OVAL

Vortex flow monitor

Eggs DELTA

Contaminants present problems! Takes quite a time to cleanse!

Poor viewability!

Costly after all! (Initial cost may be low, but a run-down battery requires entire meter replacement!)

Can't we find a better solution?

Is excesdsive heat your problem?

Inconvenient limitations on physical orientation!

Why not leave your problems to OVAL's Eggs.

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Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
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Уфа (347)229-48-12
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93

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Eggs DELTA Product Line

This product is NOT designed and manufactured for use in applications where safety is a prerequisite.

Desirable advantages

- Eggs DELTA, a Karman vortex flow monitor is serviceable with most fluids, both liquid and gas.
- Ideally suited for consumption monitoring and control in the cleansing and cooling water processes, or of medical gas, factory air, etc.
- Has an LCD digital display (reads in L/min., L/h, or L).
- Immune to dust and mist.
- Measures both clean and wet gas.
- Serviceable for dirty water, such as circulating cooling water and well-water.
- Thanks to the absence of moving parts, it's maintenance free.

Select one from the Eggs DELTA product line that best suits your particular application.

Battery powered

- All you need is simply to install in the line. Battery powered, it monitors instantaneous flowrate (□/h or □/min.) or total flow on its digital display. Saves electrical installation cost.
- Built-in battery is good for 4 years approx.
- Battery pack is replaceable for economy benefit.

Output

- Remote output (analog instantaneous flowrate, pulse total flow) available for remote management.
- A model with alarm output (two outputs) also available to serve as a flow switch.

Metal process connection

- Stainless steel connectors eliminate the risk of chipped threads at connections with tubing.

MODEL : FLM ① ② – ③ ④ ⑤ ⑥ ⑦

FLM □ □ – 1 □ □ C W

Product Code Explanation

●Synthetic resin body

③ Display

1 LCD display

※Material : Polycarbonate

④ Outputs

0 None (battery powered)
1 Factored pulse
2 Analog
3 Unfactored pulse
4 High/low alarm
5 Factored pulse + high/low alarm
6 Unfactored pulse + high/low alarm

② Nominal size

S 4mm
0 8mm
1 15mm
2 25mm

⑤ Process connection

P R thread : PPS
N NPT thread : PPS
S Rc thread : SCS14A

① Acceptable fluids

2 Liquid
3 Gas

⑦ Waterproof construction

W Always coded "W"

⑥ Version

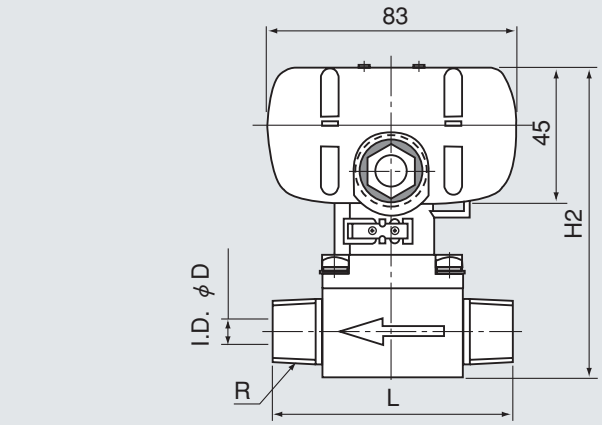
C Always coded "C"

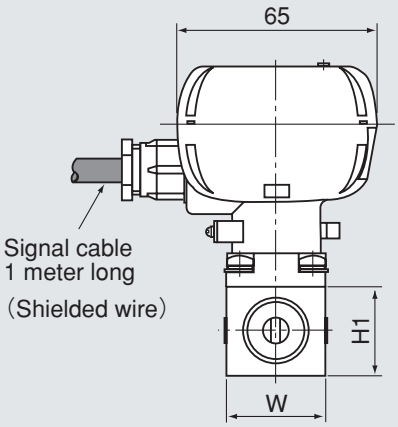
Outline Dimensions

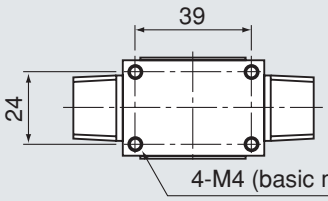
PPS resin process connection

Major dimensions remain the same in both the externally powered and battery powered models.

Units in mm





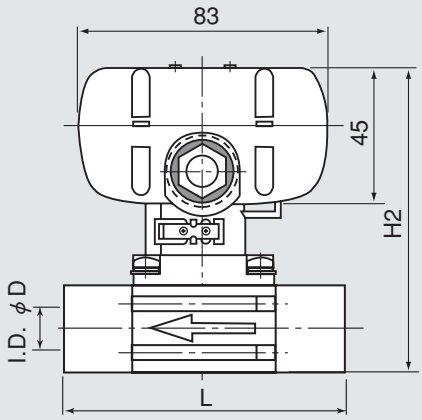


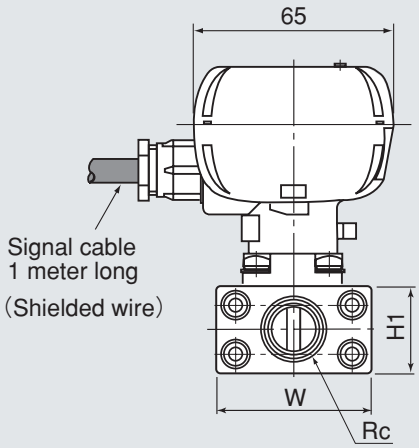
NOTES : Battery powered model is not provided with signal cable.

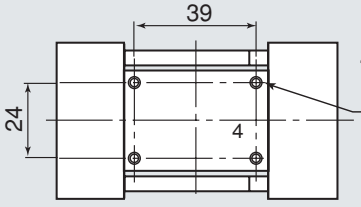
Model	Nom. size	ϕD	R		L	W	H1	H2	Approx. weight(g)
FLM⅔S-1□PNCW	4	8.5	R3/8	NPT3/8	80	32	29	102	285
FLM⅔0-1□PNCW	8	13	R1/2	NPT1/2	80	32	29	102	285
FLM⅔1-1□PNCW	15	14	R3/4	NPT3/4	85	32	29	102	290
FLM⅔2-1□PNCW	25	24.5	R1¼	NPT1¼	120	46	46	119	420

Metal process connection

Units in mm







NOTES :
1. Meter body fitting screws cannot be used for the 25mm.
2. Battery powered model is not provided with signal cable.

Model	Nom. size	ϕD	Rc	L	W	H1	H2	Approx. weight(g)
FLM⅔S-1□SCW	4	8.5	Rc1/4	91	50	29	102	660
FLM⅔0-1□SCW	8	8.5	Rc1/4	91	50	29	102	660
FLM⅔1-1□SCW	15	14	Rc1/2	91	50	29	102	660
FLM⅔2-1□SCW	25	24.5	Rc1	126	46	46	119	960

General Specifications

■Synthetic resin body

Acceptable fluids

〈Liquid〉 Cooling water, Pure water

〈Gas〉 Air, Nitrogen

※For use with fluids other than above,consult the factory.

⚠ This product is NOT compatible with fllammable,corrosive,or toxic fluids.

Nominal size and process connections

4mm	8mm	15mm	25mm
R 3/8 ext. thd or Rc 1/4 int. thd	R 1/2 ext. thd or Rc 1/4 int. thd	R 3/4 ext. thd or Rc 1/2 int. thd	R 1 1/4 ext. thd or Rc 1 int. thd

Temp. range

Fluid −10 to +80℃

Free from freezing

Atmosphere −10 to +60℃

Max. operating press.

0.98MPa

Flow range (L/min) ※1

	4mm	8mm	15mm	25mm
Liquid	0.4 to 4	1.1 to 15	2.8 to 45	8.3 to 133
Gas	7.2 to 17	18 to 90	55 to 283	167 to 850

Accuracy

±3% of full scale

Repeatability

±0.5%

Pressure loss at max. flowrate (kPa) ※2

	4mm	8mm	15mm	25mm
Liquid	31	34.3		
Gas	0.7	1.52		

Power

Battery drive

- Battery pack (lithium battery)
- Battery life good for 4 years approx.
- Battery pack is replaceable.

Externally powered 12 to 45VDC

- Acceptable load resistance value has limitations (see resistive load range on page 6.)

Installation locotion

- Free feom rainwater and running water
- Minimal tempereture variation
- Not exposed to the direct sunshine

Backup

EEPROM retains parameters and total flow.

Analog full scale flowrates

Nom. size (mm)	Water	Air
4	4 L/min	17 L/min
8	15 L/min	90 L/min
15	45 L/min	283 L/min
25	133 L/min	850 L/min

Output signals

Analog 4 to 20mA

Factored pulse or unfactored pulse Open collector

- Allowable current 20mA Max. voltage impressed 30V
- Pulse width (Factored: 30ms Unfactored: 1ms)

Alarm Open collector

- Allowable current 20mA Max. voltage impressed 30V
- LED (red) in the display shows the alarm status.

※2

Indicated total flow unit, factored pulse unit, and unfactored pulse unit

●Indicated total flow unit

Nom. size (mm)	Liquid	Gas
4	0.01 L	0.1 L
8	0.1 L	1 L
15	1 L	1 L
25	1 L	10 L

●Factored pulse unit

Nom. size (mm)	Liquid	Gas
4	0.01 L	0.1 L
8	0.1 L	1 L
15	1 L	1 L
25	1 L	10 L

●Unfactored pulse unit (nominal)

Nom. size (mm)	Liquid		Gas	
	Pulse unit	Frequency at max.flowrate	Pulse unit	Frequency at max.flowrate
4	0.4450 mL/P	150 Hz	2.225 mL/P	130 Hz
8	2.204 mL/P	115 Hz	11.02 mL/P	140 Hz
15	11.82 mL/P	65 Hz	59.08 mL/P	80 Hz
25	63.30 mL/P	35 Hz	316.5 mL/P	45 Hz

● Pressure loss calculation formula

$$\Delta P = \Delta Po \times \frac{\rho}{\rho o} \times \left(\frac{Q}{Qo}\right)^2$$

where

ΔP : Pressure loss [kP]
ΔPo : Pressure loss at max. liquid or gas flowrate (Page 5 ※2 stated value) [kPa]
ρ : Density of fluid at measurement [kg/m³]
ρo : Standard density:1000 [kg/m³] In the case of liquid, 1.2 [kg/m³] In the case of gas.
Q : Flowrate at measurement [L/min.]
Qo : Max. liquid or gas flowrate (Page 5 ※1 stated value) [L/min.]

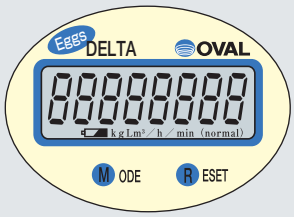
〈Example〉
With 15mm Eggs DELTA for gas service, find the pressure loss at 0.5MPa, 50℃, air, and 100L/min.

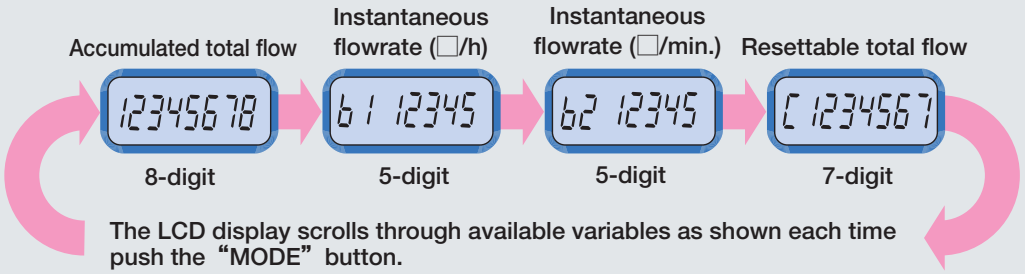
0.5MPa Density at 50℃

$$\Delta P = 1.52 \times \frac{6.382}{1.2} \times \left(\frac{100}{283}\right)^2$$

$$= 1.01 \text{ [kPa]}$$

● Display

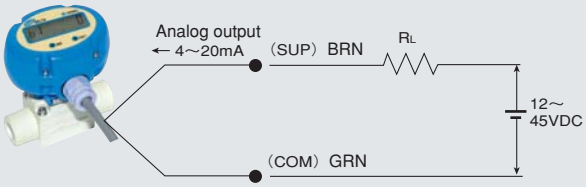




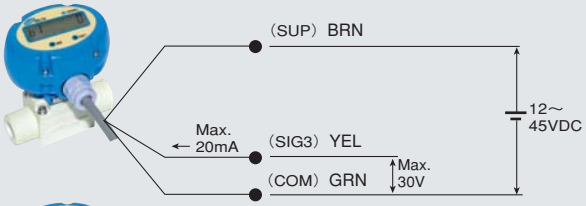
The LCD display scrolls through available variables as shown each time push the "MODE" button.

● Wiring Diagrams

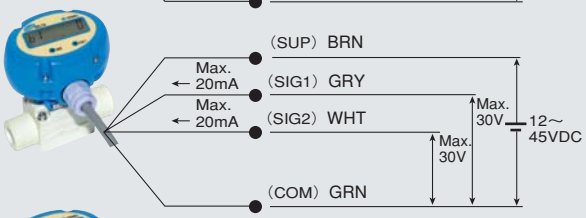
●Analog output (2-wire)



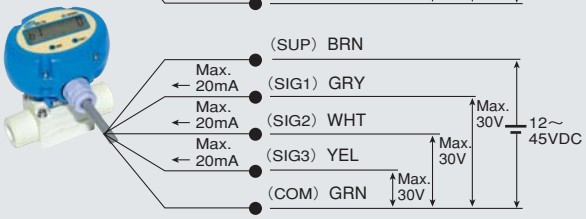
●Factored or unfactored pulse output (3-wire)



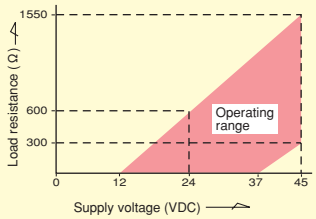
●High/low alarm output (2 outputs) (4-wire)



●High/low alarm (2 outputs) + Factored pulse or unfactored pulse (5-wire)



●Load resistance range



■ Polarities

BRN: SUP. (and analog output)
GRY: SIG. 1··· Alarm 1 output (upper or lower)
WHT: SIG. 2 ··· Alarm 2 output (upper or lower)
YEL: SIG. 3 ··· Factored or unfactored pulse output
GRN: COM

※ : Transmission distance; longest 1km with the conductiue area 2.0mm².

Installation Conditions

● Installation location

Select an installation location that meets the following requirements:

CAUTION:Installation in an explosionproof area (hazardous location)is NOT permitted.

① A location free from rainwater and moisture (for use indoors).

Avoid exposure to the sun.

② A location with least temperature variation (preferably within a range 0 to +60 ℃).

③ A location free from excessive vibration and shock (preferably pipe oscillation 0.2G max.).

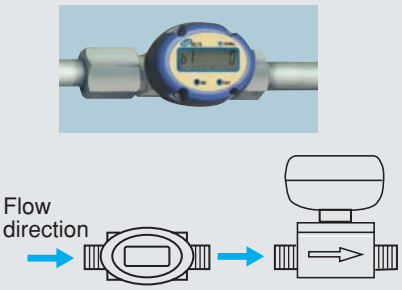
④ A location for ease of display readability and servicing.

⑤ A location free of bubble entrapment and filled with the fluid (in liquid measurement).

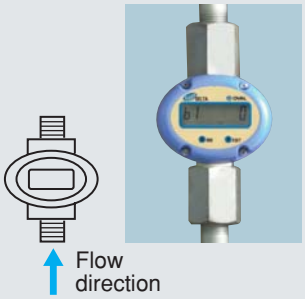
⑥ A location where fluid pressure is held below permissible pressure of 0.98MP.

⑦ A location free for the fluid from freezing.

Tubing Requirements



〈Horizontal line〉



〈Vertical line〉

With PPS external threads, exercise care to avoid applying excessive stress or impact, observing the tightening torques shown in the table below.

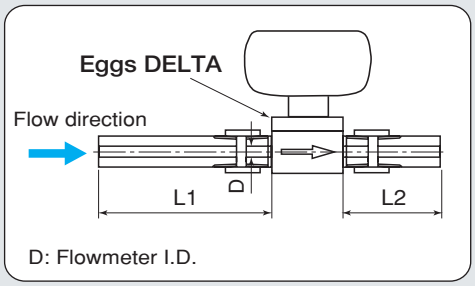
Nominal size (mm)	Tightening torque tolerances (N・cm)
4	1960
8	1960
15	1960
25	9800

①Secure a straight tube length 7D min. upstream of, and 3D min. downstream of the meter.

②Any equipment having a "sharp increase in tube diameter" such as a throttle valve or a tapered tube, if present upstream of the meter, should be located at least 50D.

③Flow regulating valve should be located downstream of the meter for controlling the flow.

④Use tubing having an inside diameter greater than the meter inside diameter.



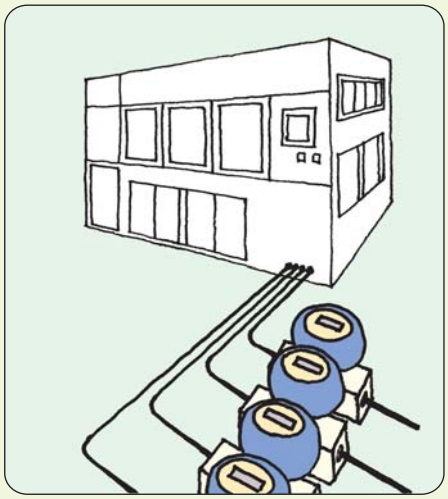
●Required straight tube lengths

Units in mm

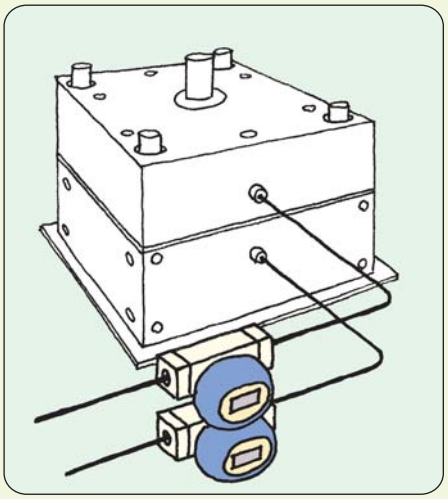
Nom. size	Inside size (D)	Upstream (L1)	Downstream (L2)
4	8.5	59 min.	25 min.
8	13	91 min.	39 min.
15	14	98 min.	42 min.
25	24.5	171 min.	73 min.

Typical Applications

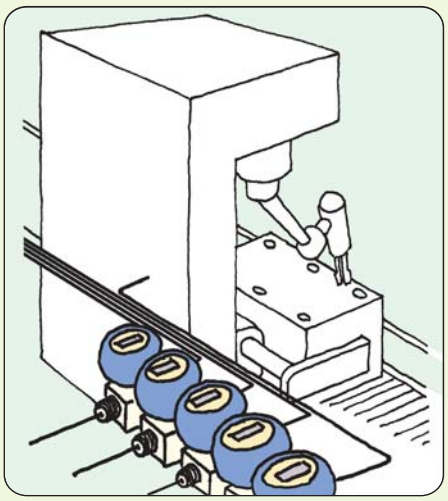
●Cooling water monitor and measurement at semiconductor production facilities



●Cooling water measurement and control for large-size metal molds



●Air consumption management at individual air-driven tools in a manufacturing plant



Associated Equipment

Eggs DELTA *Pulse*
Vortex flow monitor

Eggs DELTA Pulse is a compact, lightweight, and competitively low priced PPS-resin Karman vortex flow monitor. Best suited for process line management in a plant where a large number of flow monitors, for tool machines for example, are in operation. Offers energy saving benefit.

- Acceptable fluids : Liquid and gas
- Nominal size

※Intrinsically safe models also available.

GS.No.GBD623

DELTA FLOWPET

DELTA FLOWPET has a stainless steel meter body of the industrial vortex flowmeter, EX-DELTA, combined with a newly designed small preamplifier.
Fast delivery, low price, sturdy design, high performance and user hriendliness have been achieved with the best price/performance in this model.

- Acceptable fluids : Liquid, gas, and steam
- Nominal size

GS.No.GBD620

DELTA FLOWPET-DX

Our product lineup consists of three types－liquid, gas, and steam service.
Pressure gage built－ in models also available.
Can measure steam flows with pressure variations at a high degree of accuracy. Our liquid service models are ideal for water management flowmeters.

- Acceptable fluids: Liquid, gas, and steam
- Nominal sizes : 15, 25, 40, 80, 100, 150mm

CAT.No.CBD120、121