TECHNICAL GUIDANCE

Low price & High efficiency

TF-4000 Series

THERMAL MASS FLOWMETER

OUTLINE

TF-4000 series Thermal Mass Flowmeter for compactness and high cost performance has been developed by our long experience and the accumulation of technology for the thermal mass flow measurement. Low price, but digital indicator (fixed type) is built in. Digital and analog interfaces are fully equipped, and the indication value can be confirmed at the site, and also it can be controlled at the remote place. The power supply is 12 to 24 V DC. CE Marking has been obtained for the fixed type indicator. This thermal mass flowmeter can be used for the various applications.

FEATURES

- ❏ Indicator: Digital indication.
- ❏ CE Marked
- ❏ Includes digital and analog interfaces.
- ❏ Quick response by highly reliable and compact Pt. temperature sensor.
- ❏ Low cost secured by the stainless steel precision casting of the flow path
- ❏ Various functions (such as alarm and generation of totalized pulse) are built in.
- ❏ Wide flow range enough to cover minimum 0 to 2L/min (nor) and maximum 0 to 1000Lmin (nor).

MAIN APPLICATIONS

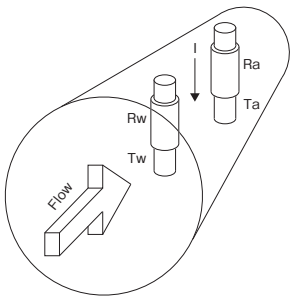
- ❏ Semiconductor field
- ❏ Biochemical field
- ❏ Various precision instrument field
- ❏ Medical field

OPERATION PRINCIPLE

A resistance thermometer Rw is installed in the flow path. The current I is controlled to keep the temperature difference (Tw—Ta) between the temperature Tw and gas temperature Ta constant by heating with electric current.

The quantity of heat (Rw x I^2) transferred from the resistance thermometer is a function of mass flow rate of passed gas, thus the mass flow rate can be measured from the electric current I.

The electric circuit to detect the flow is a unique component to compensate even the minute change of performance with the change of physical properties value. Thus the mass flow rate can be measured with high accuracy. The current I is converted to an electric signal in proportion to the specified flow rate in order to be output.



SPECIFICATIONS

Measuring object		Air, N_2, & O_2
Flow range		Min. 0 to 2 L/min (nor)
		Max. 0 to 1000 L/min (nor)
Ambient & gas temperature		0 to 60°C (No condensation)
Gas pressure		0.1 to 1.0MPa
Accuracy		±2% F.S. (±1digit of indication accuracy added)
Response		Within 0.5 sec. (90% response)
Temp. & press. effect		0.1%F.S./°C, 0.1%F.S./0.1 MPa
Rangiability		1:20 (Low flow cutoff: 5% F.S.)
Material of gas contact part	Main body	SCS14
	Sensor	SUS316, glass, platinum-iridium, & CTFE
	Seal	Fluororubber
Case		ABS resin (Non-waterproof)
Process connection		Rc1/4, Rc3/8, Rc1/2, & Rc3/4 (Depending on Model)
Electric connection		Exclusive cable with connector (1 m long)
Installation posture		Horizontal or vertical
Indication		7 segments Red LED, 5 digits Flow rate, totalization, setting value & error Momentary flow rate: 0.00 to 99999. • A decimal point is displayed by automatic change. • An integrated value is not held at the time of a nonpower supply. Red LED × 2 pcs. Lighting when alarm is operating.
Output*	Aanalog	0 to 5 V DC (Output impedance: 50Ω or less), or 4 to 20 mA DC (Load resistance: 300Ω or less for 12 V power supply; 600Ω or less for 24 V power supply) (Selectable)
	Digital	RS-485, 2-wire connection, asynchronous serial communication Communication speed: 2400, 4800, 9600 bps (Selectable) Protocol: 8N1, ID address: 00 to 99
	Integrating pulse	Open collector (24 V DC, less than 10 mA) • 0.2 to 10.0% F.S.·min/pulse (Selectable)
	Alarm	Open collector (24 V DC, less than 100 mA)
Power supply		12 to 24 V DC, Max.210 mA
CE marking		Conformity

TOKYO KEISO CO.,LTD.

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SCALE RANGE AND MODEL CODE

TF-41	□0–□	□	Description
Connection size, Flow range, Pressure Loss*	10–1		Rc1/4, 0- 2 L/min (nor), 0.015 kPa (Approx.)
	10–2		Rc1/4, 0- 5 L/min (nor), 0.080 kPa (Approx.)
	10–3		Rc1/4, 0- 10 L/min (nor), 0.25 kPa (Approx.)
	10–4		Rc1/4, 0- 30 L/min (nor), 0.47 kPa (Approx.)
	10–5		Rc1/4, 0- 50 L/min (nor), 1.22 kPa (Approx.)
	10–6		Rc1/4, 0- 80 L/min (nor), 1.82 kPa (Approx.)
	10–7		Rc1/4, 0- 100 L/min (nor), 2.75 kPa (Approx.)
	20–1		Rc3/8, 0- 150 L/min (nor), 1.23 kPa (Approx.)
	20–2		Rc3/8, 0- 200 L/min (nor), 1.72 kPa (Approx.)
	20–3		Rc3/8, 0- 250 L/min (nor), 2.27 kPa (Approx.)
	30–1		Rc1/2, 0- 300 L/min (nor), 2.87 kPa (Approx.)
	30–2		Rc1/2, 0- 400 L/min (nor), 4.28 kPa (Approx.)
	30–3		Rc1/2, 0- 500 L/min (nor), 6.20 kPa (Approx.)
	40–1		Rc3/4, 0- 600 L/min (nor), 3.13 kPa (Approx.)
	40–2		Rc3/4, 0- 800 L/min (nor), 4.11 kPa (Approx.)
	40–3		Rc3/4, 0-1000 L/min (nor), 6.01 kPa (Approx.)
Analog output		1	0 to 5 V DC
		2	4 to 20 mA DC

*: Gas pressure 0.1 MPa, pressure loss at max flow rate

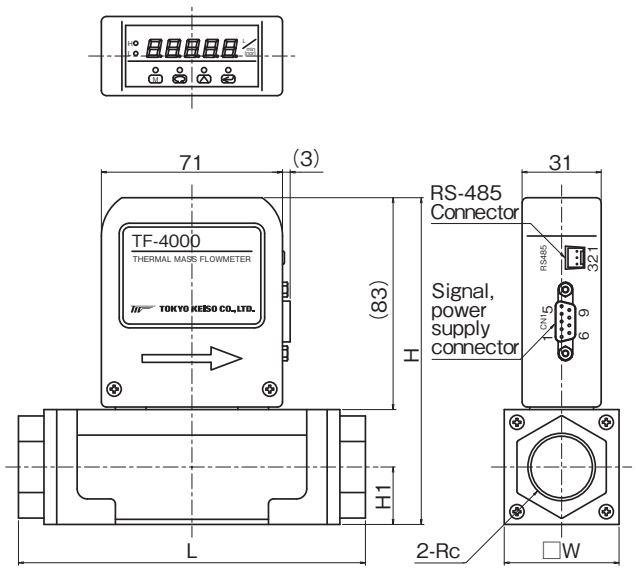
SIGNAL, POWER SUPPLY CABLE

Pin No.	Color	Wiring Indication
1	Brown	Analog out put (+)
2	Red	Analog out put (−)
3	Orange	Open collector high alarm (+)
4	Yellow	Open collector low alarm (+)
5	Green	Open collector totalization out put (+)
6	Blue	Open collector COM
7	Violet	Open collector COM
8	Black	Power supply (+)
9	Gray	Power supply (−)
—	Black (thick)	Shield

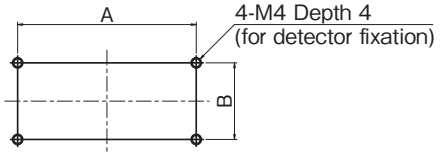
RS-485 CABLE

Pin No.	Color	Wiring Indication
1	Red	RS-485 (+)
2	Black	RS-485 (−)
3	Black (thick)	Shield

DIMENSIONS



Screw holes location
on the detector bottom



Model	Connection	L	□W	H	H1	A	B	Mass (Approx.)
TF-4110	Rc1/4	76	25	108	12.5	64	10	0.35kg
TF-4120	Rc3/8	76	32	115	16	64	10	0.5kg
TF-4130	Rc1/2	112	38	121	19	50	30	0.85kg
TF-4140	Rc3/4	136	45	128	22.5	70	30	1.15kg

* Specification is subject to change without notice.

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