

TF-600 Series

MINI THERMAL MASS FLOWMETER

OUTLINE

TF-600 MINI THERMAL MASS FLOWMETERS are developed in the extreme priority for very competitive price. **TF-600** has not been influenced by the change in temperature and pressure, and can directly measure mass flow rate of Air and Nitrogen.

TF-600 adopted general-purpose type temperature sensor as the flow rate sensor. And low price is realized by reconsidering design thoroughly with high performance.

TF-600 MINI THERMAL MASS FLOWMETERS are designed and developed to offer the remote indication and control of gas flow process where Purgemeters have been commonly used.



FEATURES

- ❑ Light and compact design
- ❑ Low cost
- ❑ Mass flow measurement
Influences due to changes in pressure and temperature are negligible small.
- ❑ High speed response
High speed response - 90 % within two seconds
- ❑ Whole quantity passage detection system
No by-pass tube used.
- ❑ High durability
Newly adopted general-purpose temperature sensor offers high durability.
- ❑ Standard power supply can be used.
Standard power supply is used and the analogue output of flow rate is obtained easily.

STANDARD SPECIFICATION

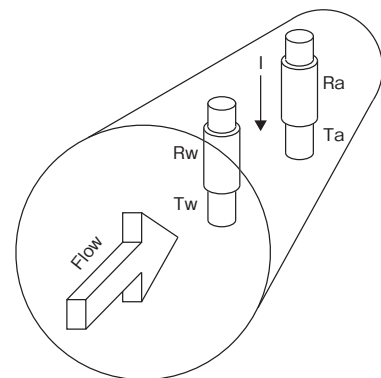
Fluid	Air, Nitrogen
Scale range	Min. 0 to 20 L/min (nor) Max. 0 to 100 L/min (nor)
Output signal	0 to 5 V DC
Accuracy	±5 % F.S.
Rangeability	1:20
temp.	0 to 60 °C
Gas press.	-0.05 MPa to 1 MPa
Temp. change effect	±0.1 % F.S. / °C
Press. change effect	±1 % F.S. at -0.05 to 1 MPa
Response	2 seconds for 90 %
Material	Body and Flow path SCS14, SUS316 Sensor: POM, Ni, Polyimide, Epoxy Seal: FKM
Housing / Protection	ABS resin / Un-waterproofing
Installation	Horizontal or Vertical
Electric connection	Connector
Power supply	±12 V DC
Consumption current	+: 85 mA, -: 25 mA
Process connection	Thread: Rc1/4
Mass	Approx. 240 g

OPERATION PRINCIPLE

As for TF-600, a resistance thermometer R_w is installed in the flow path. The current I is controlled to keep the temperature difference ($T_w - T_a$) between the temperature T_w and gas temperature T_a constant by heating with electric current.

The quantity of heat ($R_w \cdot I^2$) 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 .

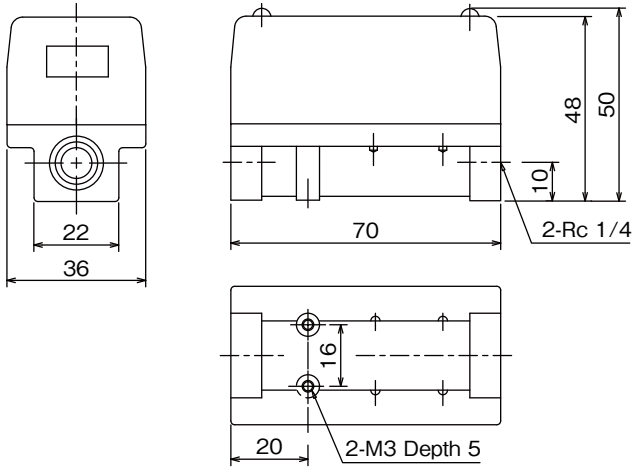
The electric circuit to detect the flow is a unique component to compensate even the minute change of performance with the change of physical properties value. Thus the mass flow rate can be measured with high accuracy. The current I is converted to an electric signal in proportion to the specified flow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



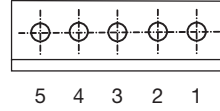
MODEL CODE

Model code						Description
TF-60			-			
Power supply	0					±12 V DC 0 to 5 V output
Body material	S					SCS14
Scale range		200				0 to 20 L/min (nor)
		300				0 to 30 L/min (nor)
		500				0 to 50 L/min (nor)
		800				0 to 80 L/min (nor)
		101				0 to 100 L/min (nor)
Connection rating				P		Rc
Process connection					04	1/4

DIMENSION



CONNECTOR ARRANGEMENT



Pin number	Description
1	+12 V
2	COM
3	-12 V
4	OUT+
5	OUT-

PRESSURE LOSS

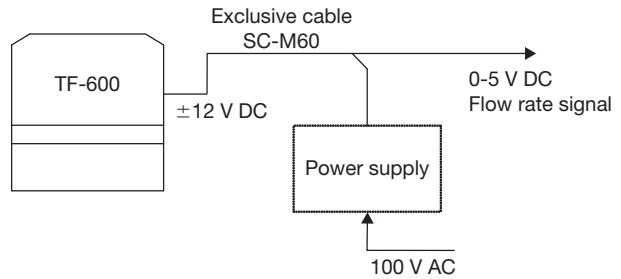
N₂, 25°C, Atmospheric pressure (Inner diameter of joint: ø6.5)

Scale range L/min(nor)	Pressure loss (kPa) (*)
0 to 20	1.5
0 to 30	2.2
0 to 50	4.5
0 to 80	13.0
0 to 100	20.0

*: Pressure loss at the time of maximum flow in the maximum range
The rough value of the pressure loss is proportional to the square of flow rate and is in inverse proportion to the pressure.

APPLICATION

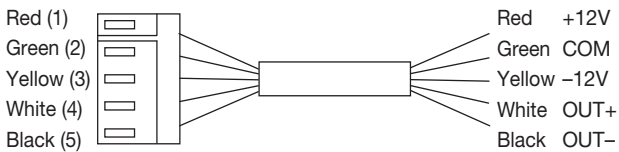
With standard power supply



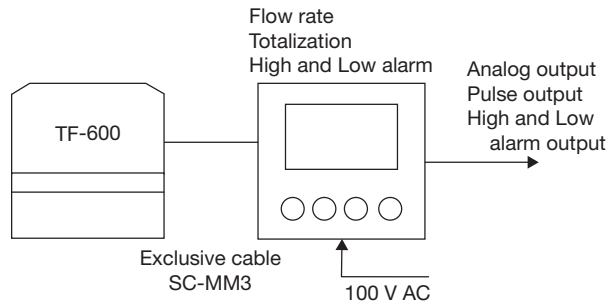
Cable with connector SC-M60

Connection: Standard power supply ±12V DC

Model code	Length (m)	Note
SC-M60-2	2	Standard
SC-M60-L	L	Max.10 m



With TM3000 series converter unit



* Specification is subject to change without notice.

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