

TH Series THERMAL FLOWMETER

GENERAL

TH series THERMAL FLOWMETER is a flowmeter for gas flow measurement. Based on Tokyo Keiso's original theory and measuring principle, the velocity of various kinds of gases are measured by thermal principle. **TH** can cover from very slow velocity to high velocity that offers very wide range ability compared to other methods of velocity detection of Orifice, Vortex etc.

Various types of detectors and converters are available to meet variety of applications and functional requirements.

FEATURES

- High accuracy
The flow rate of various gases can be measured at high accuracy of $\pm 1.0\%$ F.S.*1 based on our theory.
- Wide rangeability
Accurate measurement in practical use at the flow rate as low as 0.5 m/sec. solving the difficulties in measuring gas flow with orifices or vortex flowmeters.
- Extremely low pressure loss
The thin cylindrical shape of sensor is effective in minimising line pressure loss.
- Long life
Long term running is guaranteed by the provision of a detector without moving parts and of a converter with a highly reliable circuit.
- Less influence from pressure fluctuation
Thanks to basic operational principle, TH Thermal Flowmeter is less influenced from by a change of a pressure of the gas.
- Less influence from gas temperature fluctuation
In normal usage, gas temperature fluctuation may cause such slight change on output as to be negligible and may be ignored. When gas temperature varies widely during operation and very accurate flow rate is required, temperature compensation function is available.
(Not applicable for TR-1000 converter)
- Mass flow
Mass flow is obtained by measuring gas temperature and computing it by temperature compensation circuit.
- Applicable to various kinds of gases
Based on well analyzed heat conduction mechanism of thin metal tube, applications for gases do not require actual flow rate calibration so long as the physical characteristics are properly specified.
- Cost effectiveness
Even in large pipe size application, the only price increasing factor is thin lead pipes of the detector, So the instrument, as a whole, provides excellent cost effectiveness.
- Wide variation of converter unit
To meet applications and requirements, 4 different types of converter unit are ready to choose.
- High temperature version
This version can be used measure gas up to +550°C.
Namely, this flowmeter can be used for the applications with which the conventional one could not comply.

*1 Accuracy of some converters are $\pm 2.0\%$ F.S.






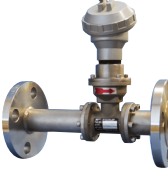
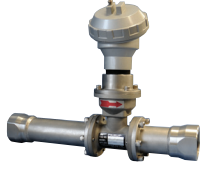






RECOMMENDED APPLICATION

- Semiconductor Gas supply lines
- Medical Oxygen supply facilities
- Air conditioning
- Utility Gas supply lines in industries
- High Temperature Dry Air lines
- Combustion Gas lines
- Low Pressure and Low Velocity Gas lines
- Incineration Facilities lines
- Electric Power Plant lines
- Flow Rate Measurement System for Automobile Examination lines
- Other Gas supply applications




Must be a dry gas that does not contain dust, mist, or corrosive components (chlorine, acid, sulfur, etc.)

LINE UP OF TH THERMAL FLOWMETERS

Widely prepared Line-up of **TH** Thermal Flowmeters covers various applications and requirements.


<p>GENERAL PURPOSE SENSORS</p> <p>Air conditioning, general utility, Oxygen line for medical applications.....Different types of sensors are ready.</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>TH-1100 Insertion type</p> </div> <div style="text-align: center;">  <p>TH-1200 Flange type</p> </div> <div style="text-align: center;">  <p>TH-1400 Variable Length Insertion type</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p>TH-1700 Small sized</p> </div> <div style="text-align: center;">  <p>TH-1800 Built-in Straightener type</p> </div> </div>
<p>SENSOR WITH PURGE FUNCTION</p> <p>Suitable for the lines of incineration plant, and various flow rate measurements under the dust condition.</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>TH-1100-SP Insertion type (Max. Temp. 240°C)</p> </div> <div style="text-align: center;">  <p>TH-3200-SP Insertion type (Max. Temp. 360°C)</p> </div> </div>
<p>HIGH TEMP VERSION</p> <p>For high temperature, it can measure up to 550°C.</p>	<div style="text-align: center;">  <p>TH-3200 Insertion type</p> </div>
<p>CONVERTERS FOR GENERAL PURPOSE SENSORS AND HIGH QUALITY SENSORS</p> <p>General type and Intelligent type, Panel mount type and Field mount type. You can select any one of them which meets your requirement.</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>TRX-600 General, Field mount</p> </div> <div style="text-align: center;">  <p>TRX-700 Intelligent, Panel mount</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  <p>TRX-900 Intelligent, Field mount</p> </div>

COMBINATION EXAMPLES


Converter model	Function							Accuracy (% F.S.)
	Flow rate indication	Total indication	Analog output	Scaled pulse output	Digital output	Flow alarm	Temp. compensation function	
 TRX-600	○	○	○	○	○ (RS-485)	△	△	±2.0%
 TRX-700	○	○	○	○	○ (RS-485)	○	○	±1.0%
 TRX-900	○	○	○	○	○ (RS-485)	○	○	±1.0%

○ : Standard △ : Optionally available × : Not available


TH-3200




TH-1100-SP




TH-3200-SP




TH-1100




TH-1200




TH-1400



TH-1700



TH-1800



OPERATION PRINCIPLE

When a heated metallic tubule is located in a gas flow path, the heat of the tubule is removed by the velocity. The lost heat is described by the following formula:

$$H = f(\rho U \times \Delta T)$$

Where **H** : Lost heat ρ : Density
U : Velocity ΔT : Difference of temperature gas and heated tubule

On the contrary, the generated heat on the tubule is described by the function of supplied voltage and current onto the tubule,

$$W = f(V \times I)$$

Where **W** : Generated heat
V : Supplied voltage **I** : Supplied current

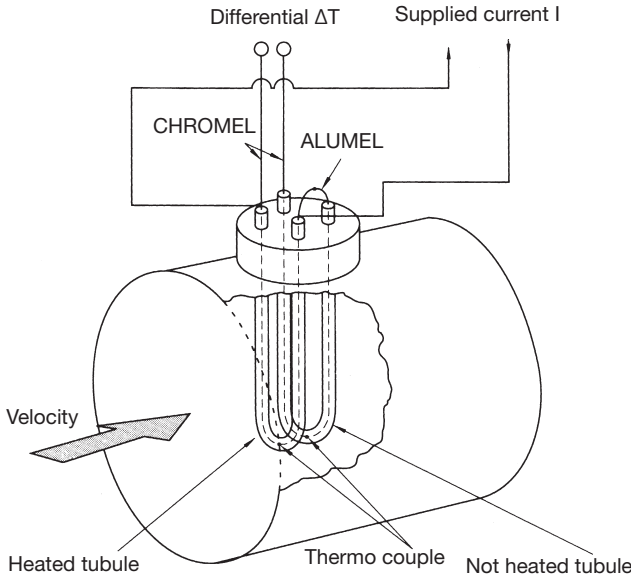
When the heated tubule is in balanced condition, the lost heat and generated heat are equal, and if the ΔT is controlled electrically, the velocity is calculated from the figures of supplied voltage and current

$$\rho U = f(V \times I)$$

The total flow rate is calculated from the velocity and the cross section area of flow path:

$$Q = \rho U \times A$$

Where **Q** : Flow rate **U** : Average velocity
A : Cross section area of flow path



FOR GENERAL PURPOSE

TH-1100

OUTLINE

TH-1100 is an insertion type detector of light weight and small size for easy installation.

Low cost measurement possible even for large size line. Besides normal pipe line, gas flow measurement in square duct also possible.

MODEL CODE

TH-11	Model code					Description
	①	②	③	④	⑤	
① Process pipe size	5					50 mm (2")
	6					65 mm (2-1/2")
	7					80 mm (3")
	8					100 mm (4")
	9					125 mm (5")
	A					150 mm (6")
	B					200 mm (8")
	C					250 mm (10")
	D					300 mm (12")
	E					350 mm (14")
F					Others	
② Sensor material	1					SUS304
	2					SUS316
	3					SUS316L
	F					Special
③ Process connection	1					32A JIS10K flange
	2					1-1/4" ANSI 150 flange
	F					Others
④ L length	1					Standard
	F					Special
⑤ Special				W		Terminal box type (Make it blank if in case of connector type.)
				E		EP grade: Electrolytic polishing (Except sensor part)
				B		BA grade: Electrolytic polishing (Except sensor part)
				C		Connector type (For built-in type)

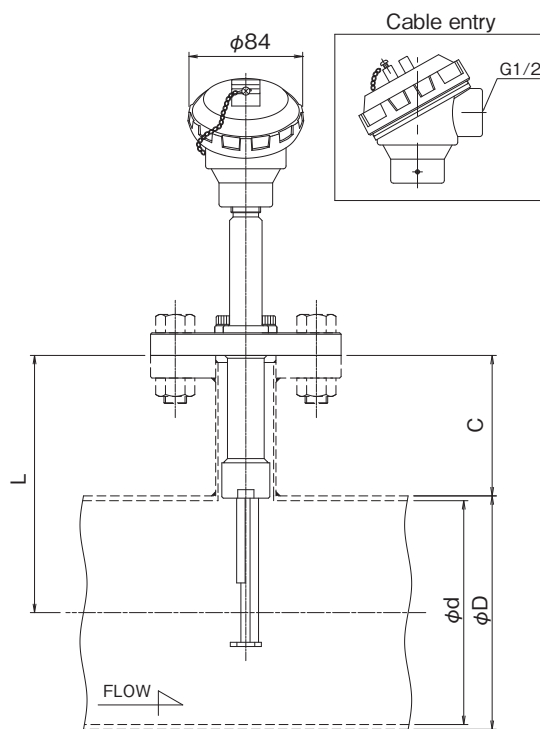
STANDARD SPECIFICATION

Type	Insertion type (Std. 32 mm JIS10K flange)	
Available size	50 mm (2") to 1500 mm (60") * Up to 1500 mm size available on request.	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor)
	Max.	Air : 0 to 130 m/s (nor)
Op. Press	-0.07 to 1.0 MPa	
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	
	High Temp. / Temp. range (0 to 180°C)	
Material	Sensor	SUS316
	Detector	SUS304, SUS316, SUS316L
	Seal	FPM, Others Construction
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (D: Inside diameter)	

Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.



DIMENSION



Process pipe size (mm)	L (mm)
50 to 150	182
200 to 250	200
300 to 350	250
More than 400	Consult factory for details

Note:

- In case of the dimension except our standard one, advise us of therequired dimension for "L" or "C".
- Advise us of the dimension for "φ d" and "φ D".

TH-1200

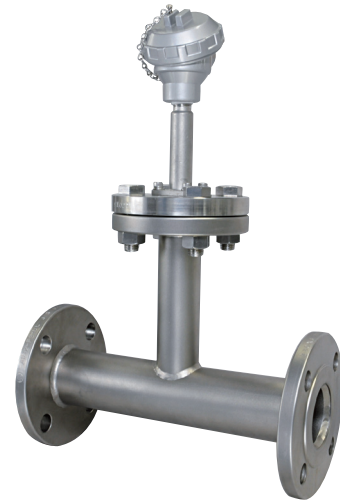
OUTLINE

TH-1200 is a flange connected detector.
Perfect fit on process piping.
6 sizes from 50 mm to 150 mm available.
The temperature well (protective tube) will be provided with a temperature sensor when electrolytic polishing inside nozzle is required.

MODEL CODE

TH-12	Model code				Description
	①	②	③	④	
① Process pipe size	5				50 mm (2")
	6				65 mm (2-1/2")
	7				80 mm (3")
	8				100 mm (4")
	9				125 mm (5")
	A				150 mm (6")
② Sensor material	1				SUS304
	2				SUS316
	3				SUS316L
	F				Special
③ Process connection		3			JIS10K flange
		4			ANSI 150 flange
		F			Others
④ Special **			W		Terminal box type (Make it blank if in case of connector type.)
			S		With straightener built in
			E		EP grade: Electrolytic polishing (Except sensor part)
			B		BA grade: Electrolytic polishing (Except sensor part)
			T		With tap for thermometer installation (Rc1/8)
			C		Connector type (For built-in type)

* Protective tube comes with a thermometer mounting seat of electrolytic polishing
** For example, the model code with "a built-in straightener", "EP grade" and "a temperature nozzle" is "TH-12□□□WEST." products.

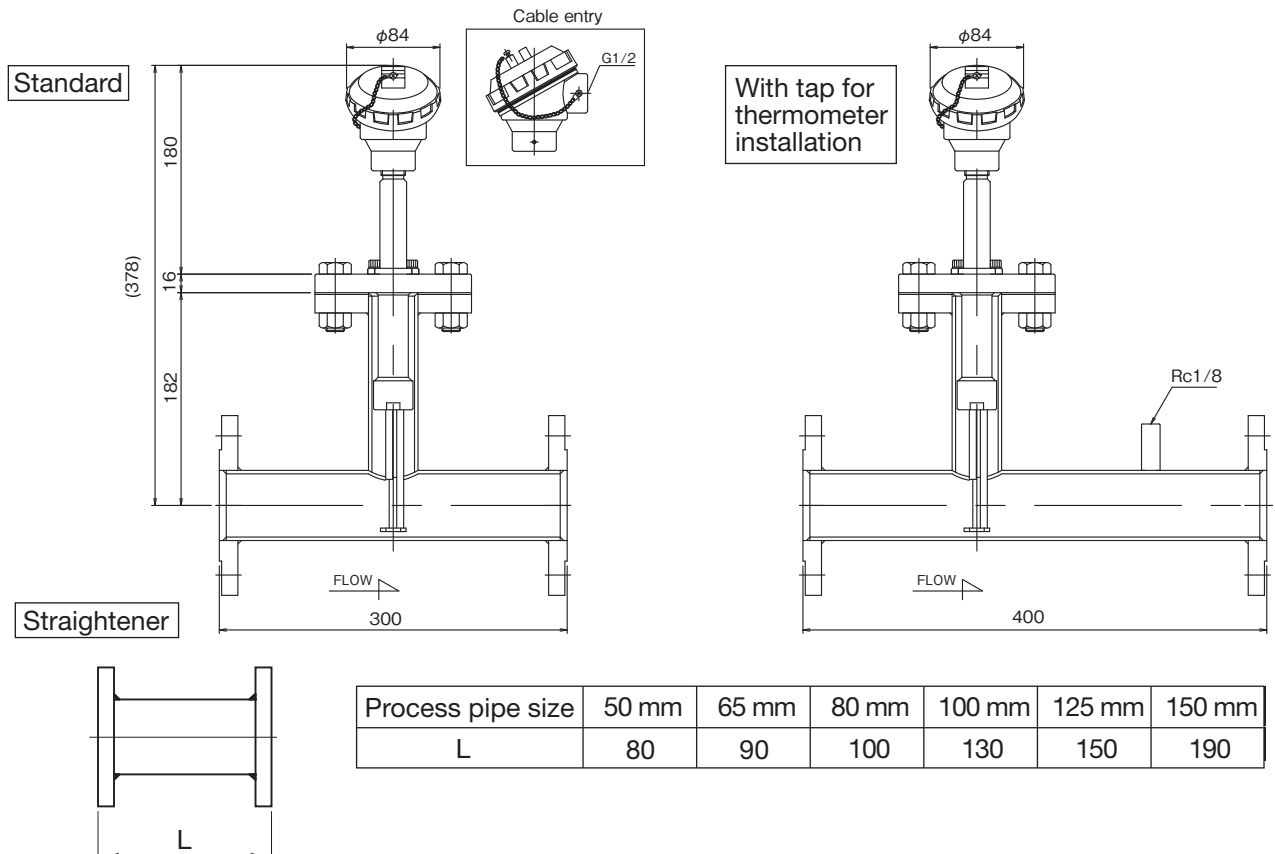


STANDARD SPECIFICATION

Type	Flange ended	
Available size	50 mm (2") to 150 mm (6")	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor)
	Max.	Air : 0 to 130 m/s (nor) (Without straightener) Air : 0 to 40 m/s (nor) (With straightener)
Op. Press.	-0.07 to 1.0 MPa	
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	
	High Temp. / Temp. range (0 to 180°C)	
Material	Sensor	SUS316
	Detector	SUS304, SUS316, SUS316L
	Seal	FPM, Others Construction
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (Without straightener) (D: Inside diameter)	
	3D to 5D (With straightener)	

Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.

DIMENSION



TH-1400

OUTLINE

TH-1400 is a variable length insertion detector provided for checking flow profile in pipe line. Gate valve (customer's supply) can be added for easy maintenance without interrupting process operation.

MODEL CODE

TH-14	Model code					Description
	①	②	③	④	⑤	
① Process pipe size	5					50 mm (2")
	6					65 mm (2-1/2")
	7					80 mm (3")
	8					100 mm (4")
	9					125 mm (5")
	A					150 mm (6")
	B					200 mm (8")
	C					250 mm (10")
	D					300 mm (12")
	E					350 mm (14")
F					Others	
② Sensor material	1					SUS304
	2					SUS316
	3					SUS316L
	F					Special
③ Process connection	1					40A JIS10K flange
	2					1-1/2" ANSI 150 flange
	F					Others
④ L length	1					Standard
	F					Special
⑤ Special						Standard type (Blank)
					W	Terminal box type (Make it blank if in case of connector type.)
					E	EP grade: Electrolytic polishing (Except sensor part)
					B	BA grade: Electrolytic polishing (Except sensor part)

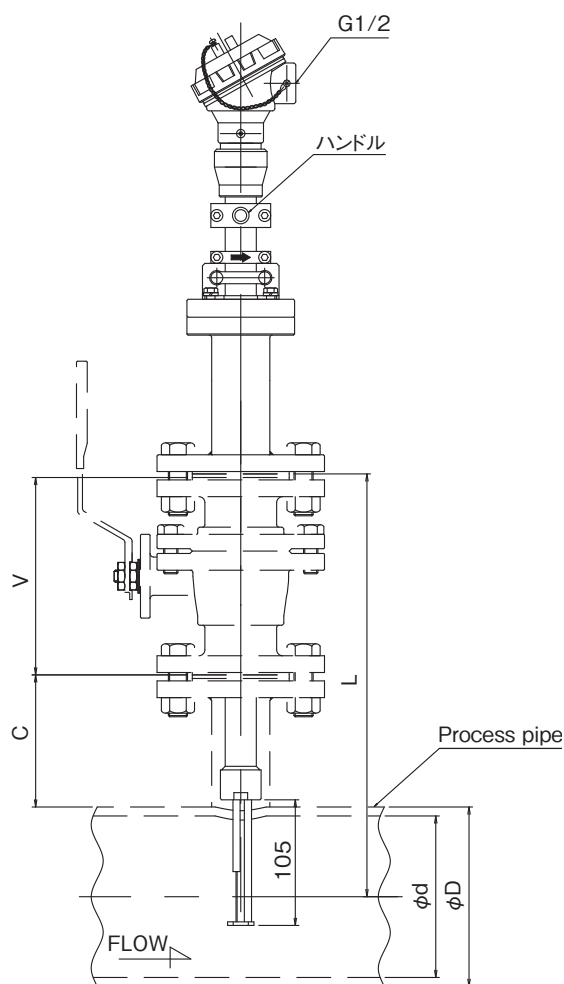
STANDARD SPECIFICATION

Type	Insertion type (Std. 40 A JIS10K flange)	
Available size	50 mm (2") to 1500 mm (60") * Up to 1500 mm size available on request.	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor)
	Max.	Air : 0 to 130 m/s (nor)
Op. Press.	-0.07 to 1.0 MPa	
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	
	High Temp. / Temp. range (0 to 180°C)	
Material	Sensor	SUS316
	Detector	SUS304, SUS316, SUS316L
	Seal	FPM, PTFE Others
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (D: Inside diameter)	

Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.



DIMENSION



Process pipe size (mm)	L (mm)
50 to 150	182
200 to 250	200
300 to 350	250
More than 400	Consult factory for details

Note:

- In case of the dimension except our standard one, advise us of the required dimension for "L" or "C".
- Advise us of the dimension "V" for valve if it is used.

TH-1700

OUTLINE

TH-1700 series can be manufactured from the nominal diameter 15 mm to 50 mm.

The process connection is only flange connection type.

5 sizes from 15 mm to 50 mm available.

The temperature well (protective tube) will be provided with a temperature sensor when electrolytic polishing inside nozzle is required.



MODEL CODE

TH-17	Model code					Description
	①	②	③	④	⑤	
① Process pipe size	1					15 mm (1/2")
	2					20 mm (3/4")
	3					25 mm (1")
	4					40 mm (1 1/2")
	5					50 mm (2")
② Operating Temp. range	1					Std. / Temp. range (0 to 80°C)
	2					High Temp. / Temp. range (0 to 180°C)
	7					Low Temp. / Protected against dew condensation (-20 to + 80°C)
③ Sensor material		4				SUS304 / SCS14
		5				SUS316 / SCS14
		6				SUS316L / SCS16
④ Process connection			1			JIS10K flange
				F		Others
⑤ Special						Standard type (Blank)
				E		EP grade: Electrolytic polishing (Except sensor part)
				B		BA grade: Electrolytic polishing (Except sensor part)
				T		With tap for thermometer installation (Rc1/8)
				C		Connector type (For built-in type)

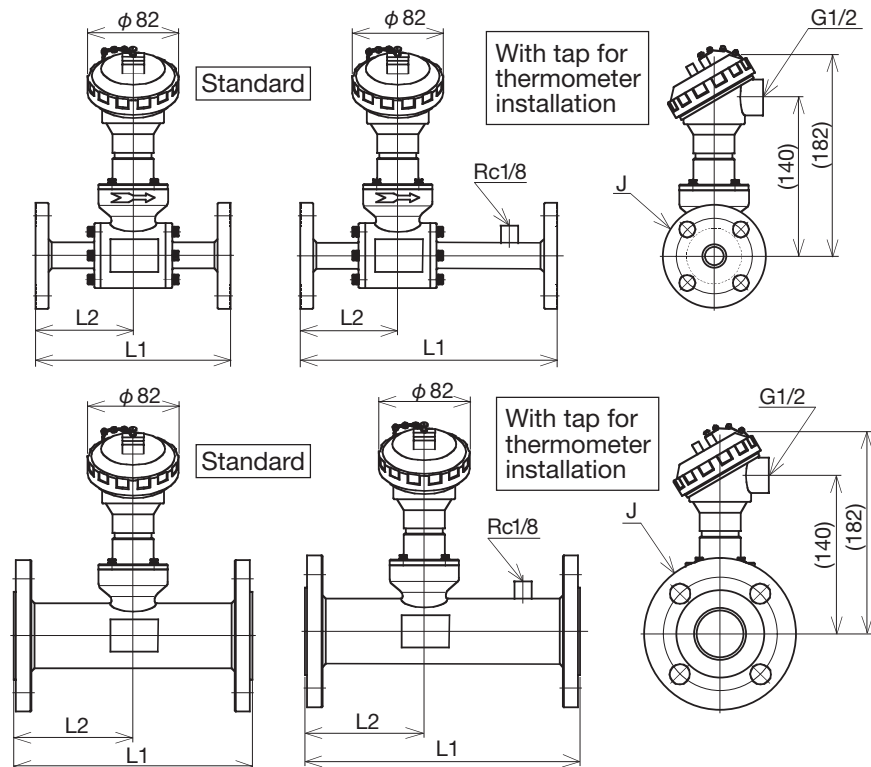
*Protective tube comes with a thermometer mounting seat of electrolytic polishing products.

STANDARD SPECIFICATION

Type	Flange ended	
Available size	15 mm (1/2") to 50 mm (2")	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor)
	Max.	Air : 0 to 130 m/s (nor)
Op. Press.	-0.07 to 1.0 MPa	
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	
	High Temp. / Temp. range (0 to 180°C)	
	Low Temp. / Temp. range (-20 to 80°C)	
Material	Sensor	SUS316
	Detector	SCS14, SCS16, SUS304, SUS316, SUS316L
	Seal	FPM, Others Construction
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (D: Inside diameter)	

Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.

DIMENSION



Standard type

Size Dimension	L1	L2	J
15 mm	180	90	15A JIS10K flange
20 mm			20A JIS10K flange
25 mm			25A JIS10K flange
40 mm	300	150	40A JIS10K flange
50 mm			50A JIS10K flange

With tap for thermometer installation type

Size Dimension	L1	L2	J
15 mm	270	90	15A JIS10K flange
20 mm			20A JIS10K flange
25 mm			25A JIS10K flange
40 mm	330	150	40A JIS10K flange
50 mm			50A JIS10K flange

TH-1800

OUTLINE

TH-1800 has a built-in flow straightener which eliminates the necessity of straight run upstream and downstream.

(Slight pressure loss is created by this built-in flow straightener. Consult factory when process pressure is very low.)

The temperature well (protective tube) will be provided with a temperature sensor when electrolytic polishing inside nozzle is required.



MODEL CODE

TH-18	Model code					Description
	①	②	③	④	⑤	
① Process pipe size	1					15 mm (1/2")
	2					20 mm (3/4")
	3					25 mm (1")
	4					40 mm (1 1/2")
	5					50 mm (2")
② Operating Temp. range	1					Std. / Temp. range (0 to 80°C)
	2					High Temp. / Temp. range (0 to 180°C)
	7					Low Temp. / Protected against dew condensation (-20 to + 80°C)
③ Sensor material			4			SUS304 / SCS14
			5			SUS316 / SCS14
			6			SUS316L / SCS16
④ Process connection				1		JIS10K flange
				2		JIS Rc screw (3/8")
				3		JIS Rc screw (1/2")
				4		JIS Rc screw (3/4")
				5		JIS Rc screw (1")
				F		Others
⑤ Special						Standard type (Blank)
				E		EP grade: Electrolytic polishing (Except sensor part)
				B		BA grade: Electrolytic polishing (Except sensor part)
				T		With tap for thermometer installation (Rc1/8)
				C		Connector type (For built-in tyP [®])

*Protective tube comes with a thermometer mounting seat of electrolytic polishing products.

STANDARD SPECIFICATION

Type	Flange or Screw ended	
Available size	15 mm (1/2") to 50 mm (2")	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor)
	Max.	Air : 0 to 45 m/s (nor)
Op. Press.	-0.07 to 1.0 MPa	
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	
	High Temp. / Temp. range (0 to 180°C)	
	Low Temp. / Temp. range (-20 to 80°C)	
Material	Sensor	SUS316
	Detector	SCS14, SCS16, SUS304, SUS316, SUS316L
	Seal	FPM, Others Construction
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	3D to 5D (D: Inside diameter)	

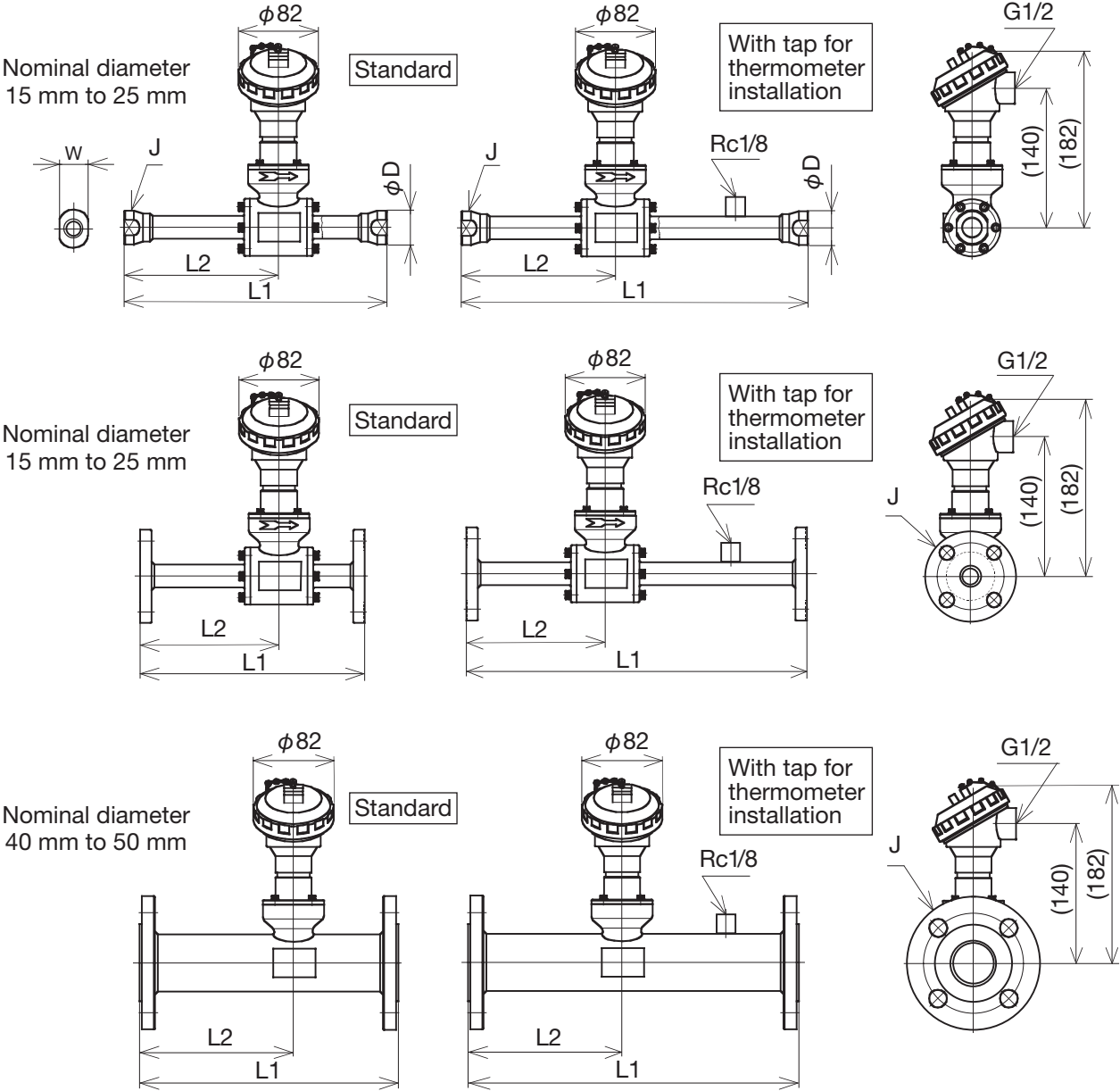
Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.

*Available process connection and sizes

Connection \ Nominal diameter	Nominal diameter				
	15 mm	20 mm	25 mm	40 mm	50 mm
Flange	○	○	○	○	○
Rc3/8	○	×	×	×	×
Rc1/2	○	○	×	×	×
Rc3/4	×	○	○	×	×
Rc1	×	×	○	×	×

Note) ○ : Producibile × : Unproducibile

DIMENSION



Standard type

Dimension	Size		J	ϕD	W
	L1	L2			
15 mm	210	105	Rc3/8 • Rc1/2	$\phi 36$	32
	180	90	15A JIS10K flange	-	-
20 mm	250	145	Rc1/2 • Rc3/4	$\phi 36$	32
	220	130	20A JIS10K flange	-	-
25 mm	280	170	Rc3/4 • Rc1	$\phi 46$	41
	240	150	25A JIS10K flange	-	-
40 mm	280	170	40A JIS10K flange	-	-
50 mm	320	210	50A JIS10K flange	-	-

With tap for thermometer installation type

Dimension	Size		J	ϕD	W
	L1	L2			
15 mm	300	105	Rc3/8 • Rc1/2	$\phi 36$	32
	270	90	15A JIS10K flange	-	-
20 mm	340	145	Rc1/2 • Rc3/4	$\phi 36$	32
	310	130	20A JIS10K flange	-	-
25 mm	370	170	Rc3/4 • Rc1	$\phi 46$	41
	330	150	25A JIS10K flange	-	-
40 mm	350	170	40A JIS10K flange	-	-
50 mm	390	210	50A JIS10K flange	-	-

SENSOR WITH PURGE FUNCTION
TH-1100-SP / TH-3200-SP

OUTLINE

TH-1100-SP / TH-3200-SP are the sensors with purge function. Purged gas prevents the dust to the sensor section from adhering and removes the adhered dust, resulting in performing the stable measurement of flow rate.

Note: Regarding the adhesive dust, it may be that the sufficient effect can not be obtained.



MODEL CODE

TH-11 TH-32	Model code						Description
	①	②	③	④	⑤	-SP	
① Process pipe size	A						150 mm (6")
	B						200 mm (8")
	C						250 mm (10")
	D						300 mm (12")
	E						350 mm (14")
	F						Others
② Sensor material	1						SUS304
	2						SUS316
	3						SUS316L
	F						Special
③ Process connection	1						65A JIS10K flange
	F						Others
④ L length		1					Standard
		F					Special
⑤ Special							Standard type (Blank)
					C		Connector type (Make it blank if in case of terminal box type.)

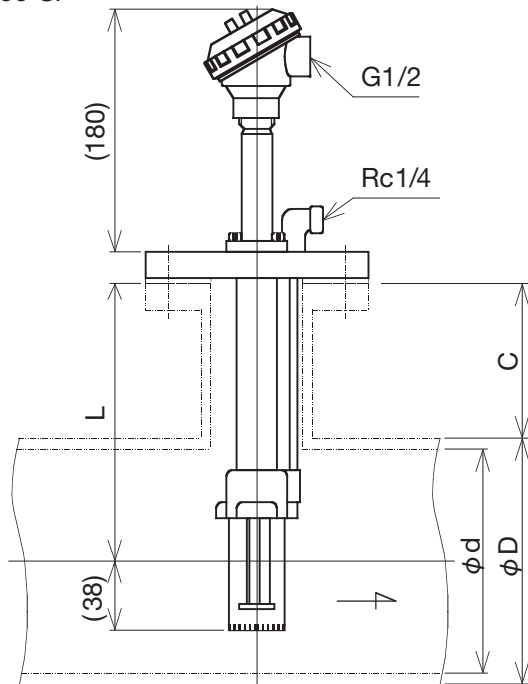
STANDARD SPECIFICATION

Model	TH-1100-SP	TH-3200-SP
Type	Insertion type (Std. 65A JIS10K flange)	
Available size	150 mm (6") to 1500 mm (60") * Up to 1500 mm size available on request.	
Measuring range	Min.	Air : 0 to 0.5 m/s (nor) Air : 0 to 5 m/s (nor)
	Max.	Air : 0 to 75 m/s (nor)
Op. Press.	-0.07 to 1.0 MPa	-0.07 to 0.1 MPa
Op. Temp. segment	Std. / Temp. range (0 to 80°C)	High Temp. / Temp. range (20 to 550°C)
	High Temp. / Temp. range (0 to 240°C)	
Material	Sensor	SUS316
	Detector	SUS304, SUS316, SUS316L
	Seal	FPM, Others
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (D: Inside diameter)	

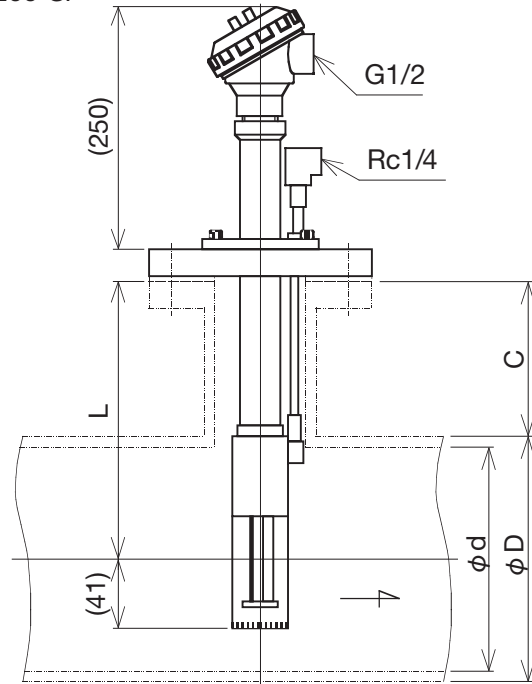
Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.

DIMENSION

TH-1100-SP



TH-3200-SP



Process pipe size (mm)	L (mm)
150	182
200 to 250	200
300 to 350	250
More than 400	Consult factory for details

Note:

- In case of the dimension except our standard one, advise us of the required dimension for "L" or "C".
- Advise us of the dimension for "ϕd" and "ϕD".

HIGH TEMP. VERSION

TH-3200

OUTLINE

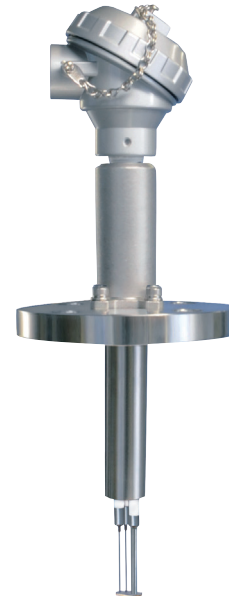
HIGH TEMP. VERSION is available for TH series THERMAL FLOWMETER.

High temp. version covers upto plus 550°C.

HIGH TEMP. VERSION will be used together with TRX-600 type converter.

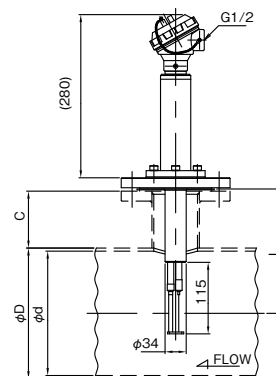
MODEL CODE

TH-3	Model code					Description
	①	②	③	④	⑤	
① Type	2			0		For high temp. Max. 0.1 MPa press.
② Process pipe size	6					65 mm (2-1/2")
	7					80 mm (3")
	8					100 mm (4")
	9					125 mm (5")
	A					150 mm (6")
	B					200 mm (8")
	C					250 mm (10")
	D					300 mm (12")
③ Sensor material	E					350 mm (14")
	F					Others
	1					SUS304
	2					SUS316
	3					SUS316L
④ Process connection	F					Special
	1					Standard
⑤ L length	1					Standard
	F					Special



DIMENSION

- Sensor
- TH-3200



Process pipe size (mm)	L (mm)
65 to 150	182
200 to 250	200
300 to 350	250
More than 400	Consult factory for details

Note:

- In case of the dimension except our standard one, advise us of the required dimension for "L" or "C".
- Advise us of the dimension for "φ d" and "φ D".

STANDARD SPECIFICATION

Model	TH-3200	
Type	Insertion type	
	Std. 32 A JIS10K flange	
Available size	65 mm (2-1/2") to 1500 mm (60")	
Measuring range	Min.	Air : 0 to 5 m/s (nor)
	Max.	Air : 0 to 75 m/s (nor)
Op. Press.	-0.07 to 0.1 MPa	
Op. Temp.	20 to 550°C (for high temp.)	
Material	Sensor	SUS316
	Detector	SUS304, SUS316, SUS316L
Water proof	IP65 equiv.	
Required upstream straight run (Recommendation)	20D (D: Inside diameter)	

Note: No cable gland is attached. Provide cable glands suitable for the cable of 12 mm in diameter.

TRX-600

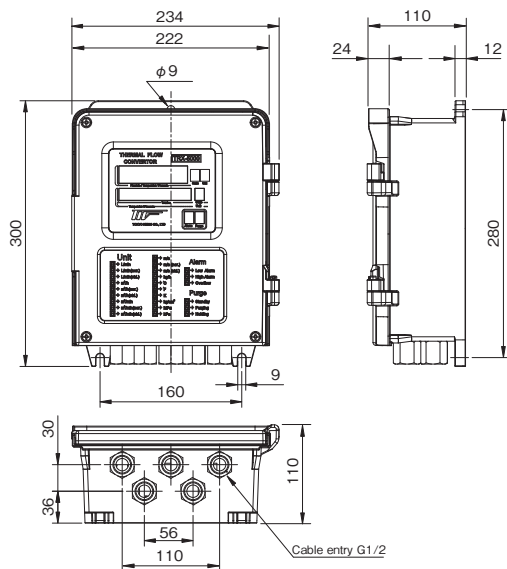
OUTLINE

TRX-600 is the converter designed for the thermal flowmeter of the field installation type in waterproof construction. By having improved the loaded CPU performances, the high precision and high efficiency have been achieved, and most operation factors can be set up or modified by the users, just by the key operation on the front panel. Moreover, the maximum 7 kinds of data are programmable beforehand, and also it is possible to expand the various functions by the optional circuit board.

MODEL CODE

MODEL CODE				CONTENTS
TRX-6	0	-	-	
Temperature correction (Input signal)	1			Resistance temp.sensor (Pt100Ω)
	2			DC4 to 20mA temp. signal
	3			DC1~5V temp.signal
Power supply	1			AC100V±10%
	2			AC110V±10%
	3			AC115V±10%
	4			AC200V±10%
	5			AC220V±10%
	6			AC240V±10%
Cable length	1			5m
	2			10m
	3			15m
	4			20m
	5			25m
	6			30m
	7			40m
	8			50m
	F			Other
Cable entry	1			G1/2
	2			Other
2" pipe mount fitting	0			Not provided
	1			Provided
Optional PCB (Note)	Purge control output	0		No purge control
		1		Open collector input (Standard)
		2		Contact input
Make it blank in case of no optional function.	Purge output	0		No purge control
		1		Contact output
		2		AC power supply
	Contact output	1		High and low alarm
		2		High alarm
		3		Low alarm
	4		Abnormality alarm	
For high-current type				-H When using in combination with TH-3200, 3200-SP.

DIMENSION



STANDARD SPECIFICATION

Connectable detector	TH-1100/1200/1400/1700 1800/3000/1100-SP/3200-SP
Installation	Installation on wall or 2" pipe (Option)
Protective construction	Jet-proof type (IP65 equivalent)
Accuracy	Indication ±2.0%F.S.±1digit
	Output ±2.0%F.S.
Display	Upper side Selected and displayed by Instantaneous flow and temperature Flow rate: 6-digit LED (0.000 to 99999.9) Temperature: 4-digit LED (-25.0 to 550.0)(※1)
	Lower side Selected and displayed by integrated flow and temperature. Integration: 8-digit LED (0.000 to 99999999) Temperature: 4-digit LED (-25.0 to 550.0)(※1)
	Lower right Displayed on the panel [ALARM] [H] Upper, [L] Lower & [E] Abnormal
Analog output	DC4 to 20mA, and allowable load resistance: Less than 500Ω
Pulse output	Open collector output PhotoMOS relay, DC30V/100mA (Max)
Digital output RS-485	2400/4800/9600bps (Selectable) ID Address: 0 to 99 Protocol: 8N1 Output: Instantaneous flow, integrated flow, temperature, and error code
Temperature correction function	3-wire type resistance temp. sensor (Pt100) or temp. sensor with analog output (DC4 to 20mA or DC1 to 5V) is separately required.
Alarm output (Option)	1 point out of [H], [L], & [E] SPDT Relay contact output AC240V/0.4A (DC30V/2A)
Purge control function (Option)	AC240V/0.4A (DC30V/2A)
	Valve control output function for purge operation
	Purge cycle and time settable Output: AC (Input power supply) or contact
Response speed	3 to 5 sec. (63% Step response)
Electric connection	Pin terminal connector
Power supply	AC100, 110, 115, 200, 220, 240V ±10% 50/60Hz
Power consumption	Approx.30VA
Housing	Aluminum die-cast / Cobalt blue or Silver
Dimension	234W × 300H × 110D (mm)
Mass	5.4 kg (Wall mount) 7.4kg (2" pipe)
Ambient temperature	-10 to 60°C
Ambient humidity	10 to 90%RH (No dew condensation)

※1: The thermometer is separately required for the temperature display.

TRX-700 / TRX-900

OUTLINE

TRX-700 / TRX-900 series are an intelligent type converter for thermal flowmeters. High-precision and high-performance capacities have been achieved by the new design of a signal processing circuit mounting double CPU's.

All the operation factors are handled by the operating keys arranged on the front panel that enables to make settings and alterations in a user-friendly way.

Functions necessary for process monitoring and controlling such as flow rate, totalization and alarm output are all installed as the standard specification.

In addition, data processing with a host computer has made available through serial communication with RS-485 interface.

Easy maintenance with self-diagnosis function

DIN96 × 96 compact housing

Two types available

- a) TRX-700 Panel mount type
- b) TRX-900 Field mount type (Water proof housing)

MODEL CODE

Model code			Description
TRX-	①	② ③	
① Type	7		DIN 96 × 96 Panel mount type
	9		Water proof housing, Field mount type
② Temperature and pressure correction	0		No correction
	1		Temperature correction
	4		Temp. and Press. correction*
③ Cable length	1	5 m	
	2	10 m	
	3	15 m	
	4	20 m	
	5	25 m	
	6	30 m	
	7	35 m	
	8	40 m	
	9	45 m	
	A	50 m	
	F	50 m to 100 m *Specify the cable length	

Note : Select "Temp.and Press.correction" in any of the following cases.
 • When measuring the actual flow rate (Volume flow rate display in use)
 • When the process pressure changes by 0.5 MPa or more.

STANDARD SPECIFICATION

Connectable detector	TH-1100/1200/1400/1700/1800	
Installation	TRX-700 : Panel mount type (DIN 96 × 96) TRX-900 : Wall or 2B pipe mount type)	
Construction	TRX-700 : IP20 equiv. (Indoor use) TRX-900 : IP54 equiv. (Field use)	
Accuracy	Analog output	±1%F.S. ±1digit (Flow rate)
Analog output		DC 4 to 20 mA / Allowable load resistance 500Ω
Pulse output		Open collector output / DC 35 V/ 50 mA (max.) Pulse width : 50, 100, 200 msec Pulse rate : 0.0 to 600 c/min 0 to 36000 c/h
Contact output of alarm		SPDT relay contact (High alarm/ Low alarm) AC 125 V/0.4 A (DC 20 V/2 A)
Digital output (RS-485)		1200 / 2400 / 4800 / 9600bps (Selectable) ID address : 00 to 99 Protocol : 8N1 Output : Flow rate, totalization, bar graph, temp., pressure, heating current, firmware version, serial No., error message, etc.
Display		Dot matrix LCD, 16 characters × 2 lines With backlight
Indication	Upper section	Select one item from flow rate, totalization, temp., Pressure, heating voltage, internal temp. and SPS ripple, or error message.
	Lower section	Select one item from bar graph, flow rate, Totalization, temp., pressure and heating current, Or error message.
Maximum number of display digits	Analog output	5 digits (0.000 to 99999) (Flow rate)
	Pulse output	7 digits (0.00 to 9999999) (Totalization)
Temp. correction function		3-wire type resistance temp. sensor (Pt100Ω) is required separately.
Pressure correction function		Pressure gauge with DC 4 to 20 mA analog output is required separately. (Used mainly for indication of actual flow rate.)
Response time		3 seconds (63% step response)
Dimensions		96 H × 96 W × 243 D (mm)
Mass		About 1.95 kg
Cable length		100 m (max.)
Power supply		AC 90 to 264 V 50/60 Hz
Power consumption		60 W (max.)
Elect. connection		Pin terminal connector
Ambient temp.		0 to 50°C
Ambient humidity		10 to 90% RH (No dew condensation)



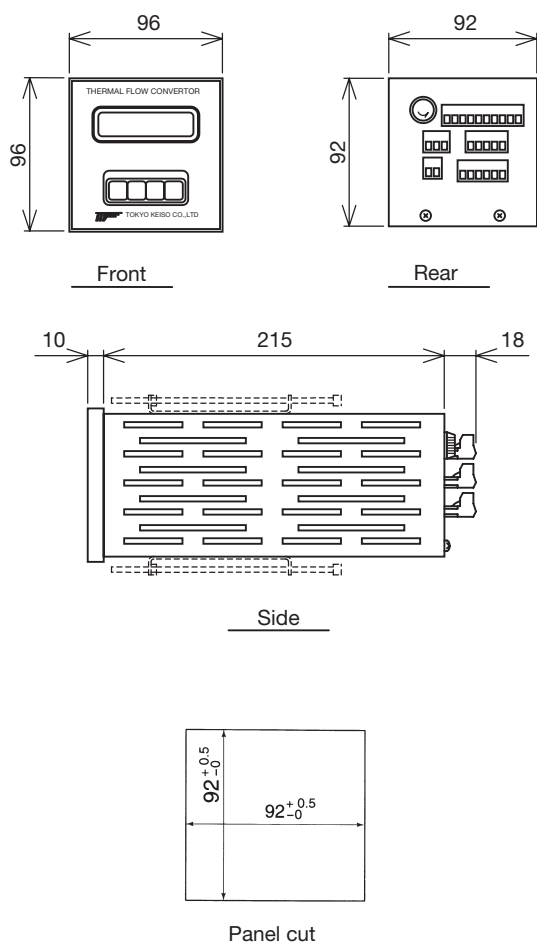
TRX-700



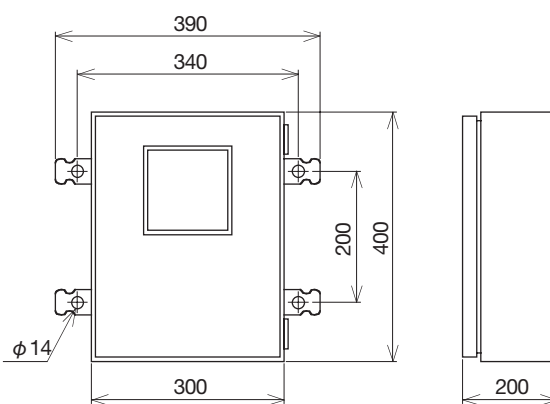
TRX-900

DIMENSION

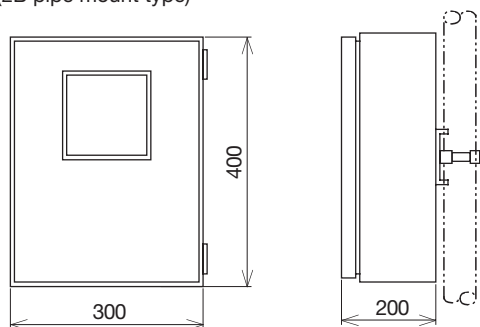
- TRX-700 (Panel mount type)



- TRX-900 (Wall mount type)



- TRX-900 (2B pipe mount type)



FLOW RATE RANGE (Full scale)

TH-1100/TH-1400

Unit : m³/h(nor)

Gas Size	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₃ H ₈	C ₄ H ₁₀ nor	NH ₃	He	H ₂
50mm	52 to 840	65 to 1060	50 to 820	100 to 1600	40 to 540	50 to 540	30 to 500	25 to 440	44 to 800	10 to 34	10 to 30
65mm	75 to 1400	90 to 1750	72 to 1360	150 to 2700	50 to 900	65 to 900	40 to 750	36 to 730	65 to 1200	16 to 45	15 to 39
80mm	95 to 1970	120 to 2500	90 to 1900	190 to 3900	60 to 1270	75 to 1240	45 to 1000	45 to 1000	80 to 1700	22 to 53	20 to 47
100mm	100 to 3400	130 to 4300	97 to 3200	200 to 6700	80 to 2200	100 to 2200	50 to 1750	50 to 1780	85 to 3000	30 to 69	30 to 62
125mm	120 to 5100	150 to 6500	120 to 5000	240 to 10200	100 to 3300	120 to 3200	60 to 2700	60 to 2700	110 to 4500	50 to 85	50 to 78
150mm	180 to 7360	230 to 9400	170 to 7100	360 to 14600	120 to 4700	150 to 4700	80 to 3800	70 to 3880	150 to 6500	75 to 98	75 to 89
200mm	200 to 12650	250 to 16000	200 to 12200	400 to 25200	155 to 8200	190 to 8000	100 to 6500	80 to 6600	170 to 11000		
250mm	250 to 20000	280 to 25000	220 to 19300	500 to 39000	200 to 12300	240 to 12500	120 to 10400	90 to 10000	200 to 17000		
300mm	260 to 28200	330 to 35600	260 to 27200	520 to 56000	230 to 17300	280 to 17700	130 to 14800	100 to 13500	240 to 24000		
350mm	300 to 35000	370 to 45000	300 to 33800	600 to 70000	270 to 21600	320 to 22000	150 to 18300	130 to 17000	260 to 30000		
400mm	340 to 46400	430 to 59000	340 to 44800	680 to 92400	300 to 28600	360 to 29100	170 to 24300	140 to 22000	300 to 40000		
450mm	380 to 59000	480 to 75500	380 to 57000	760 to 118000	340 to 36300	410 to 37000	200 to 30900	150 to 28000	350 to 50000		
500mm	430 to 74000	540 to 93500	430 to 71000	860 to 146000	370 to 45500	460 to 46500	220 to 38700	170 to 36000	380 to 62000		
550mm	470 to 89000	600 to 114000	470 to 86000	940 to 178000	410 to 55000	510 to 56000	250 to 46600	190 to 43000	430 to 75000		
600mm	510 to 106000	650 to 135000	510 to 102000	1020 to 210000	450 to 65200	550 to 67000	270 to 55500	220 to 51000	460 to 90000		
650mm	560 to 124000	710 to 158000	560 to 120000	1120 to 247000	490 to 76300	600 to 78000	310 to 65000	260 to 60000	500 to 104000		
700mm	600 to 145000	760 to 183000	600 to 140000	1200 to 280000	530 to 90000	640 to 91000	360 to 76000	290 to 69000	540 to 125000		
750mm	650 to 167000	870 to 212000	650 to 161000	1300 to 331000	560 to 103000	690 to 105000	420 to 87500	340 to 80000	620 to 140000		
800mm	735 to 190600	990 to 242000	720 to 184000	1470 to 380000	600 to 118000	740 to 120000	470 to 100000	390 to 100000	700 to 160000		
850mm	830 to 216000	1130 to 274000	820 to 208000	1660 to 430000	640 to 133000	780 to 136000	540 to 113000	440 to 103000	790 to 180000		
900mm	940 to 242000	1200 to 308000	920 to 234000	1880 to 483000	680 to 149000	830 to 152000	600 to 127000	490 to 120000	890 to 220000		
1000mm	1200 to 300000	1500 to 380400	1100 to 290000	2400 to 596000	760 to 184500	930 to 188000	740 to 160000	600 to 145000	1100 to 260000		
1100mm	1400 to 365000	1900 to 464000	1370 to 353000	2800 to 726000	920 to 225000	1020 to 230000	900 to 195000	740 to 175000	1300 to 306000		
1200mm	1680 to 435000	2200 to 552000	1630 to 420000	3360 to 865000	1090 to 268000	1120 to 272000	1100 to 228000	890 to 207000	1600 to 380000		
1300mm	2000 to 511000	2600 to 649000	1930 to 494000	4000 to 1016000	1280 to 315000	1300 to 320000	1270 to 268000	1000 to 245000	1900 to 430000		
1400mm	2300 to 593000	3000 to 753000	2300 to 572000	4600 to 1180000	1480 to 365000	1500 to 372000	1500 to 310000	1200 to 282000	2200 to 500000		
1500mm	2650 to 681000	3600 to 865000	2550 to 657000	5300 to 1350000	1700 to 420000	1700 to 428000	1680 to 357000	1380 to 325000	2500 to 570000		

TH-1200 [Without flow Straightener]

Unit : m³/h(nor)

Gas Size	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₃ H ₈	C ₄ H ₁₀ nor	NH ₃	He	H ₂
50mm	52 to 840	65 to 1060	50 to 820	100 to 1600	40 to 540	50 to 540	30 to 500	25 to 440	44 to 800	10 to 34	10 to 30
65mm	75 to 1400	90 to 1750	72 to 1360	150 to 2700	50 to 900	65 to 900	40 to 750	36 to 730	65 to 1200	16 to 45	15 to 39
80mm	95 to 1970	120 to 2500	90 to 1900	190 to 3900	60 to 1270	75 to 1240	45 to 1000	45 to 1000	80 to 1700	22 to 53	20 to 47
100mm	100 to 3400	130 to 4300	97 to 3200	200 to 6700	80 to 2200	100 to 2200	50 to 1750	50 to 1780	85 to 3000	30 to 69	30 to 62
125mm	120 to 5100	150 to 6500	120 to 5000	240 to 10200	100 to 3300	120 to 3200	60 to 2700	60 to 2700	110 to 4500	50 to 85	50 to 78
150mm	180 to 7360	230 to 9400	170 to 7100	360 to 14600	120 to 4700	150 to 4700	80 to 3800	70 to 3880	150 to 6500	75 to 98	75 to 89

TH-1200 [With flow Straightener]

Unit : m³/h(nor)

Gas Size	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₃ H ₈	C ₄ H ₁₀ nor	NH ₃	He	H ₂
50mm	10 to 280	12 to 380	10 to 270	20 to 570	10 to 170	10 to 180	10 to 150	10 to 140	10 to 240	10 to 99	10 to 61
65mm	15 to 450	20 to 600	15 to 440	30 to 900	15 to 280	15 to 280	15 to 240	15 to 220	15 to 380	16 to 180	15 to 108
80mm	30 to 690	40 to 900	30 to 670	60 to 1380	30 to 430	30 to 440	30 to 360	30 to 330	30 to 580	22 to 254	20 to 159
100mm	40 to 1200	50 to 1600	40 to 1200	80 to 2400	40 to 740	40 to 760	40 to 630	40 to 580	40 to 1000	30 to 428	30 to 267
125mm	60 to 1800	70 to 2200	60 to 1800	118 to 3600	60 to 1100	60 to 1100	60 to 940	60 to 870	60 to 1500	50 to 645	50 to 403
150mm	80 to 2600	100 to 3200	80 to 2500	158 to 5200	80 to 1600	80 to 1600	80 to 1400	80 to 1200	80 to 2200	75 to 916	75 to 573

TH-1700

Unit : L/min(nor)

Gas Size	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₃ H ₈	C ₄ H ₁₀ nor	NH ₃	He	H ₂
15mm	240 to 1300	300 to 1800	240 to 1300	460 to 2700	200 to 880	250 to 890	120 to 870	100 to 720	220 to 1300	15 to 160	12 to 100
20mm	320 to 2400	400 to 3300	320 to 2400	620 to 4800	280 to 1600	340 to 1600	160 to 1600	140 to 1300	280 to 2300	20 to 280	20 to 170
25mm	400 to 3900	500 to 5300	400 to 3800	780 to 7800	350 to 2500	430 to 2600	200 to 2500	170 to 2000	360 to 3700	30 to 350	30 to 260
40mm	700 to 9000	780 to 12500	620 to 9000	1380 to 18500	500 to 6000	600 to 6100	360 to 6000	300 to 4900	560 to 8800	100 to 530	80 to 480
50mm	800 to 14800	980 to 20000	780 to 14400	1580 to 29000	800 to 9600	830 to 9700	420 to 9500	340 to 7800	700 to 14000	150 to 670	100 to 600

TH-1800

Unit : L/min(nor)

Gas Size	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₃ H ₈	C ₄ H ₁₀ nor	NH ₃	He	H ₂
15mm	50 to 560	60 to 760	50 to 550	98 to 1100	40 to 360	40 to 370	30 to 360	30 to 300	50 to 540	15 to 130	12 to 80
20mm	80 to 1000	100 to 1400	80 to 1000	160 to 2000	50 to 650	50 to 660	45 to 650	40 to 530	70 to 960	20 to 240	20 to 150
25mm	120 to 1620	150 to 2200	120 to 1600	240 to 3200	75 to 1000	75 to 1000	70 to 1000	60 to 860	100 to 1500	30 to 400	30 to 240
40mm	300 to 3600	360 to 4800	290 to 3500	600 to 7000	190 to 2300	190 to 2300	160 to 2300	150 to 1900	250 to 3400	100 to 940	80 to 570
50mm	450 to 5800	540 to 7900	430 to 5700	880 to 11600	280 to 3800	280 to 3800	240 to 3800	220 to 3000	380 to 5600	150 to 1520	100 to 920

Note:

- (1) Above flow rates are shown at the conditions of 0°C and 1.0 atm. which are converted from the flow rates measured at 20°C and 1.0 atm.
- (2) Let us know each gas property with its volume % when the gas is mixed one.
- (3) Gas mixtures containing 10 to 90% H₂ or He are not suitable.

* Measuring range : 0 to Full scale

Ex) TH-1100 50 mm, Air

Min. measuring range : 0 to 52 m³/h (nor)

Max. measuring range : 0 to 840 m³/h (nor)

TH THERMAL FLOWMETER

TH-3200 Unit : m³/h(nor)

Size	Gas	AIR/N ₂	
65mm		70 to	800
80mm		100 to	1100
100mm		160 to	1900
125mm		250 to	2900
150mm		350 to	4000
200mm		600 to	7000
250mm		950 to	11000
300mm		1300 to	15500
350mm		1700 to	19500
400mm		2200 to	25000
450mm		2800 to	32000
500mm		3500 to	40000
550mm		4000 to	48000
600mm		5000 to	57000
650mm		5600 to	67000
700mm		6500 to	78000
750mm		7600 to	90000
800mm		8500 to	103000
850mm		9500 to	115000
900mm		11000 to	130000
1000mm		14000 to	160000
1100mm		16500 to	195000
1200mm		20000 to	235000
1300mm		23000 to	270000
1400mm		27000 to	320000
1500mm		32000 to	370000

Please contact us for gases other than AIR N₂.

TH-1100-SP

Unit : m³/h(nor)

Size	Gas	AIR/N ₂	CO ₂	O ₂	Ar	13A	CH ₄	C ₂ H ₆	C ₄ H ₁₀ nor	NH ₃
150mm		180 to 3800	230 to 4800	170 to 3600	360 to 7600	120 to 2400	150 to 2400	100 to 2200	70 to 1800	160 to 3400
200mm		200 to 6800	250 to 8600	200 to 6500	400 to 13600	155 to 4200	190 to 4200	120 to 4000	80 to 3200	180 to 6000
250mm		250 to 10800	280 to 14000	220 to 10400	500 to 21600	200 to 6700	240 to 6800	140 to 6000	90 to 5200	220 to 9800
300mm		260 to 15700	330 to 20000	260 to 15000	520 to 31400	230 to 9600	280 to 9800	150 to 8800	100 to 7600	230 to 14000
350mm		300 to 19800	370 to 25000	300 to 19000	600 to 39600	270 to 12000	320 to 12400	170 to 11000	130 to 9500	270 to 18000
400mm		340 to 26000	430 to 33000	340 to 25000	680 to 52000	300 to 16000	360 to 16000	190 to 15000	140 to 12500	300 to 24000
450mm		380 to 33000	480 to 42000	380 to 32000	760 to 66000	340 to 20000	410 to 20000	220 to 18000	150 to 16000	340 to 30000
500mm		430 to 41000	540 to 52000	430 to 40000	860 to 82000	370 to 26000	460 to 26000	240 to 23000	170 to 20000	380 to 37000
550mm		470 to 50000	600 to 64000	470 to 48000	940 to 100000	410 to 31000	510 to 32000	260 to 28000	190 to 24000	420 to 45000
600mm		500 to 60000	650 to 76000	500 to 58000	1000 to 120000	450 to 37000	550 to 38000	280 to 33600	220 to 28800	460 to 54000
650mm		560 to 70000	710 to 90000	560 to 67000	1120 to 140000	490 to 43000	600 to 44000	320 to 38000	260 to 33000	500 to 63000
700mm		600 to 82000	760 to 110000	600 to 79000	1200 to 164000	530 to 50000	640 to 51000	350 to 45000	290 to 40000	540 to 74000
750mm		650 to 95000	870 to 120000	650 to 92000	1300 to 190000	560 to 58000	690 to 59000	380 to 53000	340 to 46000	580 to 86000
800mm		740 to 109000	990 to 140000	720 to 105000	1480 to 218000	600 to 67000	740 to 68000	400 to 61000	390 to 52000	680 to 98000
850mm		830 to 124000	1130 to 160000	820 to 120000	1660 to 248000	640 to 76000	780 to 77000	470 to 70000	440 to 60000	750 to 111000
900mm		940 to 140000	1200 to 180000	920 to 135000	1880 to 280000	680 to 86000	830 to 87000	530 to 80000	490 to 67000	850 to 126000
1000mm		1200 to 170000	1500 to 220000	1100 to 164000	2400 to 340000	760 to 104000	930 to 10600	680 to 95000	600 to 82000	1100 to 153000
1100mm		1400 to 209000	1900 to 270000	1370 to 200000	2800 to 418000	920 to 128000	1020 to 130000	780 to 120000	740 to 100000	1300 to 188000
1200mm		1700 to 250000	2200 to 320000	1630 to 240000	3400 to 500000	1090 to 153000	1120 to 156000	1000 to 140000	890 to 120000	1500 to 225000
1300mm		2000 to 290000	2600 to 370000	1930 to 280000	4000 to 580000	1280 to 180000	1300 to 182000	1200 to 163000	1000 to 140000	1800 to 260000
1400mm		2300 to 340000	3000 to 430000	2300 to 330000	4600 to 680000	1480 to 208000	1500 to 210000	1400 to 190000	1200 to 160000	2200 to 306000
1500mm		2700 to 390000	3600 to 500000	2550 to 380000	5400 to 780000	1700 to 240000	1700 to 240000	1600 to 220000	1380 to 190000	2400 to 350000

Note:

- (1) Above flow rates are shown at the conditions of 0° C and 1.0 atm. which are converted from the flow rates measured at 20° C and 1.0 atm.
- (2) Let us know each gas property with its volume % when the gas is mixed one.
- (3) Gas mixtures containing 10 to 90% H₂ or He are not suitable.

TH-3200-SP Unit : m³/h(nor)

Gas Size	AIR/N ₂	
150mm	260 to	3800
200mm	460 to	6500
250mm	730 to	10000
300mm	1000 to	14500
350mm	1300 to	18000
400mm	1700 to	24000
450mm	2200 to	30000
500mm	2800 to	38000
550mm	3400 to	46000
600mm	4000 to	56000
650mm	4700 to	65000
700mm	5500 to	73000
750mm	6300 to	85000
800mm	7200 to	96000
850mm	8300 to	110000
900mm	9200 to	124000
1000mm	11500 to	150000
1100mm	14000 to	185000
1200mm	16000 to	220000
1300mm	20000 to	260000
1400mm	22000 to	300000
1500mm	26000 to	350000

Please contact us for gases other than AIR N₂.

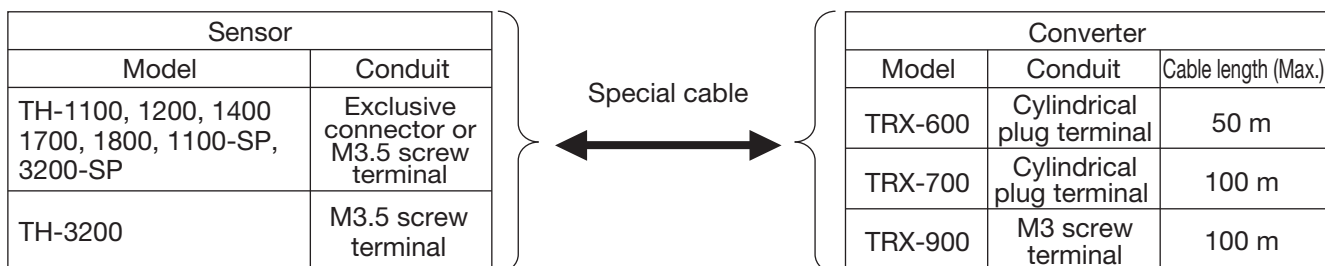
Note:

- (1) Above flow rates are shown at the conditions of 0° C and 1.0 atm. which are converted from the flow rates measured at 20° C and 1.0 atm.
- (2) Let us know each gas property with its volume % when the gas is mixed one.
- (3) Gas mixtures containing 10 to 90% H₂ or He are not suitable.

APPLICATION EXAMPLE

Thermal Flowmeter is connected with the special signal cable between sensor and converter. Refer to the following table for details.

- Connection and special signal cable



SUGGESTIONS

- TH series Thermal Flowmeter is not suitable for the measurement of gases containing condensate and/or sticking contamination. In that case, we can provide air purge system as option. Consult factory for details.
- Specified straight run for upstream and downstream is required for accurate measurement. Refer to instruction manual for details.

* Specification is subject to change without notice.

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