

SHEATH TYPE THERMOCOUPLE

DATA SHEET

FTJ, K, E

This thermocouple is firmly sealed with high-purity oxidized magnesium (insulating material) in a fine metallic protective tube without air gaps, together with the thermocouple element.

Unlike ordinary type thermocouples, it provides excellent sensitivity and vibration resistance, and is designed to permit easy bending work.

FEATURES

1. Thermocouple tube is very small in size, providing excellent sensitivity.
2. Adoption of integrated structure has improved the vibration resisting characteristic.
3. Easy bending work allows fabricating a long-sized thermocouple for easy measurement even in a place where ordinary type thermocouples cannot be used.
4. Thermocouple strand is not exposed to air, ensuring a long life with minimum deterioration or breaks of wire, unlike ordinary type thermocouples.
5. A variety of protective tube materials are available for selection according to applications.
6. Various types of terminals such as extension cable type, connector type, exposed type, terminal box type, etc., are also available for selection according to applications.

SPECIFICATIONS

• Applied standard:

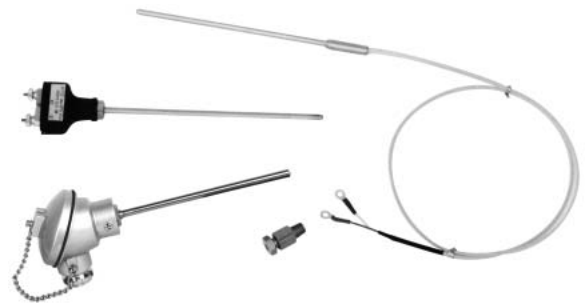
JIS C 1605-1995

• Thermocouple element:

Component material

Kind	Component material	
	+ foot	- foot
J	Iron	Alloy made of copper and nickel
K	Alloy made of nickel and chrome	Alloy made of nickel
E	Alloy made of nickel and chrome	Alloy made of copper and nickel

(Note) "+foot" is connected to the terminal (+) of instrument for measuring thermal electromotive force, and "-foot" is connected to opposite side.



Class :

Class	Remarks
1	Class 3 is permitted only for FTK, FTE.
2	
3	

Note: Class 3 is applied only for low temperature of less than 40°C.

Temperature tolerance :

Symbol	Class	Measured temperature (°C)	Tolerance
K	1	-40°C or more, less than +375°C	±1.5°C
		375°C or more, less than 1000°C	±0.004• t
	2	-40°C or more, less than +333°C	±2.5°C
		333°C or more, less than 1200°C	±0.0075• t
	3	-167°C or more, less than +40°C	±2.5°C
		-200°C or more, less than -167°C	±0.015• t
E	1	-40°C or more, less than +375°C	±1.5°C
		375°C or more, less than 800°C	±0.004• t
	2	-40°C or more, less than +333°C	±2.5°C
		333°C or more, less than 900°C	±0.0075• t
	3	-167°C or more, less than +40°C	±2.5°C
		-200°C or more, less than -167°C	±0.015• t
J	1	-40°C or more, less than +375°C	±1.5°C
		375°C or more, less than 750°C	±0.004• t
	2	-40°C or more, less than +333°C	±2.5°C
		333°C or more, less than 750°C	±0.0075• t

Note: Tolerance means the maximum allowable limit of the value calculated by subtracting the temperature of the temperature measuring junction from the temperature obtained by converting the thermal electromotive force by the reference thermal electromotive force. |t| is the value indicated by temperature (°C) that is not related to + or - symbol of the measured temperature.

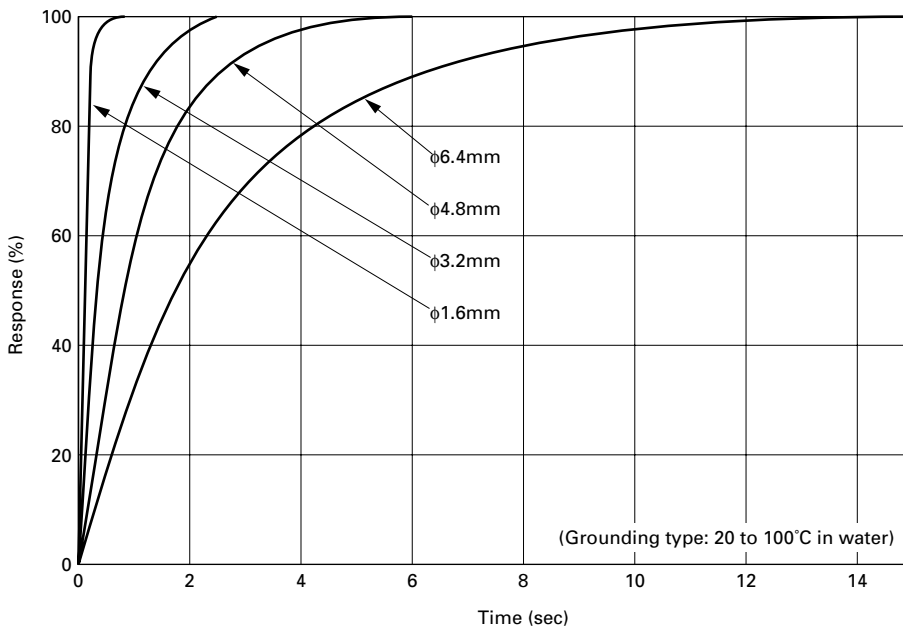
- Sheath material : SUS347, SUS310S, SUS316 or Inconel
- Sheath outside diameter : ϕ 1.6, ϕ 3.2, ϕ 4.8 or ϕ 6.4mm
- Mounting method :
 Insertion type or screw-in type (with mounting bracket)
 Mounting screw size: R1/8 (PT1/8) or R1/4 (PT1/4)
- Insertion length : 100~9000mm (specified in 10mm base)
- Terminal structure :
 Extension cable type, connector type, exposed type, terminal box type, and extension cable (with connector) type
- Temperature limit : (Unit:°C)

Sheath outside diameter (mm)	1.6		3.2		4.8		6.4	
	A	B	A	B	A	B	A	B
Kind K	650		750		800	900	800	1000
E	650	-	750	-	800	-	800	-
J	450	-	650	-	750	-	750	-

(Note*) Sheath material A: SUS347, SUS310S, SUS316
 B: Inconel

- Element structure :
 Single-core: insulation type,
 Twin-core: insulation type
 Single-core; grounding type,
 Twin-core: grounding type
 (Note) Twin-core type : ϕ 3.2mm or more
- Minimum bending radius :
 5 times larger than sheath outside diameter
- Response characteristic :
 See table below.

Sheath thermocouple response characteristic



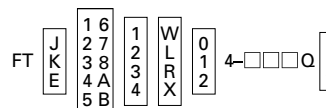
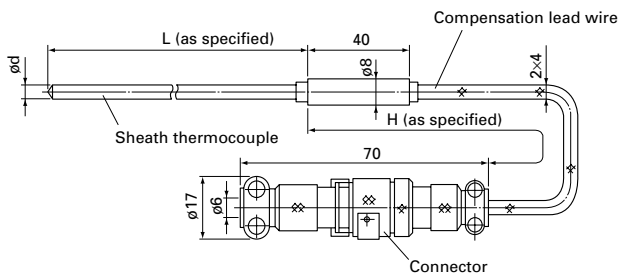
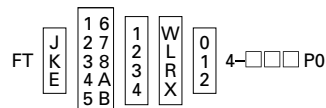
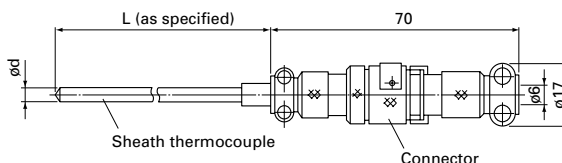
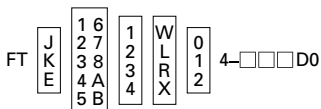
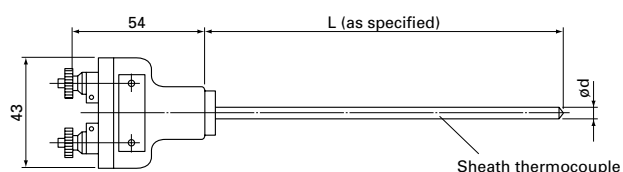
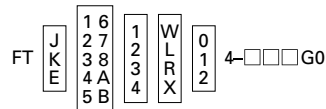
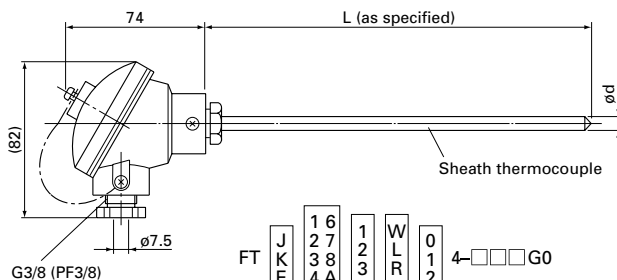
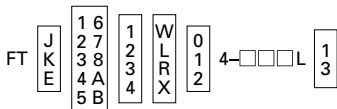
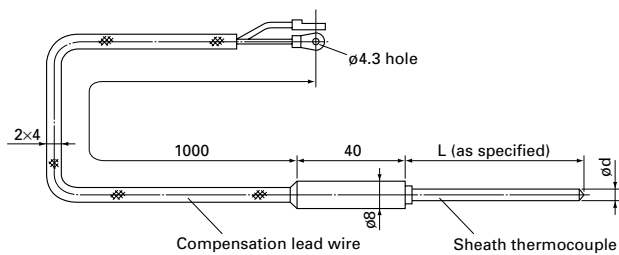
Type of thermocouple	Time constant (sec)	
Sheath thermocouple	ϕ 6.4	2.60
	ϕ 4.8	1.22
	ϕ 3.2	0.53
	ϕ 1.6	0.11
Ordinary type	ϕ 12	51

Code symbols

1 2 3 4 5 6 7 8 9 10 11 12 13																																																													
Sheath type J thermocouple	F	T	J				4	-																																																					
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<table border="1"> <thead> <tr> <th rowspan="2">Type</th> <th colspan="5">External size</th> </tr> <tr> <th>Material</th> <th>φ1.6</th> <th>φ3.2</th> <th>φ4.8</th> <th>φ6.4</th> </tr> </thead> <tbody> <tr> <td rowspan="2">FTJ</td> <td>SUS316</td> <td>○</td> <td>◎</td> <td>◎</td> <td>◎</td> </tr> <tr> <td>SUS310S</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td rowspan="3">FTK</td> <td>SUS316</td> <td>○</td> <td>◎</td> <td>◎</td> <td>◎</td> </tr> <tr> <td>SUS347</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>Inconel</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td rowspan="2">FTE</td> <td>SUS347</td> <td>○</td> <td>◎</td> <td>◎</td> <td>◎</td> </tr> <tr> <td>SUS316</td> <td>○</td> <td>◎</td> <td>◎</td> <td>◎</td> </tr> </tbody> </table>													Type	External size					Material	φ1.6	φ3.2	φ4.8	φ6.4	FTJ	SUS316	○	◎	◎	◎	SUS310S	○	○	○	○	FTK	SUS316	○	◎	◎	◎	SUS347	○	○	○	○	Inconel	○	○	○	○	FTE	SUS347	○	◎	◎	◎	SUS316	○	◎	◎	◎
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Example) 200mm → 020																																																													
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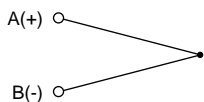
Outline diagram (Unit: mm)

(Insertion diameter "d" can be selected from 1.6 , 3.2 , 4.8 , 6.4.)



Connection diagram

Mounting fitting
(Supplied as specified)



R1/8 (PT1/8) or R1/4 (PT1/4)

⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

Fuji Electric Systems Co., Ltd.

Head Office

Gate City Ohsaki, East Tower, 11-2, Osaki 1-chome,
Shinagawa-ku, Tokyo 141-0032, Japan

<http://www.fesys.co.jp/eng>

Instrumentation Div.

International Sales Dept.

No.1, Fuji-machi, Hino-city, Tokyo, 191-8502 Japan

Phone: 81-42-585-6201, 6202 Fax: 81-42-585-6187

<http://www.fic-net.jp/eng>

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