

Type 2040 Safety Temperature Monitor (STM)

Application

Pressure regulator for cryogenic gases and liquids as well as other liquids, gases and vapors · Set point ranges from -45 to $+10$ °C · Temperature range from -60 to $+60$ °C · Operating pressure max. 40 bar · Free of oil and grease

Typetested by TÜV
EC type examination 

Industrial gases (such as argon, nitrogen and oxygen) are stored in a liquefied condition at extremely low temperatures and at a constant pressure in thermally insulated tanks. Pipes transport the medium to the consumer.

To comply with the German pressure vessel ordinance, cryogenic media must be prevented from entering consumer plants which are not designed to handle such low temperatures. The Type 2040 Safety Temperature Monitors (STM) are used for protection in these applications.

The safety temperature monitors close when the medium temperature falls below the temperature set point to prevent excessively cold process medium from entering the downstream consumer plant.

Special features

- Self-operated regulator with integrated temperature sensor
- Convenient set point adjustment
- Free of oil and grease, suitable for oxygen ($p_{max.} = 25$ bar)
- Rugged, compact design featuring small dimensions

The Type 2040 Safety Temperature Monitors are characterized by their increased safety. The regulators close automatically when the sensor system is defective.

The use of Type 2040 Safety Temperature Monitors, however, is not only restricted to cryogenic applications. Due to their special design, these regulators can also handle gases and liquids under other operating conditions.

Versions

The Type 2040 Safety Temperature Monitor consists of a body, an integrated temperature sensor, a set point adjuster and the connecting body with G 1¼ A conical joints at both the inlet and outlet.

Soldering nipples and welding ends including connection nuts are available as end connections (see Accessories).



Fig. 1: Type 2040 Safety Temperature Monitor

Special version

Set point adjuster with set point marking · Reading in steps of 10 °C indicated by ring marks on the set point adjuster.

Type test/type examination

The Type 2040 Safety Temperature Monitors are typetested. The test mark is available on request.

An EC type examination according to the Pressure Equipment Directive 97/23/EC, Module B has been performed on the Type 2040 Safety Temperature Monitors.

Principle of operation

The Type 2040 Safety Temperature Monitors (STM) operate according to the liquid expansion principle. The volume of the temperature-sensitive filling medium confined in the integrated temperature sensor (6) expands as the temperature rises and contracts again as the temperature falls.

The regulators close when the temperature falls below an adjusted temperature set point to prevent excessively cold medium from entering the downstream plant.

The Type 2040 Safety Temperature Monitor consists of the body (1) with integrated temperature sensor (6) and set point adjuster (3).

The valve is normally open. If the medium temperature falls below the adjusted set point (when the medium is too cold), the liquid inside the sensor contracts and the tubular plug (5) is pushed by the positioning spring (4) against the soft-sealed seat (2).

As the medium temperature drops, the plug moves in the closing direction, restricting the medium flow. If the medium temperature drops further, the valve is closed completely when the temperature reaches the adjusted set point.

The set point temperature and the throttling range in front of it can be adjusted within the set point range. The valve first opens again when the medium temperature has exceeded the adjusted set point by 2 K.

If the sensor system is defective, the valve closes (fail-safe position).

Installation

The following generally applies:

- The valve can be mounted in any desired position.
- The direction of flow must match the direction indicated by the arrow on the body.
- Do not install the regulator directly next to an air vaporizer. Otherwise, the regulator might close due to the low outdoor temperature.

Set point adjustment

The closing function (when the set point is reached) works regardless whether the sensor temperature is determined by the ambient air or the process medium. Therefore, the ambient temperature must be at least 15 K above the target temperature to be adjusted before adjusting the set point. If necessary, insulate the regulator accordingly or warm up the regulator to reach this temperature.

Accessories

Connecting parts: connection nut with soldering nipple/welding ends with either a spherical liner or gasket. (see Table 3)

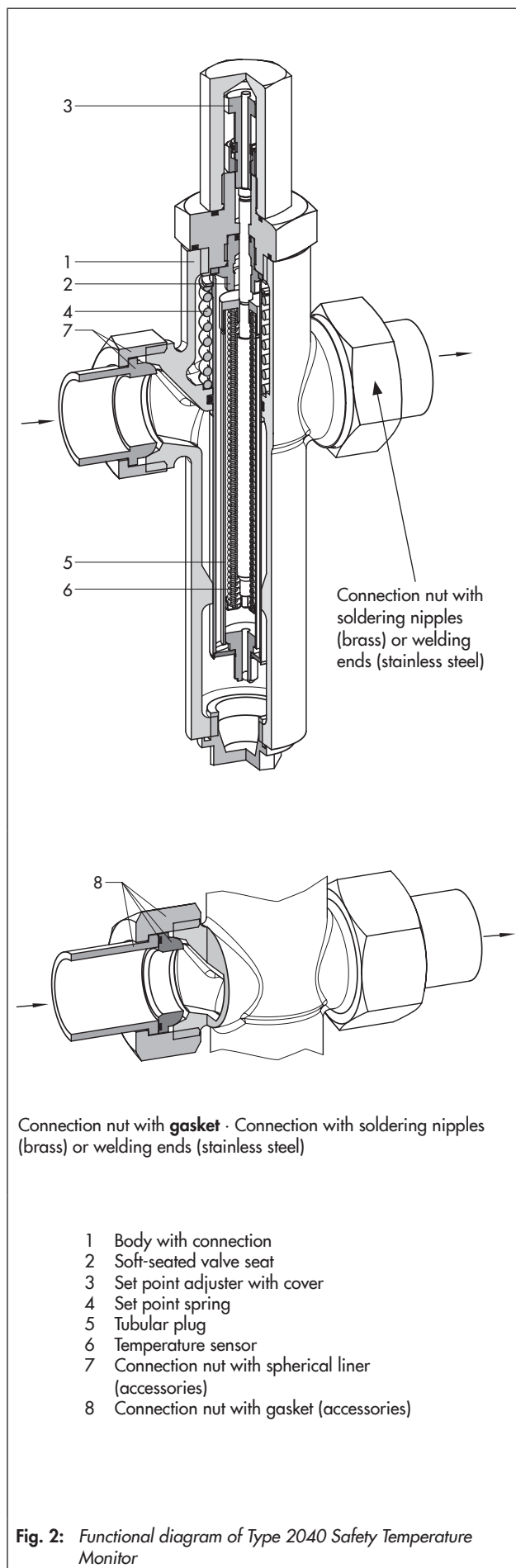


Fig. 2: Functional diagram of Type 2040 Safety Temperature Monitor

Table 1: Technical data · All pressures in bar (gauge)

Type 2040 Safety Temperature Monitor	
Body connection	G 1¼ (see Fig. 4 for connecting parts)
K _{V5} coefficient	5
Set point ranges ¹⁾	-30 to +10 °C · -45 to -10 °C ²⁾
Max. permissible operating pressure	40 bar ³⁾
Max. permissible differential pressure	25 bar
Leakage class according to IEC 60534-4	0.05 % of K _{V5} coefficient at -10 °C · 0.1 % of K _{V5} coefficient at -45 °C
Hysteresis	2 K
Accuracy	1 °C
Permissible ambient temperature range	-60 to +60 °C ⁴⁾
Temperature differential (open/closed)	17 K

1) Temperature set point adjustable within the specified range

2) On request

3) Oxygen service: 25 bar

4) To adjust the set point properly, the ambient temperature must be at least 15 K above the target temperature to be adjusted.

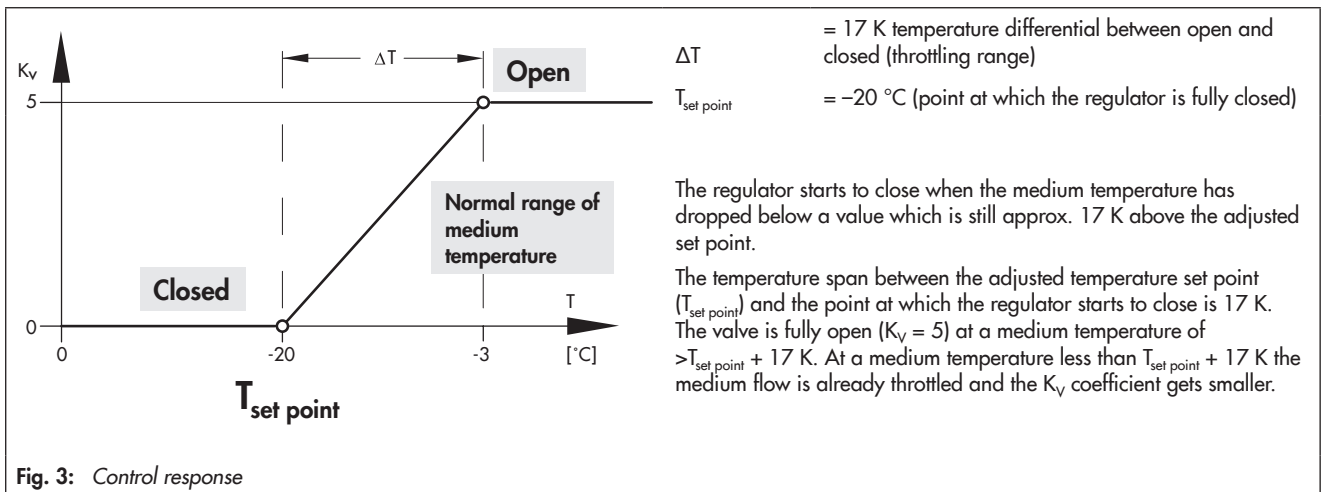


Fig. 3: Control response

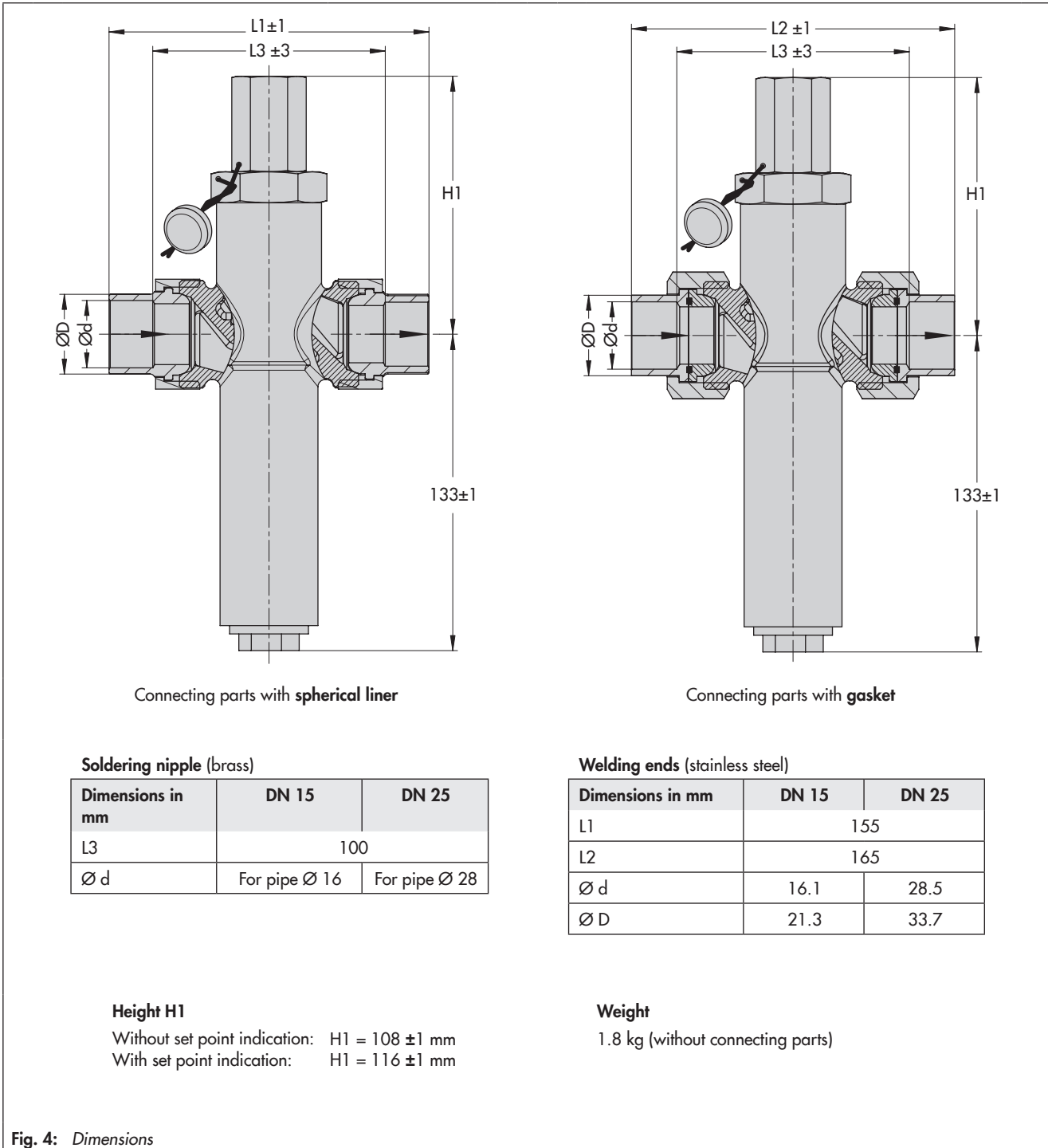
Table 2: Materials · Material numbers according to DIN EN

Body	CC491K/CC499K (G-CuSn5ZnPb)
Bellows	CW453K (CuSn8F40)
Spring	1.4310
O-ring	NBR
Seat	CW617N (CuZn40Pb2)/NBR
Tubular plug	1.4571/1.4404

Table 3: Connecting parts (including order number)

Connection	Connecting parts	Order no.
Conical seal	Soldering nipple (red brass), DN 25	1400-6840
	Soldering nipple (brass), DN 15	1400-9182
	Welding ends (stainless steel), DN 25	1400-9129
	Welding ends (stainless steel), DN 15	1400-9183
Flat seal	Soldering nipple (brass), DN 25	1400-9131
	Soldering nipple (brass), DN 15	1400-9130
	Welding ends (stainless steel), DN 25	1400-9181
	Welding ends (stainless steel), DN 15	1400-9180

Dimensions



Ordering text

Type 2040 Safety Temperature Monitor (STM)

Set point range ...

Accessories · Connecting parts ...

Optionally, special version

Specifications subject to change without notice



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