# Compact temperature switch
# IP 65
# Model TCS



## Applications

- Temperature monitoring and direct switching of electrical loads
- Control and regulation of industrial processes
- Universally suitable for machine building, plant, vessel, apparatus construction and food industry, chemical industry, petrochemical industry
- For measuring points with limited space

## Special features

- Case aluminium, epoxy resin coated
- Ingress protection IP 65, NEMA 4
- Ambient temperature -40 ... +85 °C
- 1 switch point, SPDT or DPDT with a high contact rating of up to 15 A / AC 220 V
- Capillary up to 10 m

**Fig. left: Temperature switch model TCS-C**
**Fig. right: Temperature switch model TCS-B**

## Description

These high-quality and robust temperature switches have been developed especially for safety-critical applications. The high quality and the manufacturing of the product ensures reliable monitoring of your plant. The manufacturer, Cella, is certified to ISO 9001. During production, the switch is followed, step by step, by quality control software and is thus 100 % tested.

All wetted parts materials are from stainless steel. Each switch family is available in a choice of IP 65, Ex-ia or Ex-d.

In order to ensure as flexible operation as possible, the temperature switches are equipped with micro switches, which make it possible to switch an electrical load of up to 15 A / AC 220 V directly. For smaller contact ratings, such as for PLC applications, Argon gas-filled micro switches with gold-plated contacts can be selected as an option.

With its flexible AISI 316 spiral protection hose, the model TCS temperature switch is extremely robust and guarantees optimal operating characteristics for applications requiring particularly high corrosion protection.



Data sheets showing similar products:
Temperature switch, stainless steel version, IP 65; model TWG; see data sheet TV 31.60
Temperature switch, Ex protection EEx-d, IP 65; model TAG; see data sheet TV 31.61
Mini temperature switch; model TXS; see data sheet TV 31.70

## Standard version

**Case**
Aluminium, epoxy resin coated, case cover with screw-type cover, due to anti-twist device secured against unauthorised intervention

**Ingress protection**
IP 65 per EN 60529 / IEC 529

**Permissible ambient temperature**
-40 ... +85 °C

**Connection to thermowell**
Stainless steel, connection thread ½ NPT

**Sensor**
AISI 316
Diameter: 9.5 mm
Length: see table "Sensor length X and immersion depth Y"

**Measuring system**
Gas-actuated temperature system
dependant on the temperature range, SAMA class II C or class II A

**Capillary length**

| Length | Code |
|---|---|
| Direct assembly | B |
| 2 m | C |
| 5 m | Q [1] |
| 10 m | R [1] |

1) Capillaries to SAMA II A: The maximum permitted height difference between sensor and housing is 2 m.

**Immersion depth**
The maximum immersion depth Y (see dimensional drawing) can be calculated as per the following equation:
Capillary length in metre x 145 mm

Example:
Capillary length 2 m
=> 2 x 145 mm = 290 mm = max. immersion depth

The length K is reduced accordingly.

**Switch contacts**

| Code | Type | Design | Electrical rating (resistive load) [2] AC | DC |
|---|---|---|---|---|
| 1 | SPDT | **Silver contacts** | 15 A, 220 V | 2 A, 24 V<br>0.5 A, 125 V<br>0.25 A, 220 V |
| 2 [3] | DPDT | **Silver contacts** | 5 A, 220 V | 0.5 A, 24 V |
| 3 | SPDT | **Silver contacts** inert gas filled Tamb: -30 ... +70 °C | 15 A, 220 V | 2 A, 24 V<br>0.5 A, 220 V |
| 4 [3] | DPDT | **Silver contacts** hermetically sealed in air | 5 A, 220 V | 0.5 A, 24 V |
| 5 | SPDT | **Gold-plated contacts** inert gas filled Tamb: -30 ... +70 °C | 1 A, 125 V | 0.5 A, 24 V |

2) Only the underlined data are shown on the product label
3) Simultaneous triggering within 2 % of the full temperature range

**Repeatability**
≤ 1 % of the full temperature range

**Setting ranges, max. test temperature, max. switch hysteresis**

| Setting range | Working range | Test temperature | Max. switch hysteresis Contact code 1, 3, 5 | Contact code 2 | Contact code 4 | SAMA class |
|---|---|---|---|---|---|---|
| **-30 ... +10 °C** | -40 ... +60 °C | +90 °C | 2 °C | 2 °C | 8 °C | II C |
| **-15 ... +40 °C** | -40 ... +60 °C | +90 °C | 1.5 °C | 2 °C | 8 °C | II C |
| **10 ... 70 °C** | -40 ... +70 °C | +90 °C | 1.5 °C | 2 °C | 8 °C | II C |
| **40 ... 100 °C** | -40 ... +120 °C | +140 °C | 1.5 °C | 2 °C | 8 °C | II C |
| **70 ... 120 °C** [4] | -40 ... +170 °C | +180 °C | 1.5 °C | 4 °C | 16 °C | II A |
| **90 ... 160 °C** | -40 ... +170 °C | +180 °C | 2 °C | 4 °C | 16 °C | II A |
| **130... 190 °C** | -40 ... +190 °C | +210 °C | 2.5 °C | 4 °C | 16 °C | II A |
| **160... 250 °C** | -40 ... +280 °C | +300 °C | 2.5 °C | 4 °C | 16 °C | II A |

4) Ambient temperature max. +70 °C

**Switch points**
After unscrewing the case cover, switch point adjustment can be made using the adjustment screw. The switch point is settable within the entire measuring range with the following general rule:

- Define the value A = 2 x repeatability + switch hysteresis
- If the temperature is rising, the switch point should be set between (min. + value A) up to max. of the setting range
- If the temperature is falling, the switch point should be set between min. up to (max. - value A) of the setting range

**Example:**
Setting range: 40 ... 100 °C with one switch contact
Repeatability: 1 % of 100 °C = 1 °C
Switch hysteresis = 1.5 °C (see table setting ranges)
Value A = 2 x 1 °C + 1.5 °C = 3.5 °C
If the temperature is rising, the switch point should be set between 43.5 °C and 100 °C.
If the temperature is falling, the switch point should be set between 40 °C and 96.5 °C (96.5 °C = 100 °C - 3.5 °C).
For optimal performance we suggest the switch point lies between 25 % and 75 % of the setting range.

**Electrical connection**
½ NPT female, cable connection using internal terminal block, protective conductor connection using internal and external screw, max. earth cable cross-section 4 mm²

**Temperature switch certified per:**
Low voltage directive 73/23 EEC and 93/68 EEC

**Dielectric strength**
Safety class I (EN 61298-2: 1997-06)

**Mounting**
Direct or wall mounting
The preferred connection location of the temperature switch should be below. Alternatively the instrument can be installed so that internal access is from the front of the enclosure and the electrical connection is located on the side.

**Weight**
approx. 1 kg

## Options

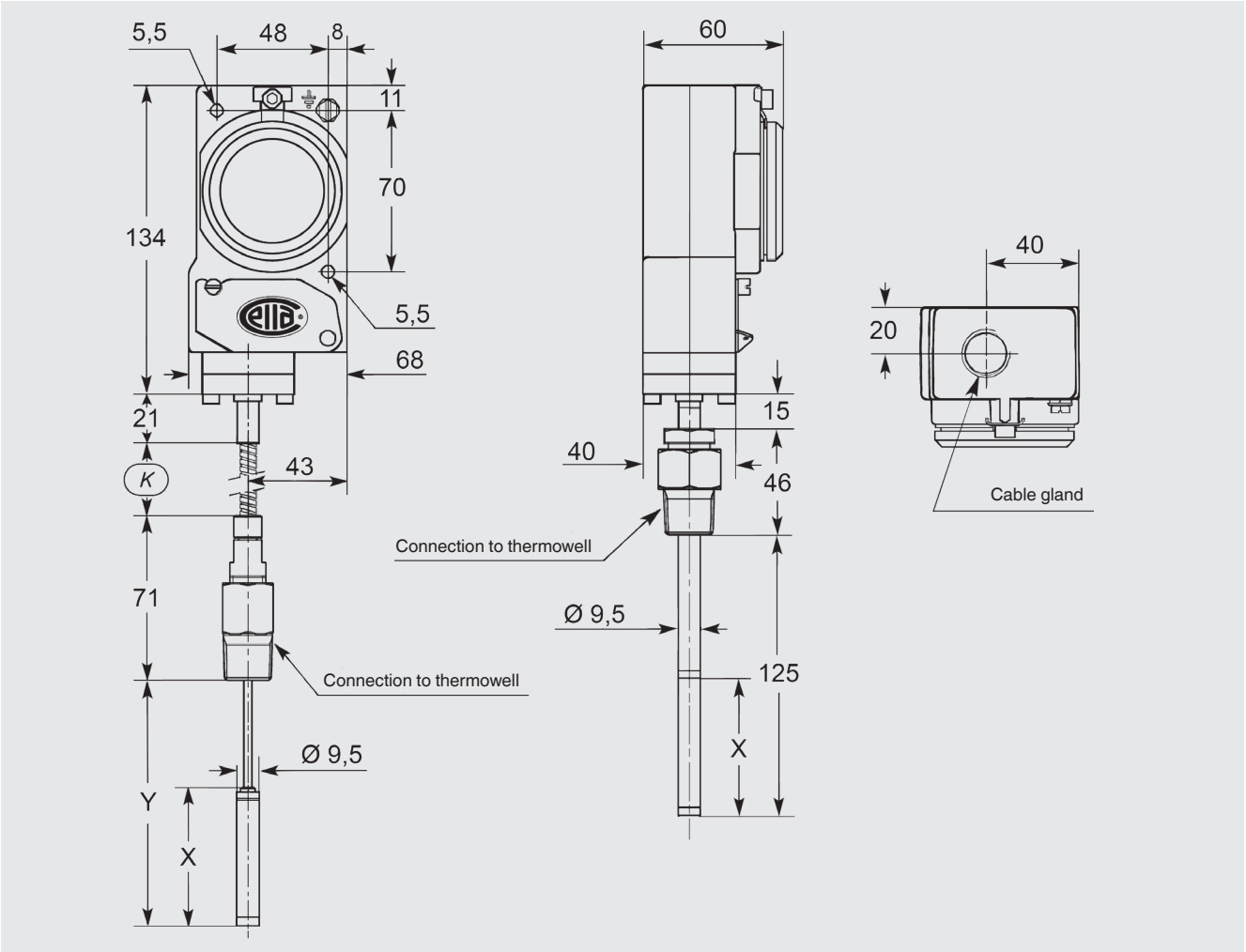
- Other connection to thermowell
- Electrical connection ¾ NPT, G ½ or M20 x 1.5 (female)
- Cable gland on request
- Switch point adjustment to customer specification
- 2" pipe-mounting kit
- Case made of AISI 316
- Helical bulb for measuring ranges -15 ... +40 °C and +10 ... +70 °C
- Version for offshore 5), geothermal 5) or tropicalised application 5)
- Version for applications to NACE 5)
- Version for ammonia applications 5)
- Design per
  GAS Ex-ia DUST Ex-iaD Gr. II Cat. 1 GD 6)
  Electrical characteristics $U_i$ = 30 V
  $I_i$ = 100 mA
  $P_i$= 0.75 W
  $C_i$= 0 µF
  $L_i$= 0 mH
- Accessories:
  Thermowells

## Approvals and certificates

- SIL 2 version 6)
- GOST-R certificate
- Test certificate *CA* (confirmation of the switching accuracy)
- Test report *CP* (3-time listing of the switch point, requires switch point specification)
- Material certificate 3.1 per EN 10204

5) Contacts 3, 4, or 5 required
6) Contacts 3 or 5 required

## Dimensions in mm




### Sensor length X and immersion depth Y

| Capillary length | Code | Dimensions in mm | | | | | |
|---|---|---|---|---|---|---|---|
| | | SAMA II C | | | SAMA II A | | |
| | | X | Y | $Y_{max}$ | X | Y | $Y_{max}$ |
| **Direct assembly** | B | 65 | 125 | 125 | 55 | 125 | 125 |
| **2 m** | C | 71 | 100 | 350 | 55 | 100 | 350 |
| **5 m** | Q 7) | 84 | 130 | 900 | 55 | 100 | 900 |
| **10 m** | R 7) | 124 | 170 | 1,800 | 55 | 100 | 1,800 |

7) Capillaries to SAMA II A: The maximum permissible height difference between sensor and housing is 2 m.

### Ordering information

Model / Capillary length / Switch contacts / Setting range / Connection to thermowell / Electrical connection / Switch point(s) / Switch direction(s) / Options

Example: TCS2 - B3 - 40/100 °C - 1/2" NPT-M - 1/2" NPT-F





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