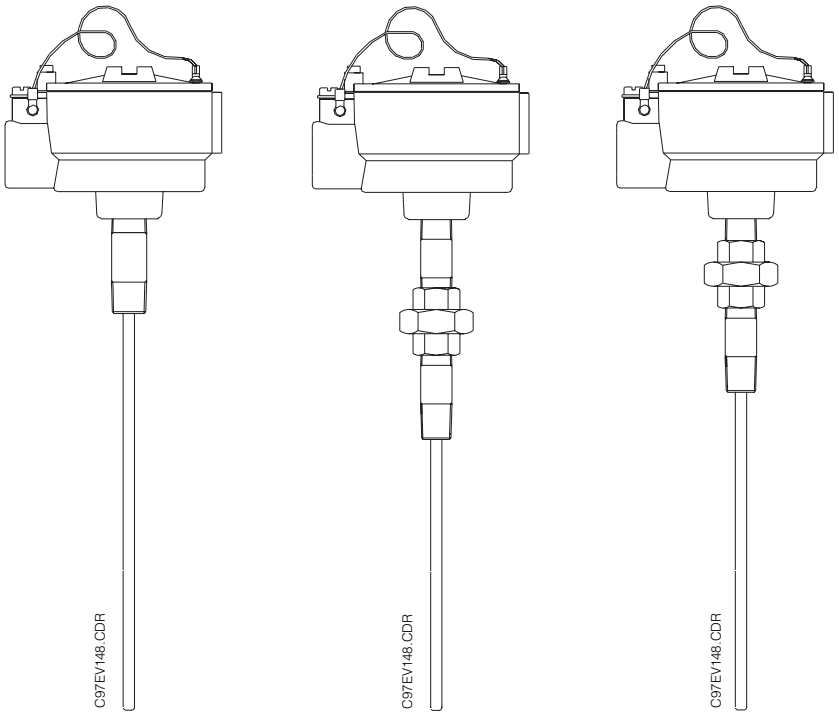
Technical
Information
TI203T/02/en

Thermocouple Thermometer
omnigrad TSC281

Heavy duty - General purpose
M.I. replaceable inset
with Nipple or Nipple and Union
G 1/2" male connection to thermowell



TSC281 Type N with Nipple

TSC281 Type NUN with Nipple/Union/Nipple

TSC281 Type UN with Union/Nipple

Description

TSC281 TC thermometer assembly is a thermocouple thermometer specifically designed for heavy duty applications that must be used in combination with bar stock and welded tube thermowells with G 1/2" female connection to thermometer (refer to TA500 series).
It includes a replaceable single or double TC inset, in mineral insulated cable, a Nipple or Nipple/Union neck and a terminal head.
From the TEC family, the inset is available either with flying leads for head transmitter mounting or with ceramic block. The neck and the insertion lengths can be chosen according to process requirements.
A wide choice of thermocouple types and terminal heads is available, other versions can be ordered according to specifications.

Application

TSC281 is a general purpose TC thermometer. It covers a wide variety of market requirements worldwide. It is widely used in many heavy duty applications either in vessels or in pipes. Typical applications can be found in the chemical industry, petroleum refineries, power stations, boilers, incinerators and everywhere a standard mechanical resistance is sufficient.

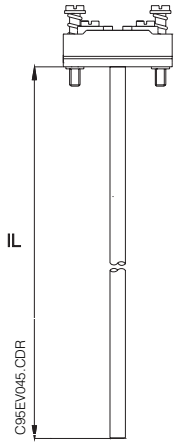
Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

Nothing beats know-how

Technical data



TEC inset

Mineral Insulated Replaceable Inset

Thermocouple type: K (NiCr / NiAl) to IEC584 or ANSI MC96.1
J (Fe / CuNi) to IEC584 or ANSI MC96.1
T (Cu / CuNi) to IEC584 or ANSI MC96.1
Tolerances: Class 2 or Class 1 to IEC584-2
Standard or Special to ANSI MC96.1

Inset model	Sheath diameter	Max. oper. temperature (1)			Response time values (2)	
		Type K	Type J	Type T	Grounded junction	Insulated junction
TEC100	6 mm	1150°C	720°C	370°C	T_{50} = 2s	T_{50} = 2.5s
					T_{90} = 5s	T_{90} = 7s
TEC105	3 mm	1070°C	520°C	315°C	T_{50} = 0.5s	T_{50} = 1s
					T_{90} = 1.5s	T_{90} = 2.5s

Table A
Notes:
(1) according to ASTM E 608
(2) tested in moving water at 0.4 m/s

Insulation resistance: ≥ 1000 MΩ , test voltage 500 V at ambient temperature according to ASTM E 608
Electrical connections: flying leads or ceramic block
Stem: mineral insulated cable
Sheath: AISI 316 / W.1.4401 or INCONEL 600 / W.2.4816
Replacement: inset length IL is calculated as follows

TSC281 Thermometer	TEC100/105 Inset length IL	
	TA20 (*)	TA20G
Type N - Nipple	ML + 118 mm [1]	ML + 127 mm
Type NUN - Nipple/Union/Nipple	ML + 152 mm	ML + 161 mm
Type UN - M/F Union and Nipple	ML + 132 mm	ML + 141 mm
Type N/NUN/UN - .... mm N length	ML+N+26 mm [2]	ML+N+35 mm

Table B
Notes :
(*) All models except for TA20G
[1] ML = Insertion length
[2] N = Neck length - see the order key

Protecting tube

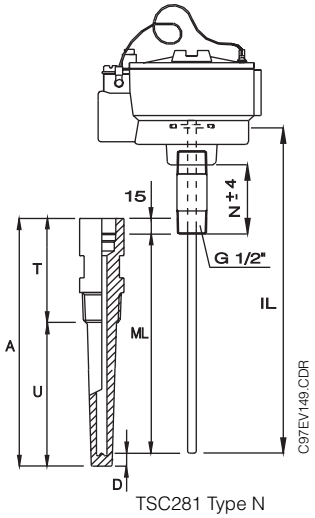
Version: TA500 thermowell series
Insertion length: Insertion length ML is calculated as follows:
ML = A - D - 15 mm where
A = Thermowell nominal length
D = Thermowell bottom thickness

Terminal head

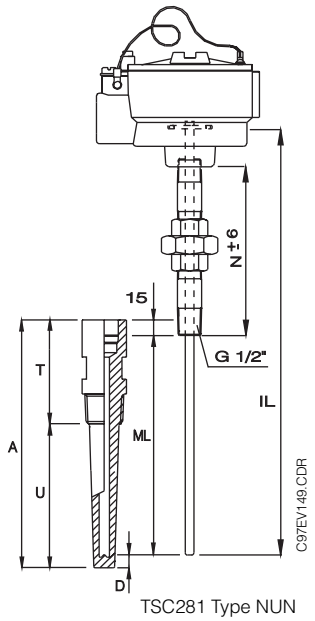
Version: refer to Order key
Protection class: typical IP55
Electrical connections: PG16, 1 or 2 x 1/2" NPT, 3/4" NPT depending on head version

Order key

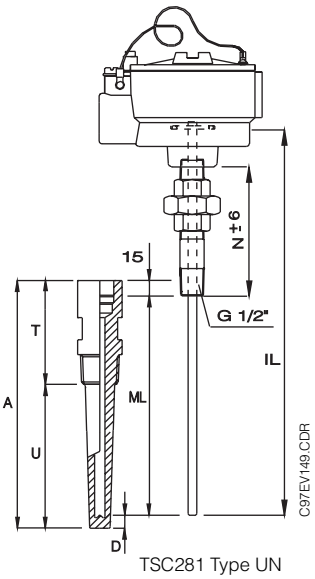
- Each TSC281 TC thermometer must be ordered with corresponding thermowell selected from TA500 series.
- For inset replacement see Technical data.
- Accuracy statement is referred to the replaceable inset only as defined by IEC 584-2 without any protecting thermowell which may introduce thermal drift due to process connection heat dissipation in conjunction to short immersion lenghts. For a correct temperature measurement the thermowell immersion length must be 20 times its diameter. Shorter immersion lengths can be supplied but the thermometer requires an external (neck and connection head) thermal insulation.



TSC281 Type N



TSC281 Type NUN



TSC281 Type UN

TSC281- **Thermocouple Thermometer** - Heavy duty - General purpose
M.I. replaceable inset - With Nipple or Nipple and Union
G 1/2" male connection to thermowell

N length / Nipple-Union material / Type
A - 92 mm / SS 304 / Type N
B - 127 mm / SS 304 / Type NUN
C - 107 mm / SS 304 / Type UN
L - 92 mm / CS A105 / Type N
M - 127 mm / CS A105 / Type NUN
N - 107 mm / CS A105 / Type UN
1 - ..... mm / SS 304 / Type N
2 - ..... mm / SS 304 / Type NUN
3 - ..... mm / SS 304 / Type UN
5 - ..... mm / CS A105 / Type N
6 - ..... mm / CS A105 / Type NUN
7 - ..... mm / CS A105 / Type UN

Insertion length ML (50 ÷ 50000 mm)
TA - 155 mm
TB - 185 mm
TC - 205 mm
TD - 275 mm
TE - 295 mm
TF - 315 mm
TG - 320 mm
TH - 335 mm
TJ - 340 mm
TK - 365 mm
TL - 370 mm
TM - 390 mm
TN - 395 mm
TP - 400 mm
TQ - 435 mm
TR - 445 mm
TS - 450 mm
TT - 535 mm
TV - 555 mm
TW - 585 mm
TX - 685 mm
YY - ..... mm insertion length to specification

Thermocouple type - O.D. - Material - Colours to IEC584 or ANSI MC96.1
See next page

Inset electrical connections
2 - Flying leads
3 - 1 TC Ceramic block
4 - 2 TC Ceramic block

Hot junction type
C - Dual ungrounded common (special version)
G - Grounded
J - Insulated

MgO purity and Class (IEC 584-2 or ANSI MC96.1)
1 - Std purity, Class 2 or Standard
2 - Std purity, Class 1 or Special
3 - High purity, Class 2 or Standard
4 - High purity, Class 1 or Special

Heads: model, material, el. connection, IP
A5 - TA20A, Al, Pg16, IP55
A6 - TA20A, Al, 1/2" NPT, IP55
D3 - TA20D, Al, Pg16, IP55
D4 - TA20D, Al, 1/2" NPT, IP55
E5 - TA20E, Al, Pg16, IP55
F5 - TA20F, PP, Pg16, IP55
G2 - TA20G, Al, 1/2" NPT, IP65, grey
G3 - TA20G, Al, 3/4" NPT, IP65, grey
G4 - TA20G, Al, 2x1/2" NPT, IP65, grey
GB - TA20G, Al, 1/2" NPT, IP65, blue
GC - TA20G, Al, 3/4" NPT, IP65, blue
GD - TA20G, Al, 2x1/2" NPT, IP65, blue
W5 - TA20W, Al, Pg16, IP55
W6 - TA20W, Al, 1/2" NPT, IP55

Built-in transmitter
0 - Without built-in transmitter
1 - Built-in transmitter to be separ. ordered

TSC281-									Complete Order Code

Order key (continued)

Thermocouple type - O.D. - Material - Colours to IEC584 or ANSI MC96.1

TC type K - Millimiters O.D. - IEC584
AB - Single TC - Ø 3 mm - INCONEL 600 / W.2.4816 - IEC
AF - Single TC - Ø 6 mm - INCONEL 600 / W.2.4816 - IEC
AL - Double TC - Ø 3 mm - INCONEL 600 / W.2.4816 - IEC
AQ - Double TC - Ø 6 mm - INCONEL 600 / W.2.4816 - IEC

TC type K - Millimiters O.D. - ANSI MC96.1
DB - Single TC - Ø 3 mm - INCONEL 600 / W.2.4816 - ANSI
DF - Single TC - Ø 6 mm - INCONEL 600 / W.2.4816 - ANSI
DL - Double TC - Ø 3 mm - INCONEL 600 / W.2.4816 - ANSI
DQ - Double TC - Ø 6 mm - INCONEL 600 / W.2.4816 - ANSI

TC type J - Millimiters O.D. - IEC584
BA - Single TC - Ø 3 mm - AISI 316 / W.1.4401 - IEC
BE - Single TC - Ø 6 mm - AISI 316 / W.1.4401 - IEC
BK - Double TC - Ø 3 mm - AISI 316 / W.1.4401 - IEC
BP - Double TC - Ø 6 mm - AISI 316 / W.1.4401 - IEC

TC type J - Millimiters O.D. - ANSI MC96.1
EA - Single TC - Ø 3 mm - AISI 316 / W.1.4401 - ANSI
EE - Single TC - Ø 6 mm - AISI 316 / W.1.4401 - ANSI
EK - Double TC - Ø 3 mm - AISI 316 / W.1.4401 - ANSI
EP - Double TC - Ø 6 mm - AISI 316 / W.1.4401 - ANSI

TC type T - Millimiters O.D. - IEC584
CA - Single TC - Ø 3 mm - AISI 316 / W.1.4401 - IEC
CE - Single TC - Ø 6 mm - AISI 316 / W.1.4401 - IEC
CK - Double TC - Ø 3 mm - AISI 316 / W.1.4401 - IEC
CP - Double TC - Ø 6 mm - AISI 316 / W.1.4401 - IEC

TC type T - Millimiters O.D. - ANSI MC96.1
FA - Single TC - Ø 3 mm - AISI 316 / W.1.4401 - ANSI
FE - Single TC - Ø 6 mm - AISI 316 / W.1.4401 - ANSI
FK - Double TC - Ø 3 mm - AISI 316 / W.1.4401 - ANSI
FP - Double TC - Ø 6 mm - AISI 316 / W.1.4401 - ANSI
YY - .....to specification

Product designation for TC type

Supplementary Documentation

- ☐ TEC100 ∅ 6 mm M.I. inset
  Technical Information TI074T/02/en
- ☐ TEC105 ∅ 3 mm M.I. inset
  Technical Information TI075T/02/en
- ☐ TA20 terminal heads
  Technical Information TI072T/02/en
- ☐ TA500 series specific product T.I.

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12.97/MT

TI 203T/02/en/12.97
Printed in Italy