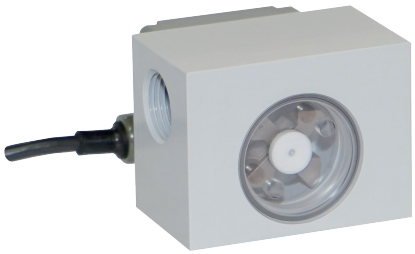
TECHNICAL GUIDANCE

Wet Parts Made of Non-metallic Materials and Compact Design
Flow Rate Monitoring of Various Liquids

W-1000
MINI-WHEEL FLOWMETER

OUTLINE

The W-1000 series is a rotary vane-type flowmeter developed by integrating the technology of the W-200/300 series that has been proven for many years, and, by using non-metallic wet parts, it became possible for the W-1000 series to be used for various fluids. There is a rotary vane containing magnets in the flow path, and the number of its rotations that are proportional to the flow rate are counted in a non-contact manner using a magnetic sensor. The W-1000 series, which is compact and easy to maintain, is optimal for monitoring flow rates of various liquids.



FEATURES

- ❏ Pulse, current, and voltage output
- ❏ Minimum range: 0.3 to 1 L/min, Maximum range: 6 to 60 L/min
- ❏ Visible wheel rotation
- ❏ The model of its body made of resin is non-metallic for all wet parts
- ❏ Customizable materials, structures, etc.
- ❏ Easy overhauling, cleaning, and maintenance
- ❏ Complying with RoHS

STANDARD SPECIFICATIONS

- ● Measuring fluid : Liquids. (The liquid viscosity is 2 mPa·s or less)
- ● Fluid pressure : Maximum 0.7 MPa (See "Body: Allowable fluid temperature and pressure ranges".)
- ● Fluid temperature : See MODEL CODE table
- ● Ambient temperature : 5 to 60℃
- ● Flow direction and posture:

  The fluid flows in a horizontal or vertical direction. (When the fluid flows in a horizontal direction, a posture in which the shaft of the rotary vane is in a horizontal orientation and the fluid flows at the top of the rotary vane will be obtained.)
- ● Construction : Drip-proof (equivalent to IP62)
- ● Accuracy : ±8% of F.S. for W-10□1 and W-10□2
  ±5% of F.S. for W-10□3
  ±3% of F.S. for W-10□4 through 10□9

[W-102□ pulse output type]
- ● Output : Open collector pulse (Unscaled pulse)
- ● Pulse frequency : Approximately 75 to 110 Hz at the maximum flow rate
  (Actual measured value is indicated on the product name plate.)
- ● Power supply : 12 to 24 VDC ±10% (10.8 to 26.4 V), 10 mA
- ● Load rating : Max. 24 VDC + 10%, 10 mA
- ● Electric connection : 3-core cable (UL2936) AWG25
- ● Fluid temperature : 5 to 80°C (5 to 60°C for products made of PVC)

[W-103□ current output type]
- ● Output : 4 to 20 mA DC
- ● Power supply : 24 VDC ±10%, 50 mA
- ● Load resistance : 500 Ω or less
- ● Electric connection : 4-core cable (UL2941) AWG26
- ● Fluid temperature : 5 to 60°C

[W-104□ voltage output type]
- ● Output : 0 to 5 VDC
- ● Power supply : 24 VDC ±10%, 35 mA
- ● Load resistance : 100 kΩ or more
- ● Electric connection : 4-core cable (UL2941) AWG26
- ● Fluid temperature : 5 to 60°C

[W-105□ voltage output type]
- ● Output : 0 to 10 VDC
- ● Power supply : 12 to 24 VDC ±10% (10.8 to 26.4 V), 35 mA
- ● Load resistance : 100 kΩ or more
- ● Electric connection : 4-core cable (UL2941) AWG26
- ● Fluid temperature : 5 to 60°C

TOKYO KEISO CO., LTD.

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MODEL CODE

Model code															Description	
W-10	□	□	□	-	□	□	-	□	□	□	□	-	□			
Output	2														Pulse output: Open collector	
	3														Current output: 4 to 20 mA DC	
	4														Voltage output: 0 to 5 VDC	
	5														Voltage output: 0 to 10 VDC	
Range of flow rate Connection size		1													0.3 to 1 L/min (Flow path nozzle Φ1.6)	Rc 1/4
		2													0.5 to 3 L/min (Flow path nozzle Φ3.0)	Rc 3/8 (When special connection specifications "A" is selected: Rc1/4)
		3													0.7 to 5 L/min (Flow path nozzle Φ4.0)	
		4													1 to 10 L/min (Flow path nozzle Φ6.4)	
		5													2 to 20 L/min (Flow path nozzle Φ10)	Rc 3/8
		6													3 to 30 L/min (Flow path nozzle Φ12)	Rc 1/2
		7													4 to 40 L/min (Flow path nozzle Φ14)	
		8													5 to 50 L/min (Flow path nozzle Φ16)	
		9													6 to 60 L/min (Flow path nozzle Φ16)	Rc 3/4
Material of body (structure) *1 *2			P												P.P. (Polypropylene) (Structure A)	
			V												PVC (Rigid polyvinyl chloride) (Structure A)	
			T												PTFE (Structure B)	
Inflow direction				R											Right to Left or Bottom to Top (Wheel on left side against flow path) (Standard)	
				L											Left to Right or Bottom to Top (Wheel on right side against flow path)	
Cable length					1										1 m (Standard)	
					2										2 m	
Material of O-ring						N									NBR (Nitrile rubber)	
						F									FKM (Fluorocarbon rubber)	
						E									EPDM (Ethylene propylene rubber)	
Material of monitoring window *1 *2							C								Polycarbonate (Standard)	
							P								P.P. (Polypropylene) (Non-monitorable)	
							V								PVC (Rigid polyvinyl chloride) (Non-monitorable)	
							T								PTFE (Non-monitorable, only available for structure B)	
Material of wheel, bearing, shaft, and brush (indicated as group)*3								1							Group 1 (Standard)	
								2							Group 2	
								6							Group 6	
Special connection specifications									0						None	
									A						Rc1/4	
									Z						Special	
Additional specifications (Add applicable code numbers when multiple requirements are involved)														A	Degrease treatment (Standard)	
														B	Non-water treatment	

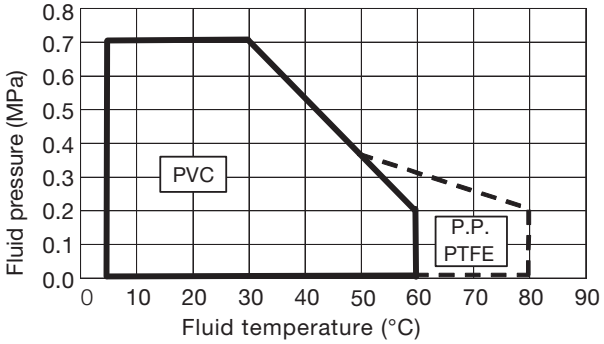
*1 The fluid temperature and pressure ranges that can be used vary depending on the body material. For details, see the figure on the right.

*2 When measuring corrosive or hazardous fluids, contact us for production availability.
(Provide the fluid name, operating temperature, pressure, and flow rate.)
Depending on the fluid to be measured, you may need to modify the body structure from A to B when the body material is P.P. or PVC. In such cases, "B" is added after the body material code (e.g., W-10 □□PB- / W-10□□VB-).

*3 Materials in each material group are listed in the outline drawing. Select the material group that is suitable for the fluid used.

*4 If you require a material or special structure not listed in the model code, contact us for production availability.

Body: Allowable fluid temperature and pressure ranges



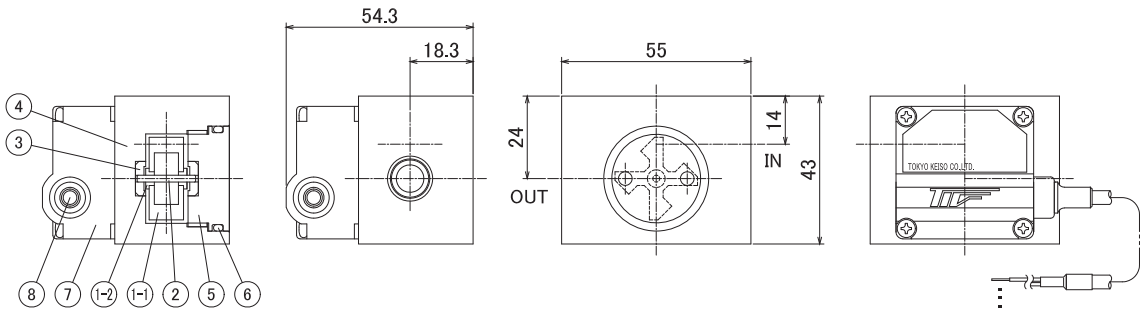
DIMENSIONS AND CONSTRUCTION

No.	Name	Material group 1 for cooling water, etc.	Material group 2 for non-carbon service	Material group 6 (Water hammer resistant*)
1-1	Wheel	PPS (Magnetic mold)	PPS (Magnetic mold)	PPS (Magnetic mold)
1-2	Bearing	Carbon-containing PTFE	Glass-containing PTFE	Carbon-containing PTFE
2	Shaft	Quartz glass	Quartz glass	Sapphire
3	Bush	PTFE	PTFE	Carbon-containing PTFE

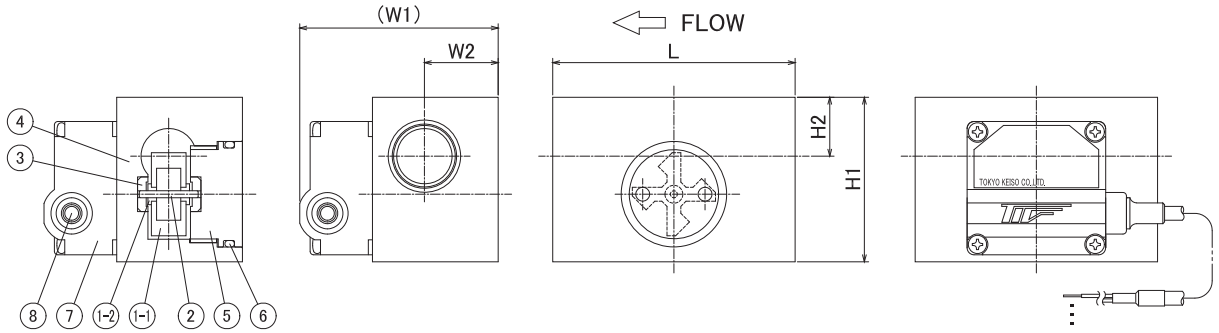
* Compared to other material groups, the shaft breakage strength-based resistance against water hammers has increased. However, this enhancement still may not be sufficient.
Note that application of repeated stress such as from water hammers may damage the shaft and other parts.

No.	Name	Material groups 1 to 6
4	Flow path body	See MODEL CODE
5	Monitoring window	See MODEL CODE
6	O-ring	See MODEL CODE
7	Cover	Polycarbonate
8	Cable	PVC sheath
9	Cover plate	SUS304
10	Fastening screws	SUS304
11	Packing	NBR
12	Base plate	SUS304

[Structure A for W-10 □ 1]



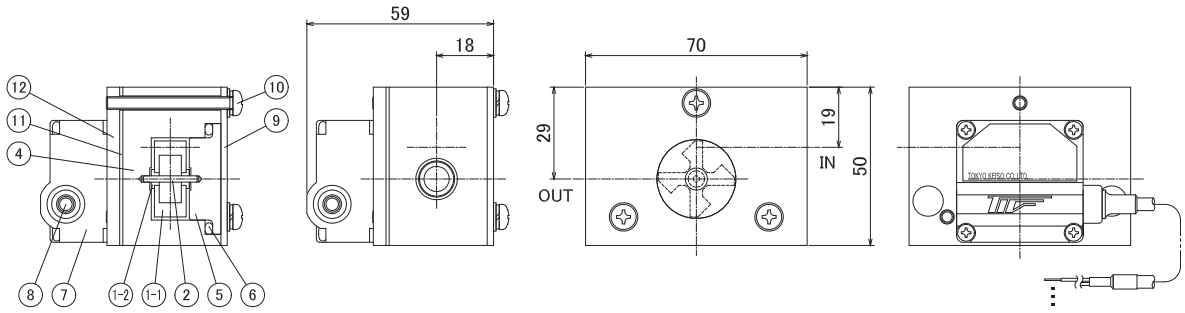
[Structure A for W-10 □ 2 to 10 □ 9]



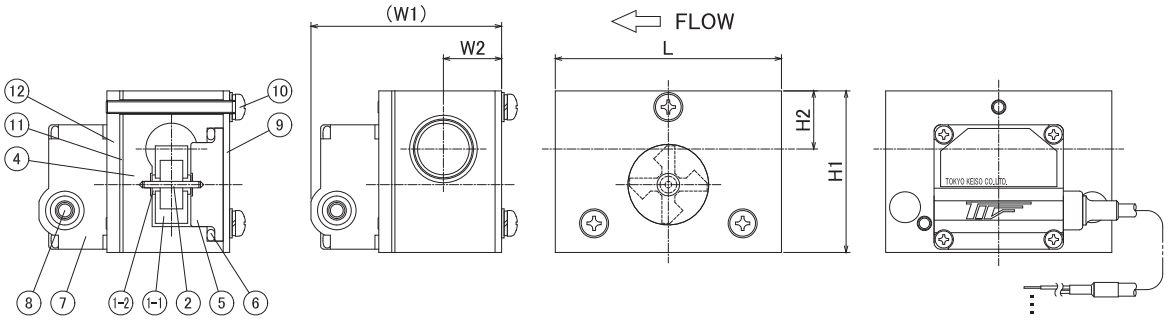
Model	L	H1	H2	W1	W2	Mass*
W-10□2 to 5	55	43	13	54.3	18.3	170 g
W-10□6 to 8	70	47.5	17	57.3	21.3	220 g
W-10□9	80	55	20.5	57.3	21.3	260 g

* Approximate mass of PVC (standard type) used as the material of bodies

[Structure B for W-10 □ 1]



[Structure B for W-10 □ 2 to 10 □ 9]



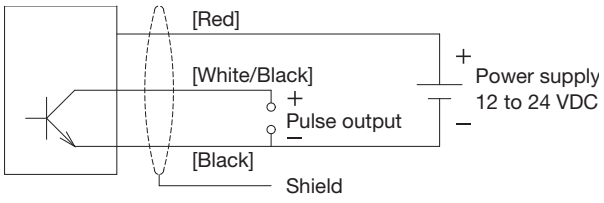
Note : For both structures A and B, the above figure shows the type "R" inflow direction. For the type "L" inflow direction, the rotary vanes and the flow paths are oriented symmetrically. However, the back cover and cable are not oriented symmetrically as shown above.

Model	L	H1	H2	W1	W2	Mass*
W-10□2 to 5	70	50	18	59	18	435 g
W-10□6 to 8	70	50	18	59	18	415 g
W-10□9	80	56.5	20.5	64	20	550 g

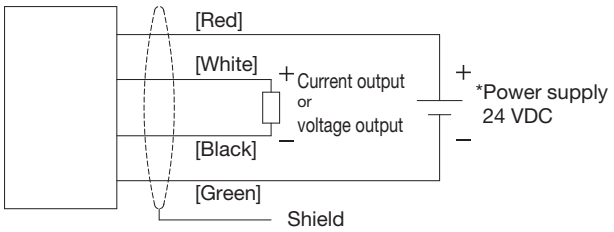
* Approximate mass of PTFE (standard type) used as the material of bodies

WIRING

[W-102 □ pulse output type]

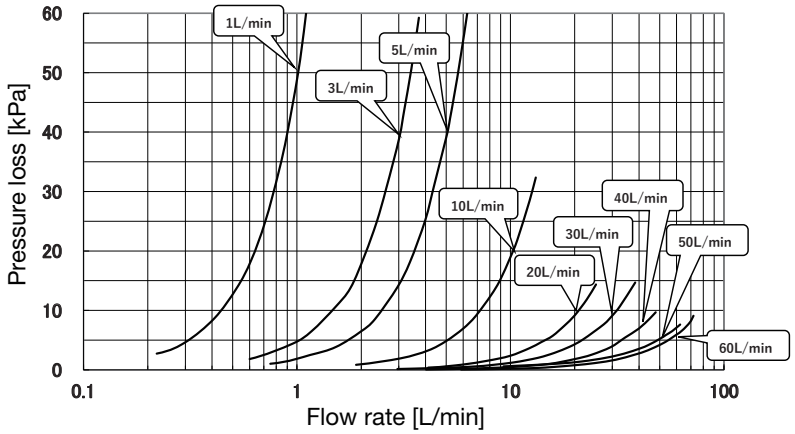


[W-103 □ current output type]
[W-104 □ /W-105 □ voltage output type]



* 12 to 24 VDC for W-105 □ .

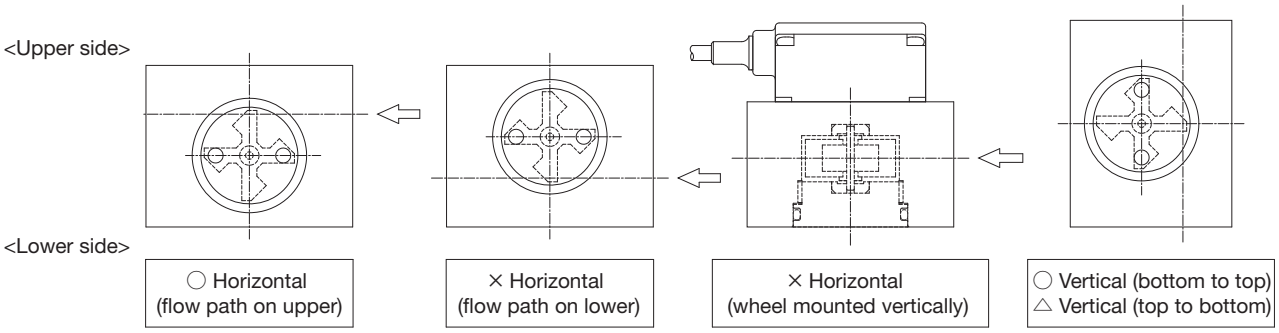
PRESSURE LOSS



Note : This graph shows reference values for pressure losses that may occur when there are no drifts or swirling flows and the viscosity is equivalent to that of water.

FLOW DIRECTION AND POSTURE

The following drawings show how to install flowmeters considering easy gas venting and full liquid flowing inside flowmeters.
(○ : Recommended △ : Conditionally accepted × : Not accepted)



NOTES

- ❏ Do not run signal cables along with other power or motor cables.
- ❏ The inside diameter of process piping and fittings must be greater than the diameter of the flow path nozzle.
- ❏ Install this product in a location where it will not be affected by magnetic fields.
- ❏ When using the product, ensure that the main body is filled with water and that there is no air near the wheel.
- ❏ Do not use air blowers to blow the product. Otherwise, the wheel and/or shaft may be damaged.
- ❏ It is recommended that a straight section with a diameter of 10 D or larger (D: Inside diameter of the connected pipe) be provided in the upstream piping if an uneven or swirling flow is expected to occur.

* Specification is subject to change without notice.

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