



# Temperature Transmitters

## OUTLINE

This transmitter consists of the temperature sensing portion, which converts temperature into an electric signal, and the conversion portion, which amplifies this signal and outputs it.

The temperature sensing portion, to which a platinum temperature sensor is applied, can be selected according to the range of measuring temperature. One temperature sensing portion among three types can be selected according to application. Other than those, the air type temperature transmitter (model: TT21), of which sensor can be applied even to an explosive environment, exists.

## FEATURE

**TH61 Temperature transmitter**  
Small and light. Remote type with 2 wire system and suitable for measurement of room temperature or oil temperature as air conditioning.

**TH71 Temperature transmitter**  
Small and light. Direct mounting type with 2 wire system and available to install to duct of air conditioning directly.

**TH81 Temperature transmitter**  
Temperature transmitter for industrial measurement and can be selected mounting type, transmission system and power source.  
Intrinsic safety construction is available. (Model: RJ81)  
Explosion-protected construction (d2G4) is available. (Model: RD81)

## SPECIFICATION 1

**Fluid:**

Gas, steam or liquid

**Operating condition:**

Under the normal condition, where there is no inflammable gas or liquid which cause the ignition or explosion.

**Mounting:**

Stem mounting, Pipe mounting, Panel mounting  
(TH61 is panel mounting with capillary tube type only and TH71 is stem mounting only.)

**Temperature sensor:**

Platinum thermo resistor  
Pt100 JIS C 1604 A class  
Pt100 JIS C 1606 A class

Wetted parts material      General typ    304 st.st.  
Sheath type                    316 st.st.

**Temperature range:**

0 ~ 50 → 300 ~ 500°C  
-50 ~ 50 → -20 ~ 100°C

**Power source:**

TH61 • 71    15 ~ 30V DC (Standard24V DC) 2 wire system  
TH81            15 ~ 30V DC (Standard24V DC) 2 wire system  
                  100V AC, 110V AC, 200V AC, 220V AC  
                  4 wire system

**Output:**

4 ~ 20mA DC

**Load resistance:**

TH61 • 71    0 ~ 500Ω (At 24V DC)  
TH81            0 ~ 500Ω (At 24V DC),  
                  0 ~ 400Ω (At AC power source)

## SPECIFICATION 2

Transmission system:

2 or 4 wire system

Operating temperature:

TH61 • 71 -10 ~ 60°C

TH81 -40 ~ 80°C

Accuracy:

TH61 • 71 ±0.75%F.S.

TH81 ±0.2%F.S.

Voltage variation of power source:

TH61 • 71 0.3%/10V

TH81 ±0.01%/V

Ambient temperature variation:

±0.025%F.S./°C

Outlet for electric wire:

TH61 Terminal block

TH71 PF1/2 (conduit type) or JIS 15a (gland)

TH81 JIS 20b (gland)

Case material:

TH61 SPCC

TH71 • 81 Aluminium alloy die casting (ADC12)

Construction:

TH61 Indoor use

TH71 • 81 Drip-proof

Weight:

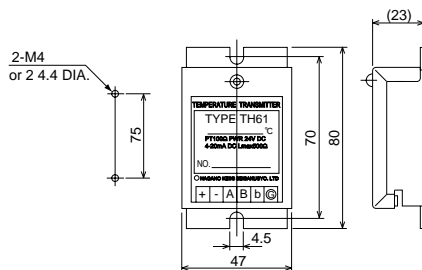
TH61 Approx. 150g (Exclude thermo resistor)

TH71 Approx. 500g

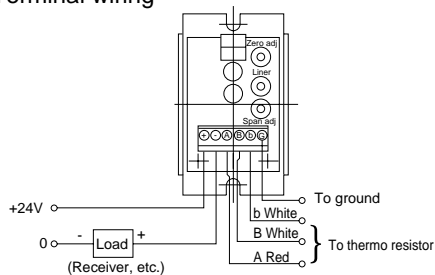
TH81 Approx. 2kg

## DIMENSIONS 1

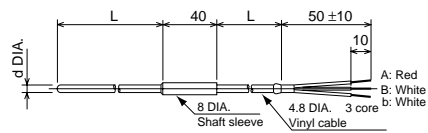
TH61



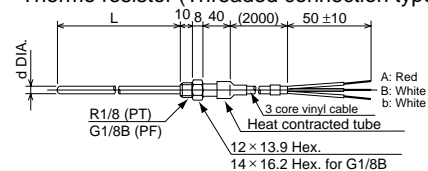
Terminal wiring



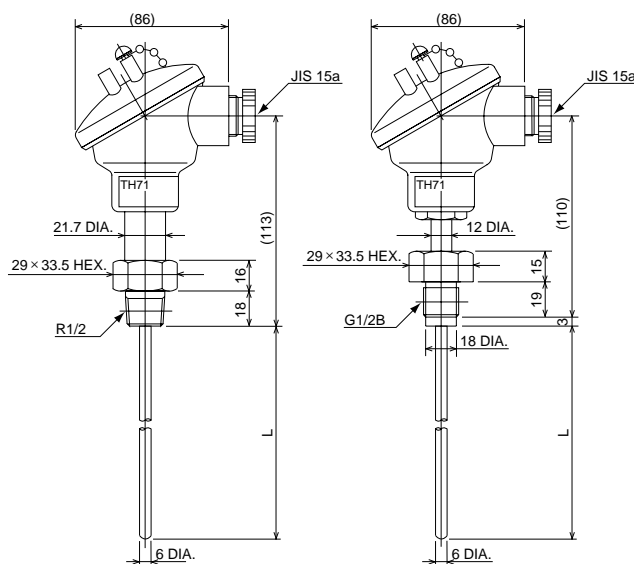
Thermo resistor (Plain type)



Thermo resistor (Threaded connection type)



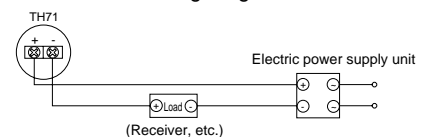
TH71



Connection R1/2 (PT): Fixed

Connection G1/2B (PF): Union

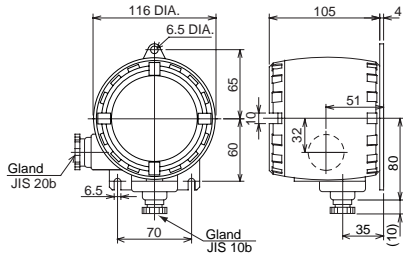
Wiring-diagram



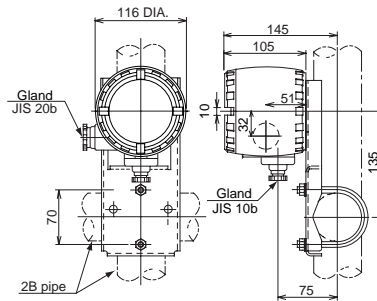
## DIMENSIONS 2

TH81

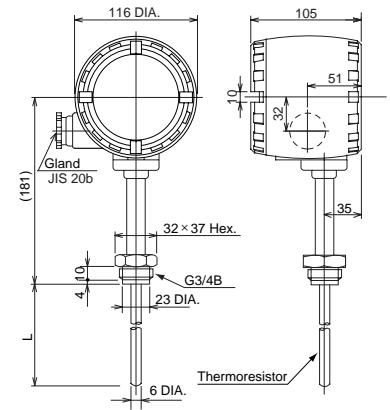
Panel mounting



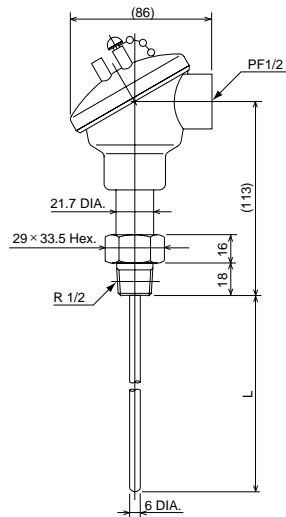
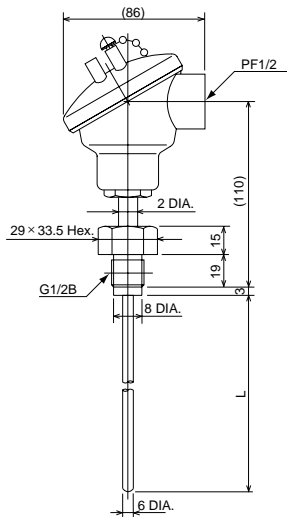
Pipe mounting



Stem mounting



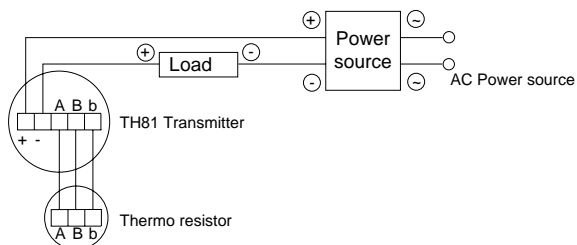
Thermo resistor



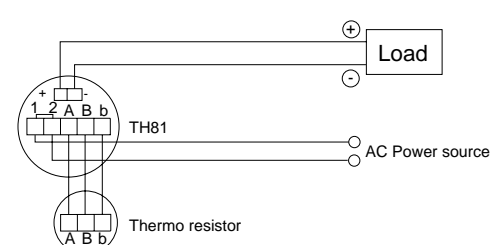
Standard length  
L = 100, 300,  
150, 400,  
200, 500,  
250, mm

Wiring diagram

2 wire system



4 wire system



# THERMO-WELL (OPTION)

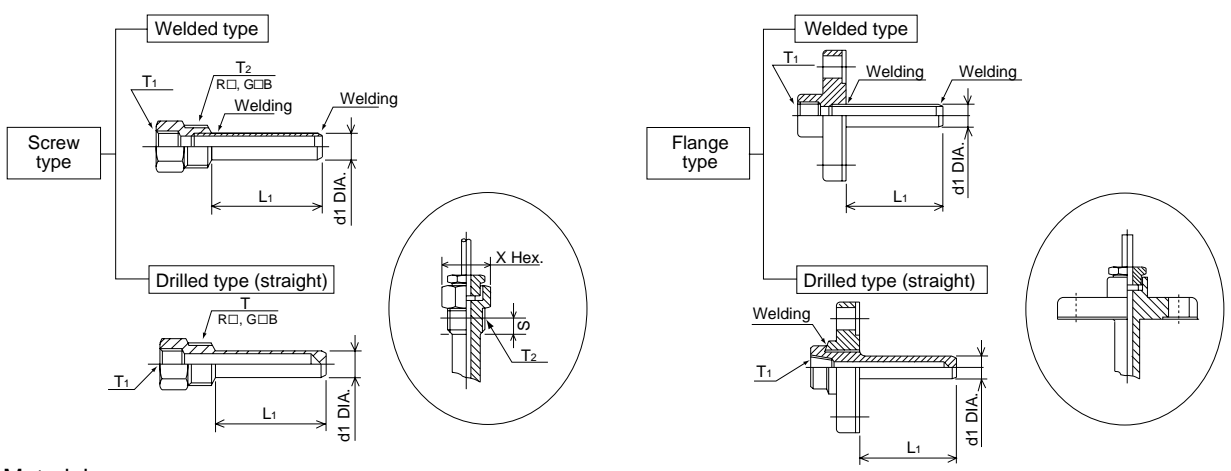
When measuring temperature object flows, and the speed is fast, and the pressure is high, the same as general temperature indication indicator, thermo-well (well) is necessary to temperature sensor department of temperature transmitter. And, in general application, it uses protecting tube to be easy maintenance.

As a condition of protecting tube

- 1) Standing temperature, the pressure that is going to be measured (it contains a flow) fully.
- 2) Not raising corrosion, other chemical reaction by measuring temperature object.
- 3) With Leakage.
- 4) It isn't damaged even if receives sudden temperature change.
- 5) It stands meachanical power such as vibration, a shock enough.
- 6) Thermo-well oneself doesn't occur gas harmful to temperature sensor.
- 7) It informs measuring temperature department of temperature change quickly.

thermo-well is digging type and welding type, and welding type is standard. And thermo-well a screw type and flange type by installation system.

## Types and dimensions of thermo-well



## Material

304st.st. is standard and 316st.st. is available by request. For range over 600°C, other material should be considered.

## Type and dimensions

### Screw parts

Screw Model	Temperature sensor T1	Screw type thermo-well			Flange type thermo-well
		T2	S	Hex. part	
TH71 TH81	G <sup>1/2</sup> B (PF)	R <sup>3/4</sup> (PT)	9.5	32 × 37 Hex.	It depends on various flange standard
TH81 Stem mounting use	G <sup>3/4</sup> B (PF)	Others R <sup>1/2</sup> B (PT), <sup>3/4</sup> Other NPT			

### Out dia

Model	Temperature sensor out dia	thermo-well out dia (d1)
TH71 TH81	Standard	6 DIA. / 10 DIA.
	Others	3.2 DIA. / 6 DIA.
		4.8 DIA. / 8 DIA.
		6.4 DIA. / 10 DIA. / 8 DIA. / 12 DIA.

### Thermo-well

L1	For TH71	For TH81
	40, 50, 100, 150, 200, 250, 300	100, 150, 200, 250, 300, 400, 500

# Pneumatic type temperature transmitter (TT21)



## OUTLINE

This transmitter detects temperature in the measurement field, and converts it into fixed air pressure signal 20 ~ 100kPa (0.2 ~ 1kgf/cm<sup>2</sup>) in proportion to measured quantity, and is force balance type transmitter to transmit it from the measurement spot to receiver of control room.

## FEATURES

- Because it is pneumatic type, it can be used even in explosive atmosphere.
- Because they are force balance types, pressure element and linkage is hardly displaced, and can be firm the whole, and accordingly, can maintain accuracy such as vibration resistance / linearity / hysteresis for a long time.
- Pressure sensing element is built-in the body so that this transmitter becomes compact. Zero adjustment can be easily done from outside without taking off the cover and giving no influence to span.

## SPECIFICATION

### Type:

Transmitter ability (standard), With reducing valve unit,  
With output gauge,  
With local indicator (receiver gauge)

### Compensation system:

Full compensation type

### Connection (air pressure):

Rc 1/4 (PT female), 6 DIA., 8 DIA., 10 DIA.

### Wetted parts material:

304st.st.

### Temperature range:

-30 ~ 650°C

### Accuracy:

±2%F.S.

### Air supply pressure:

140 ±10kPa (1.4±0.1kgf/cm<sup>2</sup>)

### Output:

20 ~ 100kPa (0.2 ~ 1kgf/cm<sup>2</sup>)

### Air consumption:

4 ~ 7L/min (normal)

### Span adjustment:

Internal adjustment

### Zero adjustment:

External adjustment

### Bulb out dia.:

8 DIA., 10 DIA., 12 DIA., 13 DIA., 16 DIA.

### Capillary tube length:

20m (max.)

### Construction:

Drip-proof

### Case material • finishing:

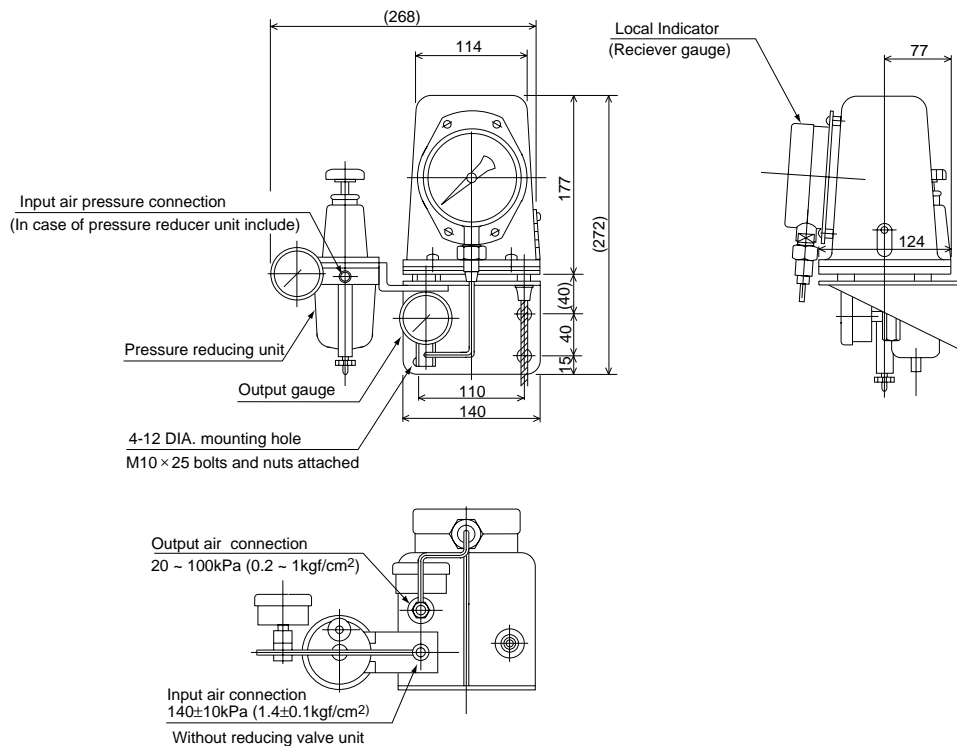
Aluminum light alloy • Gray

# PNEUMATIC TYPE TEMPERATURE TRANSMITTER (TT21)

Range, bulb out DIA. and length:

Range °C	Standard Bulb out DIA. × length d × L (d1 × L)	Buld length (L)mm					Max.
		The minimum insertion length					
		D = 8 DIA. (d1 = 12 DIA.)	D = 10 DIA. (d1 = 15 DIA.)	D = 12 DIA.	D = 13 DIA. (d1 = 19 DIA.)	D = 16 DIA. (d1 = 23 DIA.)	
-30 ~ 50	10 DIA. × 200 (15 DIA. × 250)	245 (265)	185 (205)	130	115 (135)	85 (105)	D = 8 DIA., 16 DIA. 1000
-30 ~ 120	10 DIA. × 150 (15 DIA. × 150)	135 (155)	105 (125)	80	70 ( 90)	55 ( 75)	
-20 ~ 100	" ( " )	170 (190)	130 (150)	95	85 (105)	65 ( 85)	
-10 ~ 50	10 DIA. × 250 (15 DIA. × 300)	320 (340)	240 (260)	170	145 (165)	110 (130)	
0 ~ 50	10 DIA. × 350 (15 DIA. × 350)	410 (430)	305 (325)	215	180 (200)	135 (155)	
~ 60	10 DIA. × 250 (15 DIA. × 300)	320 (340)	240 (260)	170	145 (165)	110 (130)	
~ 80	10 DIA. × 200 (15 DIA. × 250)	245 (265)	185 (205)	130	115 (135)	85 (105)	
~ 100	10 DIA. × 150 (15 DIA. × 200)	200 (220)	150 (170)	110	95 (115)	70 ( 90)	
~ 120	" (15 DIA. × 150)	170 (190)	130 (150)	95	85 (105)	65 ( 85)	
~ 150	" ( " )	135 (155)	105 (125)	80	70 ( 90)	55 ( 75)	
~ 200	10 DIA. × 100 ( " )	110 (130)	85 (105)	65	55 ( 75)	45 ( 65)	D = 10 DIA., 12 DIA., 13 DIA. 3000
~ 250	" (15 DIA. × 100)	90 (110)	70 ( 90)	55	50 ( 70)	40 ( 60)	
~ 300	" ( " )	80 (100)	65 ( 85)	50	45 ( 65)	40 ( 60)	
~ 400	" ( " )	65 ( 85)	55 ( 75)	40	40 ( 60)	40 ( 60)	
~ 500	" ( " )	55 ( 75)	45 ( 65)	40	40 ( 60)	55 ( 75)	
~ 600	" ( " )	50 ( 70)	40 ( 60)	40	40 ( 60)	50 ( 70)	
~ 650	" ( " )	45 ( 65)	40 ( 60)	40	40 ( 60)	45 ( 65)	

Dimensions:

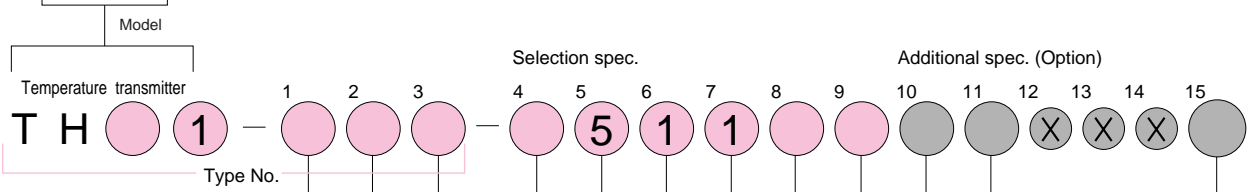


# Type No. constitution 1

Please specify Type No., each specification and range when ordering.

Note: For this Model, there is no applicable item for the figures X, but please specify X when ordering.

T	H	6	1	Remoto type
T	H	7	1	Stem mounting



**1 Mounting** \_\_\_\_\_ TH61

1	Main body
2	Main body + thermo resistor (Threaded connection) 6 DIA. and 6.4 DIA. sheath type only*
3	Main body + thermo resistor (Plain type) 4.8 DIA. only

\* In case of 6.4 DIA. sheath, connection to be G1/4 B, R1/4 or over

**1 Type** \_\_\_\_\_ TH71

1	Union type G1/2B
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**2 Out dia of Thermo resistor** \_\_\_\_\_

1	6 DIA. (JIS C 1604)
2	TH61: 4.8 DIA. (JIS C 1604) TH71: 8 DIA. (JIS C 1604)
3	6.4 DIA. sheath (JIS C 1606)
4	TH61: 4.8 DIA. sheath (JIS C 1604) TH71: 8 DIA. sheath (JIS C 1606)

**3 L length** \_\_\_\_\_

1	~ 100mm
2	~ 200mm
3	~ 300mm

**4 Temperature range (°C)** \_\_\_\_\_  
(When ordering, please specify pressure range & unit.)

1	-50 ~ 50, -30 ~ 50, -20 ~ 100, -10 ~ 50
2	0 ~ 50, 100 0 ~ 150, 200 TH61 only
3	0 ~ 250, 300, 350 TH61 only

**5 Accuracy** \_\_\_\_\_

5	±0.75%F.S.
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**6 Power source** \_\_\_\_\_

1	24V DC (15 ~ 30V DC)
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**7 Output** \_\_\_\_\_

1	4 ~ 20mA DC
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**8 Type of outlet** \_\_\_\_\_

0	Nil TH61 only
1	Conduit type TH71 only
2	Gland TH71 only

**9 Outlet for electric wire** \_\_\_\_\_

TH61

0	Terminal box
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TH71

1	PF1/2
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9 Outlet for electric wire Gland

3	JIS 15a
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**10 Treatment** \_\_\_\_\_

0	Nil
1	Use no oil
2	Use no water
3	Use no oil & water

**11 Other additional spec.** \_\_\_\_\_

0	Nil
1	Please specify your requirement Thermowell option (TH71 only)

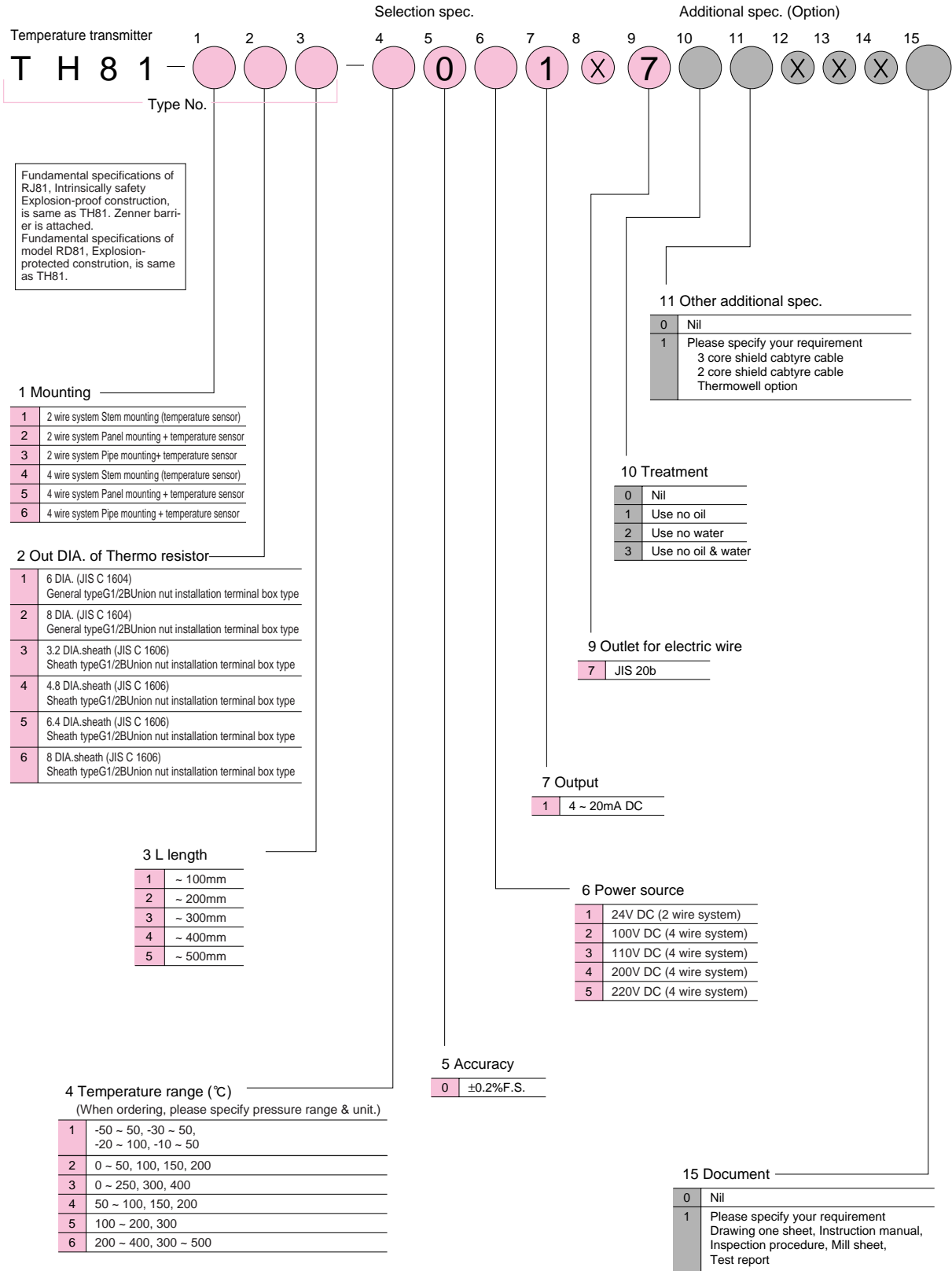
**Additional spec. (Option)**

10	
11	
12	X
13	X
14	X
15	

**15 Document** \_\_\_\_\_

0	Nil
1	Please specify your requirement Drawing one sheet, Instruction manual, Inspection procedure, Mill sheet, Test report

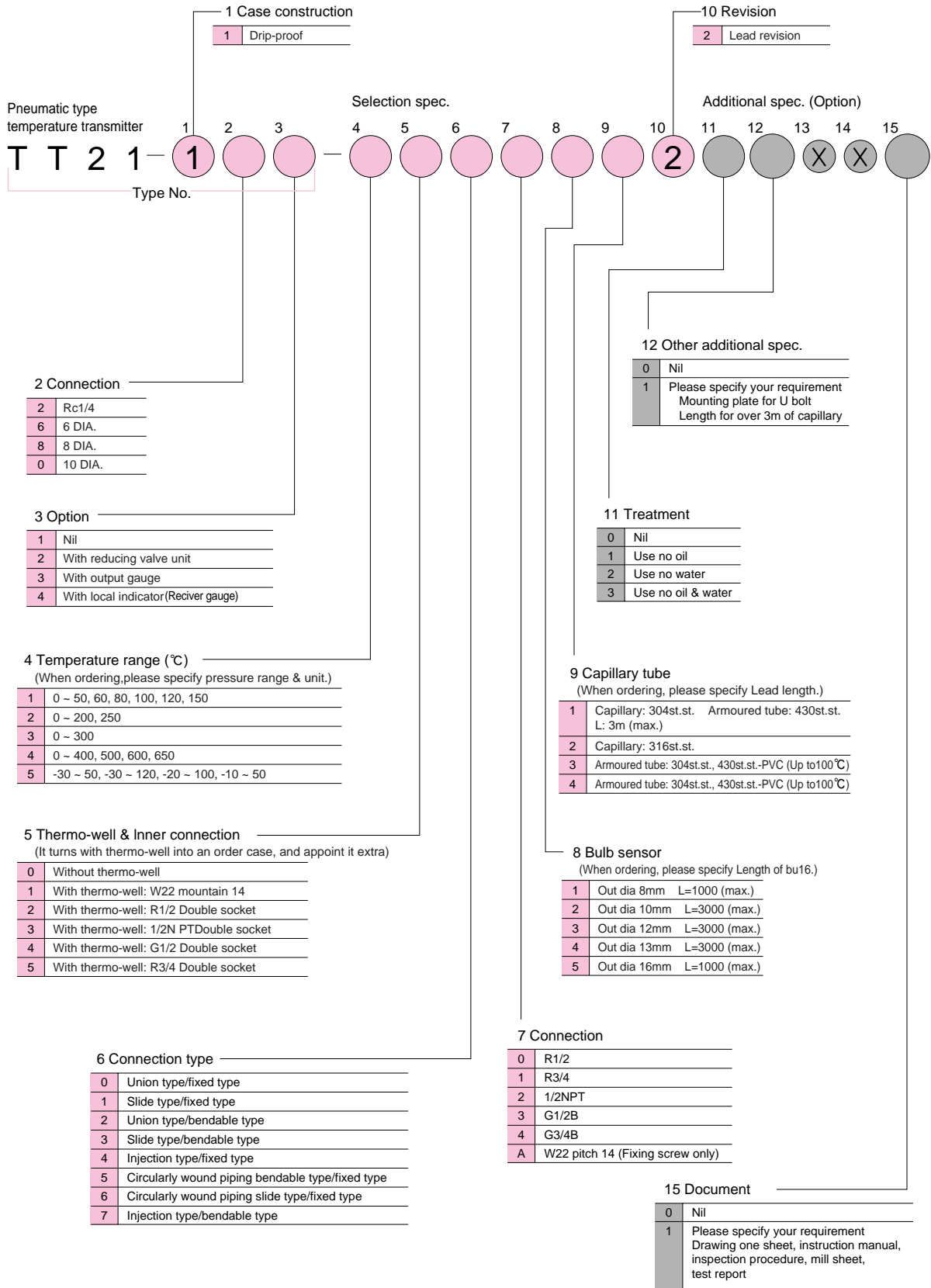
Note: For this Model, there is no applicable item for the figures X, but please specify X when ordering.



# Type No. constitution 3

Please specify Type No., each specification and range when ordering.

Note: For this Model, there is no applicable item for the figures X, but please specify X when ordering.



Pneumatic type temperature transmitter

TT 21  
Type No.

1 Case construction  
1 Drip-proof

10 Revision  
2 Lead revision

Selection spec.

Additional spec. (Option)

2 Connection

2	Rc1/4
6	6 DIA.
8	8 DIA.
0	10 DIA.

3 Option

1	Nil
2	With reducing valve unit
3	With output gauge
4	With local indicator(Receiver gauge)

4 Temperature range (°C)

(When ordering, please specify pressure range & unit.)

1	0 ~ 50, 60, 80, 100, 120, 150
2	0 ~ 200, 250
3	0 ~ 300
4	0 ~ 400, 500, 600, 650
5	-30 ~ 50, -30 ~ 120, -20 ~ 100, -10 ~ 50

5 Thermo-well & Inner connection

(It turns with thermo-well into an order case, and appoint it extra)

0	Without thermo-well
1	With thermo-well: W22 mountain 14
2	With thermo-well: R1/2 Double socket
3	With thermo-well: 1/2N PTDouble socket
4	With thermo-well: G1/2 Double socket
5	With thermo-well: R3/4 Double socket

6 Connection type

0	Union type/fixed type
1	Slide type/fixed type
2	Union type/bendable type
3	Slide type/bendable type
4	Injection type/fixed type
5	Circularly wound piping bendable type/fixed type
6	Circularly wound piping slide type/fixed type
7	Injection type/bendable type

7 Connection

0	R1/2
1	R3/4
2	1/2NPT
3	G1/2B
4	G3/4B
A	W22 pitch 14 (Fixing screw only)

12 Other additional spec.

0	Nil
1	Please specify your requirement Mounting plate for U bolt Length for over 3m of capillary

11 Treatment

0	Nil
1	Use no oil
2	Use no water
3	Use no oil & water

9 Capillary tube

(When ordering, please specify Lead length.)

1	Capillary: 304st.st. Armoured tube: 430st.st. L: 3m (max.)
2	Capillary: 316st.st.
3	Armoured tube: 304st.st., 430st.st.-PVC (Up to100°C)
4	Armoured tube: 304st.st., 430st.st.-PVC (Up to100°C)

8 Bulb sensor

(When ordering, please specify Length of bu16.)

1	Out dia 8mm L=1000 (max.)
2	Out dia 10mm L=3000 (max.)
3	Out dia 12mm L=3000 (max.)
4	Out dia 13mm L=3000 (max.)
5	Out dia 16mm L=1000 (max.)

15 Document

0	Nil
1	Please specify your requirement Drawing one sheet, instruction manual, inspection procedure, mill sheet, test report