Liquid

Ideal choice for fuel injection volume and fuel consumption measurement !!

No delta P

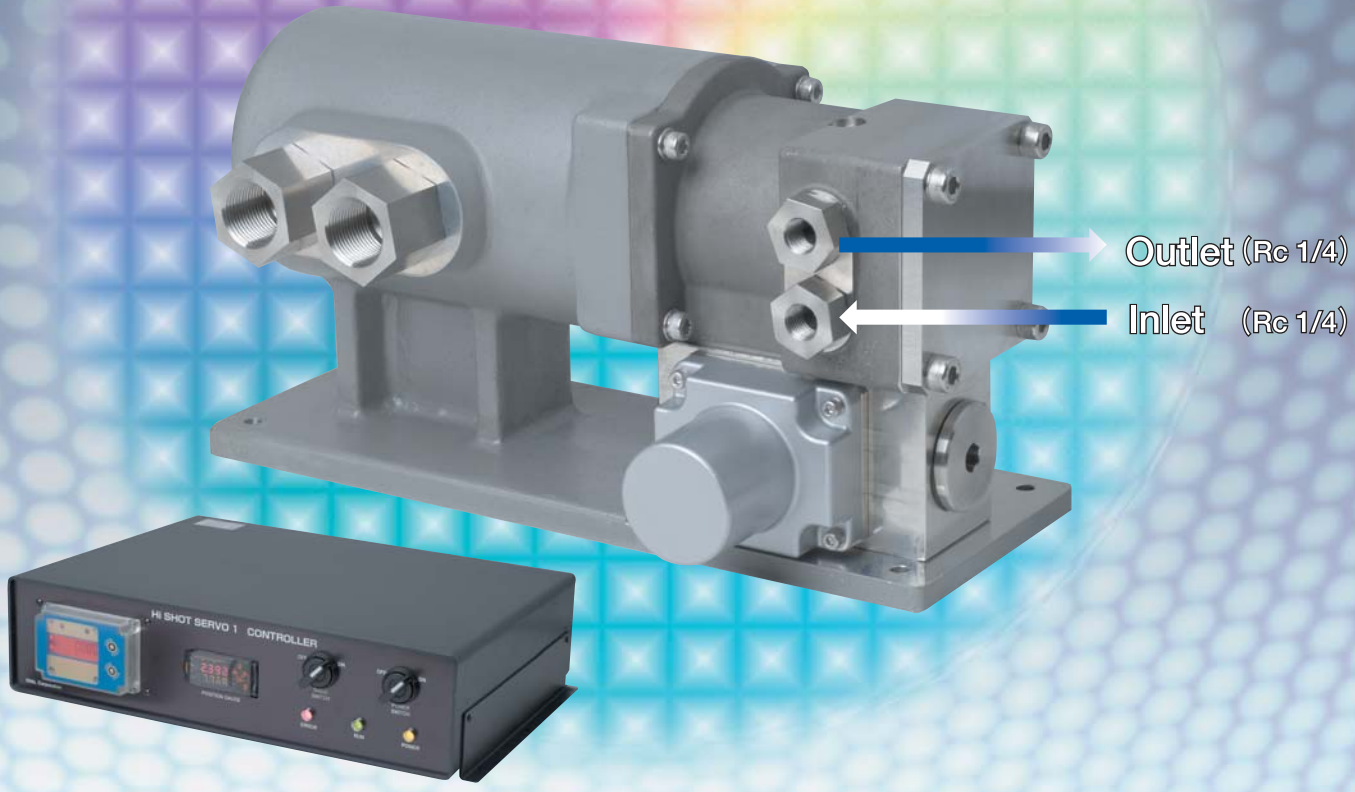
High response

High accuracy

Exceptional resolution

Wide range

Hi SHOT SERVO 1



Applying our proprietary precision rotors, this flowmeter measures the process flow at a high degree of accuracy as a servo mechanism continually controls the rotor rotation to maintain “zero differential pressure” across the inlet and outlet at all times.
Ideal for measuring of injection quantity into engines, injection nozzle flowrate, microflows at laboratories and test plants, or precisely controlled additives in very small quantities.

Typical Applications

- Injection volume measurement in gasoline injectors
- Fuel consumption measurement on the engine test bench
- Assessment of materials for bioethanol

Hi SHOT SERVO 1

General Specifications

[Low pressure service]

●Sensor (basic fowmeter)

Item		Description	
Flow range		0.1 to 30L/h	0.2 to 60L/h
Acceptable fluid		Light oil, gasoline, ethanol (For others, consult factory.)	
Operating temp. range of fluid		−10 to +80℃	
Operating ambient temp. range		−10 to +60℃	
Max. operating pressure		1MPa	
Meter err. acc.	Repeatability	2σ=0.04% (at 1/2 of full scale flowrate)	
Construction		Select one of the following two: ●Non-explosionproof ●Flameproof (TIIS approved: Exd II B T4) (ATEX approval is under review.)	

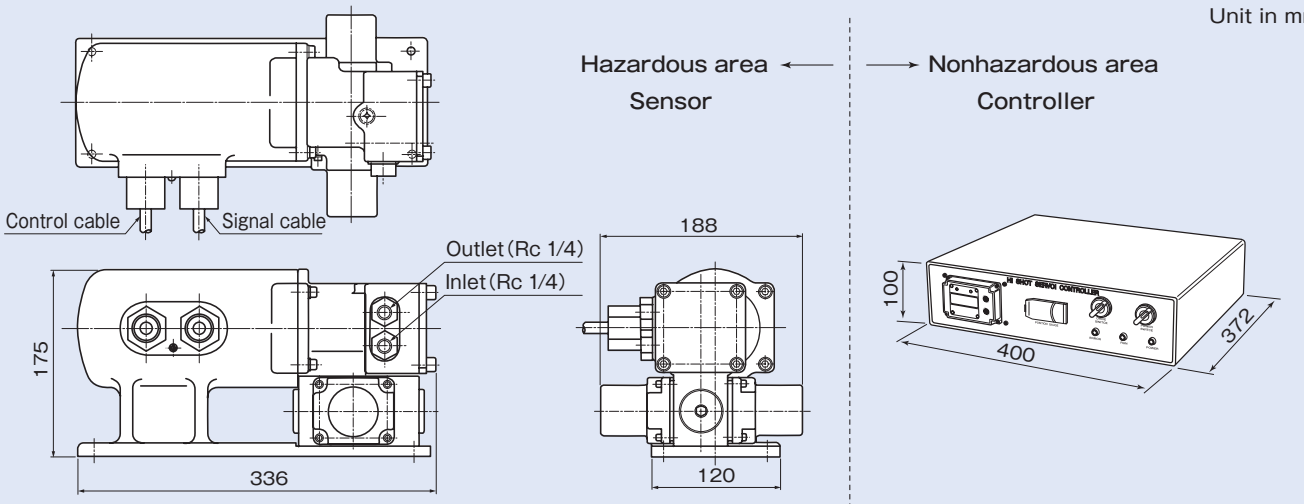
[High pressure service]

●Sensor (basic flowmeter) Targeted availability date

Item	Description		
Flow range	20L/h	90L/h	120L/h
Acceptable fluid	Gasoline		
Operating temp. range of fluid	−10 to +80℃		
Operating ambient temp. range	−10 to +60℃		
Max. operating pressure	12MPa		24MPa

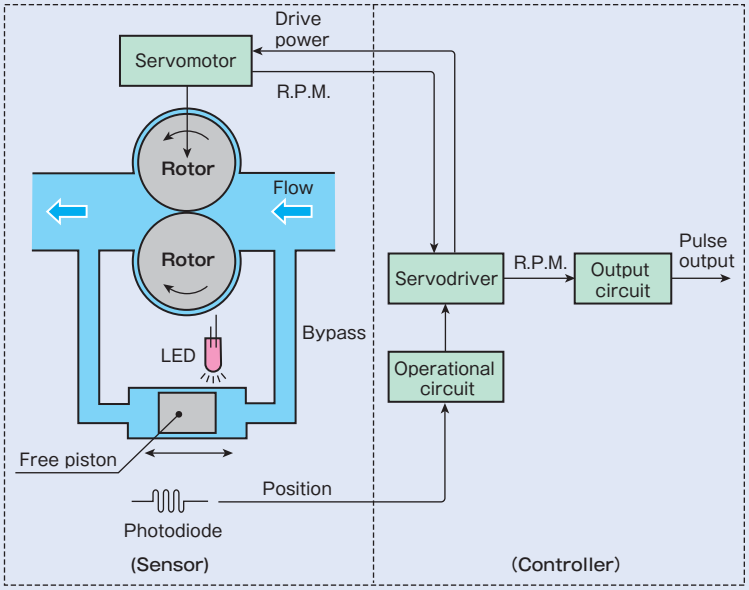
Outline Dimensions

Unit in mm



※: The dimensions shown above apply to low pressure models. For high pressure models, consult the factory.

Principle of Operation (to maintain the meter error at zero)



[Operating Principle]

As the fluid flows across the meter, a pressure differential is created between the inlet and outlet of rotors. The resultant pressure differential moves a free piston incorporated in the capillary line in the bypass.

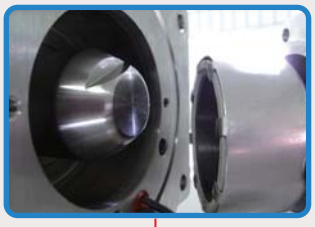
A photodiode sensor keeps track of the position of free piston and feeds back the obtained position information, via the controller, to the servomotor. It thus serves to maintain the pressure differential between the inlet and output of rotors at zero continuously.

By maintaining the pressure differential at zero, highly accurate flowmetering can be achieved over a broad flow range.

Exceptionally high resolution benefit is attributed to the high speed pulse train produced by an encoder synchronized with the revolution of servomotor.

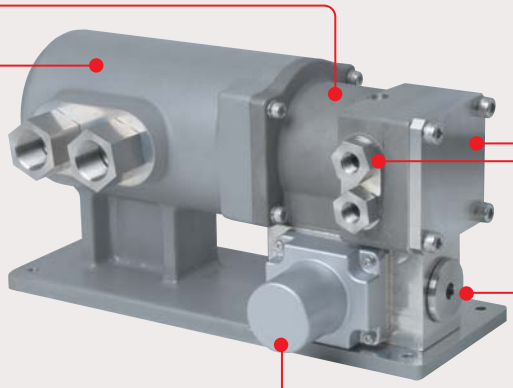
Features

①Magnetic coupling



②Measuring unit (readily separable by taking off four screws.)

Servomotor section



④Filter

③Photodiode sensor section

⑤Free piston section

① Magnetic coupling : Connects the servomotor to the rotors. Compared with the traditional direct shaft coupling, its benefits include desirable sealing performance, long life and consistent accuracy particularly in low flow ranges.

② Measuring unit : Rotors are accommodated in a cartridge type measuring unit for maximum ease of rotor replacement. In the event of rotors jammed with foreign solids, you can promptly replace them in the field and resume operation in the line after you enter parameter "meter factor" of the cartridge measuring unit into the controller.

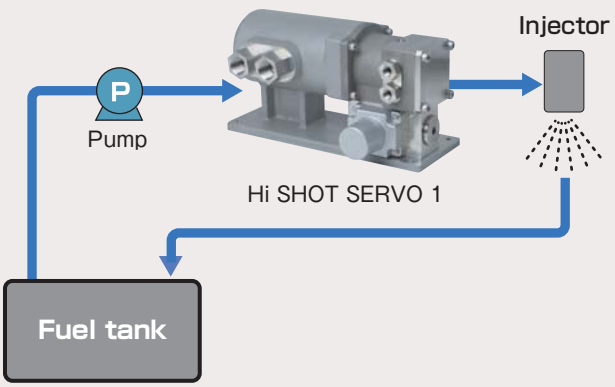
③ Phorodiode sensor section : Readily detachable to facilitate cleansing.

④ Filter : A built-in filter (500 mesh screen) designed to preclude foreign solids affords adequate protection against a clogged external filter.

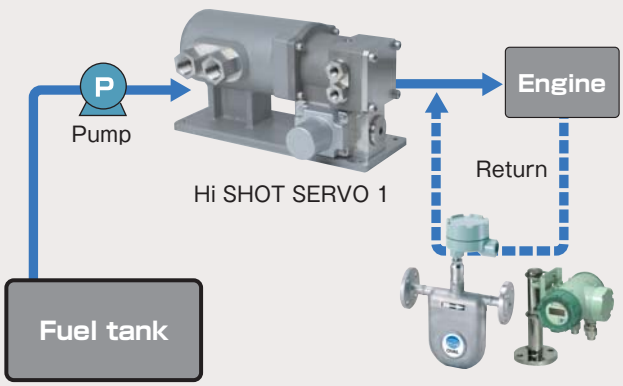
⑤ Free piston section : Designed with ease of maintenance in mind. Just in case of air entrapment in the piston area, a bypass is provided to permit release of entrapped air.

Applications (installation examples)

[Measuring the injection volume of injectors]



[Measuring the engine fuel oil consumption]



Product Code Expnalation

Item	Product Code ①②③④⑤⑥⑦⑧⑨⑩⑪⑫–⑬⑭⑮⑯⑰	Description
Model	L H S	Hi SHOT SERVO 1
Construction	1	Remotely located controller
Applicable categoty	D	Light oil
	G	Gasoline
	Z	Others
Capacity code	0 3 0	0.1 to 30L/h
	0 6 0	0.2 to 60L/h
Meter material	C	Stainless steel (standard)
	Z	Others
Max. operating pressure	S	1MPa
	H	12MPa (in preparation)
Process connection	1	Rc1/4
Operating temp. range	1	Standard (-10 to +80° C)
	9	Others
Explosionproof rating	0	Non-explosionproof
	1	TIIS explosionproof
	2	ATEX exp.proof (in preparation)
Reserved code	0	Always "0"
Power to controller	1	100VAC 50/60Hz
	2	200VAC 50/60Hz
	3	110/115VAC 50/60Hz
	4	220/230VAC 50/60Hz
Controller output signals	0	Output not provided
	1	1 pulse output (unfactored)
	2	1 pulse output (unfactored), 2 (factored)
	3	1 pulse output (unfactored) + temp. output (4 to 20mA)
	4	1 pulse output (unfactored), 2 (factored) + temp. output (4 to 20mA)
	9	Others
Reserved code	0	Always "0"

Example Application in Test Equipment

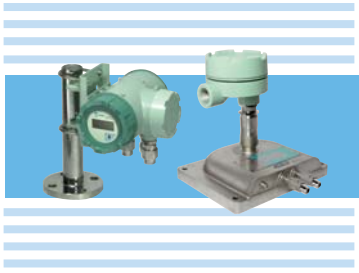
Injector's temperature and negative pressure response test equipment

An environmental test equipment that tests injector performance under varying environmental conditions - under elevated temperature and negative pressure conditions.

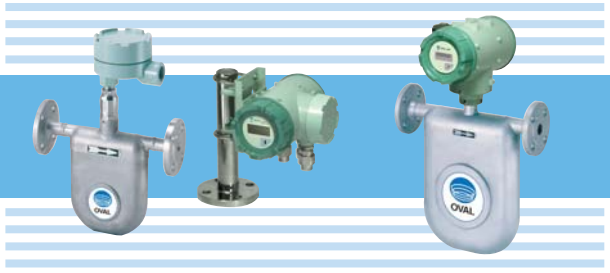
Specializing in flow measurement technology-based products, OVAL designs and manufactures widely varying customer-tailored test equipment .

Coriolis Flowmeters

ULTRAmassMKII Series



CN00A, CN001



CN003 to CN080

CN100

Model	CN00A	CN001	CN003	CN006	CN010	CN015	CN025	CN050	CN080	CN100 ※2
Lower limit flowrate	0.4g/min ※1	1.5g/min	12g/min	60g/min	200g/min	600g/min	1.8kg/min	6.5kg/min	20kg/min	57kg/min
Max. flowrate	60g/min	225g/min	2.4kg/min	12kg/min	40kg/min	120kg/min	360kg/min	1300kg/min	4000kg/min	6200kg/min
Accuracy (liquid)	±0.2% RD ± zero stability error		±0.1% RD ± zero stability error							
Temp. range	−200℃ to +200℃ (Non-explosionproof rated)									
Max. operating press.	15MPa (liquid, 20℃)		9.4MPa (20℃)							13.56MPa (20℃)
Enclosure	Intrinsic safety									

※1 : Minimum detectable flowrate is 0.2g/min.
※2 : CN100 is dedicated to liquid service.

The specification as of Dec., 2012 is stated in this catalog. Specifications and design are subject to change without notice.

ISO 9001 ISO 14001 0180 JCSS

Sales Representative: