



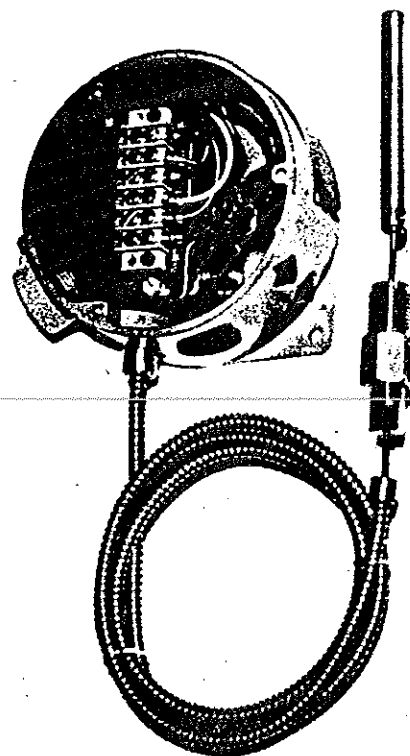
TEMPERATURE SWITCHES

Mercury Filled Element Weatherproof Enclosure

1 - GENERAL SPECIFICATIONS

Series TS

- **Thermal Element**
Mercury filled system Class VB (SAMA Classification).
Construction characteristics overleaf.
- **Enclosure**
Weatherproof, degree of protection IEC IP-55 and NEMA 4.
- **Operating Limits**
 - Range Limits: -30 to $+600^{\circ}\text{C}$ (see Table 1).
 - Allowable Overrange: to the proof temperature.
 - Ambient Temperature: -30 to $+70^{\circ}\text{C}$.
- **Electric Contacts**
1 or 2 independent microswitches (see Table 2).
- **Differential:** fixed or adjustable (see Table 1).
- **Set Point**
Blind: adjustable throughout the range.
Adjustability: $\pm 0,25\%$ of span.
- **Repeatability:** $\pm 0,5\%$ of span.
- **Temperature Error (Set Point Thermal Shift).**
Max $\pm 0,026\%$ of span $\times 1^{\circ}\text{C}$ change from set point calibration temperature.
- **Mounting**
 - Direct, by Stem Type B.
 - Surface (through capillary), by Stem Type C or F.
See Table 3 overleaf for style of stems.
- **Connections:**
 - Bulb: $1/2''\text{NPT-M}$.
 - Electrical: $1/2''\text{BSP-F}$.



Model TSC-DN
(cover removed)

2 - CHOICE OF RANGES

TABLE 1

RANGE ($^{\circ}\text{C}$)	PROOF TEMPERATURE ($^{\circ}\text{C}$)	DIFFERENTIAL ($^{\circ}\text{C}$)		
		FIXED		ADJUSTABLE
		1 CONTACT	2 CONTACTS	1 CONTACT ONLY
$-30/+70$	115	1+2	1+2	7+22
0/100	150	1+2	1+2	7+22
0/150	215	1,5+3	1,5+3	11+35
0/250	300	2+6	2+6	18+55
0/400	500	4+10	4+10	30+90
0/600	600	6+15	6+15	45+135

3 - CHOICE OF ELECTRIC CONTACTS

TABLE 2 (Electrical characteristics overleaf)

NUMBER OF CONTACTS	TYPE	CONTACTS CODE
1	Normal Sealed Adjustable	UN US UR
2	Normal Sealed	DN DS

4 - WETTED MATERIALS

- Bulb (and extension, if any): AISI 316 L.
- Capillary: AISI 316.
- Connection: AISI 304.
- Packing: Teflon.

5 - MODEL CODING:

Series Code _____ TS ☐ - ☐
Stem Type (B, C, F: Table 3 overleaf) _____
Contacts Code (Table 2) _____

6 - ORDERING DATA

- Specify: — Quantity
— Model Code (Point 5)
— Range (Table 1)
— Bulb Connection
— Bulb O.D. (Table 3 overleaf)
— Under-Connection Length Y
— Capillary Length K
— Armor, if required
— Electrical connection
— Options and Accessories (Point 10 overleaf).

Example: 7 TSC-DN, 0/250 $^{\circ}\text{C}$, $1/2''\text{NPT-M}$, bulb 12 O.D., Y = 200 mm, K = 3 m armored, el. conn. $1/2''\text{BSP-F}$.

IMPORTANT NOTES

- 1 - The sensitive portion of the stem (length X: see overleaf) must always plunge COMPLETELY into process fluid; be sure this occurs specially if the bulb is to be installed through a thermowell.
- 2 - For safety reasons and ease of maintenance, it is advisable to always install the bulb through a thermowell. The operating characteristics given above can be guaranteed only if the thermowell is properly sized and correctly installed (refer to Instruction Manual).



TABLE 3 - STEMS (dimensions in mm).

TABLE 1. THERMOWELL DIMENSIONS (mm)

Stem Type B

Stem Type C

Stem Type F

Length X = Sensitive Portion

Length Y = Under-Connection Length: see NOTES below

SPAN (°C)	STD. BULB Ø 12		OPT. BULB Ø 9,5	
	X	Y	X	Y
100	85	145	135	195
160	70	130	105	165
250	47	107	72	132
400	41	101	63	123
600	37	97	61	121

NOTES

- 1) The Under-Connection Length Y must be chosen so that the Sensitive Portion X be COMPLETELY plunged into process fluid after instrument installation.
- 2) In case of thermowell above condition 1) depends on thermowell size and on how it is installed.
- 3) The Length Y given in above table is the MINIMUM required in the most favourable conditions (our std. thermowell without lagging extension and with threaded process connection, installed through std. coupling welded to pipe).

NOTES

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7 - CONSTRUCTION CHARACTERISTICS

Thermal Element

The mercury filled thermal system consists of:

- Elastic Element: AISI 316 L Bourdon tube;
- Capillary: AISI 316 armorless or (on request) protected with st. steel flexible armor, std. length 1.5 m, max 6 m;
- Bulb: AISI 316 L 12 mm O.D. std. (AISI 304 9.5 mm O.D. on request);
- connection: AISI 304 compression fitting adjustable along bulb extension or capillary.

- Other Characteristics: as Pressure Switches with Bourdon tube element (see Bulletin 2.1.1).

8 - ELECTRICAL CHARACTERISTICS

Type of Microswitches (2nd letter of Contacts Code)

N = Normal construction.

S = Sealed construction: the microswitch is argon filled and then sealed to make it operate safely in dusty or chemical aggressive environments, specially with low current values. Not available with adjustable differential.

R = Adjustable Differential: permits fine adjustment of differential, within a wider band, by means of a knurled plastic wheel integrally mounted on the microswitch itself. Available for 1 contact models only.

- Electrical Rating: 220/380 V 15 A A.C.
125 V 0,5 A D.C.

Terminal Block

Screw-type terminals suitable also for thimbles. Plaskon 446 MIL-UL Insulating material.

Earth Screws

Two earth screws are provided: one on the outside of the case, the other inside the case to earth all the metal parts of the instrument.

- Insulation (terminal screws/earth screws)

The test voltage is 2000 V.

9 - REMARKS FOR CORRECT APPLICATION

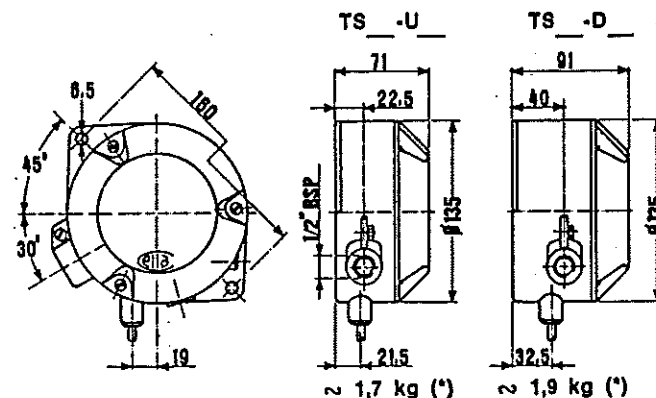
- Setting too near the normal working temperature (less than 10% of span) should be avoided when the instrument might undergo vibrations or accidental shocks.
- Should vibrations be unavoidable, install the instrument so that vibration direction is perpendicular to the axis of microswitch pin.

10 - OPTIONS AND ACCESSORIES

- 1 - Bulb connection other than standard.
- 2 - Electrical connection other than standard.
- 3 - Set point calibration.
- 4 - Shifted range (with std. span and max 600°C f.r.v.).
- 5 - Bulb 9,5 mm O.D.
- 6 - Degree of protection IP-65.
- 7 - Stainless steel exposed screws.
- 8 - Electrical connectors to MIL Standards.

INSTRUCTION MANUAL: NI-061

11 - DIMENSIONS (mm) AND WEIGHTS (kg)



(*) CON BULBO TIPO C STD. / with Stem Type C std.