TECHNICAL GUIDANCE

SPACE-SAVING BY DRASTIC CUT OF PIPING PARTS

MU-1000

MANIFOLD MINI-WHEEL FLOWMETER

OUTLINE

Having integrated the technologies of widely-used mini-wheel flowmeters, **MU-1000** is the manifold type mini-wheel flowmeter which fits in various compact devices and package units.
By reducing numbers of piping parts and installation cost drastically, it realizes a compact space-saving flowmeter manifold system with numbers of flowmeters.

FEATURES

- ❑ Free configuration either flow collection or distribution:
  Either flow collection from flowmeters into manifold or distribution from manifold to flowmeters is selectable.
- ❑ Free combination with variations:
  Flowmeters or through-plugs can be selected freely. Both flow collection and distribution system can be integrated into one block of manifold with a partition.
- ❑ Easy extension, rearrangement, and replacement:
  Rearrangement and extension of system are at customers' discretion in selecting various attachments, changing flow direction and selection of flow divergences, etc.
- ❑ Four flow ranges:
  0.6 to 3 L/min, 0.75 to 5 L/min, 1 to 10 L/min, 2 to 20 L/min
- ❑ Pulse or current output:
  It can be used with panel instruments for flow indication, integration, and alarms depending on electric signals.
- ❑ Direct monitoring of flow:
  Through windows the rotation of wheel is visible. If the wheel gets dirty, it is easily disassembled for cleaning.
- ❑ Complying with UL:
  UL61010-1 NYOK2/8
- ❑ Complying with RoHS

PRINCIPLE OF OPEATION

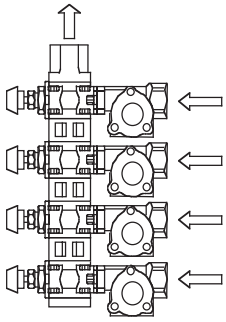
MU-1000 series has a tangential type flowmeter with a wheel in the flow path. The frequency of rotation of wheel where the magnet is molded is picked up by the magnetic sensor element attached to the exterior of main body of flow path, and it is outputted after being converted to the flow signal in proportion to the flow rate.

MAIN APPLICATION

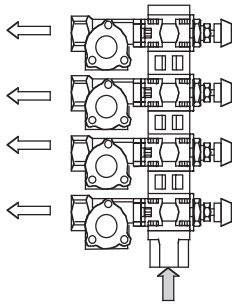
- ❑ Space-saving cooling unit
- ❑ Cooling lines for semi-conductor production equipment
- ❑ Cooling lines of metal mold

EXAMPLE OF APPLICATION

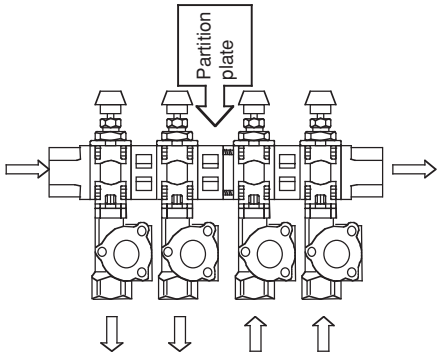
Liquid collection and drainage system



Liquid distribution and supplying system



Combination of collection and distribution systems



BASIC SPECIFICATION OF FLOWMETER

Measuring object		Water or liquids with max. viscosity 2mPa·s
Max. op. press.		1.0 MPa at 25°C
Test pressure		1.5 MPa
Fluid temp.		Refer to TRANSMITTER SPECIFICATION
Ambient temp.		5 to 60°C
Humidity		35 to 85%RH
Process connection		Rc3/8
Installation		Horizontal (The wheel shaft to be horizontal, and the flow path to be above the wheel.) / Vertical
Flow range		0.6 to 3 L/min, 0.75 to 5 L/min, 1 to 10 L/min, 2 to 20 L/min
Wet parts	Wheel	PPS (Bearing :PTFE containing carbon)
	Shaft	Quartz glass
	Bushing	PTFE
	Window	Poly-carbonate
	Body	SCS14, SUS304
	Packing (O-ring)	NBR (standard), FPM
Enclosure		IP62 (Protected against dripping water, indoor use only)
Mass		Approx. 0.25kg/pc
Approved safety standard		UL61010-1 File No. E238567
Remarks		· Altitude less than 2000m · Over voltage Category II · Pollution degree 2 (IEC 60664)

TRANSMITTER SPECIFICATION

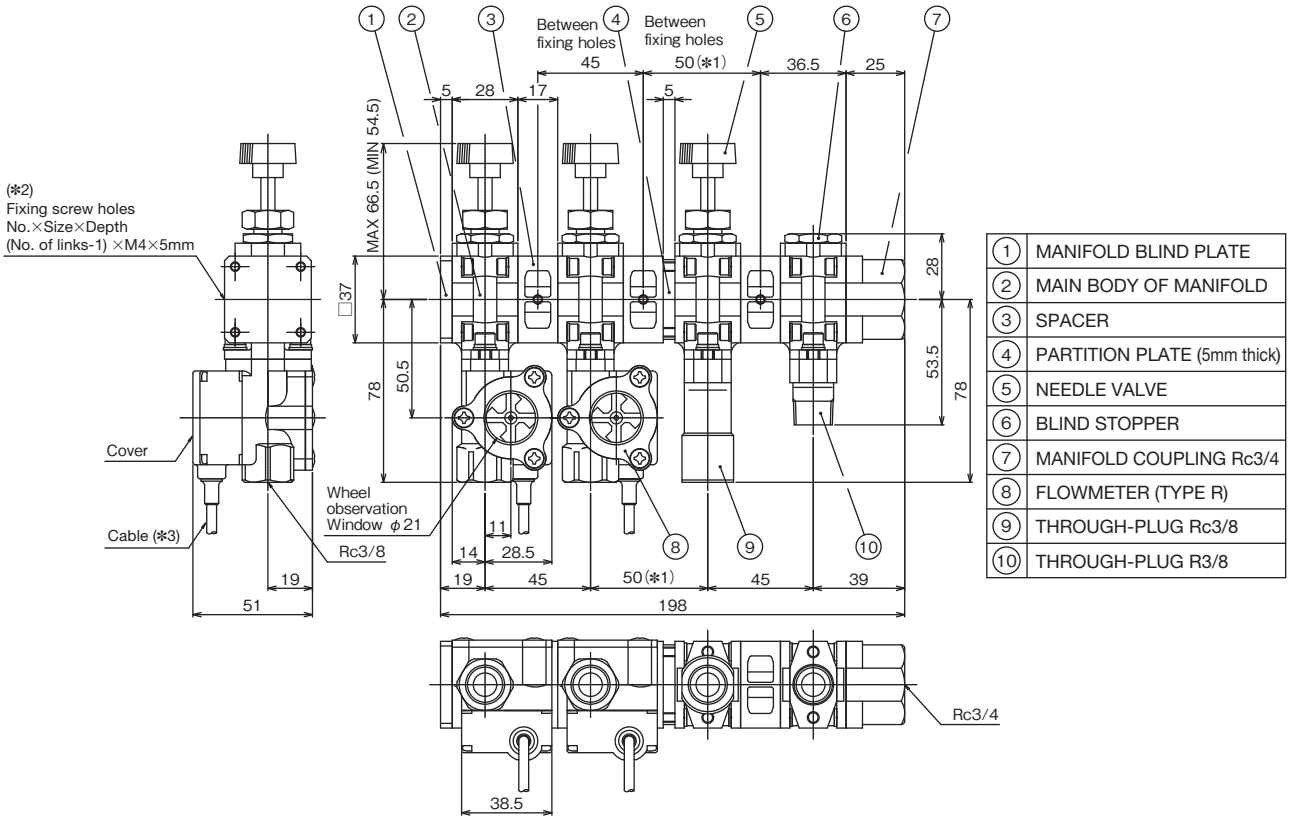
Output	Pulse output: Open collector (Unscaled)
Power supply	5 to 18 V DC, 12 mA (0.22W)
Load rating	Max. 18 V, 15 mA
Accuracy	Within ±5% F.S.
Fluid temp.	0 to 80°C (without freezing and dew condensation)
Cable	4-core Equivalent to 26AWG(12/0.12) UL style 2941

Output	Current output: 4 to 20 mA DC
Power supply	24 V DC±10%, 50 mA (1.33W)
Load rating	Less than 500Ω
Accuracy	Within ±5% F.S.
Fluid temp.	0 to 60°C (without freezing and dew condensation)
Cable	4-core Equivalent to 26AWG(12/0.12) UL style 2941

SPECIFICATION OF MANIFOLD (EXCEPT FOR FLOWMETER)

Measuring object	Water or liquid equivalent to water
Max. op. press.	1.0 MPa
Max. op. temp.	0 to 120°C However 80°C for standard packing NBR
Process connection	Rc3/4
Material	SCS14, SUS304
Components	Flowmeter, Through-plug (Rc3/8 or R3/8)
Needle valve	Combination of SUS304, PTFE, NBR (Standard)
Mass	Approx. 0.6kg (for one link with flowmeter)

MAIN EXTERNAL DIMENSION



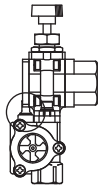
①	MANIFOLD BLIND PLATE
②	MAIN BODY OF MANIFOLD
③	SPACER
④	PARTITION PLATE (5mm thick)
⑤	NEEDLE VALVE
⑥	BLIND STOPPER
⑦	MANIFOLD COUPLING Rc3/4
⑧	FLOWMETER (TYPE R)
⑨	THROUGH-PLUG Rc3/8
⑩	THROUGH-PLUG R3/8

✻1. This length becomes 50mm by adding 5mm of partition thickness if it is assembled.

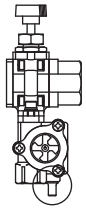
✻2. Each spacer has a screw hole of M4 and depth 5mm. Fix the manifold to the panel or bracket if required. The screw hole is located on the cover side of the flowmeter or rear side of the manifold unless otherwise specified. The location of the screw hole is also placed on the other face at 90° pitch.

✻3. The lead wire comes out from the flowmeter as shown in the circle of the below drawings unless otherwise specified.
(The opposite side outlet is selectable)

Type L : Needle valve side



Type R : Process connection side



MODEL CODE

BASIC CODE							MANIFOLD CONNECTION CODE		PARTS CODE OF EACH LINK (Please specify from bottom to top by assuming vertical installation)							
MU	—	1					—		—						—	
			A	B	C			D	E	FI	FII	FIII	FIV	FV	FVI	G
										F						

A : Attached equipment to manifold

Code	Contents
1	Flowmeter (Pulse output)
2	Flowmeter (Current output)
3	Through-plug Rc3/8
4	Through-plug R3/8
5	Combination of flowmeter and through-plug

B : Number of connected links of flowmeter and through-plug

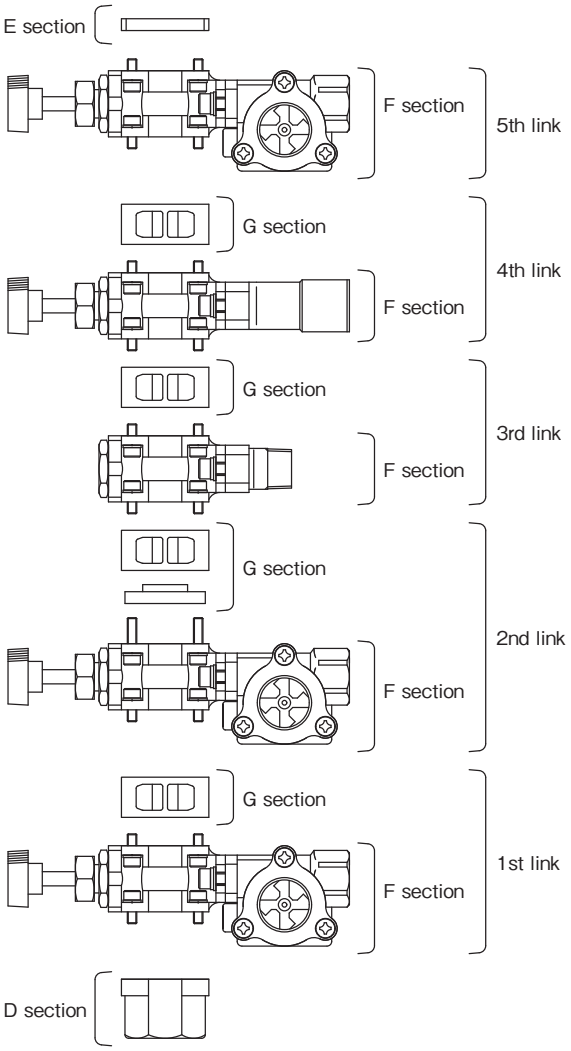
Code	Contents
01	1 link
02	2 links
:	:
10	10 links
**	Designate 2 digits of number if it exceeds 10 links.

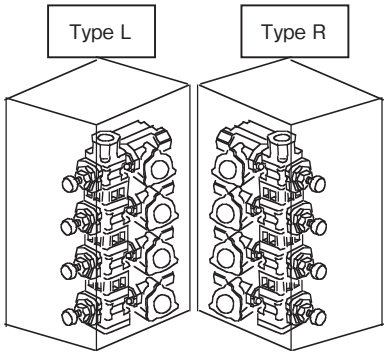
· Count as one link for both cases the combination with flowmeter and with through-plug.
· There is no limitation of number of links. However, consult TOKYO KEISO CO., Ltd. for the services with more than total 60L/min in one system.

C : Position of needle valve in vertical installation

Code	Contents
L	Left–hand side of manifold
R	Right-hand side of manifold

· Type L means that the needle valve is located at left-hand side when you look at the observation window of flowmeter at the front. Type R means vice versa. If the each valve location in multi-links differs, the valve located at the youngest No. of link dominates.





D : Manifold end connection (Bottom)

Code	Contents
1	Coupling Rc3/4 (Standard)
2	Blind plate (Standard)
3	Spacer (for extension, etc.)
4	Not required (for extension, etc.)

E : Manifold end connection (Top)

Code	Contents
1	Coupling Rc3/4 (Standard)
2	Blind plate (Standard)
3	Spacer (for extension, etc.)
4	Not required (for extension, etc.)

<F : Code details of attached equipment>

FI: Attached equipment

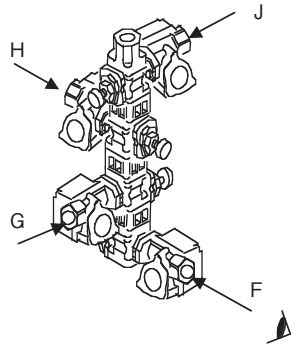
Code	Contents	
1	Pulse output	0.6 to 3 L/min
2		0.75 to 5 L/min
3		1 to 10 L/min
4		2 to 20 L/min
5	Current output	0.6 to 3 L/min
6		0.75 to 5 L/min
7		1 to 10 L/min
8		2 to 20 L/min
A	Through-plug Rc3/8	
B	Through-plug R3/8	

FII : Flow direction

Code	Contents
C	Collection (From flowmeter to manifold)
D	Distribution (From manifold to flowmeter)
E	Bi-directional (Through-plug)

FIII : Direction of parts connection

Code	Contents
F	Front
G	Left side (Standard for type R)
H	Rear
J	Right side (Standard for type L)



FIV : Needle valve

Code	Contents
K	With needle valve
L	Without needle valve and with a blind stopper

FV : Cable length

Code	Contents
N	1m (Standard)
M	2m
P	Not required (for through plug)

FVI : Packing material

Code	Contents
Q	NBR (Standard)
R	FPM

G : The side of main body of manifold (Top)

Code	Contents
1	Spacer
2	Partition plate + spacer
3	Not required

· "Spacer" or "Partition plate +Spacer" is requited between main bodies of manifold.
· Partition plate makes independent piping system.

HOW TO PLACE ORDER

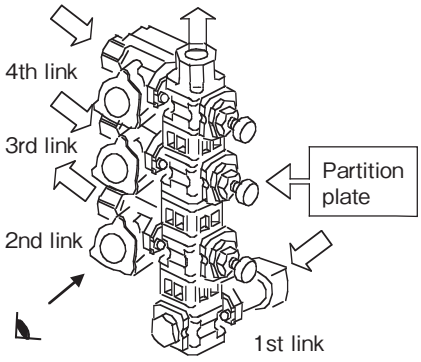
Example: 2 systems consisting of a collection and a distribution shown as right drawing

(1) Select basic code.
Example 4 links, the combination of flowmeters and a through-plug, needle valves on the right-hand side.

MU-1504R

(2) Select manifold connection code.
Example Bottom: Blind plate Top: Coupling Rc3/4

MU-1504R – 21



(3) Specify the part codes for each link Example:

1st link : A through plug with Rc3/8, bi-directional flow, rear-side connection, with a blind stopper, no cable required, NBR, with a spacer — AEHLPQ-1

2nd link : A flowmeter (pulse output, 3 L/min), distribution flow, left-side connection, a needle valve, with a standard cable, NBR, with a partition plate + spacer — 1DGKNQ-2

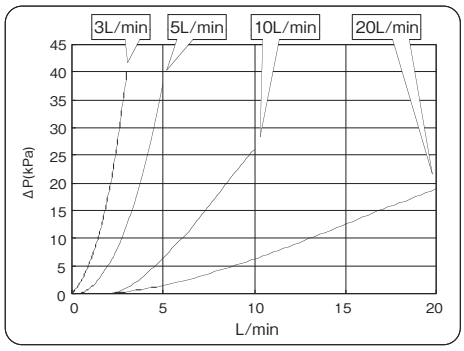
3rd link : A flowmeter (pulse output, 5 L/min), collection flow, left-side connection, a needle valve, with a standard cable, NBR, with a spacer — 2CGKNQ-1

4th link : A flowmeter (pulse output, 10 L/min), collection flow, left-side connection, a needle valve, with a standard cable, NBR, without spacer — 3CGKNQ-3

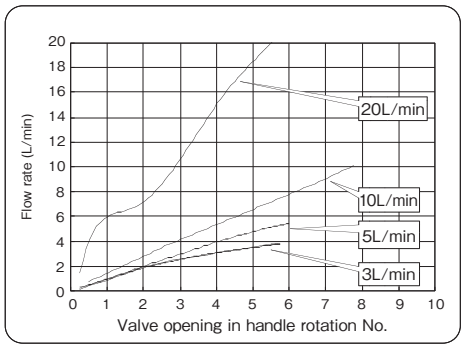
(4) Model code for ordering is shown as:

MU–1504R–21– AEHLPQ –1
1DGKNQ –2
2CGKNQ –1
3CGKNQ –3

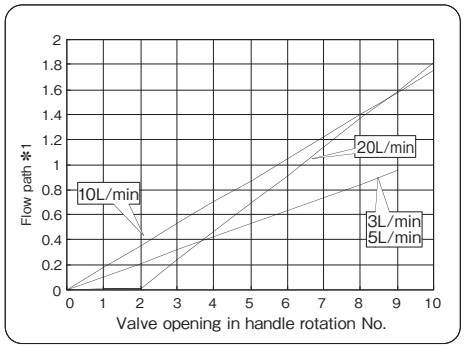
PRESSURE LOSS (WHEN NEEDLE VALVE IS FULLY OPEN)



CHARACTERISTICS OF STANDARD NEEDLE VALVE (WHEN DIFFERENTIAL PRESSURE IS 0.1MPa.)



FLOW PATH OPENING OF STANDARD NEEDLE VALVE

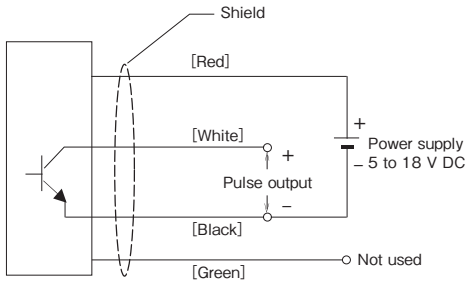


✻1 Flow path means the opening of inner valve of needle valve in mm. It is recommended to use it at more than 0.2 mm opening.

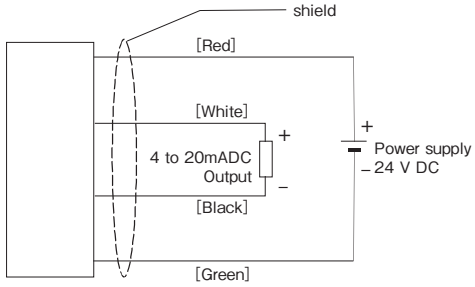
WIRING

Wire the cable lead of the flowmeter as follows.
Various indicators for the flowmeter are available.

● Pulse output type



● Current output type



(Note 1) Do not short-circuit the output. It might result in troubles.
(Note 2) In the current output type the minus terminals of power supply and output are commonly connected. Therefore, use red, white and black wires when you connect 3 wire cables for the loop wiring.
(Note 3) Do not disconnect the minus line of 3-wire current output type with power on. It might result in troubles.

NOTES

- ❑ Use this flowmeter where there is no stagnation of air around the wheel and also in the state of water filled up.
- ❑ When flowmeter is installed horizontally, the wheel axis must be horizontal. The flow path must be located above the wheel.
- ❑ Do not put a signal cable along with other power lines.
- ❑ Installation is to be made at the place free from the influence of external magnetic field which affects the characteristics.
- ❑ Install the filter at the upstream of needle valve in order to avoid dirt adherence due to the small opening of the valve. The adherence or clogging of the dirt may affect proper performance of flowmeter.
- ❑ Avoid the air blow. Otherwise, the wheel and shaft might be damaged.
- ❑ Close the valve slowly if necessary to avoid water hammer.
- ❑ Be careful for the cavitation which likely occurs when the downstream side is opened to the atmosphere.
- ❑ The needle valve used for the controlling of flow which is not adequate for tight shut-off. Install a shut-off valve for closing purpose if necessary.

PARTS LIST

MAIN BODY OF MANIFOLD

All of attached parts are connected to this body.

SPACER

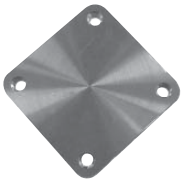
A spacer is required between main bodies.

MANIFOLD COUPLING Rc3/4

Coupling for inflow to manifold and outflow from manifold.

MANIFOLD BLIND PLATE

Blind plate for flow stoppage at the end of manifold.



PARTITION PLATE

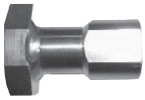
The flow is intercepted by putting this plate between a main body and a spacer to make independent system.

EXCLUSIVE FLOWMETER

Two types – L and R, each symmetrical - are available. Photo below shows R type.

THROUGH-PLUG Rc3/8

This plug with a female screw connection is used as a bypass of flowmeter to connect other equipment.

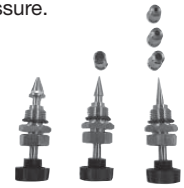


THROUGH – PLUG R3/8

This plug with a male screw connection is used as a bypass of flowmeter to connect other equipment.

NEEDLE VALVE

Available in the various sizes in accordance with the flow rate and the differential pressure.



BLIND STOPPER FOR NEEDLE VALVE

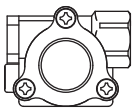
This is used when flow adjustment is not required.

- An order for parts only is welcome. When placing an order for flowmeters only, specify them using FLOWMETER MODEL CODE as shown in the following table.
- Needle valves are available in the various sizes. Contact TOKYO KEISO when the differential pressure is more than 0.1MPa, or when set flow rate is small.
- Refer to Instruction Manual for exchange procedure of parts.

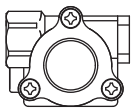
<FLOWMETER MODEL CODE>

Model Code									Description
W-2	□	□	□	–	□	□	–	□	
Type	L								Type : L (Standard)
	R								Type : R
Output		1							Pulse output: Open collector
		3							Current output: 4 to 20 mA DC
Flow range			2						0.6 to 3 L/min
			3						0.75 to 5 L/min
			4						1 to 10 L/min
			5						2 to 20 L/min
Application					D				Distribution of fluid
					C				Collection of fluid
Cable length						1			1 m (Standard)
						2			2 m
Packing (O-ring) material								N	NBR (Standard)
								F	FPM

Type L



Type R



PLEASE SPECIFY FOLLOWING WHEN ORDERING

- Fluid name, temperature and pressure
- Model code
- Differential pressure between inlet and outlet of manifold

* Specification is subject to change without notice.

TOKYO KEISO CO.,LTD.

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