TECHNICAL GUIDANCE

High flow rate measurement,
Lightweight aluminum alloy body

TF-4150/4160/4170

THERMAL MASS FLOWMETER

OUTLINE

TF-4100 series Thermal Mass Flowmeter for high flow rate measurement has been developed by our long experience and the accumulation of technology for the thermal mass flow measurement. Low price, but digital indicator (fixed and rotating) excellent in the visibility is built in. Digital and analog interfaces are fully equipped, and the lightweight aluminum alloy and stainless steel are available for main body. The power supply is DC12 to 24 V. The rotating indicator type complies with the CE marking.
This thermal mass flowmeter is suitable for the various applications.

FEATURES

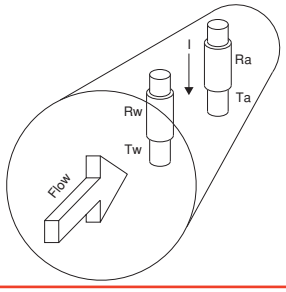
- ❏ Sensor and converter are integrated in one unit with digital indication. Furthermore, an indication is excellent in visibility for LED type of self-luminous indication.
- ❏ An indication part can be rotated according to the flow directon. (TF-41 □ 2 type, Except 50A)
- ❏ It is lightweight because main body is made of aluminum alloy.
- ❏ The ambient condition of use has been improved. Construction is equivalent to IP64.
- ❏ Integration of main body and display has made it simple and compact.
- ❏ Flow straightener built-in. No straight run is required, and the piping layout can be freely made.
- ❏ The measurement of gases can be made without being affected by the change in the operating pressure and temperature. It is not necessary to make measurement of temperature and pressure, resulting in reducing the total cost of system.
- ❏ Digital and analog interfaces are provided.
- ❏ Pulse output or alarm output can be chosen for open collector.
- ❏ Since a setup of totalizing rate and alarm point can be made, the correspondence to various applications is possible.
- ❏ Power supply is DC 12 to 24 V suitable for the sequencer.

MAIN APPLICATIONS

- ❏ Semiconductor field
- ❏ Automobile field
- ❏ Biochemical
- ❏ Precision instrument field
- ❏ Air conditioning application

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.



SPECIFICATION

Measuring object		Air, N_2
Flow range		0 to 4000L/min (nor) TF-415□-□□ 25A 0 to 8000L/min (nor) TF-416□-□□ 40A 0 to 16000L/min (nor) TF-417□-□□ 50A
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 1 sec. (90% response)
Temp. & press. effect		0.1%F.S./°C, 0.1%F.S./0.1MPa
Rangiability		1:20 (Low flow cutoff: 2.5% F.S.)
Material of gas contact part	Main body	A6061-T6 or SCS13 (Selectable)
	Sensor	SUS316, glass, platinum-iridium
	Seal	Fluororubber and NBR
Case		ABS resin
Process connection		Rc1, Rc1.1/2, & Rc2 (Depending on model)
Electric connection		Exclusive cable with connector (5m long) AWG24
Installation posture		Horizontal or vertical
Indication		7 segments Red LED, 5 digits
		Flow rate, totalization, setting value & error
Indication value		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: 50 Ω or less), or 4 to 20 mA DC (Load resistance: 300 Ω or less for 12 V power supply; 600 Ω 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 (DC 30V, less than 100mA) • 0.2 to 10.0% F.S.·min/pulse (Selectable)
	Alarm	Open collector (DC 30V, less than 100mA)
Power supply (Supplied by customer)		DC 12 to 24V, Max.200mA
CE marking		Conformity (rotating indicator type only)

* Integrating pulse and alarm (upper/lower) can not be outputted at the same time.

TOKYO KEISO CO.,

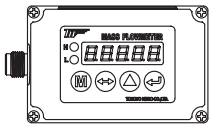
TG-ES841-0E NOV. 2005
TG-ES841-4E SEP. 2012K

MODEL CODE AND PRESSURE LOSS

TF-41	□	□	—	□	□	Description	Max. pressure loss*3
Nominal diameter, Connection, Scale range	5					25A, Rc 1, 0 to 4,000 L/min (nor)	39 kPa
	6					40A, Rc 1 1/2, 0 to 8,000 L/min (nor)	33 kPa
	7					50A, Rc 2, 0 to 16,000 L/min (nor)	39 kPa
Direction of the connector and the indicator		0				Upstream connector, Fixed indicator *1	
		1				Downstream connector, Fixed indicator *2	
		2				Upstream connector, Rotatable indicator (Except 50A)	
Body material				0		Aluminium alloy A6061-T6	
				1		SCS13 (Except 50A)	
Analog output					1	DC 0 to 5 V	
					2	DC 4 to 20 mA	

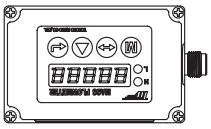
*1:
TF-41□0-□□
Direction of the indicator

FLOW



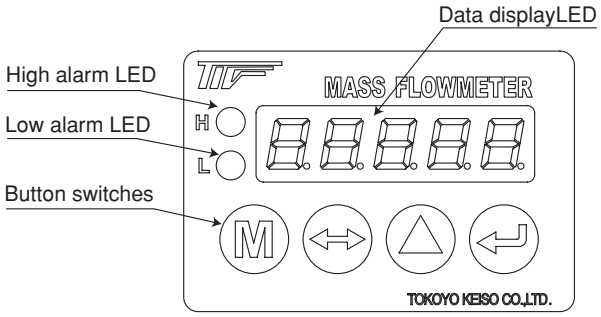
*2:
TF-41□1-□□
Direction of the indicator

FLOW

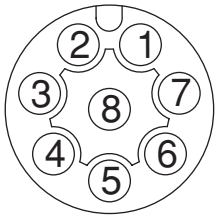


*3: Pressure loss (at 0.1MPa F.S)

DISPLAY

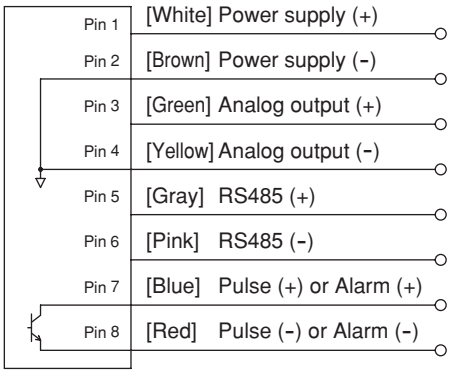


CONNECTOR PIN NO.



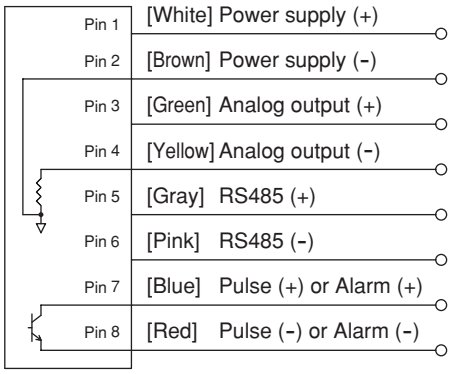
ELECTRICAL CONNECTION

Fixed indicator type 0 to 5 V DC output: TF-41□0-□1,TF-41□1-□1
Fixed indicator type 4 to 20 mA DC output: TF-41□0-□2,TF-41□1-□2
Rotating indicator type 0 to 5 V DC output: TF-41□2-□1



Rotating indicator type (4 to 20 mA DC output): TF-41□2-□2

Note: Do not connect the power supply (—) and analog output (—) .



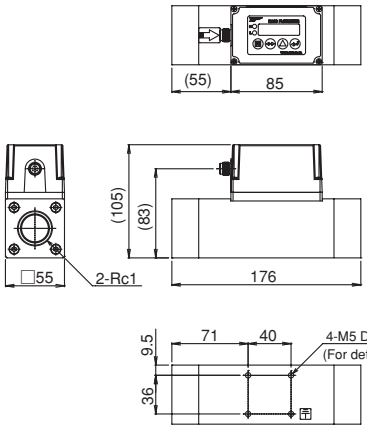
ROTATABLE INDICATOR TYPE

The indicator direction of rotatable indicator type (TF-4152, TF-4162) can be easily changed at the installation site according to the flow directon.

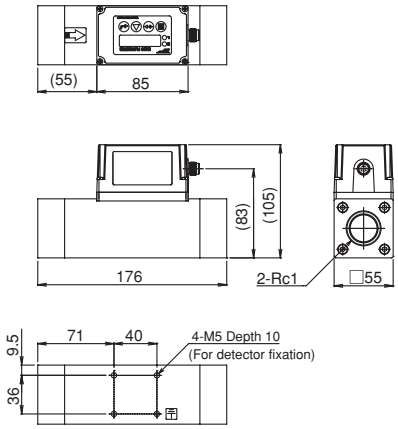
DIMENSIONS 1

25A, body:A6061-T6

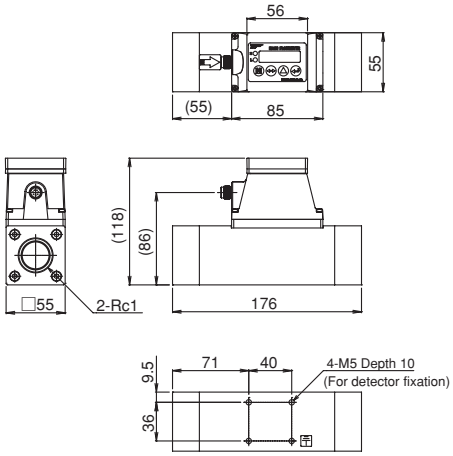
TF-4150-0□



TF-4151-0□

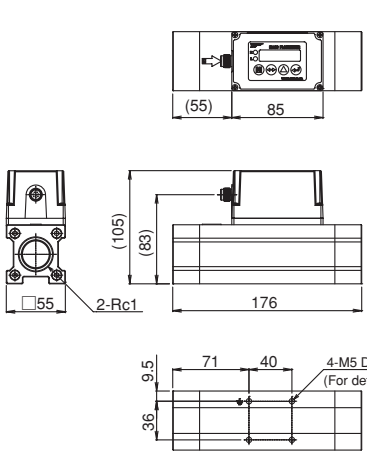


TF-4152-0□

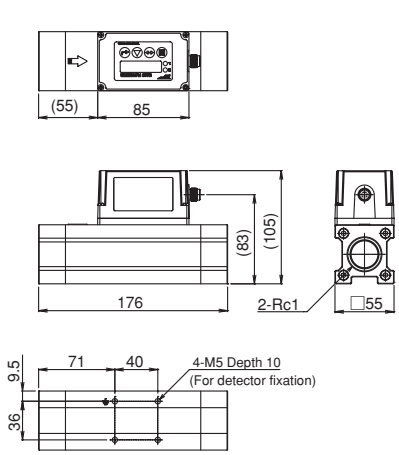


25A, body:SCS13

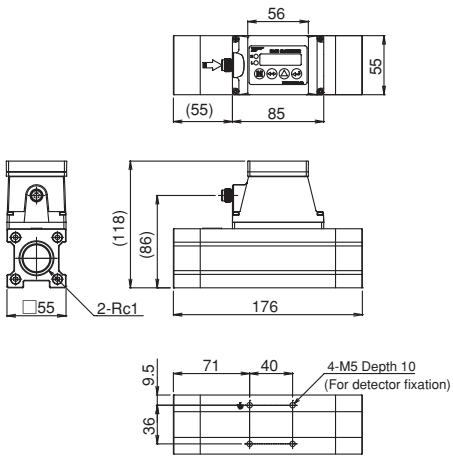
TF-4150-1□



TF-4151-1□

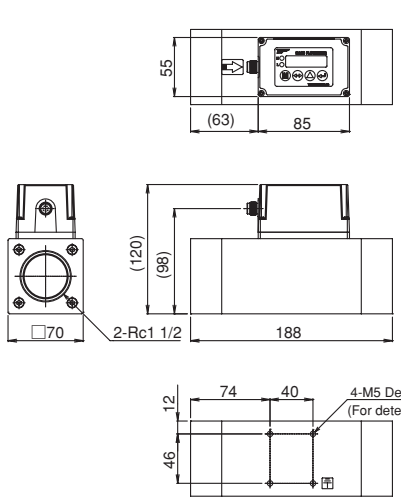


TF-4152-1□

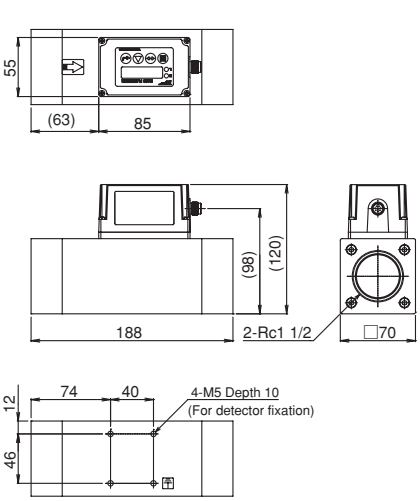


40A, body:A6061-T6

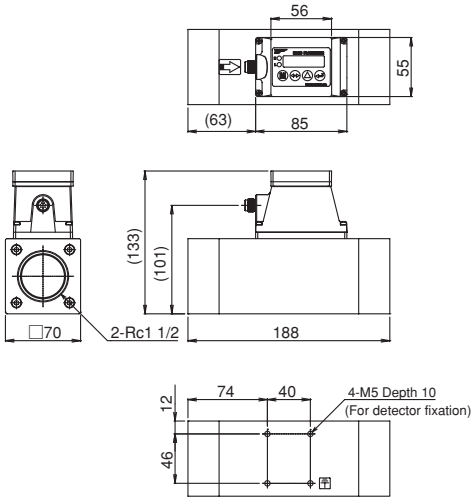
TF-4160-0□



TF-4161-0□



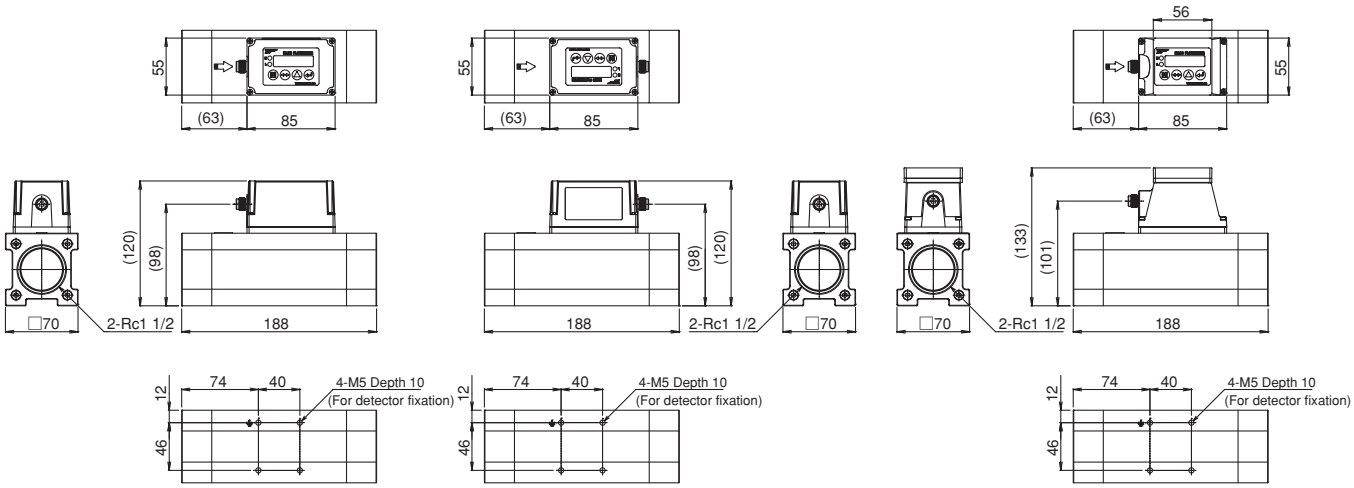
TF-4162-0□



DIMENSIONS 2

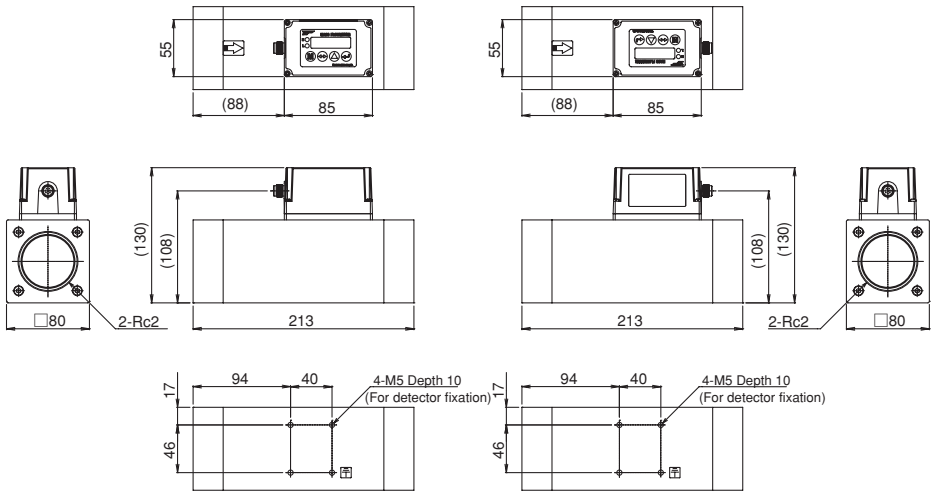
40A, body:SCS13

TF-4160-1□ TF-4161-1□ TF-4162-1□



50A, body:A6061-T6

TF-4170-0□ TF-4171-0□



* Specification is subject to change without notice.

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