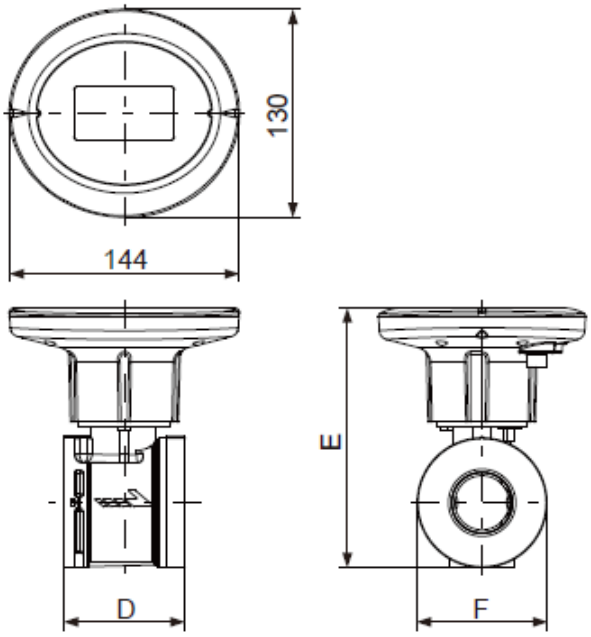
Chapter 11 Dimensions

11.1 Small pipe size type



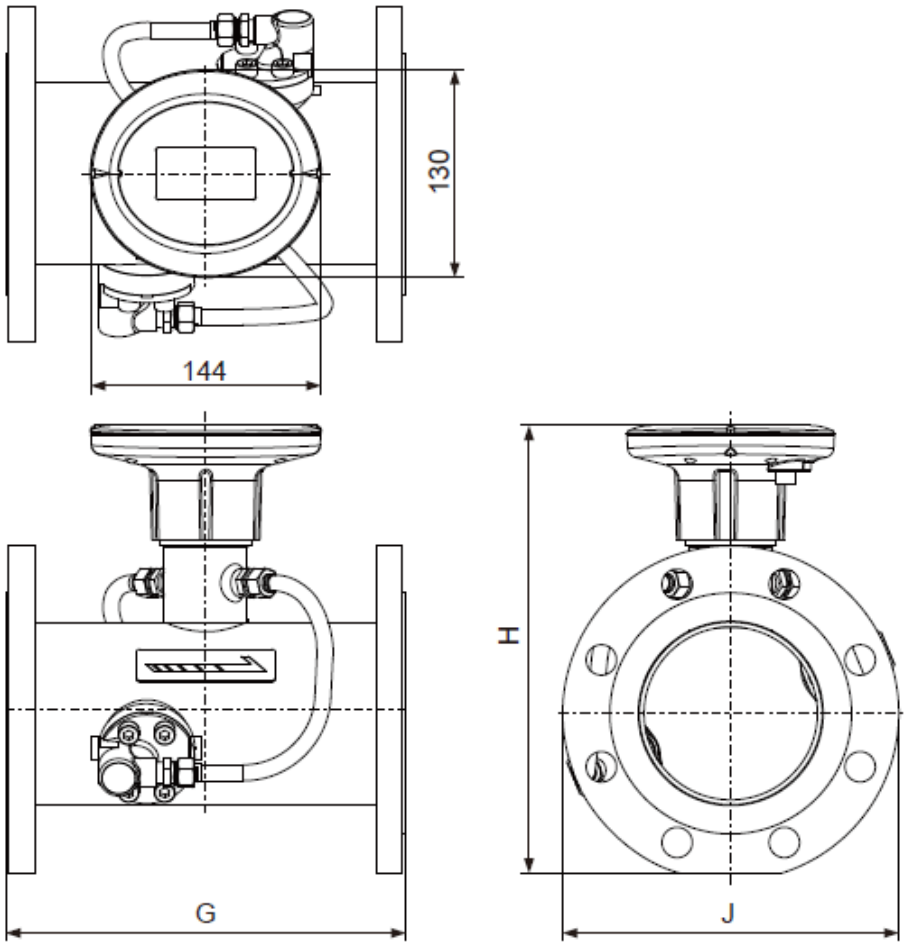
Model No.	A	B	C
AEWA1025	147	162	80
AEWA1032	147	162	80

11.2 Medium pipe size type



Model No.	D	E	F
AEWA1040	76	163	81
AEWA1050	90	176	96
AEWA1065	108	197	117
AEWA1080	117	220	126

11.3 Large pipe size type



Model No.	G	H	J
AEWA1100	250	280	210
AEWA1150	300	341	280
AEWA1200	350	391	330

Revision History

Issue Date	Manual no.	Content of revision
November, 2011	WUME-EWA1-1	First edition
June, 2013	WUME-EWA1-2	Second edition -Change company name