OVAL

Vortex Flow Monitor

Eggs DELTA Ⅱ

GENERAL SPECIFICATION

GS.No.GBD626E–2

■ GENERAL

The Eggs DELTA II is a compact and lightweight vortex flowmeter with a built-in piezo-electric sensor.
When a fluid flows past a triangular bluff body placed perpendicular to the flow direction, Karman vortices are generated downstream of the bluff body with a frequency proportional to the flow velocity. The piezo-electric sensor detects the number of Karman vortices, then measures the flowrate.

■ FEATURES

(1) Excellent durability with no moving parts.
(2) Lightweight and compact design adopting resin material for main parts.
(3) Alarm, pulse or analog output can be selected.
Long life replaceable battery equipped for battery powered model.
(4) Display items on the large LCD can be switched between total flow and instantaneous flow, and total amount can be reset to zero with simple operation by MODE / RESET buttons.
(5) Display can be rotated manually for easy view.

■ FIXED TEMPERATURE/PRESSURE COMPENSATION FUNCTION

Conversion function will help your gas measurement with fixed temperature / pressure compensation. Each output and display will reflect the result of the conversion.

- Normal conversion
  Measurement is converted into volume using: reference temperature (0°C), and reference pressure (1atm [101.325kPa]).
- Standard conversion
  Measurement is converted into volume using reference temperature/pressure set at arbitrary values.
- ANR conversion
  Measurement is converted into volume using: reference temperature (20°C), reference pressure (1atm [101.325kPa]), and humidity (65%).

OVAL Corporation

http://www.oval.co.jp/english

Head Office (Tokyo): Tel. +81 3-3360-5121 Fax. +81 3-3365-8605
International Sales Division Email: SK10@oval.co.jp
Overseas Branch Offices: Beijing, Seoul, Singapore, Taipei

■ GENERAL SPECIFICATIONS

Item		Description			
Nominal size		4mm	8mm	15mm	25mm
Process connection	R male thread Material: PPS	R3/8	R1/2	R3/4	R1·1/4
	NPT male thread Material: PPS	NPT3/8	NPT1/2	NPT3/4	NPT1·1/4
	Rc female thread Material: SCS14A	Rc1/4	Rc1/4	Rc1/2	Rc1
Applicable fluids (Note 1)	Liquid	Water			
	Gas	Air, Nitrogen gas			
Flow range (L/min)	Water	0.4 to 4	1.1 to 15	2.8 to 45	8.3 to 133
	Air at atmospheric pressure	7.2 to 17	18 to 90	55 to 283	167 to 850
Temperature range	Fluid	–10 to +80°C (no condensation)			
	Ambient	–10 to +60°C			
Max operating pressure		0.98MPa			
Accuracy		Liquids: ±2% of full scale Gas: ±3% of full scale			
Repeatability		± 0.5%			
Pressure loss (kPa)	Water	0.31 to 31	0.12 to 34.3		
	Air at atmospheric pressure	0.13 to 0.7	0.06 to 1.52		
Major parts material		Body and sensor: PPS resin (Polyphenylene sulfide) Transmitter housing: Polycarbonate Wet sealing material: Fluoro rubber			
Installation location		① Free from rain and water ② Minimal temperature variation ③ No exposure to direct sunlight (equivalent to IP53)			
Display (LCD)		① Accumulated total flow 8-digit ② Instantaneous flowrate per hour 5-digit ③ Instantaneous flowrate per minute 5-digit ④ Resettable total flow 7-digit (⑤ Fluid pressure setting) (⑥ Fluid temperature setting)	Display shows items ①②③④ in rotation by pressing MODE button. When the temperature/pressure compensation (fixed conversion) is specified, ⑤ and ⑥ will also be displayed in rotation. The display can be rotated manually by 0°, 90°, 180°, and 270°.		
Output	Battery powered	None			
	Externally powered	Analog output	4 to 20mA		
		Alarm output	Open drain output (equivalent to open collector), Allowable current: 20mA, Maximum applied voltage: 30V Output point: 2 points (Set arbitrary values for [High limit alarm instant flow] and [Low limit alarm instant flow])		
		Factored pulse output	Open drain output (equivalent to open collector), Allowable current: 20mA, Maximum applied voltage: 30V Pulse width: 30ms (selectable range: 1 to 999ms)		
Power source	Battery powered	Lithium battery unit Life: 6 years approx. (at room temperature)			
	Externally powered	12 to 45VDC Max 30mA			
Transmitter cable (Externally powered)		5-conductor shield cable (1m attached)			
Transmitter length (Externally powered)		Max 1km (CVVS: 1.25 to 2.0mm^2) Max 100m when using analog output with pulse/alarm output			
Applicable standards		2014/30/EU EMC Directive: EN 61326-1 2011/65/EU RoHS Directive: EN 50581			

Note 1: Hazardous fluids (flammable, corrosive, toxic, etc.) cannot be measured.

■ DISPLAY AND OUTPUT UNIT (STANDARD SETTING)

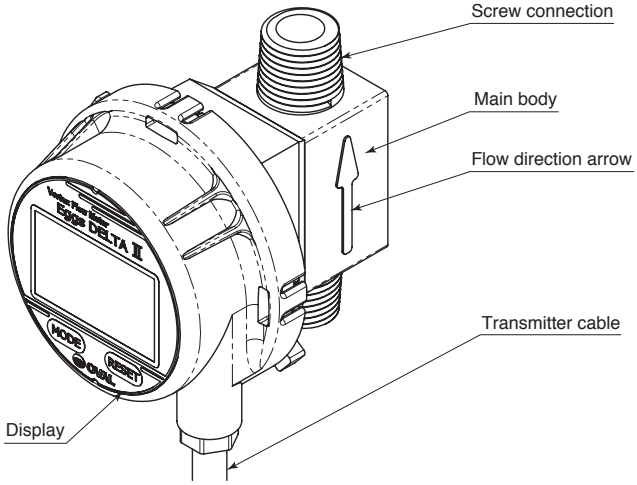
(1) For liquid

Model	Nominal Size (mm)	Total flow unit and factored pulse unit		Maximum flowrate L/min
		Pulse unit [L]	Max output frequency [Hz]	
FLM2S–1□□D□	4	0.01	6.67	4
FLM20–1□□D□	8	0.1	2.50	15
FLM21–1□□D□	15	1	0.75	45
FLM22–1□□D□	25	1	2.22	133

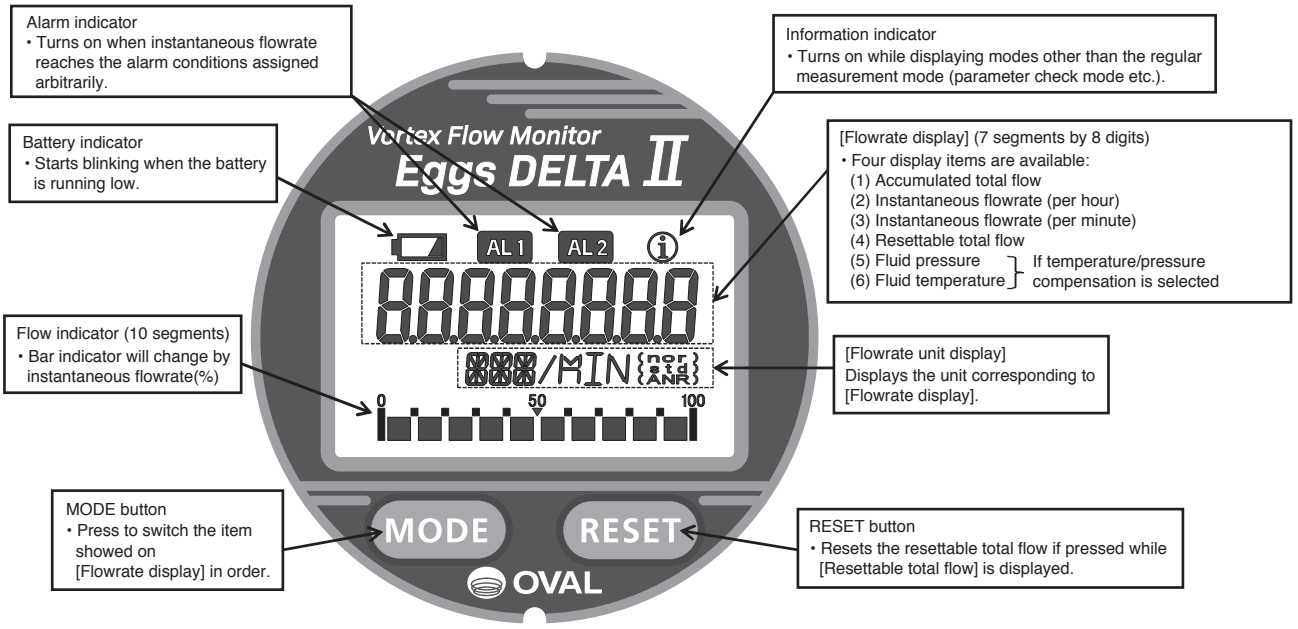
(2) For gas

Model	Nominal Size (mm)	Total flow unit and factored pulse unit		Maximum flowrate L/min
		Pulse unit [L]	Max output frequency [Hz]	
FLM3S–1□□D□	4	0.1	2.83	17
FLM30–1□□D□	8	1	1.50	90
FLM31–1□□D□	15	1	4.72	283
FLM32–1□□D□	25	10	1.42	850

■ PARTS NAME

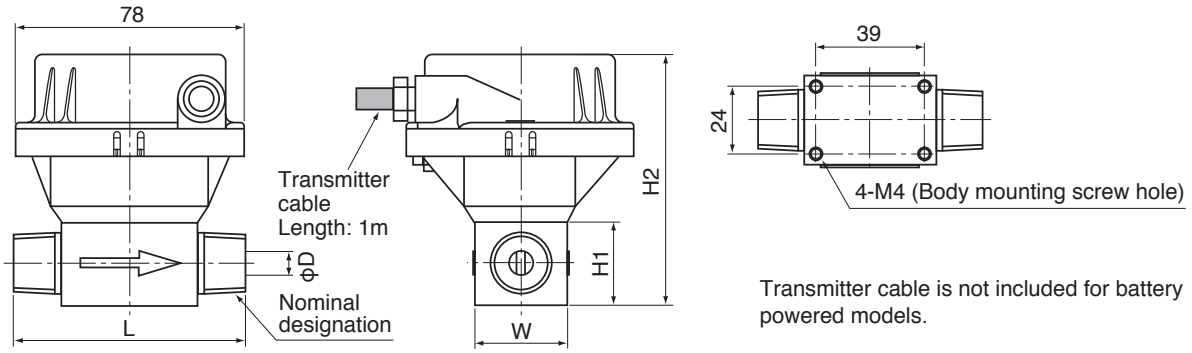


DISPLAY / BUTTONS



■ OUTLINE DIMENSIONS

● R male thread, NPT male thread

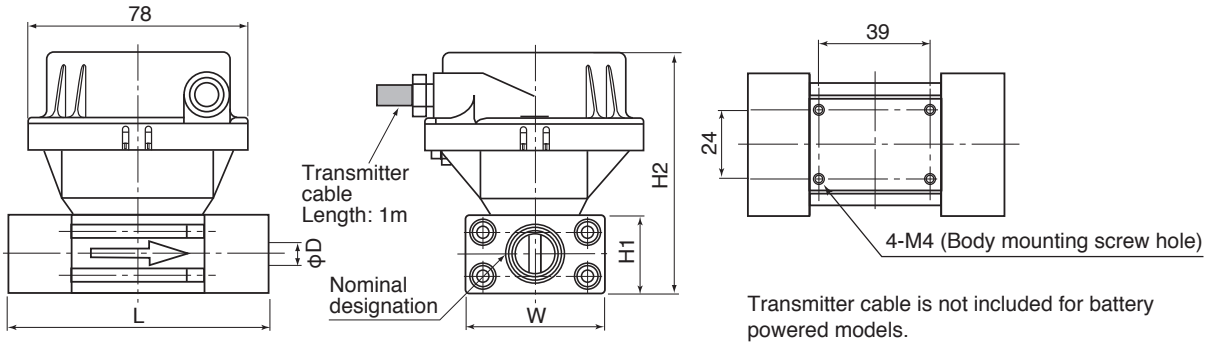


Transmitter cable is not included for battery powered models.

[Unit: mm]

Model	Nominal size	ϕD	Nominal designation	L	W	H1	H2
FLM $\frac{2}{3}$S–1□$\frac{P}{N}$D□	4	8.5	R3/8 NPT3/8	80	32	29	86.2
FLM $\frac{2}{3}$0–1□$\frac{P}{N}$D□	8	13	R1/2 NPT1/2	80	32	29	86.2
FLM $\frac{2}{3}$1–1□$\frac{P}{N}$D□	15	14	R3/4 NPT3/4	85	32	29	86.2
FLM $\frac{2}{3}$2–1□$\frac{P}{N}$D□	25	24.5	R1·1/4 NPT1·1/4	120	46	46	103.2

● Rc female thread



Transmitter cable is not included for battery powered models.

[Unit: mm]

Model	Nominal size	ϕD	Nominal designation	L	W	H1	H2
FLM $\frac{2}{3}$ S–1□SD□	4	8.5	Rc1/4	91	50	29	86.2
FLM $\frac{2}{3}$ 0–1□SD□	8	10.7	Rc1/4	91	50	29	86.2
FLM $\frac{2}{3}$ 1–1□SD□	15	14	Rc1/2	91	50	29	86.2
FLM $\frac{2}{3}$ 2–1□SD□	25	24.5	Rc1	126	46	46	103.2

■ INSTALLATION LOCATION

Select an installation location that meets the following requirements.

(1) A location free from excessive vibration or shock (preferably piping vibration 0.2G or less)

(2) A location that provides easy access for display reading and servicing.

(3) A location where the process line is kept full of fluid without air entrapment (for liquid measurement).

(4) A location where fluid pressure is held at or below allowable pressure of 0.98MPa.

(5) A location free from fluid condensation.

To prevent damage on the transmitter housing, avoid installation in the following locations:

(1) A location where operating ambient temperature exceeds the range of -10 to +60°C.

(2) A location with exposure to direct sunlight.

(3) A location with abrupt temperature change.

(4) A location exposed to substances such as oils or solvents that may degrade the transmitter housing (made of Polycarbonate.)

(5) A location exposed to rain or water.

If flowmeter must be used under conditions that does not satisfy above, provide protection with shelter, cover or by seal on the flowmeter.

※: The product shall not be used in hazardous locations.

■ PIPING REQUIREMENTS

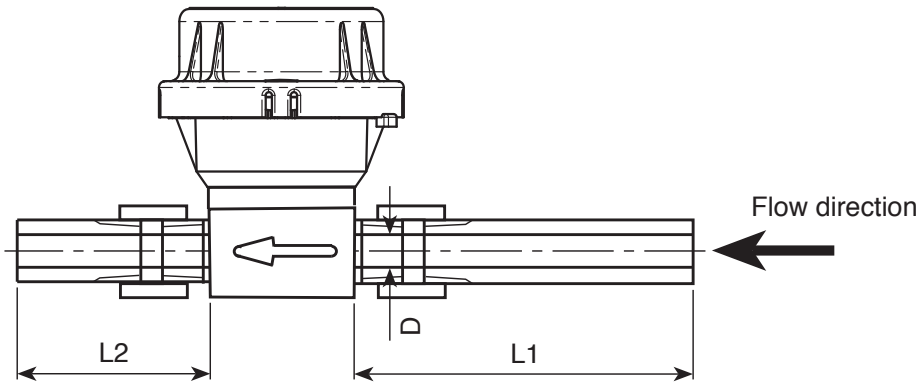
Please refer to the table below for the straight tube lengths required. Note the following to maintain metering accuracy.

Nominal size (mm)	Main body inner diameter (mm)	Upstream tube (L1) (mm)	Downstream tube (L2) (mm)
4	8.5	59 or more	25 or more
8 (Male thread)	13	91 or more	39 or more
8 (Female thread)	10.7	59 or more	25 or more
15	14	98 or more	42 or more
25	24.5	171 or more	73 or more

(1) Use piping having an inner diameter equal to or greater than the main body inner diameter.

(2) An "abrupt increase in diameter", such as a throttle valve or an expanded tube, located upstream, has to be at least 50D away from this meter.

(3) A flow control valve shall be located downstream of the meter to regulate flowrate.



D: Main body inner diameter

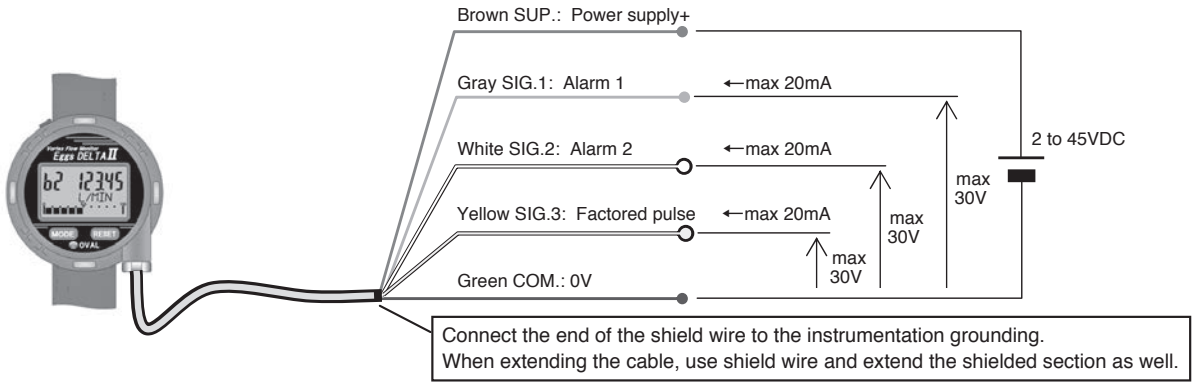
■ INSTALLATION POSITION

There is no restriction in installation position in terms of accuracy. Confirm that the flow direction arrow indicated on the side of the flowmeter body matches the actual flow direction.

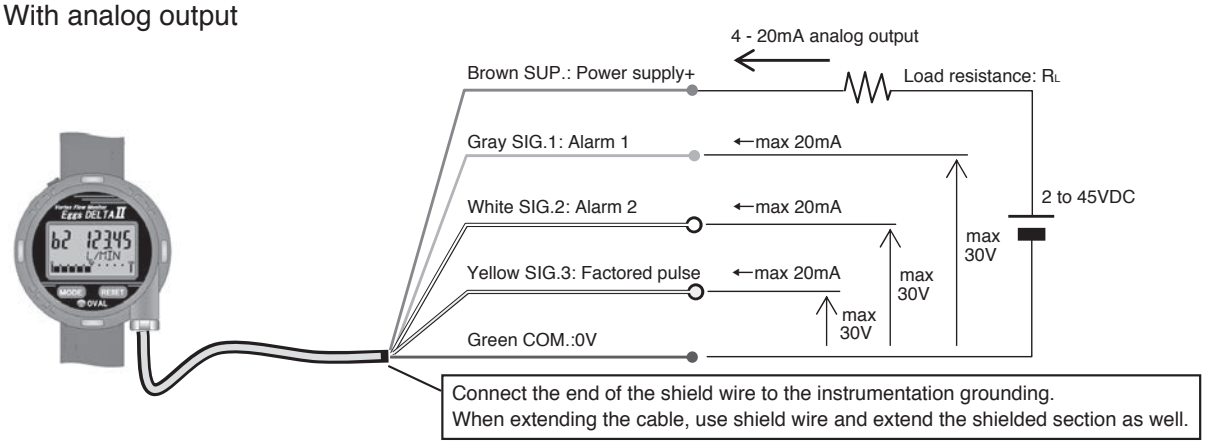
※: In applications where air entrapment can occur, vertical piping (flow direction: bottom to up) is recommended.

■ WIRING DIAGRAM

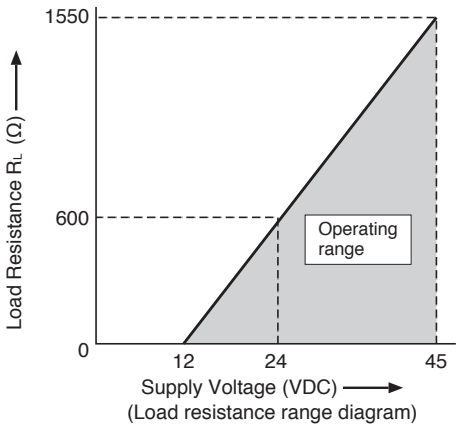
● Alarm output and pulse output (with no analog output)



● With analog output



Wire color	Description
Brown	SUP. (and analog output)
Gray	SIG.1 ..... Alarm 1 output (high or low)
White	SIG.2 ..... Alarm 2 output (high or low)
Yellow	SIG.3 ..... Factored pulse output
Green	COM



(Load resistance range diagram)

※: For long-distance transmission, extension shall be done using shield cable of at least 0.75mm^2 in diameter.
Wires should be routed away from noise sources such as power cable.
(Transmission length: Max 1km with conductive area 2.0mm^2.
Max 100m when using both analog output and pulse/alarm output)

■ PRODUCT CODE DESCRIPTION

Item	Product code											Description
	①	②	③	④	⑤	–	⑥	⑦	⑧	⑨	⑩	
Model	F	L	M									Eggs DELTA II
Fluid Category				2								Liquid
				3								Gas
Nominal Diameter (N.D.)					S							4mm
					0							8mm
					1							15mm
					2							25mm
						–						
Display							1					LCD display provided
Output								0				No output (battery-powered)
								1				Factored pulse output
								2				Analog output
								4				High/low alarm output
								5				Factored pulse output + High/low alarm output
								7				Analog output + Factored pulse output + High/low alarm output
Process Connection									P			R male thread Material: PPS
									N			NPT male thread Material: PPS
									S			Rc female thread Material: SCS14A
Version										D		Always "D"
Characteristic Code											0	None
											N	Normal conversion
											S	Standard conversion
											Z	Other temperature/pressure compensation

The specification as of July, 2019 is stated in this GS Sheet. Specifications and design are subject to change without notice.

Sales Representative:

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初版	改訂	印刷
19.02	19.07	