CAT.No.CBB370E-10

Liquid

OVAL

Circular gear positive displacement flowmeter for painting

Hi SHOTGEAR

LSGG Series

Ideal for paint process!





- Circular gear positive displacement flowmeter **made in Japan**
- **Fast response/high resolution**
- **Easy-to-clean** structure
- High pressure (**25MPa**) supported
- Resistant to **vibration and high voltage**
- **Lightweight and compact**/Easy to install in a device or robot
- **ATEX/IECEx** compliant

■ GENERAL SPECIFICATIONS

•Flowmeter body

Item	Description	
Applicable fluid	Paint, hardening agent, grease, polymer solution, hydraulic oil, other high-viscosity fluids	
Model	LSGG13	LSGG23
Flow range	20 to 1000mL/min	50 to 2000mL/min
Nominal meter factor	0.04366mL/P	0.1215mL/P
Fluid temperature range	–20 to +60°C	
Ambient temperature	–20 to +50°C	
Viscosity	30mPa·s or more (If the viscosity is 30mPa·s or less, contact OVAL.)	
Accuracy	±0.5%RD	
Maximum allowable pressure	25MPa	
Connection	φ6 (Rc1/4 or G1/4 when the adapter is used)	
Material	Body: SUS316L Rotors: SUS329J4L Bushing: Cemented carbide Converter housing: aluminum	
Weight	With adapter: approx. 1.5kg Without adapter: approx. 0.9kg	
Explosionproof	TIIS : Ex ia IIB T6 Gb ATEX: II2G Ex ia IIB T6 Gb IECEx : Ex ia IIB T6 Gb CSA : Class I, Division 2, Groups C, D T6 Ex ia IIB T6 Gb Class I, Zone 1, AEx ia IIB T6 Gb	
Length of dedicated signal cable	Standard 5m (max. 30m)	

•Dedicated Barrier

Item	Description
Power supply voltage	19 to 30VDC
Current consumption	20mA or less
Ambient Temperature	–20 to +60°C
Weight	Approx. 150g
Output	NPN or PNP open collector pulse (no current limiting resistor) ON voltage: 3V or less Allowable voltage: 30V or less Allowable current: 100mA Pulse width: Duty1: 1
Protection class	IP20
Housing material	Resin
Installation	35mm DIN Mounting rail (EN 60715:2001)

•Applicable standards

Applicable EU directive	EMC Directive : 2014/30/EU RoHS Directive : 2011/65/EU+(EU)2015/863 ATEX Directive : 2014/34/EU
Applicable standards/ Other	EMC Directive : EN 61326-1 RoHS Directive : EN IEC 63000 ATEX Directive : EN IEC 60079-0, EN60079-11 IECEx : IEC60079-0, IEC60079-11 TIIS : JNIOSH-TR-46-1:2015, JNIOSH-TR-46-6:2015 CSA : UL, CSA, ANSI 61010-1, 60079-0, 60079-11

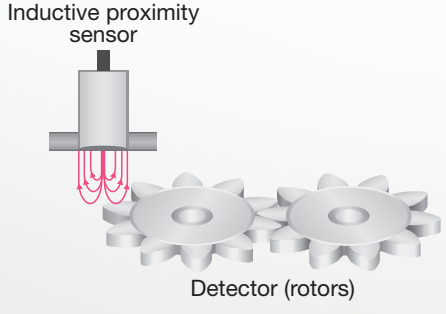
■ PRODUCT CODE EXPLANATION

	①	②	③	④	⑤	⑥	–	⑧	⑨	⑩	⑪	⑫	–	⑭	⑮	–	⑰	⑱	–	⑳	㉑	㉒	㉓	㉔	Description
Model	L	S	G																						Gear flowmeter
Meter size				G	1	3	–																		20 to 1000mL/min
				G	2	3	–																		50 to 2000mL/min
Fluid category								L																	Liquid
Temperature category									0																60°C or less
Major material										S															SUS316L
Process connection											C	0	–												φ6 port (Standard)
											T	C	–												Rc1/4 (Adapter included)
											T	G	–												G1/4 (Adapter included)
Explosionproof														E											ATEX/IECEx
														J											TIIS
														A											CSA
Explosionproof temperature class															6	–									Temperature class T6
Converter																	A								PA0N
Version																		A	–						Version code
Sealing material																				F					O-ring: FPM
																				C					O-ring: IIR
																				T					O-ring: PTFE
																				Z					O-ring: Special
Accessory 1 (Intrinsic safety barrier)																					0				Not included
																					1				Included
Accessory 2 (dedicated signal cable)																						0	0		Not included
																						0	5		Included Length: 5m (standard)
																						1	0		Included Length: 10m
																						2	0		Included Length: 20m
																						3	0		Included Length: 30m
																						9	9		Included Length: Customer specific (Max. 30m)
Special specification																								0	Standard
																								Z	Special

■ PRINCIPLE OF MEASUREMENT

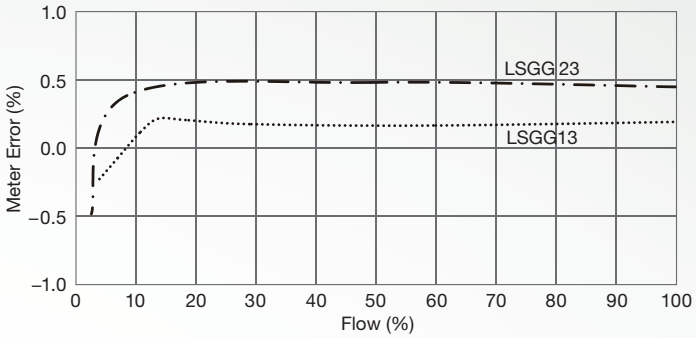
High performance made possible with the inductive proximity sensor

The inductive proximity sensor is a proximity switch which generates magnetic field within the sensing range.
The sensor provides high resolution by detecting each tooth of the detector (rotor). It's detection element consists of a coil combined with a high-frequency oscillation circuit. As the detector (rotor) approaches the sensor, induction current is generated from magnetic induction, changing the inductance and loss of the detecting coil, which then changes the oscillation circuit constant, oscillation amplitude, and oscillation frequency. These changes are used to detect the number of rotor revolution.

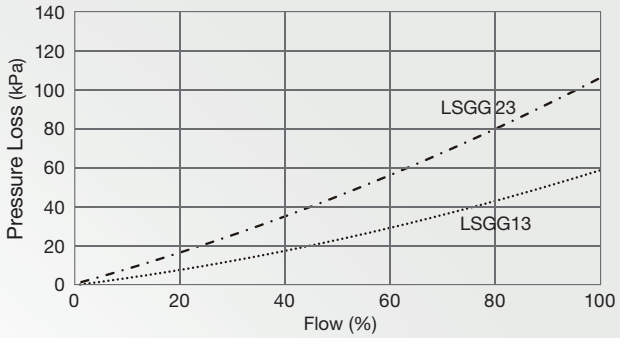


■ METER ERROR AND PRESSURE LOSS

• Meter Error



• Pressure Loss



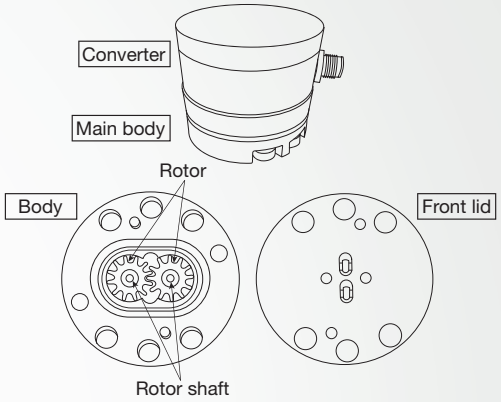
※: This is an example of meter error and pressure loss at viscosity 30mPa·s.

■ INSTALLATION CONDITIONS

- Mounting orientation
  There is no restriction on mounting orientation.
- Piping procedure

(1) Adjust the inflow direction properly following the arrow on the flowmeter body.
(2) The proximity sensor used for this flowmeter is averse to external magnetic flux.
To eliminate the influences of external magnetic flux, install the flowmeter at least 5m away from strong magnetic field such as motors and generators, as well as devices and wires which generate strong magnetic field.
(3) To implement electric heat tracing, please contact OVAL.
(4) If applying heat insulation, make sure that insulation material does not touch the converter.

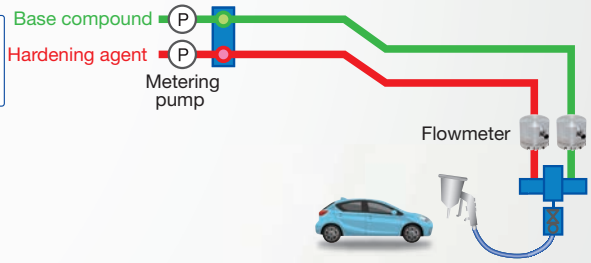
■ NAME OF EACH SECTION (FLOWMETER BODY)



■ APPLICATION EXAMPLE

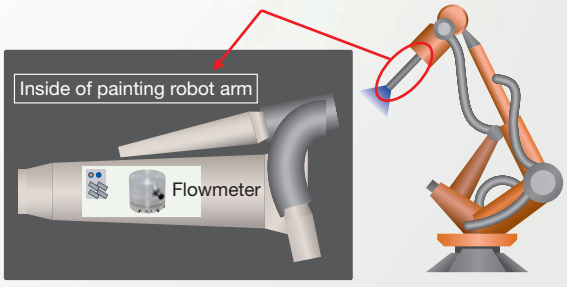
Mounted on 2-component mix painting device

Fast-response and high-resolution. Hi SHOTGEAR is best for monitoring usage and mixing ratio of each component.

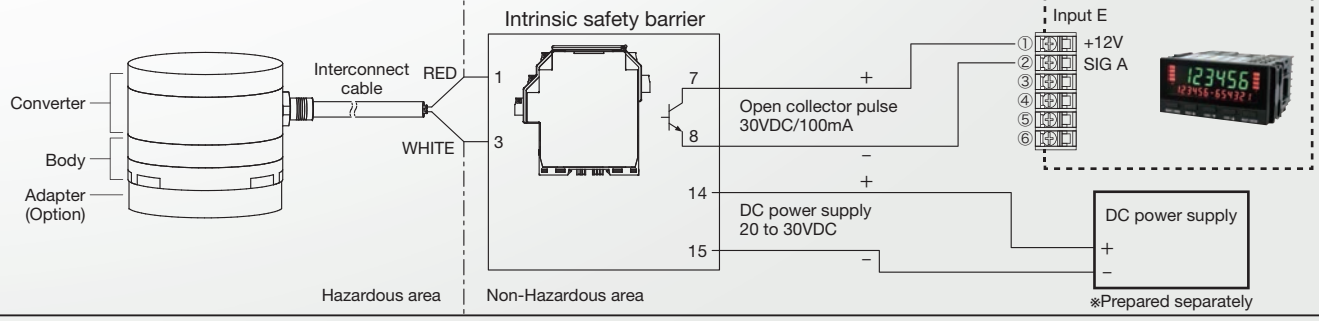


Mounted on painting robot arm

Compact, lightweight, and resistant to vibration and high voltage. Hi SHOTGEAR is best for installation inside arms of painting robots.



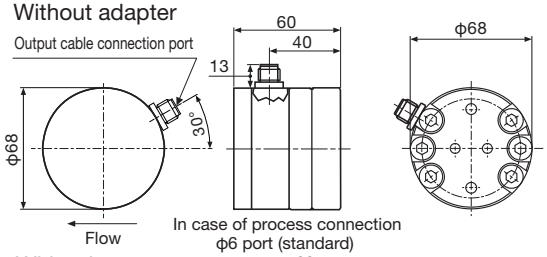
■ WIRING DIAGRAM



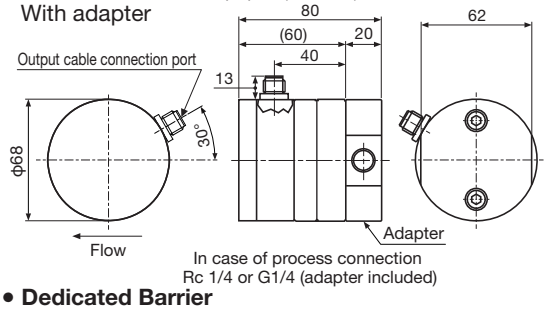
■ OUTLINE DIMENSIONS (Unit: mm)

• Flowmeter Body (LSGG13)

Without adapter

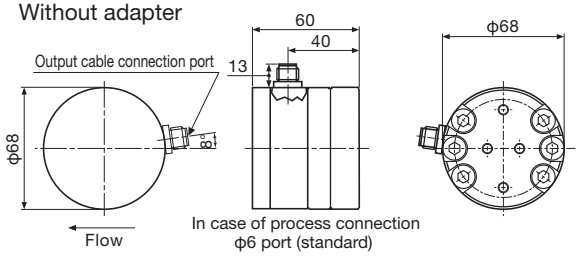


With adapter

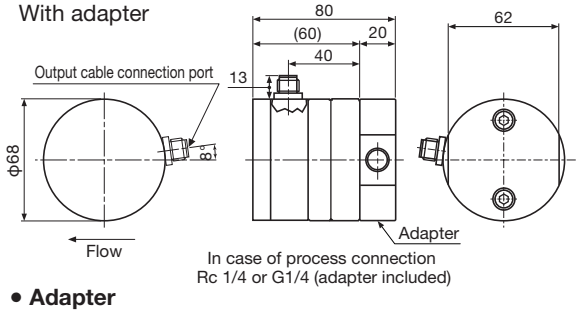


• Flowmeter Body (LSGG23)

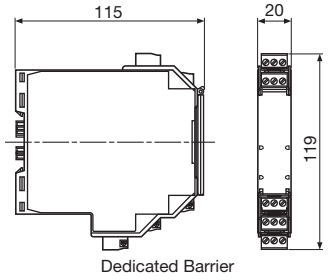
Without adapter



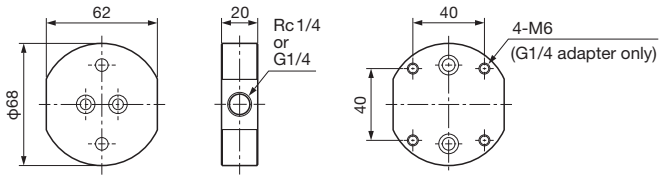
With adapter



• Dedicated Barrier



• Adapter



■ FLOW RATE INDICATOR



I want to display instantaneous flow rate and cumulative flow rate ····► **Adopting a high brightness LCD with good visibility, TFM-200 displays instantaneous flow rate, and TFW-200 simultaneously displays both instantaneous and cumulative flow rate**

I want to monitor and control flow rate with an analog signal ····► **With high speed response of 1msec. A 16 bit analog signal, simultaneously outputs instantaneous and cumulative flow rate**

I want to communicate with CAN ····► **It comes with various options such as CAN data, analog (±10V, 4-20mA), BCD, and RS-232C**





Flowmeter/Dedicated Barrier Hi SHOTGEAR

Flow Rate Indicator TFM-200, TFW-200

- Using two flow rate sensors, it measures instantaneous or cumulative flow rate at the same time, and calculates their sum, the difference and the average of flow rate (Note) Consult OVAL sales office or nearest representative
- Two level of 6-digit and 13-digit high brightness LCD display (red and green)
- Instantaneous measurement, periodic calculation method, measurement clock 20MHz

For Hi SHOTGEAR, Flow Rate Indicator (TFM-200, TFW-200) with capabilities of various calculation such as high frequency input is the best!

(Note) TFM-200 and TFW-200 are products of ATSENSE INC.

■ Cautions (For safe and proper use of this flowmeter, take the following into consideration.)

1. To ensure the required flow rate and pressure, and to prevent excessive flow or pressure increase, select/install appropriate pump and valve based on information such as flow range, operating pressure, and pressure loss of the flowmeter and strainer.
2. Install flowmeter body and interconnect cable as far as possible from sources of high magnetic field. (e.g. Keep the distance of 10cm or more from a solenoid valve with power consumption 10W approx.)
3. The applicable fluid is limited for this flowmeter since it is designed mainly for painting. For other applications, contact your nearest OVAL office or representative for consultation.
4. This flowmeter is not approved for custody transfer measurement under any legal metrology.
5. The operating ambient temperature range of this flowmeter is -20 to +50°C. If the flowmeter is expected to be exposed to high temperature caused by direct sunlight or reflected heat, install sunshade.
6. This flowmeter is designed for indoor use. Do not use outdoors.
7. This flowmeter does not have subtraction function. In applications where fluid flows backward or pulsates (fluid flowing forward and backward in piping due to pressure), pulse output is generated regardless of inflow direction.

The specification as of November, 2025 is stated in this catalog. Specifications and design are subject to change without notice.

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