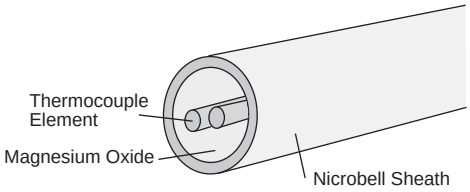
Nicrobell Sheathed Thermocouples

■ Nicrobell Sheathed Thermocouple

Wires of traditional metallic sheath (stainless steel, inconel, etc) is likely to receive chemical erosion or metallic fatigue under high temperature circumstance, and these give negative effects on their stability and longevity. Nicrobell Sheath is an epoch making heat resistant alloy and has chemical composition very close to that of the type N (Nicrosil) element, minimizing chemical erosion and metal fatigue.



■ Nicrobell Sheathed N Thermocouple

High Stability

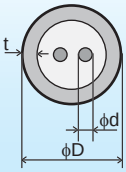
Nicrobell sheath has chemical composition very close to that of the type N element and does not generate any metal gas in high temperature range different from conventional alloys such as stainless steel (SUS316, SUS310) and Inconel, thus prevents the element of type N thermocouple from contamination.

High Accuracy

Our Nicrobell sheath (N) thermocouple is class 1. It is capable of high temperature measurement with high accuracy compared with traditional sheath types.
Moreover, its high stability shows the same or higher realization with PL II (platinum II) and R around 1200°C.

Environmental Resistance

Nicrobell sheath (N) thermocouple has chemical composition very close to that of the type N element and does not generate any metal gas in high temperature range different from conventional alloys such as stainless steel (316SS, 310SS) and Inconel, thus prevents the element of type N thermocouple from contamination.



t : More than 10% of ϕD
ϕd : More than 18% of ϕD

Long Life

Nicrobell sheath (N) thermocouple, which has high stability and environmental resistance, has a longer cycle of periodic replacement and economical for it will less change over the time and has a long life span compared with traditional sheathes.

■ Nicrobell Sheathed K Thermocouple

Because Nicrobell sheath is a nickel based alloy as K type, it minimizes corrosion by metallic gas expansion to its wires under high temperature range, and improves stability, environmental resistance, and thermal resistance of its thermoelectromotive force.

Low Cost

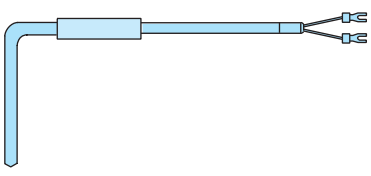
Nicrobell K thermocouple realizes high stability and environmental resistance with almost same price with traditional Inconel sheath. Progress of basic function results in low cost due to long-term use by stabilizing accuracy of thermoelectromotive force in long-term and by extending periodic replacement by reinforcing K type strength (thermal resistance) in high temperature range.

Improved Reliability

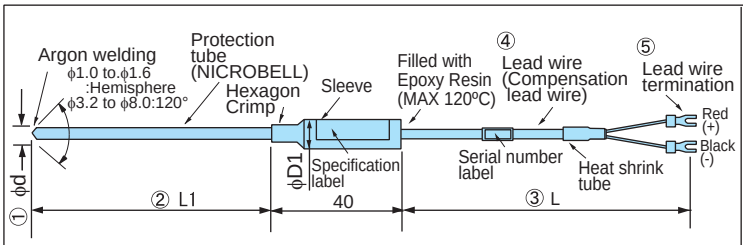
Traditionally, when talking about environmental resistance for selection of thermocouple metallic sheath, people were likely to more focus on its materials and did not pay much attention on relationship between its materials and wire.
Nicrobell sheath is a new created metallic sheath balancing its traditional matter, thus its accountability will be highly progressed

Long Life

Nicrobell sheath K type thermocouple can be used for long duration of time in a high temperature range by the difference of performance and traditional thick wire.

Sleeve type	Terminal head type
T-101N 	T-30N 
T-111N 	Terminal head type T-35N 

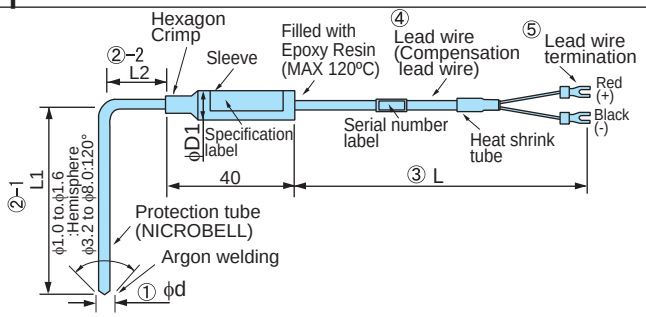
NICROBELL Sheathed Thermocouples : T-101N/T-111N



T - 101N - φd - L1 - L - □□□ - □ - □ - □ - □
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Diameter of protection tube
② Length of protection tube
③ Lead wire length
④ Lead protection
⑤ Lead wire termination
⑥ Thermocouple type
⑦ Sensing junction
⑧ Mounting bracket

Example :T-101N-4.8-100-2000-EXA-Y-K-G-N



T - 111N - φd - L1 - L2 - L - □□□ - □ - □ - □ - □
① ②–1 ②–2 ③ ④ ⑤ ⑥ ⑦ ⑧

① Diameter of protection tube
②–1, 2 Length of protection tube
③ Lead wire length
④ Lead protection
⑤ Lead wire termination
⑥ Thermocouple type
⑦ Sensing junction
⑧ Mounting bracket

Example :T-111N-4.8-100-30-2000-EXA-Y-K-G-N

①	Diameter of protection tube	φ1.0, φ1.6, φ2.3, φ3.2, φ4.8, φ6.4, φ8.0
②	Length of protection tube	Specify length by “mm” (100mm to 10,000mm) ②– 1 Specify length by “mm” (100mm or more, L1+L2=10,000mm or less) ②– 2 Specify length by “mm” (25mm or more, L1+L2=10,000mm or less) • Length is 25mm without specification.
③	Lead wire length	Specify length by “mm” (100mm or more)

④ Lead protection

Code	Details	Operating temperature	Code	Details	Operating temperature
EXA	Fiberglass with stainless steel	0 to 150ºC	EXD	PVC (polyvinyl chloride)	-20 to +90ºC
EXB	Fiberglass	0 to 150ºC	EXE	Silicone rubber (Only for Type K)	-55 to +180ºC
EXC	PVC (polyvinyl chloride) with copper wire braided	-20 to +90ºC	EXF	Fluorocarbon polymers (FEP) (Only for Type K)	0 to 200ºC

⑤ Lead wire termination

Code	Details	Code	Details
Y	Spade lugs for JIS standard "M3" size screw	TE *1	Thermocouple connector (CSP01+CLP-A+CSP02) (Only for Type K)
R	Ring lugs for JIS standard "M4" size screw	N	No terminal lugs *terminal soldered
M	Metal connector (SCK-1602-P)		•See Page7

*1 : Other thermocouple connector : See Page 10

⑥ Thermocouple type

Code	Details
K	Type K (Chromel-Alumel)
N	Type N (Nicrosil-Nisil)

⑦ Measuring junction

Code	Details
G	Grounded
NG	Ungrounded

⑧ Mounting bracket

Code	Details	Code	Details
A	Fixed nipple (nut)	E	Compression fitting
B	Rotary nipple (nut)	N	No bracket

Specify size of mounting braket when code is "A", "B", or "E". (See Page 6)

• Fixed nipple/Rotary nipple is Silver brazing. (Maximum temperature : 500ºC.)
• Please contact distributors regarding other mounting bracket.

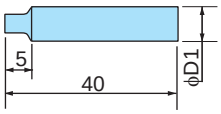
Specifications

Class : class 1
Element : Single element
Operating temperature for regular use

Thermocouple type	Diameter of protection tube	Operating temperature for regular use
K	φ1.0	900ºC
	φ1.6, φ2.3	1000ºC
	φ3.2, φ4.8	1100ºC
	φ6.4	1150ºC
	φ8.0	1200ºC
N	φ1.6, φ2.3	1000ºC
	φ3.2, φ4.8	1100ºC
	φ6.4	1150ºC
	φ8.0	1200ºC

Sleeve Dimension (φD1)

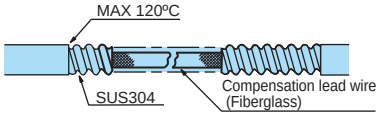
Lead wire type \ Diameter of protection tube	φ1.0, φ1.6, φ2.3 φ3.2, φ4.8	φ6.4, φ8.0
EXA,EXB,EXC EXD,EXF	φ8×40	φ10×40
EXE	φ10×40	



Reference

• Stainless flexible lead wire is available

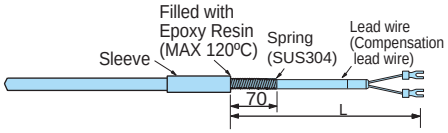
Model Code : T-101FS/T-111FS



For flexible lead wire, the dimension of the sleeve is φ10 x 40mm.
When φ1.0 to φ4.8 of the protection tube with EXB is selected as the extention lead wire, its dimension is φ8 x 40mm.

• No waterproof

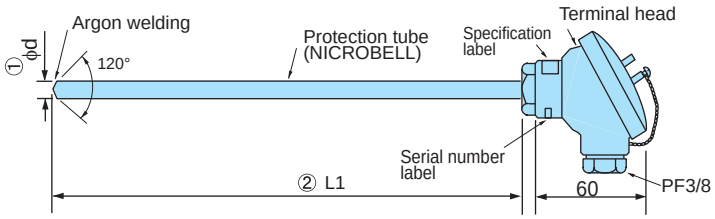
• Spring loaded type is available
(Please specify when you order)



Dimensions for the spring loaded sleeve is as follows.

• Protection tube φ1.0 to φ4.8 with extension lead wire
EXA, EXB, EXC, EXD : φ8 x 40mm
• Except the above: : φ10 x 40mm

NICROBELL Sheathed Thermocouples : T-30N/T-35N



No lead wire

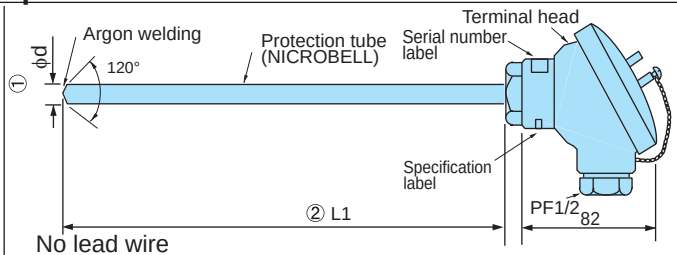
T - 30N - ϕd - L1 - □ - □ - □
① ② ⑥ ⑦ ⑧

With lead wire

T - 30N - ϕd - L1 - L - □□□ - □ - □ - □ - □
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Diameter of protection tube
② Length of protection tube
③ Lead wire length
④ Lead protection
⑤ Lead wire termination
⑥ Thermocouple type
⑦ Sensing junction
⑧ Mounting bracket

Example :T-30N-4.8-100-K-G-N (No lead wire)
:T-30N-4.8-100-2000-EXA-Y-K-G-N (With lead wire)



No lead wire

T - 35N - ϕd - L1 - □ - □ - □
① ② ⑥ ⑦ ⑧

With lead wire

T - 35N - ϕd - L1 - L - □□□ - □ - □ - □ - □
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Diameter of protection tube
② Length of protection tube
③ Lead wire length
④ Lead protection
⑤ Lead wire termination
⑥ Thermocouple type
⑦ Sensing junction
⑧ Mounting bracket

Example :T-30N-4.8-100-K-G-N (No lead wire)
:T-30N-4.8-100-2000-EXA-Y-K-G-N (With lead wire)

①	Diameter of protection tube	ϕ3.2, ϕ4.8, ϕ6.4, ϕ8.0	ϕ4.8, ϕ6.4, ϕ8.0
②	Length of protection tube	Specify length by “mm” (100mm to 10,000mm)	Specify length by “mm” (100mm to 10,000mm)
③	Lead wire length	Specify length by “mm” (100mm or more)	

④ Lead protection (No need to specify in case of without lead wire)

Code	Details	Operating temperature	Code	Details	Operating temperature
EXA	Fiberglass with stainless steel	0 to 150ºC	EXD	PVC (polyvinyl chloride)	-20 to +90ºC
EXB	Fiberglass	0 to 150ºC	EXE	Silicone rubber (Only for Type K)	-55 to +180ºC
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Code	Details	Code	Details
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⑦ Measuring junction

Code	Details
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⑧ Mounting bracket

Code	Details	Code	Details
A	Fixed nipple (nut)	E	Compression fitting
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Specify size of mounting bracket when code is "A", "B", or "E". (See Page 6)

• Fixed nipple/Rotary nipple is Silver soldering. (Maximum temperature : 500ºC.)
• Please contact distributors regarding other mounting bracket.

Specifications

Class : class 1
Element : Single element
Operating temperature for regular use

Thermocouple type	Diameter of protection tube	Operating temperature for regular use
K	ϕ3.2 to ϕ4.8	1100ºC
	ϕ6.4	1150ºC
	ϕ8.0	1200ºC
N	ϕ3.2 to ϕ4.8	1100ºC
	ϕ6.4	1150ºC
	ϕ8.0	1200ºC

Reference