



# TECHNICAL GUIDANCE

PERFECT LINE-UP, BEST COST PERFORMANCE

## TF-1000 Series

### MINI THERMAL MASS FLOWMETER

#### OUTLOOK

**TF-1000 MINI THERMAL MASS FLOWMETERS** are designed and developed to offer the remote indication and control of gas flow process where glass tube purgemeters have been commonly used.

**TF-1000 MINI THERMAL MASS FLOWMETERS** are very competitive in price and very compact in size and can be a good substitution for such glass tube purgemeters. New type in the mid to large diameter has been added to TF-1000 series. Different types of sensors cover all requirements for gas measurement. Also All-in-One type panel mount converters are ready for easy loop design.

#### FEATURES

- ❑ Low cost, High performance
- ❑ High accuracy
- ❑ Direct mass flow measurement using thermal theory  
Free from changes of pressure and temperature! No compensation required.
- ❑ Quick response  
0.5sec. for 90%
- ❑ Easy maintenance  
No by-pass tube used.
- ❑ High durability  
Newly designed sensing element offers high durability.
- ❑ Supporting instruments are ready.
- ❑ Wide range  
Min. 0 to 2 L/min(nor)., Max. 750m<sup>3</sup>/h(nor). can be covered by one line.
- ❑ The piping layout can be freely made due to the short required straight run.

#### PRODUCT LINE-UP

Different sensors and panel mount converters are ready to choose Mass flowmeter

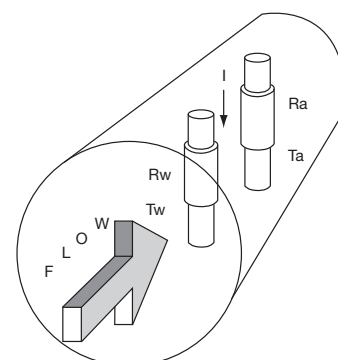
- ❑ Low price, Compact
  - TF-100□P      Engineering plastic body
  - TF-100□S      SCS14 casted body
- ❑ Standard type
  - TF-11□□      Stainless steel body, Mid to large connection types are available.
  - TF-13□□      Stainless steel body, Low pressure loss
- ❑ Outdoor use, Water tight housing
  - TF-12□□      Stainless steel body, Mid to large connection types are available
  - TF-14□□      Stainless steel body, Low pressure loss
- ❑ Convertor
  - TM3000      Flow rate, Totalizing, H and L alarm indication, Analog output, Totalizing pulse output, Alarm output




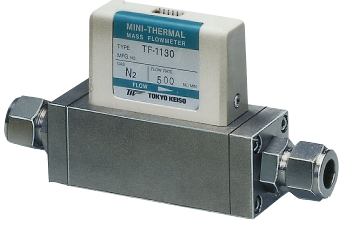
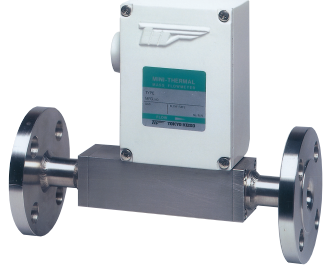
#### OPERATION PRINCIPLE

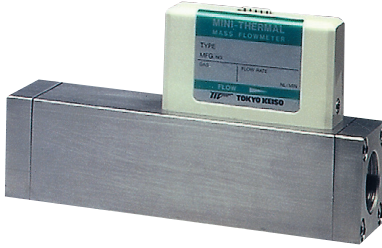
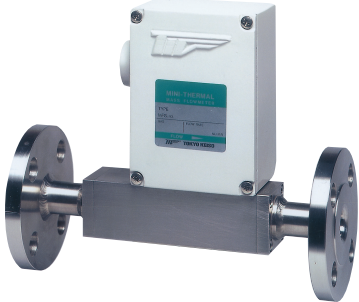
Temperature detection sensor **Ra** and velocity detection sensor **Rw** are installed in the gas flow path of **TF-1000 MINI-THERMAL MASS FLOWMETER**. The internal electronics circuits keep the temperature gap between **Rw (Tw)** and **Ra (Ta = Gas temp.)** constant by supplying electric current **I**. The transferred heat from **Ra** to passed gas (**Rw • I<sup>2</sup>**) is proportional to the mass flow rate of the gas to be measured which can be calculated from supplied current **I**. The detection principle is completely free from the change of gas pressure and the change of temperature. It is compensated by internal software and finally the measurement is totally independent of any operating conditions.

The flow rate is calculated from supplied current **I** and output in the form of electric signal.



STANDARD SPECIFICATION AND MODEL CODE [up to 1000L/min(nor)]

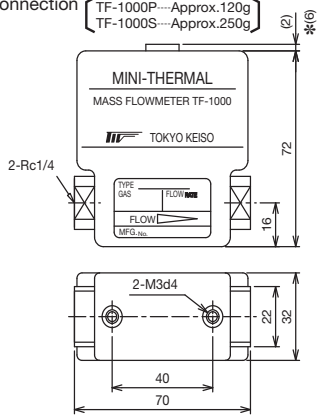
Model	TF-100□P/S	TF-11□□	TF-12□□																																																																																																																																																																																																																																																																																													
																																																																																																																																																																																																																																																																																																
Type	Compact type	Stainless steel body, Standard type	Stainless steel body, Water tight housing																																																																																																																																																																																																																																																																																													
Gas to be measured	All kinds of gases, except gases containing more than 10%(Vol.) of H <sub>2</sub> or He and mixture of H <sub>2</sub> or He and CnHm																																																																																																																																																																																																																																																																																															
Scale range	Min. 0 to 2 L/min(nor) Max. 0 to 120 L/min(nor)	Min. 0 to 2 L/min(nor) Max. 0 to 1000 L/min(nor)																																																																																																																																																																																																																																																																																														
Amb. and Gas temp.	0 to 60°C [0 to 50°C for TF-1000P (Poly-acetal resin body)]																																																																																																																																																																																																																																																																																															
Gas press.	-0.07 to 1.0 MPa [-0.07 to 0.5 MPa for TF-1000P (Poly-acetal resin body)]																																																																																																																																																																																																																																																																																															
Accuracy	±2.0% F.S.																																																																																																																																																																																																																																																																																															
Temp. change effect	Within ±0.1% F.S. /°C																																																																																																																																																																																																																																																																																															
Press. change effect	Within ±0.1% F.S. /0.1 MPa																																																																																																																																																																																																																																																																																															
Rangeability	1: 20																																																																																																																																																																																																																																																																																															
Gas contact part material	Tube	TF-100□P : Poly-Acetal, PFA, SUS316 TF-100□S : SCS14, PFA, SUS316	SUS316[SUS316 and PFA (TF-1□1□)]																																																																																																																																																																																																																																																																																													
	Sensor	Combination of SUS316, Glass, PT and CTFE																																																																																																																																																																																																																																																																																														
	Seal	FKM or CR																																																																																																																																																																																																																																																																																														
Housing material	ABS resin IP20 equ. (Indoor use)		ADC12 IP65 equ. (Water tight)																																																																																																																																																																																																																																																																																													
Process connection	TF-100□P : Rc1/4 TF-100□S : Rc1/4 or OD1/4B SWL	TF-1□1□ : Rc1/4 OD1/4B, 3/8B, 1/2B SWL 15A, 20A, 25A, JIS10K Flange TF-1□2□ : Rc1/4, 3/8 OD1/4B, 3/8B, 1/2B SWL 15A, 20A, 25A, JIS10K Flange TF-1□3□ : Rc3/8, 1/2 OD3/8B, 1/2B, 3/4B SWL 15A, 20A, 25A, JIS10K Flange TF-1□4□ : Rc3/8, 1/2, 3/4 OD3/8B, 1/2B, 3/4B SWL 15A, 20A, 25A, JIS10K Flange																																																																																																																																																																																																																																																																																														
Power supply/ Output	TF-1□□□ ±12 V DC or ±15 V DC, +150 mA, -20 mA/0 to 5 V DC (Load resistance:More than 5kΩ) TF-1□□1 24 V DC ±10%, +150mA/4 to 20 mA DC (Load resistance:Less than 450Ω)																																																																																																																																																																																																																																																																																															
Electric connection	Exclusive cable with connector		G1/2, M3 screw terminal																																																																																																																																																																																																																																																																																													
Model code	<table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>TF-100</td> <td>- - - - -</td> <td>up to 120</td> </tr> <tr> <td>Flow range L/min(nor)</td> <td></td> <td>±12 V DC(15V)0 to 5 V DC</td> </tr> <tr> <td>Power supply/ Output</td> <td>0</td> <td>24 V DC/4 to 20 mA DC</td> </tr> <tr> <td>Body material</td> <td>P</td> <td>Poly-Acetal</td> </tr> <tr> <td></td> <td>S</td> <td>SCS14</td> </tr> <tr> <td>Scale range L/min (nor)</td> <td>0 2 0</td> <td>0 to 2</td> </tr> <tr> <td></td> <td>0 3 0</td> <td>0 to 3</td> </tr> <tr> <td></td> <td>0 5 0</td> <td>0 to 5</td> </tr> <tr> <td></td> <td>0 8 0</td> <td>0 to 8</td> </tr> <tr> <td></td> <td>1 0 0</td> <td>0 to 10</td> </tr> <tr> <td></td> <td>1 5 0</td> <td>0 to 15</td> </tr> <tr> <td></td> <td>2 0 0</td> <td>0 to 20</td> </tr> <tr> <td></td> <td>3 0 0</td> <td>0 to 30</td> </tr> <tr> <td></td> <td>5 0 0</td> <td>0 to 50</td> </tr> <tr> <td></td> <td>8 0 0</td> <td>0 to 80</td> </tr> <tr> <td></td> <td>1 0 1</td> <td>0 to 100</td> </tr> <tr> <td></td> <td>1 2 1</td> <td>0 to 120</td> </tr> <tr> <td>Connection rating</td> <td>P</td> <td>Rc thread</td> </tr> <tr> <td></td> <td>S</td> <td>Swagelok*</td> </tr> <tr> <td>Connection size</td> <td>0 4</td> <td>1/4B(8A)</td> </tr> </tbody> </table>	Model code		Description	TF-100	- - - - -	up to 120	Flow range L/min(nor)		±12 V DC(15V)0 to 5 V DC	Power supply/ Output	0	24 V DC/4 to 20 mA DC	Body material	P	Poly-Acetal		S	SCS14	Scale range L/min (nor)	0 2 0	0 to 2		0 3 0	0 to 3		0 5 0	0 to 5		0 8 0	0 to 8		1 0 0	0 to 10		1 5 0	0 to 15		2 0 0	0 to 20		3 0 0	0 to 30		5 0 0	0 to 50		8 0 0	0 to 80		1 0 1	0 to 100		1 2 1	0 to 120	Connection rating	P	Rc thread		S	Swagelok*	Connection size	0 4	1/4B(8A)	<table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>TF-11</td> <td>- - - - -</td> <td>up to 120</td> </tr> <tr> <td>Flow range</td> <td>1</td> <td>up to 250</td> </tr> <tr> <td></td> <td>2</td> <td>up to 500</td> </tr> <tr> <td></td> <td>3</td> <td>up to 1000</td> </tr> <tr> <td>L/min (nor)</td> <td>4</td> <td></td> </tr> <tr> <td>Power supply/ Output</td> <td>0</td> <td>±12 V DC(15V)0 to 5 V DC</td> </tr> <tr> <td></td> <td>1</td> <td>24 V DC/4 to 20 mA DC</td> </tr> <tr> <td>Scale range L/min (nor)</td> <td>0 2 0</td> <td>0 to 2</td> </tr> <tr> <td></td> <td>0 3 0</td> <td>0 to 3</td> </tr> <tr> <td></td> <td>0 5 0</td> <td>0 to 5</td> </tr> <tr> <td></td> <td>0 8 0</td> <td>0 to 8</td> </tr> <tr> <td></td> <td>1 0 0</td> <td>0 to 10</td> </tr> <tr> <td></td> <td>1 5 0</td> <td>0 to 15</td> </tr> <tr> <td></td> <td>2 0 0</td> <td>0 to 20</td> </tr> <tr> <td></td> <td>3 0 0</td> <td>0 to 30</td> </tr> <tr> <td></td> <td>5 0 0</td> <td>0 to 50</td> </tr> <tr> <td></td> <td>8 0 0</td> <td>0 to 80</td> </tr> <tr> <td></td> <td>1 0 1</td> <td>0 to 100</td> </tr> <tr> <td></td> <td>1 2 1</td> <td>0 to 120</td> </tr> <tr> <td></td> <td>1 5 1</td> <td>0 to 150</td> </tr> <tr> <td></td> <td>2 0 1</td> <td>0 to 200</td> </tr> <tr> <td></td> <td>2 5 1</td> <td>0 to 250</td> </tr> <tr> <td></td> <td>3 0 1</td> <td>0 to 300</td> </tr> <tr> <td></td> <td>4 0 1</td> <td>0 to 400</td> </tr> <tr> <td></td> <td>5 0 1</td> <td>0 to 500</td> </tr> <tr> <td></td> <td>6 0 1</td> <td>0 to 600</td> </tr> <tr> <td></td> <td>8 0 1</td> <td>0 to 800</td> </tr> <tr> <td></td> <td>1 0 2</td> <td>0 to 1000</td> </tr> <tr> <td>Connection rating</td> <td>P</td> <td>Rc thread</td> </tr> <tr> <td></td> <td>S</td> <td>Swagelok</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange</td> </tr> <tr> <td>Connection size</td> <td>0 4</td> <td>1/4B(8A)</td> </tr> <tr> <td></td> <td>0 6</td> <td>3/8B(10A)</td> </tr> <tr> <td></td> <td>0 8</td> <td>1/2B(15A)</td> </tr> <tr> <td></td> <td>1 2</td> <td>3/4B(20A)</td> </tr> <tr> <td></td> <td>1 6</td> <td>1B (25A)</td> </tr> </tbody> </table>	Model code		Description	TF-11	- - - - -	up to 120	Flow range	1	up to 250		2	up to 500		3	up to 1000	L/min (nor)	4		Power supply/ Output	0	±12 V DC(15V)0 to 5 V DC		1	24 V DC/4 to 20 mA DC	Scale range L/min (nor)	0 2 0	0 to 2		0 3 0	0 to 3		0 5 0	0 to 5		0 8 0	0 to 8		1 0 0	0 to 10		1 5 0	0 to 15		2 0 0	0 to 20		3 0 0	0 to 30		5 0 0	0 to 50		8 0 0	0 to 80		1 0 1	0 to 100		1 2 1	0 to 120		1 5 1	0 to 150		2 0 1	0 to 200		2 5 1	0 to 250		3 0 1	0 to 300		4 0 1	0 to 400		5 0 1	0 to 500		6 0 1	0 to 600		8 0 1	0 to 800		1 0 2	0 to 1000	Connection rating	P	Rc thread		S	Swagelok		F	JIS10K Flange	Connection size	0 4	1/4B(8A)		0 6	3/8B(10A)		0 8	1/2B(15A)		1 2	3/4B(20A)		1 6	1B (25A)	<table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>TF-12</td> <td>- - - - -</td> <td>up to 120</td> </tr> <tr> <td>Flow range</td> <td>1</td> <td>up to 250</td> </tr> <tr> <td></td> <td>2</td> <td>up to 500</td> </tr> <tr> <td></td> <td>3</td> <td>up to 1000</td> </tr> <tr> <td>L/min (nor)</td> <td>4</td> <td></td> </tr> <tr> <td>Power supply/ Output</td> <td>0</td> <td>±12 V DC(15V)0 to 5 V DC</td> </tr> <tr> <td></td> <td>1</td> <td>24 V DC/4 to 20 mA DC</td> </tr> <tr> <td>Scale range L/min (nor)</td> <td>0 2 0</td> <td>0 to 2</td> </tr> <tr> <td></td> <td>0 3 0</td> <td>0 to 3</td> </tr> <tr> <td></td> <td>0 5 0</td> <td>0 to 5</td> </tr> <tr> <td></td> <td>0 8 0</td> <td>0 to 8</td> </tr> <tr> <td></td> <td>1 0 0</td> <td>0 to 10</td> </tr> <tr> <td></td> <td>1 5 0</td> <td>0 to 15</td> </tr> <tr> <td></td> <td>2 0 0</td> <td>0 to 20</td> </tr> <tr> <td></td> <td>3 0 0</td> <td>0 to 30</td> </tr> <tr> <td></td> <td>5 0 0</td> <td>0 to 50</td> </tr> <tr> <td></td> <td>8 0 0</td> <td>0 to 80</td> </tr> <tr> <td></td> <td>1 0 1</td> <td>0 to 100</td> </tr> <tr> <td></td> <td>1 2 1</td> <td>0 to 120</td> </tr> <tr> <td></td> <td>1 5 1</td> <td>0 to 150</td> </tr> <tr> <td></td> <td>2 0 1</td> <td>0 to 200</td> </tr> <tr> <td></td> <td>2 5 1</td> <td>0 to 250</td> </tr> <tr> <td></td> <td>3 0 1</td> <td>0 to 300</td> </tr> <tr> <td></td> <td>4 0 1</td> <td>0 to 400</td> </tr> <tr> <td></td> <td>5 0 1</td> <td>0 to 500</td> </tr> <tr> <td></td> <td>6 0 1</td> <td>0 to 600</td> </tr> <tr> <td></td> <td>8 0 1</td> <td>0 to 800</td> </tr> <tr> <td></td> <td>1 0 2</td> <td>0 to 1000</td> </tr> <tr> <td>Connection rating</td> <td>P</td> <td>Rc thread</td> </tr> <tr> <td></td> <td>S</td> <td>Swagelok</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange</td> </tr> <tr> <td>Connection size</td> <td>0 4</td> <td>1/4B(8A)</td> </tr> <tr> <td></td> <td>0 6</td> <td>3/8B(10A)</td> </tr> <tr> <td></td> <td>0 8</td> <td>1/2B(15A)</td> </tr> <tr> <td></td> <td>1 2</td> <td>3/4B(20A)</td> </tr> <tr> <td></td> <td>1 6</td> <td>1B (25A)</td> </tr> </tbody> </table>	Model code		Description	TF-12	- - - - -	up to 120	Flow range	1	up to 250		2	up to 500		3	up to 1000	L/min (nor)	4		Power supply/ Output	0	±12 V DC(15V)0 to 5 V DC		1	24 V DC/4 to 20 mA DC	Scale range L/min (nor)	0 2 0	0 to 2		0 3 0	0 to 3		0 5 0	0 to 5		0 8 0	0 to 8		1 0 0	0 to 10		1 5 0	0 to 15		2 0 0	0 to 20		3 0 0	0 to 30		5 0 0	0 to 50		8 0 0	0 to 80		1 0 1	0 to 100		1 2 1	0 to 120		1 5 1	0 to 150		2 0 1	0 to 200		2 5 1	0 to 250		3 0 1	0 to 300		4 0 1	0 to 400		5 0 1	0 to 500		6 0 1	0 to 600		8 0 1	0 to 800		1 0 2	0 to 1000	Connection rating	P	Rc thread		S	Swagelok		F	JIS10K Flange	Connection size	0 4	1/4B(8A)		0 6	3/8B(10A)		0 8	1/2B(15A)		1 2	3/4B(20A)		1 6	1B (25A)
	Model code		Description																																																																																																																																																																																																																																																																																													
TF-100	- - - - -	up to 120																																																																																																																																																																																																																																																																																														
Flow range L/min(nor)		±12 V DC(15V)0 to 5 V DC																																																																																																																																																																																																																																																																																														
Power supply/ Output	0	24 V DC/4 to 20 mA DC																																																																																																																																																																																																																																																																																														
Body material	P	Poly-Acetal																																																																																																																																																																																																																																																																																														
	S	SCS14																																																																																																																																																																																																																																																																																														
Scale range L/min (nor)	0 2 0	0 to 2																																																																																																																																																																																																																																																																																														
	0 3 0	0 to 3																																																																																																																																																																																																																																																																																														
	0 5 0	0 to 5																																																																																																																																																																																																																																																																																														
	0 8 0	0 to 8																																																																																																																																																																																																																																																																																														
	1 0 0	0 to 10																																																																																																																																																																																																																																																																																														
	1 5 0	0 to 15																																																																																																																																																																																																																																																																																														
	2 0 0	0 to 20																																																																																																																																																																																																																																																																																														
	3 0 0	0 to 30																																																																																																																																																																																																																																																																																														
	5 0 0	0 to 50																																																																																																																																																																																																																																																																																														
	8 0 0	0 to 80																																																																																																																																																																																																																																																																																														
	1 0 1	0 to 100																																																																																																																																																																																																																																																																																														
	1 2 1	0 to 120																																																																																																																																																																																																																																																																																														
Connection rating	P	Rc thread																																																																																																																																																																																																																																																																																														
	S	Swagelok*																																																																																																																																																																																																																																																																																														
Connection size	0 4	1/4B(8A)																																																																																																																																																																																																																																																																																														
Model code		Description																																																																																																																																																																																																																																																																																														
TF-11	- - - - -	up to 120																																																																																																																																																																																																																																																																																														
Flow range	1	up to 250																																																																																																																																																																																																																																																																																														
	2	up to 500																																																																																																																																																																																																																																																																																														
	3	up to 1000																																																																																																																																																																																																																																																																																														
L/min (nor)	4																																																																																																																																																																																																																																																																																															
Power supply/ Output	0	±12 V DC(15V)0 to 5 V DC																																																																																																																																																																																																																																																																																														
	1	24 V DC/4 to 20 mA DC																																																																																																																																																																																																																																																																																														
Scale range L/min (nor)	0 2 0	0 to 2																																																																																																																																																																																																																																																																																														
	0 3 0	0 to 3																																																																																																																																																																																																																																																																																														
	0 5 0	0 to 5																																																																																																																																																																																																																																																																																														
	0 8 0	0 to 8																																																																																																																																																																																																																																																																																														
	1 0 0	0 to 10																																																																																																																																																																																																																																																																																														
	1 5 0	0 to 15																																																																																																																																																																																																																																																																																														
	2 0 0	0 to 20																																																																																																																																																																																																																																																																																														
	3 0 0	0 to 30																																																																																																																																																																																																																																																																																														
	5 0 0	0 to 50																																																																																																																																																																																																																																																																																														
	8 0 0	0 to 80																																																																																																																																																																																																																																																																																														
	1 0 1	0 to 100																																																																																																																																																																																																																																																																																														
	1 2 1	0 to 120																																																																																																																																																																																																																																																																																														
	1 5 1	0 to 150																																																																																																																																																																																																																																																																																														
	2 0 1	0 to 200																																																																																																																																																																																																																																																																																														
	2 5 1	0 to 250																																																																																																																																																																																																																																																																																														
	3 0 1	0 to 300																																																																																																																																																																																																																																																																																														
	4 0 1	0 to 400																																																																																																																																																																																																																																																																																														
	5 0 1	0 to 500																																																																																																																																																																																																																																																																																														
	6 0 1	0 to 600																																																																																																																																																																																																																																																																																														
	8 0 1	0 to 800																																																																																																																																																																																																																																																																																														
	1 0 2	0 to 1000																																																																																																																																																																																																																																																																																														
Connection rating	P	Rc thread																																																																																																																																																																																																																																																																																														
	S	Swagelok																																																																																																																																																																																																																																																																																														
	F	JIS10K Flange																																																																																																																																																																																																																																																																																														
Connection size	0 4	1/4B(8A)																																																																																																																																																																																																																																																																																														
	0 6	3/8B(10A)																																																																																																																																																																																																																																																																																														
	0 8	1/2B(15A)																																																																																																																																																																																																																																																																																														
	1 2	3/4B(20A)																																																																																																																																																																																																																																																																																														
	1 6	1B (25A)																																																																																																																																																																																																																																																																																														
Model code		Description																																																																																																																																																																																																																																																																																														
TF-12	- - - - -	up to 120																																																																																																																																																																																																																																																																																														
Flow range	1	up to 250																																																																																																																																																																																																																																																																																														
	2	up to 500																																																																																																																																																																																																																																																																																														
	3	up to 1000																																																																																																																																																																																																																																																																																														
L/min (nor)	4																																																																																																																																																																																																																																																																																															
Power supply/ Output	0	±12 V DC(15V)0 to 5 V DC																																																																																																																																																																																																																																																																																														
	1	24 V DC/4 to 20 mA DC																																																																																																																																																																																																																																																																																														
Scale range L/min (nor)	0 2 0	0 to 2																																																																																																																																																																																																																																																																																														
	0 3 0	0 to 3																																																																																																																																																																																																																																																																																														
	0 5 0	0 to 5																																																																																																																																																																																																																																																																																														
	0 8 0	0 to 8																																																																																																																																																																																																																																																																																														
	1 0 0	0 to 10																																																																																																																																																																																																																																																																																														
	1 5 0	0 to 15																																																																																																																																																																																																																																																																																														
	2 0 0	0 to 20																																																																																																																																																																																																																																																																																														
	3 0 0	0 to 30																																																																																																																																																																																																																																																																																														
	5 0 0	0 to 50																																																																																																																																																																																																																																																																																														
	8 0 0	0 to 80																																																																																																																																																																																																																																																																																														
	1 0 1	0 to 100																																																																																																																																																																																																																																																																																														
	1 2 1	0 to 120																																																																																																																																																																																																																																																																																														
	1 5 1	0 to 150																																																																																																																																																																																																																																																																																														
	2 0 1	0 to 200																																																																																																																																																																																																																																																																																														
	2 5 1	0 to 250																																																																																																																																																																																																																																																																																														
	3 0 1	0 to 300																																																																																																																																																																																																																																																																																														
	4 0 1	0 to 400																																																																																																																																																																																																																																																																																														
	5 0 1	0 to 500																																																																																																																																																																																																																																																																																														
	6 0 1	0 to 600																																																																																																																																																																																																																																																																																														
	8 0 1	0 to 800																																																																																																																																																																																																																																																																																														
	1 0 2	0 to 1000																																																																																																																																																																																																																																																																																														
Connection rating	P	Rc thread																																																																																																																																																																																																																																																																																														
	S	Swagelok																																																																																																																																																																																																																																																																																														
	F	JIS10K Flange																																																																																																																																																																																																																																																																																														
Connection size	0 4	1/4B(8A)																																																																																																																																																																																																																																																																																														
	0 6	3/8B(10A)																																																																																																																																																																																																																																																																																														
	0 8	1/2B(15A)																																																																																																																																																																																																																																																																																														
	1 2	3/4B(20A)																																																																																																																																																																																																																																																																																														
	1 6	1B (25A)																																																																																																																																																																																																																																																																																														
	*Swagelok connection is available only for TF-100□S type.																																																																																																																																																																																																																																																																																															

Model	TF-13□□	TF-14□□																																																																																																																
																																																																																																																		
Type	Low pressure loss, Indoor use	Low pressure loss, Water tight type																																																																																																																
Gas to be measured	All kinds of gases, except gases containing more than 10%(Vol.) of H <sub>2</sub> or He and mixture of H <sub>2</sub> or He and CnHm																																																																																																																	
Scale range	Min. 0 to 150 L/min(nor) Max. 0 to 1000 L/min(nor)																																																																																																																	
Amb. and Gas temp.	0 to 60°C																																																																																																																	
Gas press.	-0.07 to 1.0 MPa																																																																																																																	
Accuracy	±2.0%F.S.																																																																																																																	
Temp. change effect	Within ±0.1%F.S. /°C																																																																																																																	
Press. change effect	Within ±0.1%F.S. /0.1 MPa																																																																																																																	
Rangeability	1 : 20																																																																																																																	
Gas contact part material	Tube	SUS316																																																																																																																
	Sensor	Combination of SUS316, Glass, PT and CTFE																																																																																																																
	Seal	FKM or CR																																																																																																																
Housing material	ABS resin IP20 equ. (Indoor use)	ADC12 IP65 equ. (Water tight)																																																																																																																
Process connection	TF-1□2□ : Rc1/2 or 15AJIS10K Flange TF-1□3□ : Rc3/4 or 20AJIS10K Flange TF-1□4□ : Rc1 or 25AJIS10K Flange																																																																																																																	
Power supply/ Output	TF-1□□0 ±12 V DC or ±15 V DC, +150 mA, -20 mA/0 to 5 V DC (Load resistance:More than 5kΩ) TF-1□□1 24 V DC ±10%, +150 mA/4 to 20 mA DC (Load resistance:Less than 450Ω)																																																																																																																	
Electric connection	Exclusive cable with connector	G1/2, M3 screw terminal																																																																																																																
Model code	<table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>TF-13</td> <td>- - - - -</td> <td></td> </tr> <tr> <td>Flow range L/min(nor)</td> <td>2</td> <td>up to 250</td> </tr> <tr> <td></td> <td>3</td> <td>up to 500</td> </tr> <tr> <td></td> <td>4</td> <td>up to 1000</td> </tr> <tr> <td>Power supply/ Output</td> <td>0</td> <td>±12 V DC(15V) 0 to 5 V DC</td> </tr> <tr> <td></td> <td>1</td> <td>24 V DC/4 to 20 mA DC</td> </tr> <tr> <td rowspan="8">Scale range L/min (nor)</td> <td>1 5 1</td> <td>0 to 150</td> </tr> <tr> <td>2 0 1</td> <td>0 to 200</td> </tr> <tr> <td>2 5 1</td> <td>0 to 250</td> </tr> <tr> <td>3 0 1</td> <td>0 to 300</td> </tr> <tr> <td>4 0 1</td> <td>0 to 400</td> </tr> <tr> <td>5 0 1</td> <td>0 to 500</td> </tr> <tr> <td>6 0 1</td> <td>0 to 600</td> </tr> <tr> <td>8 0 1</td> <td>0 to 800</td> </tr> <tr> <td></td> <td>1 0 2</td> <td>0 to 1000</td> </tr> <tr> <td>Connection rating</td> <td>P</td> <td>Rc thread</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange</td> </tr> <tr> <td>Connection size (Choose the connection size from the above-mentioned process connection.)</td> <td>0 8</td> <td>1/2B(15A)</td> </tr> <tr> <td></td> <td>1 2</td> <td>3/4B(20A)</td> </tr> <tr> <td></td> <td>1 6</td> <td>1B (25A)</td> </tr> </tbody> </table> <p>*TF-11□ is recommended for scale range smaller than 120L/min(nor). *Required straight run for upstream is 5D and downstream is 0D. Installation of the pipe is the same connection of flowmeter.</p>	Model code		Description	TF-13	- - - - -		Flow range L/min(nor)	2	up to 250		3	up to 500		4	up to 1000	Power supply/ Output	0	±12 V DC(15V) 0 to 5 V DC		1	24 V DC/4 to 20 mA DC	Scale range L/min (nor)	1 5 1	0 to 150	2 0 1	0 to 200	2 5 1	0 to 250	3 0 1	0 to 300	4 0 1	0 to 400	5 0 1	0 to 500	6 0 1	0 to 600	8 0 1	0 to 800		1 0 2	0 to 1000	Connection rating	P	Rc thread		F	JIS10K Flange	Connection size (Choose the connection size from the above-mentioned process connection.)	0 8	1/2B(15A)		1 2	3/4B(20A)		1 6	1B (25A)	<table border="1"> <thead> <tr> <th colspan="2">Model code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>TF-14</td> <td>- - - - -</td> <td></td> </tr> <tr> <td>Flow range L/min(nor)</td> <td>2</td> <td>up to 250</td> </tr> <tr> <td></td> <td>3</td> <td>up to 500</td> </tr> <tr> <td></td> <td>4</td> <td>up to 1000</td> </tr> <tr> <td>Power supply/ Output</td> <td>0</td> <td>±12 V DC(15V) 0 to 5 V DC</td> </tr> <tr> <td></td> <td>1</td> <td>24 V DC/4 to 20 mA DC</td> </tr> <tr> <td rowspan="8">Scale range L/min (nor)</td> <td>1 5 1</td> <td>0 to 150</td> </tr> <tr> <td>2 0 1</td> <td>0 to 200</td> </tr> <tr> <td>2 5 1</td> <td>0 to 250</td> </tr> <tr> <td>3 0 1</td> <td>0 to 300</td> </tr> <tr> <td>4 0 1</td> <td>0 to 400</td> </tr> <tr> <td>5 0 1</td> <td>0 to 500</td> </tr> <tr> <td>6 0 1</td> <td>0 to 600</td> </tr> <tr> <td>8 0 1</td> <td>0 to 800</td> </tr> <tr> <td></td> <td>1 0 2</td> <td>0 to 1000</td> </tr> <tr> <td>Connection rating</td> <td>P</td> <td>Rc thread</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange</td> </tr> <tr> <td>Connection size (Choose the connection size from the above-mentioned process connection.)</td> <td>0 8</td> <td>1/2B(15A)</td> </tr> <tr> <td></td> <td>1 2</td> <td>3/4B(20A)</td> </tr> <tr> <td></td> <td>1 6</td> <td>1B (25A)</td> </tr> </tbody> </table> <p>*TF-121□ is recommended for scale range smaller than 120L/min(nor). *Required straight run for upstream is 5D and downstream is 0D. Installation of the pipe is the same connection of flowmeter.</p>	Model code		Description	TF-14	- - - - -		Flow range L/min(nor)	2	up to 250		3	up to 500		4	up to 1000	Power supply/ Output	0	±12 V DC(15V) 0 to 5 V DC		1	24 V DC/4 to 20 mA DC	Scale range L/min (nor)	1 5 1	0 to 150	2 0 1	0 to 200	2 5 1	0 to 250	3 0 1	0 to 300	4 0 1	0 to 400	5 0 1	0 to 500	6 0 1	0 to 600	8 0 1	0 to 800		1 0 2	0 to 1000	Connection rating	P	Rc thread		F	JIS10K Flange	Connection size (Choose the connection size from the above-mentioned process connection.)	0 8	1/2B(15A)		1 2	3/4B(20A)		1 6	1B (25A)
Model code		Description																																																																																																																
TF-13	- - - - -																																																																																																																	
Flow range L/min(nor)	2	up to 250																																																																																																																
	3	up to 500																																																																																																																
	4	up to 1000																																																																																																																
Power supply/ Output	0	±12 V DC(15V) 0 to 5 V DC																																																																																																																
	1	24 V DC/4 to 20 mA DC																																																																																																																
Scale range L/min (nor)	1 5 1	0 to 150																																																																																																																
	2 0 1	0 to 200																																																																																																																
	2 5 1	0 to 250																																																																																																																
	3 0 1	0 to 300																																																																																																																
	4 0 1	0 to 400																																																																																																																
	5 0 1	0 to 500																																																																																																																
	6 0 1	0 to 600																																																																																																																
	8 0 1	0 to 800																																																																																																																
	1 0 2	0 to 1000																																																																																																																
Connection rating	P	Rc thread																																																																																																																
	F	JIS10K Flange																																																																																																																
Connection size (Choose the connection size from the above-mentioned process connection.)	0 8	1/2B(15A)																																																																																																																
	1 2	3/4B(20A)																																																																																																																
	1 6	1B (25A)																																																																																																																
Model code		Description																																																																																																																
TF-14	- - - - -																																																																																																																	
Flow range L/min(nor)	2	up to 250																																																																																																																
	3	up to 500																																																																																																																
	4	up to 1000																																																																																																																
Power supply/ Output	0	±12 V DC(15V) 0 to 5 V DC																																																																																																																
	1	24 V DC/4 to 20 mA DC																																																																																																																
Scale range L/min (nor)	1 5 1	0 to 150																																																																																																																
	2 0 1	0 to 200																																																																																																																
	2 5 1	0 to 250																																																																																																																
	3 0 1	0 to 300																																																																																																																
	4 0 1	0 to 400																																																																																																																
	5 0 1	0 to 500																																																																																																																
	6 0 1	0 to 600																																																																																																																
	8 0 1	0 to 800																																																																																																																
	1 0 2	0 to 1000																																																																																																																
Connection rating	P	Rc thread																																																																																																																
	F	JIS10K Flange																																																																																																																
Connection size (Choose the connection size from the above-mentioned process connection.)	0 8	1/2B(15A)																																																																																																																
	1 2	3/4B(20A)																																																																																																																
	1 6	1B (25A)																																																																																																																

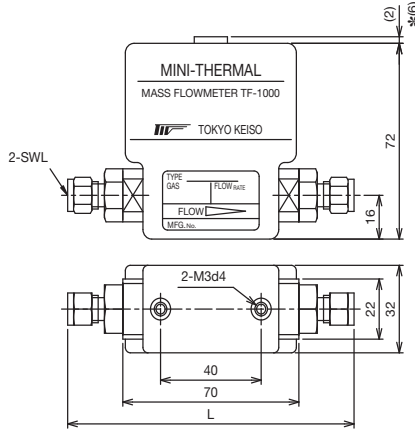
**DIMENSION AND WEIGHT**

TF-1000 Compact type  
[TF-1000P.TF-1000S]

· Rc screw connection (TF-1000P.....Approx.120g)  
TF-1000S.....Approx.250g



· SWL connection (Approx.330g for TF-1000S)

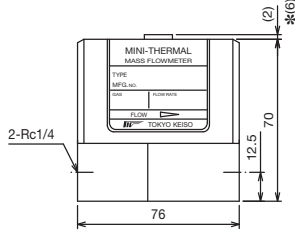


Connection, Rating	L
1/4SWL	121
3/8SWL	124
1/2SWL	128

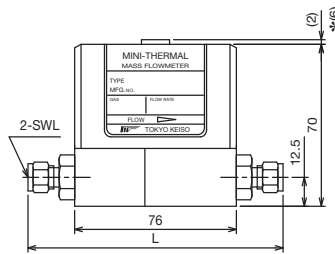
\*TF-1□□1--6mm

TF-1110 Stainless steel body, Standard type  
[TF-1110]

· Rc screw connection (Approx.450g)

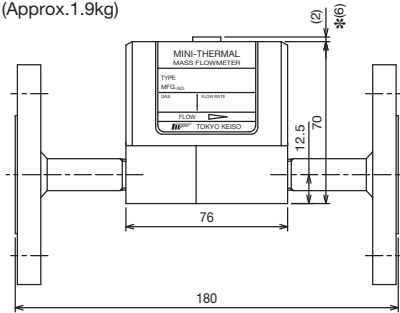


· SWL connection (Approx.530g)

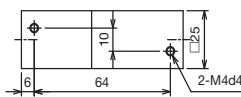


Connection, Rating	L
1/4SWL	127
3/8SWL	130
1/2SWL	134

· Flange connection (Approx.1.9kg)

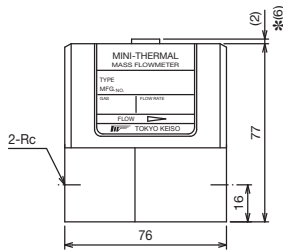


[Rc, SWL and Flange connection]  
Mounting dimension (Bottom face)

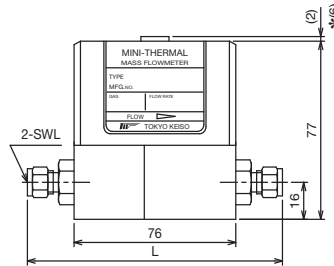


[TF-1120]

· Rc screw connection (Approx.650g)

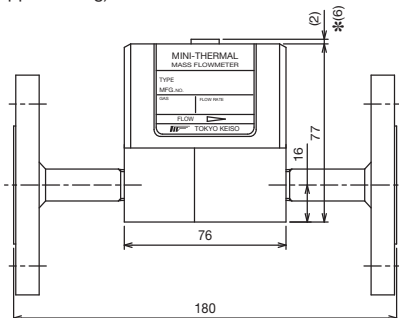


· SWL connection (Approx.740g)

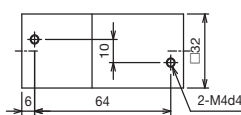


Connection, Rating	L
1/4SWL	127
3/8SWL	130
1/2SWL	134

· Flange connection (Approx.3.0kg)

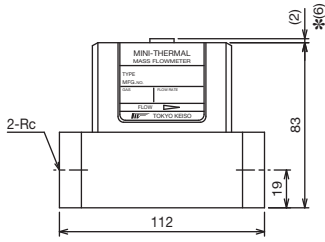


[Rc, SWL and Flange connection]  
Mounting dimension (Bottom face)

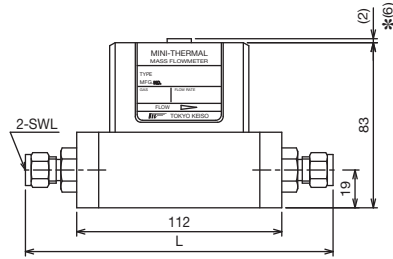


[TF-1130]

• Rc screw connection (Approx.1kg)

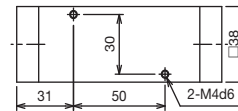


• SWL connection (Approx.1.2kg)

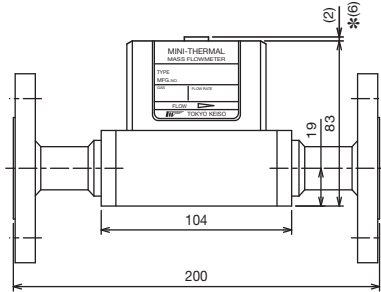


Connection, Rating	L
3/8SWL	168
1/2SWL	173
3/4SWL	182

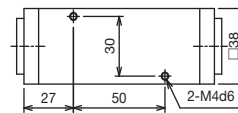
[Rc and SWL connection] Mounting dimension (Bottom face)



• Flange connection (Approx.2.5kg)

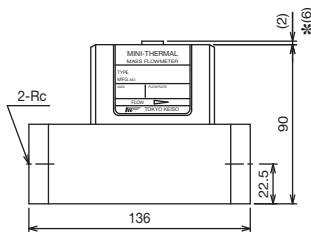


[Flange connection] Mounting dimension (Bottom face)

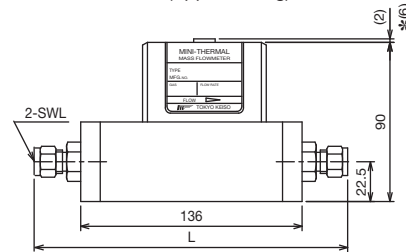


[TF-1140]

• Rc screw connection (Approx.1.5kg)

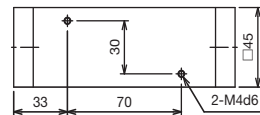


• SWL connection (Approx.1.8kg)

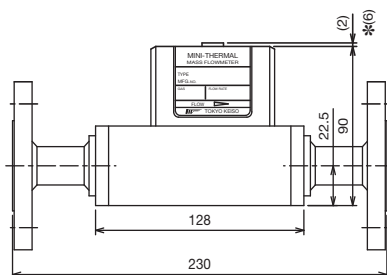


Connection, Rating	L
3/8SWL	192
1/2SWL	197
3/4SWL	206

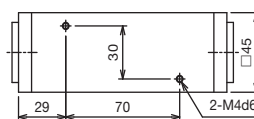
[Rc and SWL connection] Mounting dimension (Bottom face)



• Flange connection (Approx.3.3kg)

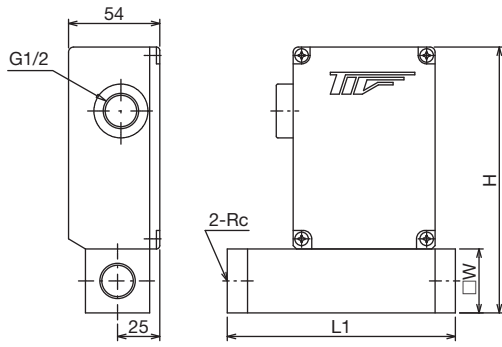


[Flange connection] Mounting dimension (Bottom face)

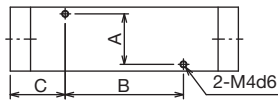


TF-1200 Stainless steel body, Water tight housing type

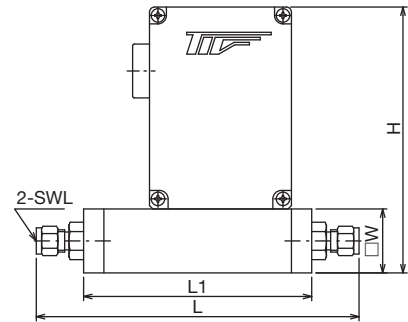
· Rc screw connection



[Rc, SWL and Flange connection] Mounting dimension (Bottom face)

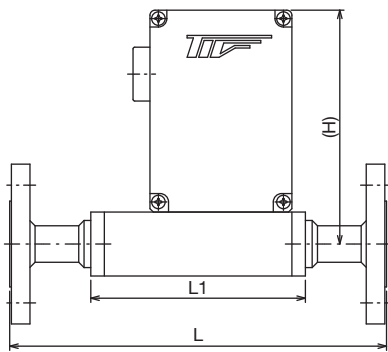


· SWL connection



Size	1/4	3/8	1/2	1/4	3/8	1/2	1/4	3/8	1/2	3/8	1/2	3/4
L	159	162	166	171	176	181	188	191	196	216	221	230
L1	108			120			135			160		
H	158			158			158			165		
□W	38			38			38			45		
A	30			30			30			30		
B	50			50			70			90		
C	29			35			32.5			35		
Mass (kg)	2.1			2.2			3.4			4.1		
Model	TF-121□			TF-122□			TF-123□			TF-124□		

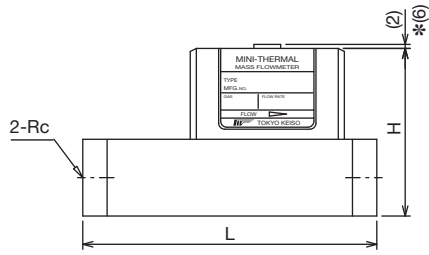
· Flange connection



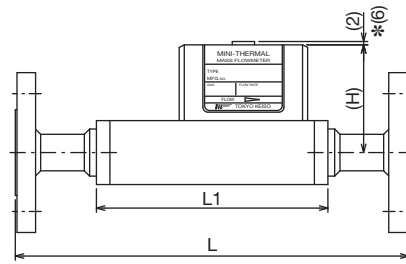
Connection	Size Rating	15A	20A	25A	15A	20A	25A	15A	20A	25A	15A	20A	25A
		JIS 10K (RF) (FF)			JIS 10K (RF) (FF)			JIS 10K (RF) (FF)			JIS 10K (RF) (FF)		
L		196			208			223			254		
L1		100			112			127			152		
□W		38			38			38			45		
H		139			139			139			142.5		
A		30			30			30			30		
B		50			50			70			90		
C		25			31			28.5			31		
Mass (kg)		4.4			4.5			5.7			6.4		
Model		TF-121□			TF-122□			TF-123□			TF-124□		

TF-1300 Low pressure loss, Indoor use type

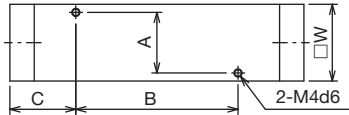
· Rc screw connection



· Flange connection



[Rc, and Flange connection] Mounting dimension (Bottom face)

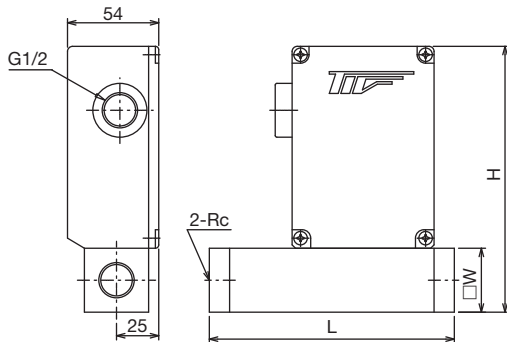


Connection	Size Rating	Rc connection			Flange connection JIS10K (RF) (FF)		
		1/2	3/4	1	15A	20A	25A
L		145	160	190	233	254	290
L1					137	152	184
□W		38	45	54	38	45	54
H		83	90	99	64	67.5	72
A		30	30	44	30	30	44
B		80	90	120	80	90	120
C		32.5	35	35	28.5	31	32
Mass (kg)		1.5	2.2	3.3	2.8	3.8	5.8
Model		TF-1320	TF-1330	TF-1340	TF-1320	TF-1330	TF-1340

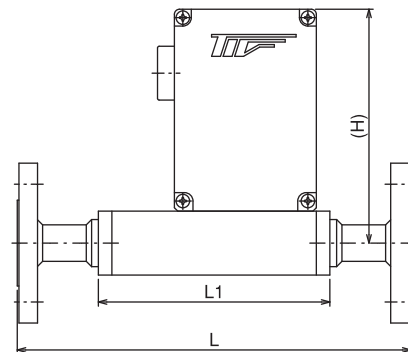
\*TF-13□1---6mm

TF-1400 Low pressure loss, Water tight type

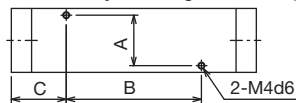
· Rc screw connection



· Flange connection

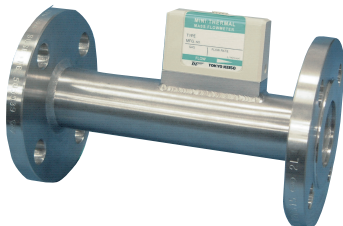
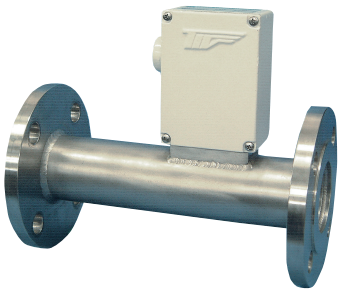


[Rc, and Flange connection] Mounting dimension (Bottom face)



Connection	Size Rating	Rc connection			Flange connection JIS10K (RF) (FF)		
		1/2	3/4	1	15A	20A	25A
L		145	160	190	233	254	290
L1					137	152	184
□W		38	45	54	38	45	54
H		158	165	174	139	142.5	147
A		30	30	44	30	30	44
B		80	90	120	80	90	120
C		32.5	35	35	28.5	31	32
Mass (kg)		2.1	2.8	3.9	3.4	4.4	6.4
Model		TF-142□	TF-143□	TF-144□	TF-142□	TF-143□	TF-144□

STANDARD SPECIFICATION AND MODEL CODE [Middle to Large connection type]

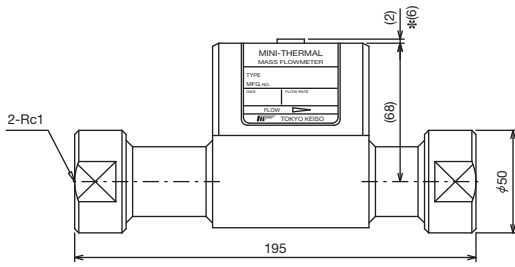
Model	TF-115□	TF-125□																																																																																																																																																																																
																																																																																																																																																																																		
Type	Standard type	Water tight housing																																																																																																																																																																																
Gas to be measured	All kinds of gases, except gases containing more than 10%(Vol.) of H <sub>2</sub> or He and mixture of H <sub>2</sub> or He and CnHm																																																																																																																																																																																	
Amb. and Gas temp.	0 to 60°C																																																																																																																																																																																	
Gas press.	-0.07 to 1.0 MPa																																																																																																																																																																																	
Accuracy	±2.0%F.S.																																																																																																																																																																																	
Temp. change effect	Within ±0.1%F.S./°C																																																																																																																																																																																	
Press. change effect	Within ±0.1%F.S./0.1 MPa																																																																																																																																																																																	
Rangeability	1 : 20																																																																																																																																																																																	
Gas contact part material	Tube	SUS316 or SUS304																																																																																																																																																																																
	Sensor	Combination of SUS316, Glass, PT and CTFE (SCS14) SUS304																																																																																																																																																																																
	Seal	FKM or CR																																																																																																																																																																																
Housing material	ABS resin IP20 equ. (Indoor use)	ADC12 IP65 equ. (Water tight)																																																																																																																																																																																
Process connection	Rc female screw (1 to 2B) JIS10K Flange (25 to 80A)																																																																																																																																																																																	
Power supply / Output	TF-1□□0 ±12 V DC or ±15 V DC, +150 mA, -20 mA/0 to 5 V DC (Load resistance: More than 5kΩ) TF-1□□1 24 V DC ±10%, +150 mA/4 to 20 mA DC (Load resistance: Less than 450Ω)																																																																																																																																																																																	
Electric connection	Exclusive cable with connector	G1/2, M3 screw terminal																																																																																																																																																																																
Model code	<table border="1"> <tr> <th colspan="2">Model code</th> <th colspan="2">Description</th> </tr> <tr> <td>TF-11</td> <td>5</td> <td></td> <td>up to 750m<sup>3</sup>/h(nor) (Refer to the following Scale range table.)</td> </tr> <tr> <td>Power supply/Output</td> <td>0</td> <td></td> <td>±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC</td> </tr> <tr> <td>Scale range</td> <td></td> <td>A B C</td> <td>Flow rate rating</td> </tr> <tr> <td rowspan="2">Material</td> <td></td> <td>4</td> <td>SUS304 (Available only for flange connection)</td> </tr> <tr> <td></td> <td>6</td> <td>SUS316 (Available for all models)</td> </tr> <tr> <td rowspan="2">Connection rating</td> <td></td> <td>P</td> <td>Rc thread (1 to 2B)</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange (25A to 80A)</td> </tr> <tr> <td rowspan="4">Connection size (Choose the connection size from the following Full scale table.)</td> <td></td> <td>2 5</td> <td>1B (25A)</td> </tr> <tr> <td></td> <td>3 2</td> <td>1-1/4B (32A)</td> </tr> <tr> <td></td> <td>4 0</td> <td>1-1/2B (40A)</td> </tr> <tr> <td></td> <td>5 0</td> <td>2B (50A)</td> </tr> <tr> <td></td> <td>6 5</td> <td>2-1/2B (65A)</td> </tr> <tr> <td></td> <td>8 0</td> <td>3B (80A)</td> </tr> </table> <p>*Full scale=(AB)×10<sup>c</sup> m<sup>3</sup>/h(nor) (Ex.) 30m<sup>3</sup>/h(nor)→300 400m<sup>3</sup>/h(nor)→401 750m<sup>3</sup>/h(nor)→751</p>	Model code		Description		TF-11	5		up to 750m <sup>3</sup> /h(nor) (Refer to the following Scale range table.)	Power supply/Output	0		±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC	Scale range		A B C	Flow rate rating	Material		4	SUS304 (Available only for flange connection)		6	SUS316 (Available for all models)	Connection rating		P	Rc thread (1 to 2B)		F	JIS10K Flange (25A to 80A)	Connection size (Choose the connection size from the following Full scale table.)		2 5	1B (25A)		3 2	1-1/4B (32A)		4 0	1-1/2B (40A)		5 0	2B (50A)		6 5	2-1/2B (65A)		8 0	3B (80A)	<table border="1"> <tr> <th colspan="2">Model code</th> <th colspan="2">Description</th> </tr> <tr> <td>TF-12</td> <td>5</td> <td></td> <td>up to 750m<sup>3</sup>/h(nor) (Refer to the following Scale range table.)</td> </tr> <tr> <td>Power supply/Output</td> <td>0</td> <td></td> <td>±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC</td> </tr> <tr> <td>Scale range</td> <td></td> <td>A B C</td> <td>Flow rate rating</td> </tr> <tr> <td rowspan="2">Material</td> <td></td> <td>4</td> <td>SUS304 (Available only for flange connection)</td> </tr> <tr> <td></td> <td>6</td> <td>SUS316 (Available for all models)</td> </tr> <tr> <td rowspan="2">Connection rating</td> <td></td> <td>P</td> <td>Rc thread (1 to 2B)</td> </tr> <tr> <td></td> <td>F</td> <td>JIS10K Flange (25A to 80A)</td> </tr> <tr> <td rowspan="4">Connection size (Choose the connection size from the following Full scale table.)</td> <td></td> <td>2 5</td> <td>1B (25A)</td> </tr> <tr> <td></td> <td>3 2</td> <td>1-1/4B (32A)</td> </tr> <tr> <td></td> <td>4 0</td> <td>1-1/2B (40A)</td> </tr> <tr> <td></td> <td>5 0</td> <td>2B (50A)</td> </tr> <tr> <td></td> <td>6 5</td> <td>2-1/2B (65A)</td> </tr> <tr> <td></td> <td>8 0</td> <td>3B (80A)</td> </tr> </table> <p>*Full scale=(AB)×10<sup>c</sup> m<sup>3</sup>/h(nor) (Ex.) 30m<sup>3</sup>/h(nor)→300 400m<sup>3</sup>/h(nor)→401 750m<sup>3</sup>/h(nor)→751</p>	Model code		Description		TF-12	5		up to 750m <sup>3</sup> /h(nor) (Refer to the following Scale range table.)	Power supply/Output	0		±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC	Scale range		A B C	Flow rate rating	Material		4	SUS304 (Available only for flange connection)		6	SUS316 (Available for all models)	Connection rating		P	Rc thread (1 to 2B)		F	JIS10K Flange (25A to 80A)	Connection size (Choose the connection size from the following Full scale table.)		2 5	1B (25A)		3 2	1-1/4B (32A)		4 0	1-1/2B (40A)		5 0	2B (50A)		6 5	2-1/2B (65A)		8 0	3B (80A)																																																																														
	Model code		Description																																																																																																																																																																															
TF-11	5		up to 750m <sup>3</sup> /h(nor) (Refer to the following Scale range table.)																																																																																																																																																																															
Power supply/Output	0		±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC																																																																																																																																																																															
Scale range		A B C	Flow rate rating																																																																																																																																																																															
Material		4	SUS304 (Available only for flange connection)																																																																																																																																																																															
		6	SUS316 (Available for all models)																																																																																																																																																																															
Connection rating		P	Rc thread (1 to 2B)																																																																																																																																																																															
		F	JIS10K Flange (25A to 80A)																																																																																																																																																																															
Connection size (Choose the connection size from the following Full scale table.)		2 5	1B (25A)																																																																																																																																																																															
		3 2	1-1/4B (32A)																																																																																																																																																																															
		4 0	1-1/2B (40A)																																																																																																																																																																															
		5 0	2B (50A)																																																																																																																																																																															
	6 5	2-1/2B (65A)																																																																																																																																																																																
	8 0	3B (80A)																																																																																																																																																																																
Model code		Description																																																																																																																																																																																
TF-12	5		up to 750m <sup>3</sup> /h(nor) (Refer to the following Scale range table.)																																																																																																																																																																															
Power supply/Output	0		±12 V DC(15V) 0 to 5 V DC 24 V DC/4 to 20 mA DC																																																																																																																																																																															
Scale range		A B C	Flow rate rating																																																																																																																																																																															
Material		4	SUS304 (Available only for flange connection)																																																																																																																																																																															
		6	SUS316 (Available for all models)																																																																																																																																																																															
Connection rating		P	Rc thread (1 to 2B)																																																																																																																																																																															
		F	JIS10K Flange (25A to 80A)																																																																																																																																																																															
Connection size (Choose the connection size from the following Full scale table.)		2 5	1B (25A)																																																																																																																																																																															
		3 2	1-1/4B (32A)																																																																																																																																																																															
		4 0	1-1/2B (40A)																																																																																																																																																																															
		5 0	2B (50A)																																																																																																																																																																															
	6 5	2-1/2B (65A)																																																																																																																																																																																
	8 0	3B (80A)																																																																																																																																																																																
Full scale according to connection	<table border="1"> <thead> <tr> <th>Connection</th> <th>Gas</th> <th>AIR</th> <th>N<sub>2</sub></th> <th>O<sub>2</sub></th> <th>CO</th> <th>CO<sub>2</sub></th> <th>Ar</th> <th>NH<sub>3</sub></th> <th>CH<sub>4</sub></th> <th>C<sub>2</sub>H<sub>6</sub></th> <th>C<sub>3</sub>H<sub>8</sub></th> <th>C<sub>4</sub>H<sub>10</sub></th> <th>13A</th> </tr> </thead> <tbody> <tr> <td rowspan="2">25A</td> <td>Min.</td> <td>30</td> <td>30</td> <td>30</td> <td>30</td> <td>30</td> <td>30</td> <td>23</td> <td>15</td> <td>17</td> <td>14</td> <td>12</td> <td>15</td> </tr> <tr> <td>Max.</td> <td>75</td> <td>75</td> <td>75</td> <td>75</td> <td>75</td> <td>75</td> <td>57</td> <td>38</td> <td>42</td> <td>35</td> <td>30</td> <td>37</td> </tr> <tr> <td rowspan="2">32A</td> <td>Min.</td> <td>65</td> <td>65</td> <td>65</td> <td>65</td> <td>65</td> <td>65</td> <td>49</td> <td>33</td> <td>36</td> <td>30</td> <td>26</td> <td>32</td> </tr> <tr> <td>Max.</td> <td>150</td> <td>150</td> <td>150</td> <td>150</td> <td>150</td> <td>150</td> <td>114</td> <td>75</td> <td>84</td> <td>69</td> <td>60</td> <td>74</td> </tr> <tr> <td rowspan="2">40A</td> <td>Min.</td> <td>90</td> <td>90</td> <td>90</td> <td>90</td> <td>90</td> <td>90</td> <td>68</td> <td>45</td> <td>50</td> <td>41</td> <td>36</td> <td>44</td> </tr> <tr> <td>Max.</td> <td>200</td> <td>200</td> <td>200</td> <td>200</td> <td>200</td> <td>200</td> <td>152</td> <td>100</td> <td>112</td> <td>92</td> <td>80</td> <td>98</td> </tr> <tr> <td rowspan="2">50A</td> <td>Min.</td> <td>140</td> <td>140</td> <td>140</td> <td>140</td> <td>140</td> <td>140</td> <td>106</td> <td>70</td> <td>78</td> <td>64</td> <td>56</td> <td>69</td> </tr> <tr> <td>Max.</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>243</td> <td>160</td> <td>179</td> <td>147</td> <td>128</td> <td>157</td> </tr> <tr> <td rowspan="2">65A</td> <td>Min.</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>220</td> <td>167</td> <td>110</td> <td>123</td> <td>101</td> <td>88</td> <td>108</td> </tr> <tr> <td>Max.</td> <td>520</td> <td>520</td> <td>520</td> <td>520</td> <td>520</td> <td>520</td> <td>395</td> <td>260</td> <td>291</td> <td>239</td> <td>208</td> <td>255</td> </tr> <tr> <td rowspan="2">80A</td> <td>Min.</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>320</td> <td>243</td> <td>160</td> <td>179</td> <td>147</td> <td>128</td> <td>157</td> </tr> <tr> <td>Max.</td> <td>750</td> <td>750</td> <td>750</td> <td>750</td> <td>750</td> <td>750</td> <td>570</td> <td>375</td> <td>420</td> <td>345</td> <td>300</td> <td>368</td> </tr> </tbody> </table>		Connection	Gas	AIR	N <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	Ar	NH <sub>3</sub>	CH <sub>4</sub>	C <sub>2</sub> H <sub>6</sub>	C <sub>3</sub> H <sub>8</sub>	C <sub>4</sub> H <sub>10</sub>	13A	25A	Min.	30	30	30	30	30	30	23	15	17	14	12	15	Max.	75	75	75	75	75	75	57	38	42	35	30	37	32A	Min.	65	65	65	65	65	65	49	33	36	30	26	32	Max.	150	150	150	150	150	150	114	75	84	69	60	74	40A	Min.	90	90	90	90	90	90	68	45	50	41	36	44	Max.	200	200	200	200	200	200	152	100	112	92	80	98	50A	Min.	140	140	140	140	140	140	106	70	78	64	56	69	Max.	320	320	320	320	320	320	243	160	179	147	128	157	65A	Min.	220	220	220	220	220	220	167	110	123	101	88	108	Max.	520	520	520	520	520	520	395	260	291	239	208	255	80A	Min.	320	320	320	320	320	320	243	160	179	147	128	157	Max.	750	750	750	750	750	750	570	375	420	345	300	368
Connection	Gas	AIR	N <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	Ar	NH <sub>3</sub>	CH <sub>4</sub>	C <sub>2</sub> H <sub>6</sub>	C <sub>3</sub> H <sub>8</sub>	C <sub>4</sub> H <sub>10</sub>	13A																																																																																																																																																																					
25A	Min.	30	30	30	30	30	30	23	15	17	14	12	15																																																																																																																																																																					
	Max.	75	75	75	75	75	75	57	38	42	35	30	37																																																																																																																																																																					
32A	Min.	65	65	65	65	65	65	49	33	36	30	26	32																																																																																																																																																																					
	Max.	150	150	150	150	150	150	114	75	84	69	60	74																																																																																																																																																																					
40A	Min.	90	90	90	90	90	90	68	45	50	41	36	44																																																																																																																																																																					
	Max.	200	200	200	200	200	200	152	100	112	92	80	98																																																																																																																																																																					
50A	Min.	140	140	140	140	140	140	106	70	78	64	56	69																																																																																																																																																																					
	Max.	320	320	320	320	320	320	243	160	179	147	128	157																																																																																																																																																																					
65A	Min.	220	220	220	220	220	220	167	110	123	101	88	108																																																																																																																																																																					
	Max.	520	520	520	520	520	520	395	260	291	239	208	255																																																																																																																																																																					
80A	Min.	320	320	320	320	320	320	243	160	179	147	128	157																																																																																																																																																																					
	Max.	750	750	750	750	750	750	570	375	420	345	300	368																																																																																																																																																																					



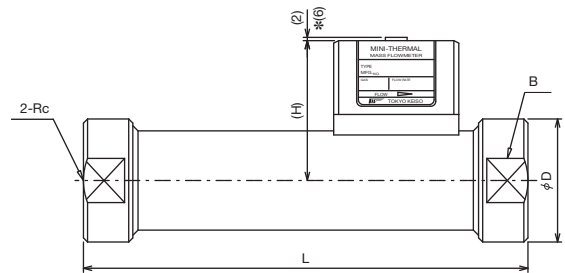
\*TF-1151...6mm

TF-115□ Standard type

- Rc screw connection (Rc1)
- Width across flat of joints: 46
- (Approx.1.9kg)

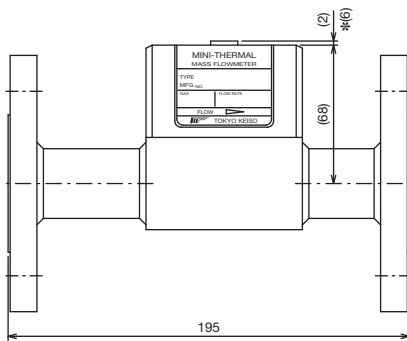


- Rc screw connection (Rc1-1/4 to Rc2)

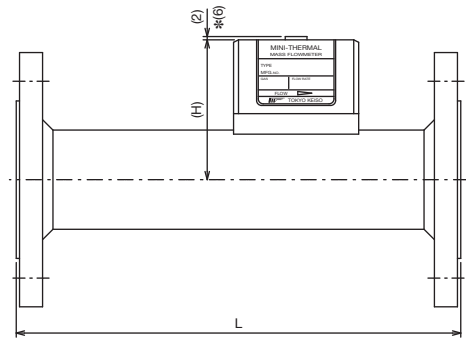


Connection	Size Rating	Rc connection		
		1-1/4	1-1/2	2
L		215	230	270
H		76	79	85
B (Width across flat)		55	60	70
φD		60	65	75
Mass (kg)		1.8	1.9	2.6

- Flange connection (25A) (Approx.3.6kg)



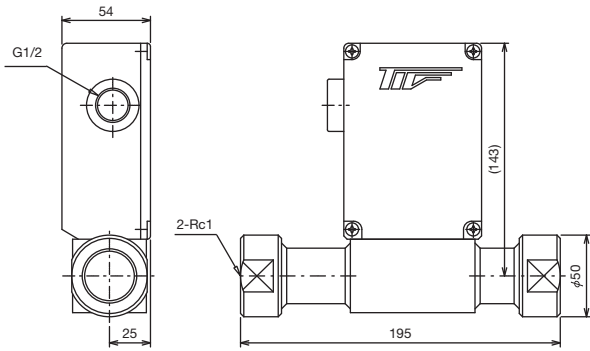
- Flange connection (32 to 80A)



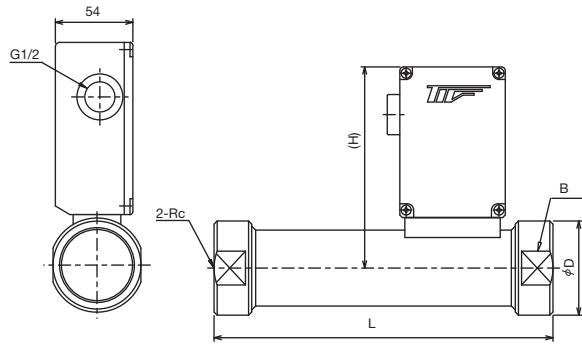
Connection	Size Rating	32A	40A	50A	65A	80A
		Flange connection JIS10K (RF) (FF)				
L		215	230	270	290	320
H		76	79	85	93	100
Mass (kg)		4.1	4.3	5.9	8.0	9.0

TF-125□ Water tight housing type

· Rc screw connection (Rc1)  
 Width across flat of joints: 46  
 (Approx.2.4kg)

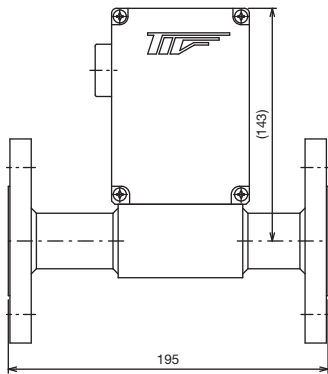


· Rc screw connection (Rc1-1/4 to Rc2)

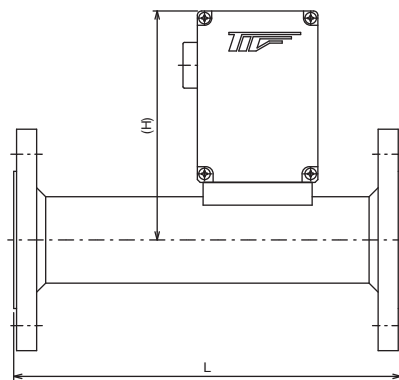


Connection	Size Rating	1-1/4	1-1/2	2
		Rc connection		
L		215	230	270
H		151	154	160
B (Width across flat)		55	60	70
$\phi D$		60	65	75
Mass (kg)		2.3	2.4	3.1

· Flange connection (25A) (Approx.4.1kg)



· Flange connection (32 to 80A)



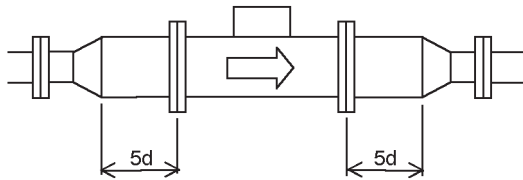
Connection	Size Rating	32A	40A	50A	65A	80A
		Flange connection JIS10K (RF) (FF)				
L		215	230	270	290	320
H		151	154	160	168	175
Mass (kg)		4.6	4.8	5.9	8.5	9.5

**PRECAUTIONS FOR INSTALLATION**

- Required straight run (d: diameter)

Model	Upstream	Downstream
TF-100□P TF-100□S	Not required	Not required
TF-111□ TF-112□ TF-113□ TF-114□	Not required	Not required
TF-115□	5d (*1, *2)	5d (*1, *2)
TF-121□ TF-122□ TF-123□ TF-124□	Not required	Not required
TF-125□	5d (*1, *2)	5d (*1, *2)
TF-132□ TF-133□ TF-134□	5d (*3)	Not required (*3)
TF-142□ TF-143□ TF-144□	5d (*3)	Not required (*3)

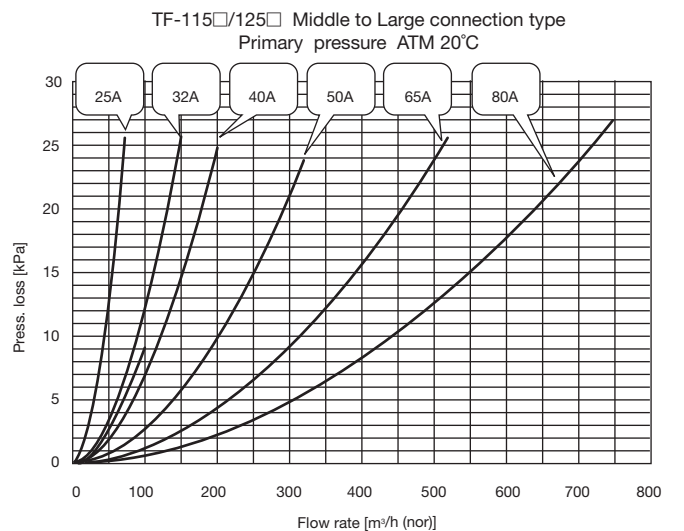
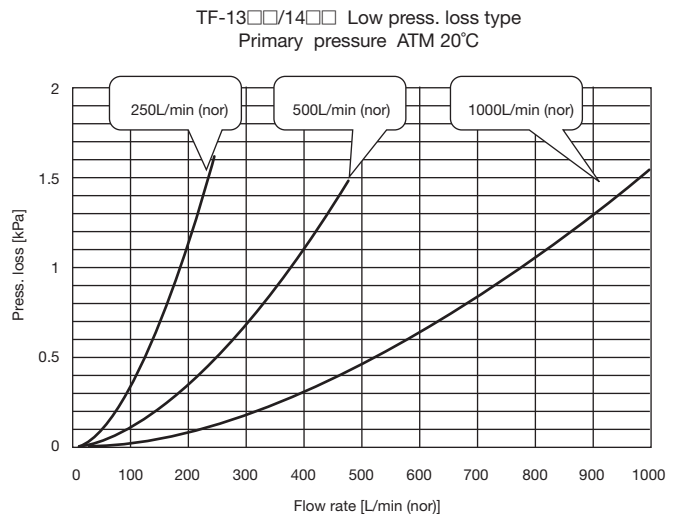
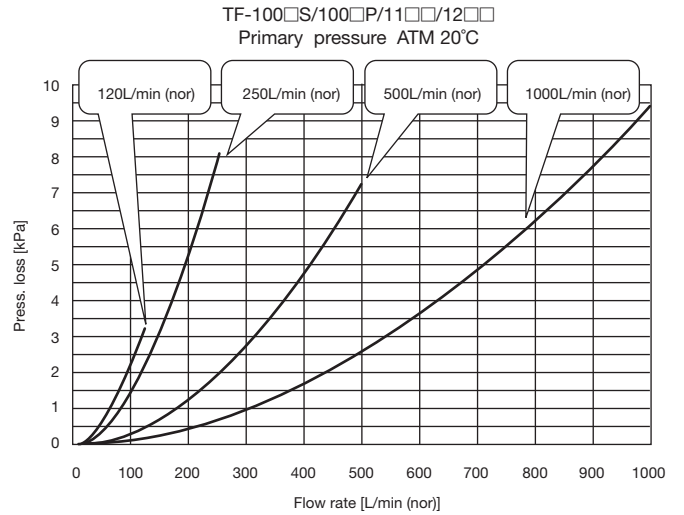
(\*1) The piping different from the diameter of flowmeter is up to ±1 size. Make the piping after installing the required straight run in the same diameter as the flowmeter.



(\*2) Make use of Rc screw fittings less than Sch. 80.  
 (\*3) Make use of the piping in the same diameter as that of the flowmeter.

- Before installing the flowmeter onto process piping, flush and clean the whole piping.
- Install valves downstream if any.
- Use the shielded cable for wiring and do not locate it near to power supply line etc. to avoid the electric noise.
- Confirm the arrow mark on the tube which indicates the flow direction.
- It is recommended to provide bypass piping for maintenance.

**PRESSURE LOSS (The following graphic chart is data in case of air)**

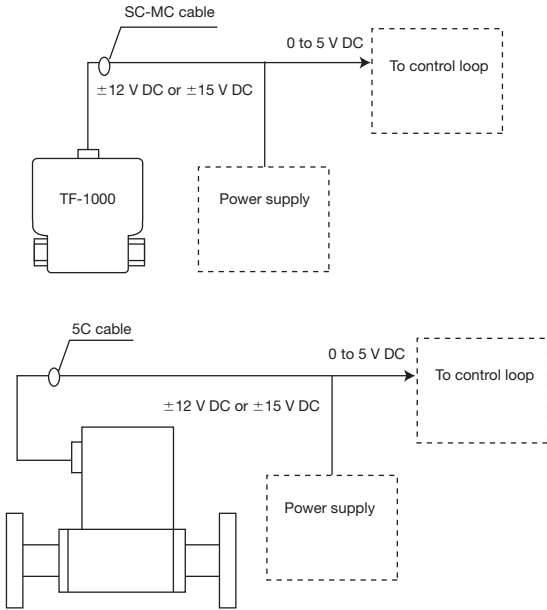


APPLICATIONS

For 0 to 5 V DC Output version

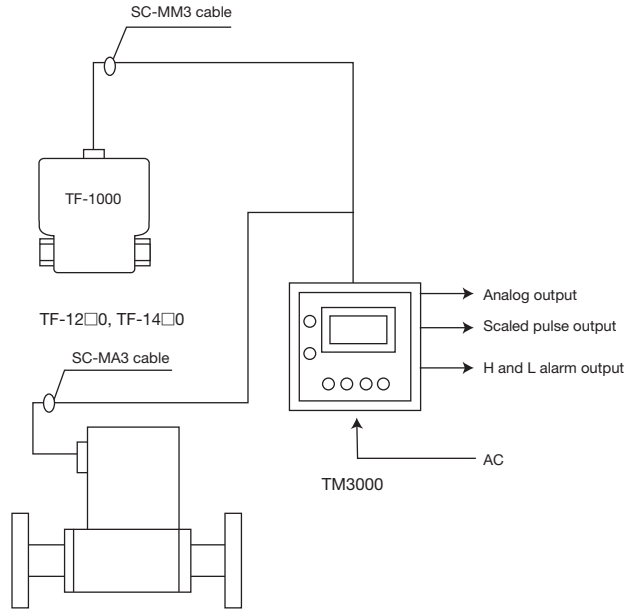
● In case standard power supply unit is used;

TF-1000P, TF-1000S, TF-11□0, TF-13□0



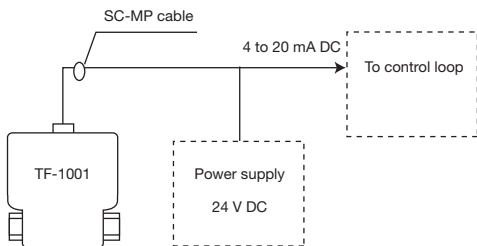
● In case TM3000 series converter unit is used;

TF-1000P, TF-1000S, TF-11□0, TF-13□0



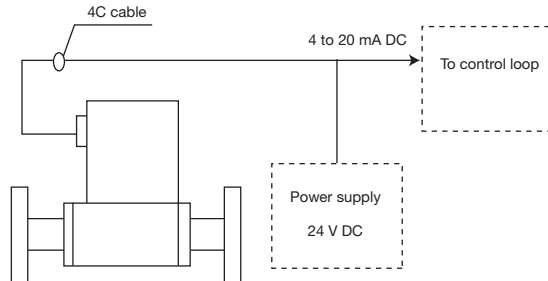
For cable with exclusive connector, 4 to 20 mA DC Output version

TF-1001P, TF-1001S, TF-11□1, TF-13□1



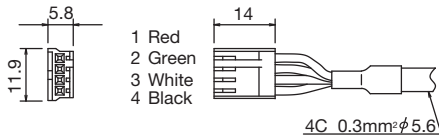
For M3 screw terminal, 4 to 20 mA DC Output version

TF-12□1, TF-14□1

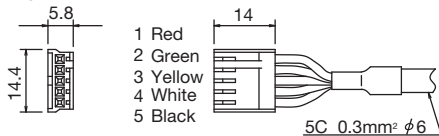


CABLE TERMINAL BY THE SIDE OF DETECTOR

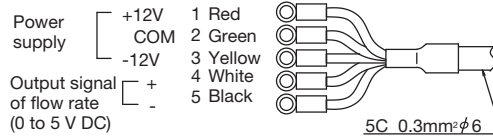
● SC-MP



● SC-MM3



● SC-MA3



\* Specification is subject to change without notice.

**TK TOKYO KEISO CO., LTD.**

Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558  
 Tel : +81-3-3431-1625 (KEY) ; Fax : +81-3-3433-4922  
 e-mail : overseas.sales@tokyokeiso.co.jp ; URL : https://www.tokyokeiso.co.jp