

W-2000 MINI-WHEEL FLOWMETER (Impeller Flowmeter)

OUTLINE

The W-2000 series is a impeller-type flowmeter that can be used on chillers that use various fluids. There is a impeller 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. Flowmeters made through precision casting that are both compact and cost-effective are optimal for various cooling water devices and semiconductor chillers.

FEATURES

- ❑ Pulse, current, and voltage output
- ❑ Covering a wide fluid temperature range from -40 to +100°C
- ❑ A minimum range of 0.5 to 3 L/min and a maximum range of 10 to 100 L/min
- ❑ Visible impeller rotation
- ❑ Wide variety of material groups to cover many kinds of fluids
- ❑ Easy overhauling, cleaning, and maintenance
- ❑ Low price owing to intensive cost down
- ❑ Complying with RoHS



STANDARD SPECIFICATIONS

- Measuring fluid : Liquids including water, Fluorinert, Galden, ethylene glycol. The liquid viscosity is 2 mPa·s or less.
- Fluid pressure : Maximum 1.0 MPa (See "Monitoring window: Allowable fluid temperature and pressure ranges".)
- Fluid temperature : See MODEL CODE table
- Ambient temperature : 5 to 60°C
- 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 impeller is in a horizontal orientation and the fluid flows at the top of the impeller will be obtained.)
- Construction : Drip-proof (equivalent to IP62)
- Accuracy : ±5% of F.S. for model W-20□2
±3% of F.S. for models W-20□3 to 20□A

[W-202□ pulse output type]

- Output : Open collector pulse
[without additional specifications C]
Open drain pulse
[with additional specifications C] (Unscaled)
- Pulse frequency : Approximately 75 to 95 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 : Maximum 24 VDC + 10%, 10 mA
- Electric connection : 3-core cable (UL2936) AWG25
- Fluid temperature : 5 to 80°C [without additional specifications C]
-40 to +100°C [with additional specifications C]

[W-203□ 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-204□ 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-205□ 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

MODEL CODE

Model code										Description					
W-20	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	-	<input type="checkbox"/>	
Output	2												Pulse output: Open collector / Open drain		
	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	2												0.5 to 3 L/min (Flow path nozzle Φ3.0)	Rc 3/8	
	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)		
	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	
A												10 to 100 L/min (Flow path nozzle Φ20)			
Inflow direction		R											Right to Left or Bottom to Top (Impeller on left side against flow path) (Standard)		
		L												Left to Right or Bottom to Top (Impeller on right side against flow path)	
Cable length		1											1 m (Standard)		
		2												2 m	
Material of O-ring		N											NBR (Nitrile rubber) *3 Recommended temperature range: -30 to +80°C		
		F												FKM (Fluorocarbon rubber) *3 Recommended temperature range: -15 to +100°C	
		E												EPDM (Ethylene propylene rubber) *3 Recommended temperature range: -40 to +80°C	
		S												FVMQ (Fluorosilicone rubber) *3 Recommended temperature range: -40 to +100°C	
		Z												Special	
Material of monitoring window *1		C											Polycarbonate		
		S												SCS14 (No monitoring)	
Material of Impeller, bearing, shaft, and brush (indicated as group) *2		1											Group 1 (Standard)		
		2												Group 2	
		3												Group 3	
		6												Group 6	
Special connection specifications		0											None		
		A												R3/8 x Rc1/4 Adapter (Overall length 18 mm) *4	
		Z												Special	
Additional specifications (Add applicable code numbers when multiple requirements are involved)		A											Degrease treatment (Standard)		
		B												Non-water treatment (Required when "Low/high temperature support" is selected.)	
		C												Low/high temperature support (Pulse output type only, fluid temperature: -40 to +100°C) *3	

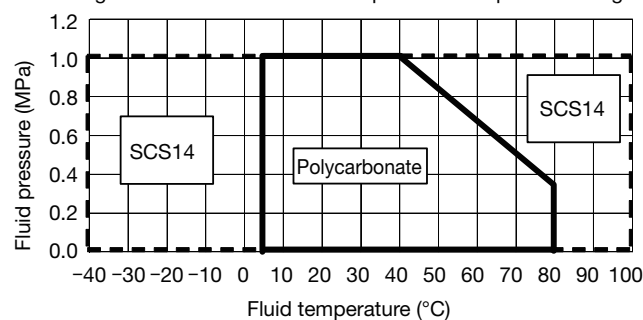
*1 Monitoring windows made of polycarbonate cannot be used for low or high temperature, or high pressure operations. For details, see the figure on the right.

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

*3 When using the product for a liquid at low or high temperatures, it is recommended that the product be used within the temperature range recommended for the material of the O-ring.

*4 The R3/8 x Rc1/4 adapter can only be used when the flow rate is within the range between W-20 $\square 2$ and 20 $\square 4$.

Monitoring window: Allowable fluid temperature and pressure ranges



<Recommended models>

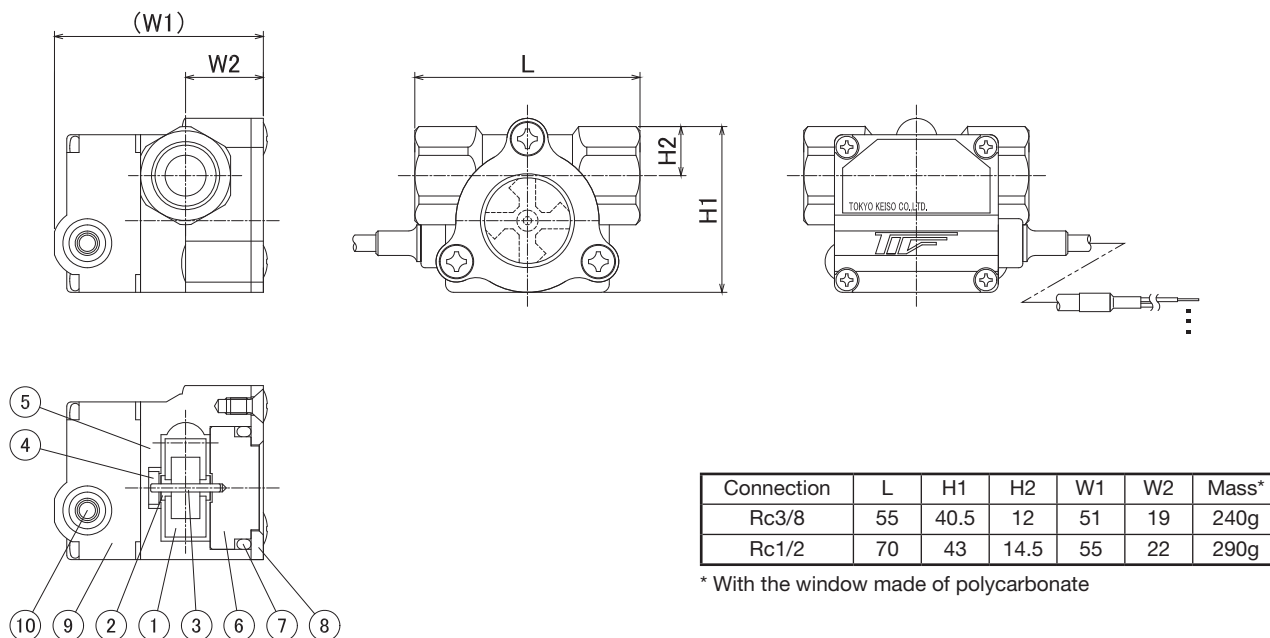
Fluid	Temperature	Max. pressure	Recommended model	Remarks
Cooling water	5 to 60°C	0.6 MPa	W-20 $\square \square$ - $\square \square$ - \square C10-A	
Cooling water	5 to 60°C	0.6 MPa	W-20 $\square 4$ - $\square \square$ - \square C1A-A	Flow rate range: 10 L/min or less Connection: Rc1/4 (Adapter included)
Cooling water	5 to 60°C	1.0 MPa	W-20 $\square \square$ - $\square \square$ - \square S10-A	
Cooling water	5 to 80°C	1.0 MPa	W-202 \square - $\square \square$ - \square S10-A	Consult us when using hot water at a temperature of 80°C or higher.
Fluorinert, Galden, ethylene glycol, etc.	5 to 60°C	0.6 MPa	W-20 $\square \square$ - $\square \square$ - $\square \square$ 30-AB	
Fluorinert, Galden, ethylene glycol, etc.	5 to 100°C	1.0 MPa	W-202 \square - $\square \square$ - SS30-AB	
Fluorinert, Galden, ethylene glycol, etc.	-40 to 100°C	1.0 MPa	W-202 \square - $\square \square$ - SS30-ABC	

DIMENSIONS AND CONSTRUCTION

No.	Name	Material group 1 for cooling water, etc.	Material group 2 for non-carbon service	Material group 3 for Fluorinert, Galden, etc	Material group 6 (Water hammer resistant*)
1	Wheel (Impeller)	PPS (Magnet mold)	PPS (Magnet mold)	PPS (Magnet mold)	PPS (Magnet mold)
2	Bearing	Carbon-containing PTFE	Glass-containing PTFE	Carbon-containing PTFE	Carbon-containing PTFE
3	Shaft	Quartz glass	Quartz glass	Quartz glass	Sapphire
4	Bush	PTFE	PTFE	Carbon-containing PTFE	Carbon-containing PTFE
5	Flow path body	SCS14			
6	Monitoring window	See MODEL CODE			
7	O-ring	See MODEL CODE			
8	Cover plate	SUS316			
9	Cover	Polycarbonate			
10	Cable	PVC sheath			

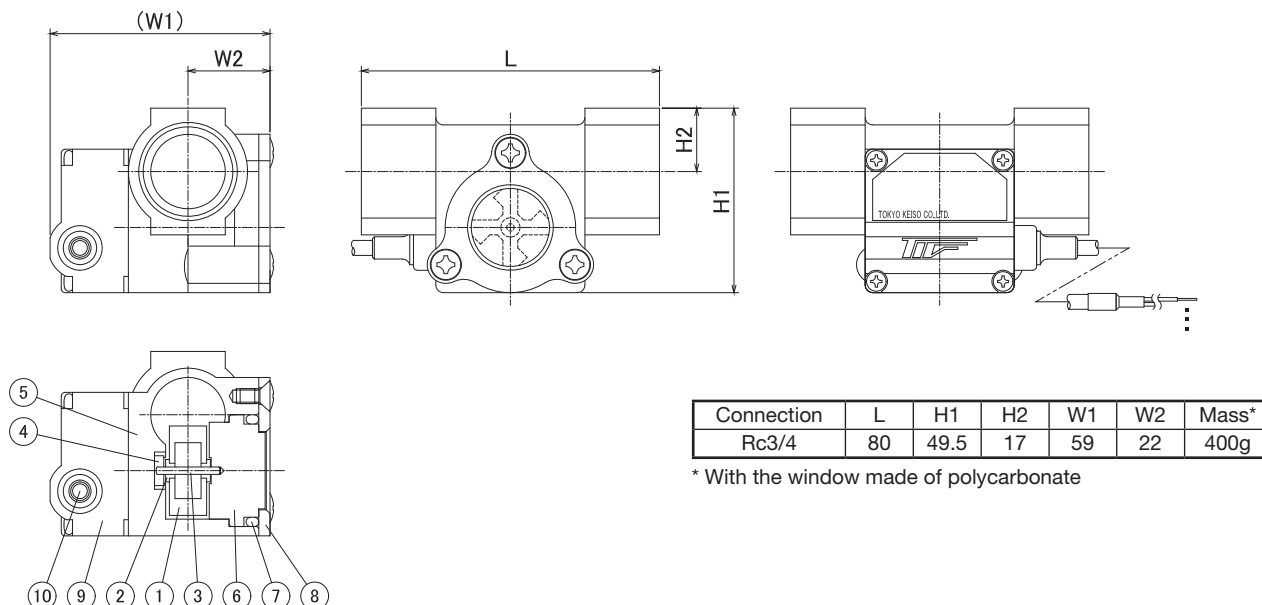
* Compared to other material groups, the shaft breakage strength-based resistance against water hammers has increased. However, this enhancement still may not be sufficient. Note that application of repeated stress such as from water hammers may damage the shaft and other parts.

[Connection Rc3/8], [Connection Rc1/2]



* With the window made of polycarbonate

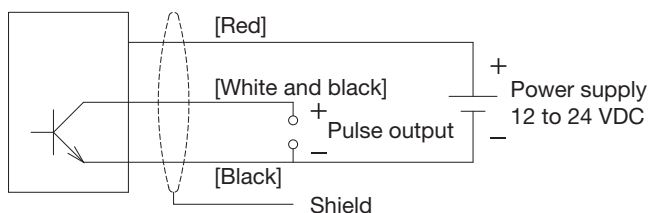
[Connection Rc3/4]



* With the window made of polycarbonate

WIRING

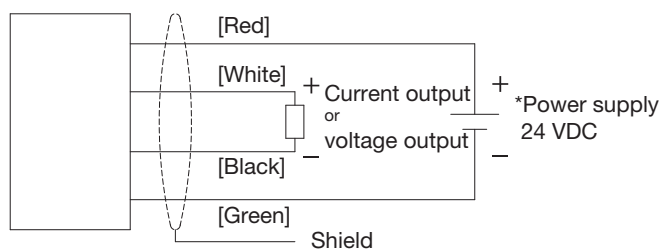
[W-202 □ pulse output type]



* In the case of open drain
 + Pulse output [White/Black]
 - Pulse output [Black]

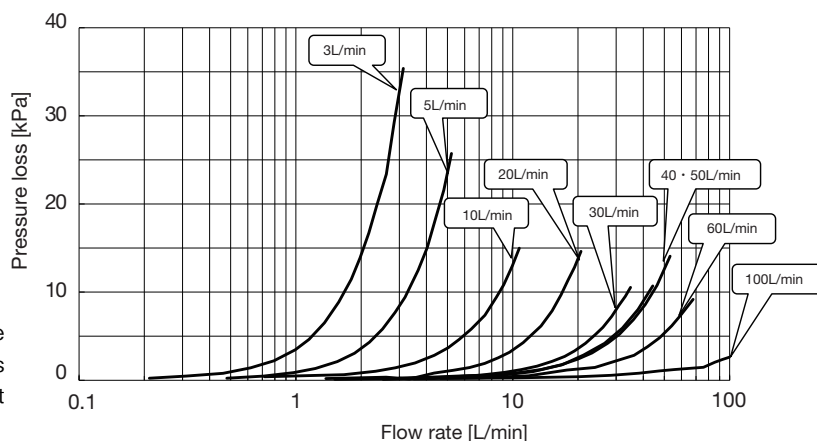
[W-203 □ current output type]

[W-204 □/W-205 □ voltage output type]



* The power for W-205 □ is 12 to 24 VDC.

PRESSURE LOSS



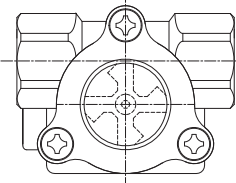
Note: This graph shows reference values for pressure losses that may occur when there are no drifts or swirling flows and the viscosity is equivalent to that of water.

FLOW DIRECTION AND POSTURE

The following drawings show how to install flowmeters considering easy gas venting and full liquid flowing inside flowmeters.

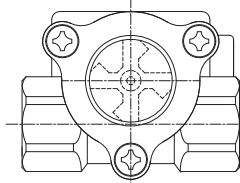
(○): Recommended △: Conditionally accepted ×: Not accepted

<Upper side>

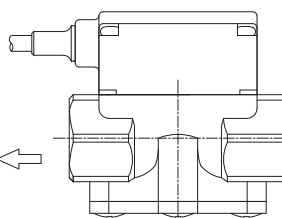


<Lower side>

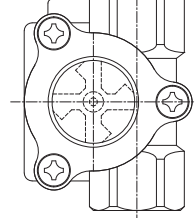
○ Horizontal
(flow path on upper)



× Horizontal
(flow path on lower)



× Horizontal
(Impeller mounted vertically)



○ Vertical (bottom to top)
 △ Vertical (top to bottom)

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 Impeller.
- Do not use air blowers to blow the product. Otherwise, the Impeller 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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