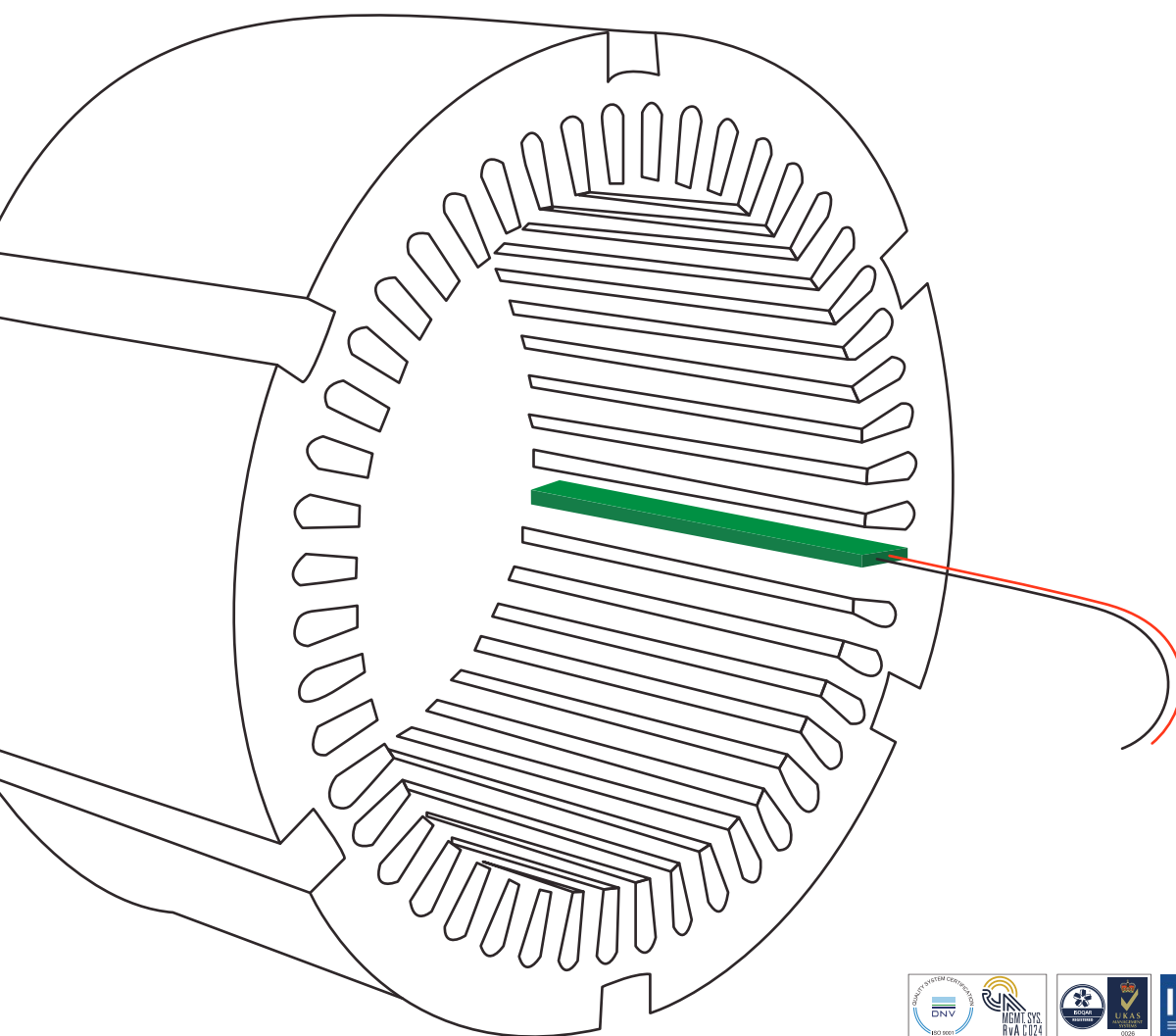




SLOT RESISTANCE THERMOMETERS

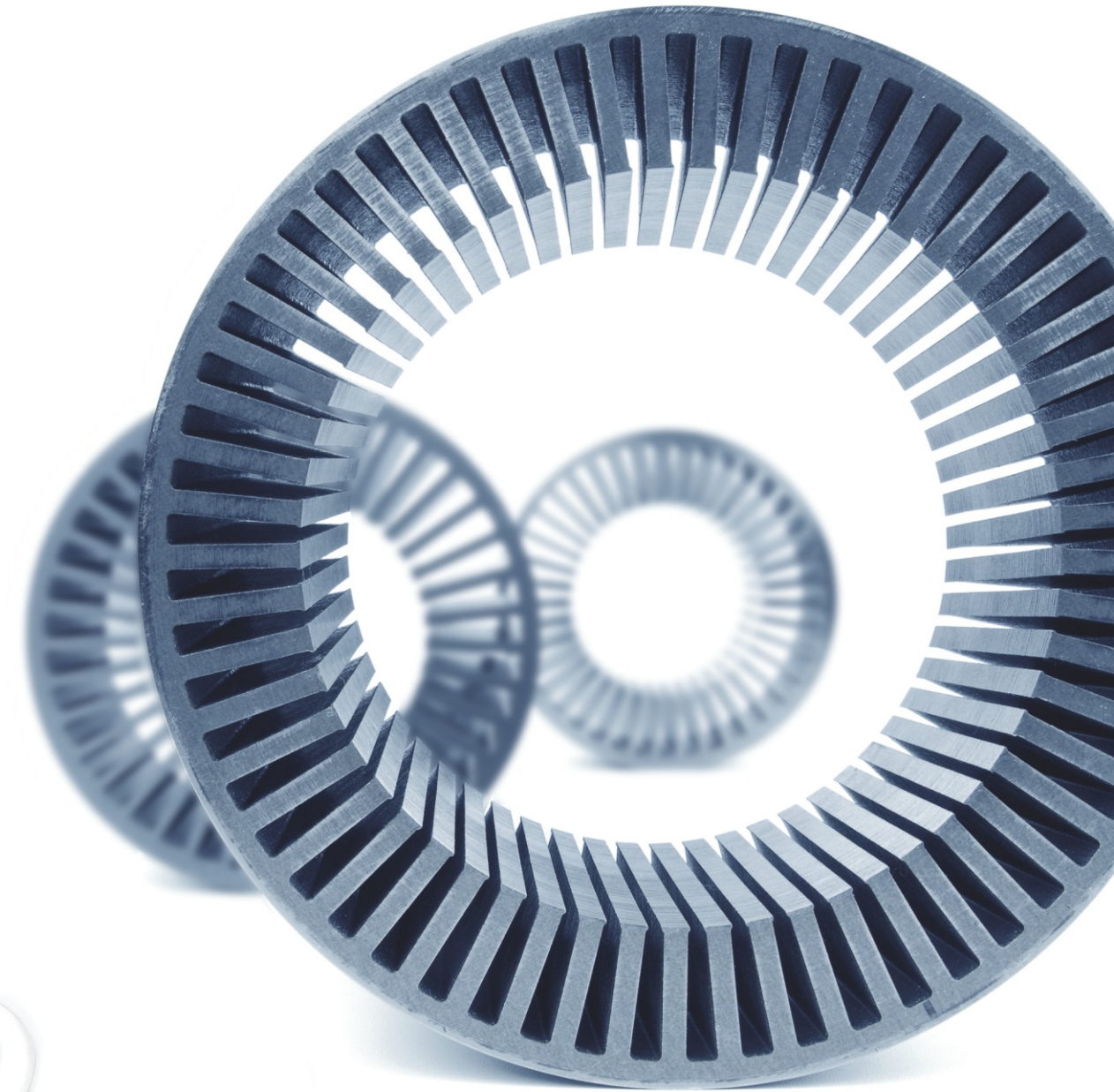


TC/BR/RTD, Rev. 01

*TSRB, TSRC, TSRD, TSRK are listed by CSA Group as Certified

** Notifying Body Number - 2460

THE COMPLETE SOLUTION FOR TEMPERATURE SENSING OF ELECTRICAL ROTARY MACHINES



Simplex (Single element)

Slot Resistance Thermometers



Product Overview

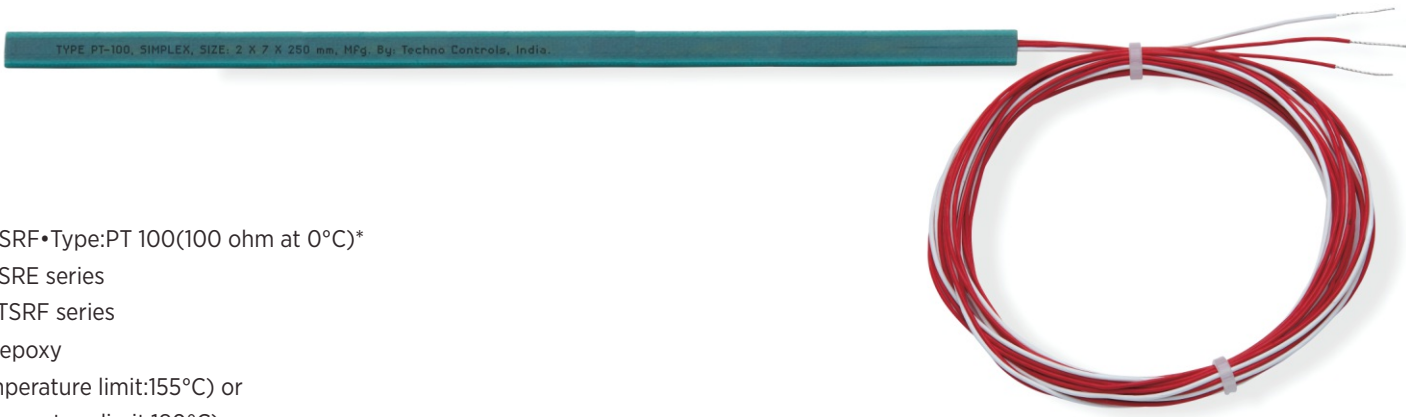
The Stator winding temperature detector (RTD) are used to measure winding temperature of large Motors, Generators etc. These sensor are sandwiched between the windings of Motors/Generators.

Unlike on/off devices, It allows continuous measurement of winding temperature. The NEMA recognizes this kind of sensor as a standard protection for motor and generator Insulation.

Normally, these RTDs are of wire wound and sensing element extends through out the length of the detector. These feature will provide average temperature reading. Normally six sensors are recommended for each motor, Two per Phase. This RTD are generally flat type in construction and are available in various sizes.

Main Features

- Slim dimensions to get inserted in between windings
- Bifiliar design that prevents induction voltage resulting in measurement errors
- Resistance to shock, vibration and pressure
- Withstand of VPI(Vacuum Pressure Impregnation) Process
- High Dielectric Strength
- EAC & PAC approved Model available for equipment used in hazardous area.

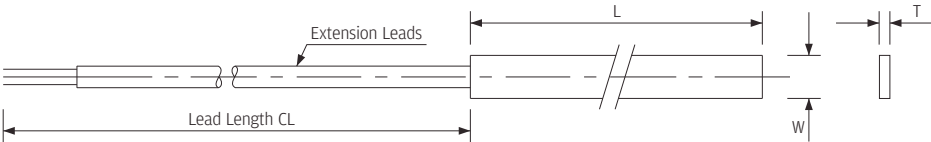


Specification

- Model: TSRE and TSRF•Type:PT 100(100 ohm at 0°C)*
- Element: Single for TSRE series
Double for TSRF series
- Body Material: Fibre Glass epoxy
- Temperature Class: Class F(Temperature limit:155°C) or
Class H(Temperature limit:180°C)
- Calibration Standard: IEC 60751
Temperature coefficient(TCR):0.00385
- Accuracy: Class A/B/2B
- Sensing current: 10mA maximum
- Dielectric strength: 3 KV 50/60 Hz for 1 minute between leads and surface of Glass epoxy
body (5 KV design are available on request)
- Number of wire: Two or three or four
- Lead Wire: Single or multiple stranded with Tin/silver/Nickel plated copper wire with
teflon or Polyamide insulation (special Lead wire and cable upon request).
Please note that the selection of suitable wire gauge is depend up on the
width and thickness of the sensor.

For Sizes & all other dimension please refer drawing.
*Note: Other values like PT-50,PT-200 and temperature coefficient of 0.003916 are available upon request. Custom design of sensors are also available upon request.

Model: TSRE series (Single element)



MODEL: TSRE-ACC-L-T-W-NW-CL-WG-CC

ACC	Accuracy of RTD element (A/B/2B)
L	Length in mm
T	Thickness in mm
W	Width in mm
NW	Nos. of wires (option 2/3/4)
CL	Lead length in mm
WG	Wire Gauge of lead wires in AWG (option 22 to 28 AWG)
CC	Lead wire Construction (See table I)

EXAMPLE (Part Number): TSRE-B-150-2-8-3-1000-24-X

DIMENSIONAL RANGE (IN MM)			
PARAMETER	MAX	MIN*	TOLERANCE
LENGTH (L)	600.0	45.0	+/- 5.0
THICKNESS (T)	4.5	2.0	+/-0.25
WIDTH (W)	30.0	6.0	+/-0.20
LEAD LENGTH (CL)	50000.0	1000.0	+50.0/-0.0

Cable Construction

TABLE 1	
DESCRIPTION	CODE
TWISTED TEFLON INSULATED / TEFLON JACKETED	X
FLAT TEFLON INSULATED LEADS (Without Jacket)	Y
FLAT POLYAMIDE INSULATED LEADS (Without Jacket)	Z
FLAT TEFLON INSULATED AND JACKETED	W
TWISTED TEFLON INSULATED /SHIELDED/ TEFLON JACKETED	R

Duplex (Double element)

Slot Resistance Thermometers



Product Overview

Duplex stator winding RTD provide extra protection for Motors & Generator. The Second element is used either incase of damage of one element or use one element to display temperature at machine & second element for control room.

Main Features

- Slim dimensions to get inserted in between windings
- Bifilar design that prevents induction voltage resulting in measurement errors
- Resistance to shock, vibration and pressure
- Withstand of VPI(Vaccum Pressure Impregnation) Process
- High Dielectric Strength
- EAC & PAC approved Model available for equipment used in hazardous area.

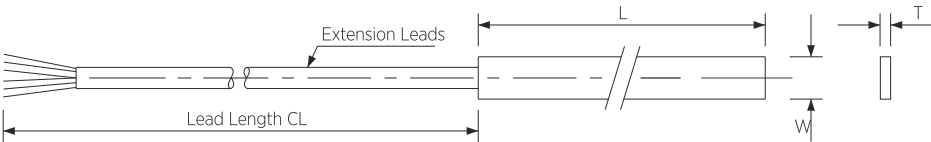


Specification

- Type: PT 100(100 ohm at 0°C)*
- Model: TSRF series
- Body Material: Fibre Glass epoxy
- Temperature Class: Class F (Temperature limit:155°C) or Class H (Temperature limit:180°C)
- Calibration Standard: IEC 60751
- Temperature
- coefficient (TCR): 0.00385
- Accuracy: Class A/B/2B
- Sensing current: 10mA maximum
- Dielectric strength: 3 KV/50Hz for 1 minute between leads and surface of Glass epoxy body (Increased dielectric strength up to 5 KV/50Hz for 1 minute upon request.)
- Lead Wire: 2/3/4 single or multiple stranded Tin/Silver/Nickel plated copper wire with PTFE or Polyamide insulation(special Lead wire and cable upon request).Please note that the selection of suitable wire gauge is depend up on the width and thickness of the sensor.

For Sizes & all other dimension please refer drawing.
*Note: Other values like PT-50,PT-200 and RTD with TCR value 0.003920 etc. are available upon request. Custom design of sensors are also available upon request.

Model : TSRF series (Double Element)



MODEL: TSRF-ACC-L-T-W-NW-CL-WG-CC

ACC	Accuracy of RTD element (A/B/2B)
L	Length in mm
T	Thickness in mm
W	Width in mm
NW	Nos. of wires (option 2/3/4)
CL	Lead length in mm
WG	Wire Gauge of lead wires in AWG (option 22 to 28 AWG)
CC	Lead wire Construction (See table I)

EXAMPLE (Part Number): TSRF-B-150-2-8-2-1000-24-X

DIMENSIONAL RANGE (IN MM)			
PARAMETER	MAX	MIN*	TOLERANCE
LENGTH (L)	600.0	45.0	+/- 5.0
THICKNESS (T)	4.5	2.0	+/-0.3
WIDTH (W)	30.0	10.0	+/-0.3
LEAD LENGTH (CL)	50000.0	1000.0	+50.0/-0.0

Cable Construction

TABLE 1	
DESCRIPTION	CODE
TWISTED TEFLON INSULATED /TEFLON JACKETED	X
PTFE INSULATED LEADS	Y
FLAT POLYAMIDE INSULATED LEADS	Z
FLAT TEFLON INSULATED AND JACKETED	W
TWISTED TEFLON INSULATED /SHIELDED/ TEFLON JACKETED	R

ATEX, IECEX, CSA, EAC, PAC, CCC, UKCA, INMETRO & PESO approved Sensors



Slot Resistance Thermometers

Explosive Gas atmospheres (Increased safety “e”, Intrinsically safe “ia”)

- Ex II 2G Ex eb IIC Gb

Ex e IIC Gb U -50°C to 180°C

Ex ia IIC Ga
- Ex II 1G Ex ia IIC Ga

Ex ia IIC Ga U -50°C to +180° C

Ex eb IIC Gb



Product Overview

ATEX, IECEX, CSA, EAC, PAC, CCC, UKCA, INMETRO & PESO approved sensors are intended for use in hazardous areas in which explosive gas atmospheres, caused by mixture of air and gases, vapours or mists, exist under normal atmospheric condition. Due to special design guidelines it prevents arcing. These certified RTDs are generally flat type in construction and are available in various sizes.

Main Features

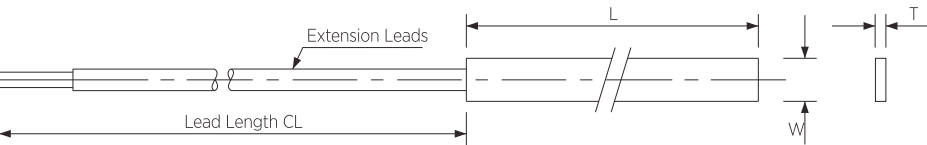
- Slim dimensions to get inserted in between windings
- Bifilar design that prevents induction voltage resulting in measurement errors
- Resistance to shock, vibration and pressure
- Withstand of VPI (Vaccum Pressure Impregnation) Process
- High Dielectric Strength
- RTD certified as Increased safety “e” and Intrinsically safe “ia” approved for zone 0, 1 and 21
- EU-Type examination Certificate No: Presafe 18 ATEX 12507U
- IECEX Certificate No: IECEX PRE 18.0032U
- CSA Certificate No : 70181802
- EAC Certificate No : EAЭC RU C-IN.АД07.B.00871, EAЭC RU C-IN.АД07.B.02319
- PAC_Kazakhstan certificate no.: KZ16VTN00008390
- PAC_Russia certificate no.: 87160-22
- China Compulsory Product Certification No : 2022312315000599, 202231235000598
- UK Type Examination Certificate No : DNV 22 UKEX 68889U
- INMETRO Certificate No: DNV 23.0140 U
- PESO approval no.: A/P/HQ/GJ/104/6158 (P578792), A/P/HQ/GJ/104/6169 (P579996)
- Complies with European standard for electrical apparatus for
 - Explosive gas atmosphere : ATEX EU Directive 2014/34/EU
 - IEC 60079-0:2017 (General requirements)
 - IEC 60079-7:2017 (Increased safety “e”)
 - IEC 60079-11:2011 (Intrinsically safe “ia”)

Specification

- Type: PT 100(100 ohm at 0°C)
- Model: TSRB, TSRC, TSRD and TSRK series
TSRB-ET, TSRC-ET, TSRD-ET series
- Element: Single for TSRB, TSRC, TSRB-ET, TSRC-ET series
Double for TSRD, TSRD-ET series
Both single and double for TSRK series
- Body Material: Fibre Glass epoxy (Class H)
- Temperature Range: -50°C to +180°C
- Temperature Range for ET version: -40°C to +180°C
- Calibration Standard: IEC 60751
- Temperature Coefficient (TCR): 0.00385
- Accuracy: Class A/B/2B
- Sensing Current: 10mA maximum
- Dielectric Strength: 3KV/50Hz, 1 minute for TSRB and TSRB-ET series
5 KV/50Hz, 1 minute for TSRC, TSRK and TSRC-ET series
3 KV/50Hz, 1 minute, for TSRD and TSRD-ET series
- Lead Wire: 2/3/4 single or multiple stranded Tin/Silver/Nickel plated copper wire with PTFE or Polyamide insulation

For Sizes & all other dimension please refer drawing.
*TSRB, TSRC, TSRD, TSRK are listed by CSA Group as Certified

For TSRB, TSRB-ET, TSRC and TSRC-ET series



- MODEL: TSRB-ACC-L-T-W-NW-CL-WG-CC
MODEL: TSRC-ACC-L-T-W-NW-CL-WG-CC
MODEL: TSRB-ET-ACC-L-T-W-NW-CL-WG-CC
MODEL: TSRC-ET-ACC-L-T-W-NW-CL-WG-CC

ACC	Accuracy of RTD element (A/B/2B)
L	Length in mm
T	Thickness in mm
W	Width in mm
NW	Nos. of wires (option 2/3/4)
CL	Lead length in mm
WG	Wire Gauge of lead wires in AWG (option 22 to 28 AWG)
CC	Cable Construction (See table I)

EXAMPLE (Part Number): TSRB-B-150-2-6-3-1000-24-Y
: TSRB-ET-150-2-6-3-1000-24-Y

DIMENSIONAL RANGE (IN MM)			
PARAMETER	MAX	MIN*	TOLERANCE
LENGTH (L)	475.0	45.0	+/- 5.0
THICKNESS (T)	4.5	2.0	+/-0.25
WIDTH (W)	25.0	6.0	+/-0.20
LEAD LENGTH (CL)	50000.0	1000.0	+50.0/-0.0

* FOR 4 WIRE RTD MINIMUM WIDTH STARTS FROM 7.5 MM

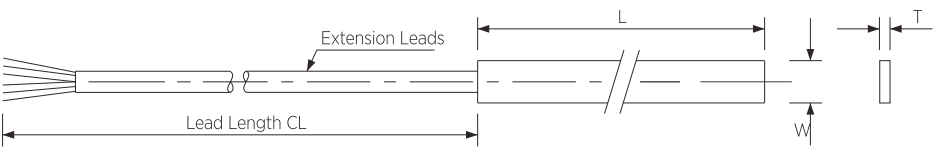
Cable Construction

TABLE 1	
DESCRIPTION	CODE
TWISTED PTFE INSULATED / PTFE JACKETED	X
FLAT PTFE INSULATED LEADS	Y
FLAT POLYAMIDE INSULATED LEADS	Z
FLAT PTFE INSULATED AND JACKETED	W
FLAT PTFE INSULATED AND FEP JACKETED	Q
TWISTED PTFE INSULATED / SHIELDED / PTFE JACKETED	R





TSRD and TSRD-ET series (Double element)



MODEL: TSRD-ACC-L-T-W-NW-CL-WG-CC
MODEL: TSRD-ET-ACC-L-T-W-NW-CL-WG-CC

ACC	Accuracy of RTD element (A/B/2B)
L	Length in mm
T	Thickness in mm
W	Width in mm
NW	Nos. of wires (option 2/3/4)
CL	Lead length in mm
WG	Wire Gauge of lead wires in AWG (option 22 to 28 AWG)
CC	Cable Construction (See table I)

EXAMPLE (Part Number): TSRD-B-150-2-14-3-2000-24-Y
: TSRD-ET-B-150-2-14-3-2000-24-Y

DIMENSIONAL RANGE (IN MM)			
PARAMETER	MAX	MIN*	TOLERANCE
LENGTH (L)	475.0	45.0	+/- 5.0
THICKNESS (T)	4.5	2.0	+/-0.3
WIDTH (W)	25.0	10	+/-0.3
LEAD LENGTH (CL)	50000.0	1000.0	+50.0/-0.0

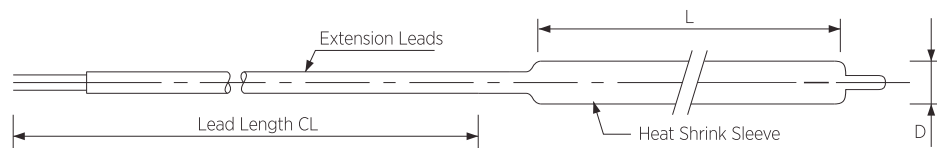
Cable Construction

TABLE 1

DESCRIPTION	CODE
TWISTED PTFE INSULATED / PTFE JACKETED	X
FLAT PTFE INSULATED LEADS	Y
FLAT POLYAMIDE INSULATED LEADS	Z
FLAT PTFE INSULATED AND JACKETED	W
FLAT PTFE INSULATED AND FEP JACKETED	Q
TWISTED PTFE INSULATED / SHIELDED / PTFE JACKETED	R

*TSRB, TSRC, TSRD, TSRK are listed by CSA Group as Certified

For TSRK series



MODEL: TSRK-E-T-ACC-L-D-NW-CL-WG-CC

E	Type of Element(P1=PT-100 & P2=PT-1000)
T	Type of RTD (S=Simplex & D=Duplex)
ACC	Accuracy of RTD element (A/B/2B)
L	Length in mm
D	Diameter in mm
NW	Nos. of wires (option 2/3/4)
CL	Lead length in mm
WG	Wire Gauge of lead wires in AWG (option 20 to 30 AWG)
CC	Cable Construction (See table I)

EXAMPLE (Part Number): - TSRK-P1-S-A-25-4-3-10000-24-Y

DIMENSIONAL RANGE (IN MM)			
PARAMETER	MAX	MIN*	TOLERANCE
LENGTH (L)	500.0	13.0	+/- 3.0
DIAMETER (D)	25.0	3.0	+/-0.5
LEAD LENGTH (CL)	50000.0	1000.0	+50.0/-0.0

Cable Construction

TABLE 1

DESCRIPTION	CODE
TWISTED PTFE INSULATED / PTFE JACKETED	X
PTFE INSULATED LEADS	Y
FLAT PTFE INSULATED AND JACKETED	W
TWISTED PTFE INSULATED / SHIELDED / PTFE JACKETED	Q
FLAT FEP INSULATED LEADS	R



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