

TSO, TSH: Room thermostat

How energy efficiency is improved

Enables controlling of HVAC components according to needs.

Features

- Room temperature can be set as the setpoint using the printed temperature scale
- Variants of the standard devices are available, such as thermal feedback, night set-back mode, fan switches and switches for heating/cooling
- Setpoint adjuster with mechanical min. and max. limitation of the setting range



Technical data

Power supply		
Load ¹⁾		230 V~ 10(2,5) A, 24 V= max. 1 A, 24 V~ min. 0.2 A
Parameters		
	Setting range	5...30 °C
	Night-time reduction (N/R)	Approx. 5 K
	Time constant in still air	17 min
	Time constant in moving air (0.2 m/s)	13 min
Thermal feedback		
	Proportional band	Approx. 3 K
	Shortest switching interval	Approx. 19 min (E = 0.5)
Ambient conditions		
	Admissible ambient temperature	0...50 °C
Construction		
	Weight	0.11 kg
	Dimensions	76 × 76 mm
	Housing	Pure white (RAL 9010)
	Housing material	Fire-retardant thermoplastic
	Fitting	Wall/recessed
	Cable inlet	At rear
	Baseplate	Black thermoplastic with membrane sensor and contact system
	Screw terminals	For wire of up to 1.5 mm ²
Standards and directives		
	Type of protection	IP 20 (EN 60529)
	Protection class	II (IEC 60730)
	Energy class	I = 1 % acc. EU 811/2013, 2010/30/EU, 2009/125/EG
CE conformity as per		
	EMC directive 2004/108/EC	EN 60730-1, EN 60730-2-9
	Low-voltage directive 2006/95/EC	EN 60730-1

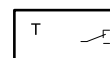
Overview of types

i Power supply: 10% more voltage means P-band approx. 4 K, switching period = 15 min, actual-value reduction = approx. 0.5 K

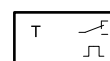
i H/C = heating or cooling, depending on connection; H//C = heating or cooling, selectable

Type	Operating mode switch	Output for	Power supply
TSO670F001	-	H/C	-
TSO672F001	Heating/OFF/Cooling	H//C	-
TSH670F002	-	H/C	230 V~, ±10%, 50...60 Hz
TSH676F002	-	H/C	230 V~, ±10%, 50...60 Hz

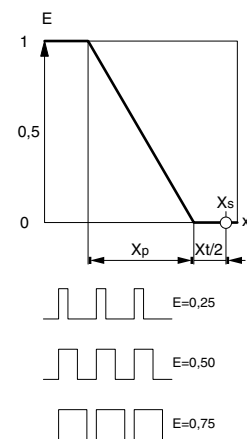
TSO67*F001



TSO67*F001



TSH67*F002



E= control factor

¹⁾ For TSO672F001 for cooling 5(1.5) A



- 💡 TSO670F001, TSO672F001: switching difference 1.3 K without thermal feedback²⁾
- 💡 TSH670F002, TSH676F002: dynamic switching difference 0.5 K with thermal feedback³⁾
- 💡 TSH676F002: additional feature N/R (normal/reduced) for external clock

Accessories

Type	Description
0362225001	Intermediate plate, pure white, for wall mounting on recessed junction box
0303124000	Recessed junction box

- 💡 0303124000: only in combination with intermediate cover plate 0362225001

Description of operation

A membrane sensor expands depending on the temperature and activates an electrical switch. The operating points of the controller are determined by the setpoint entered and the switching difference.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product regulations must also be adhered to. Changing or converting the product is not admissible.

Without thermal feedback

The contacts only switch when the room temperature has changed by the amount of the switching difference. The setpoint corresponds to the upper change-over point.

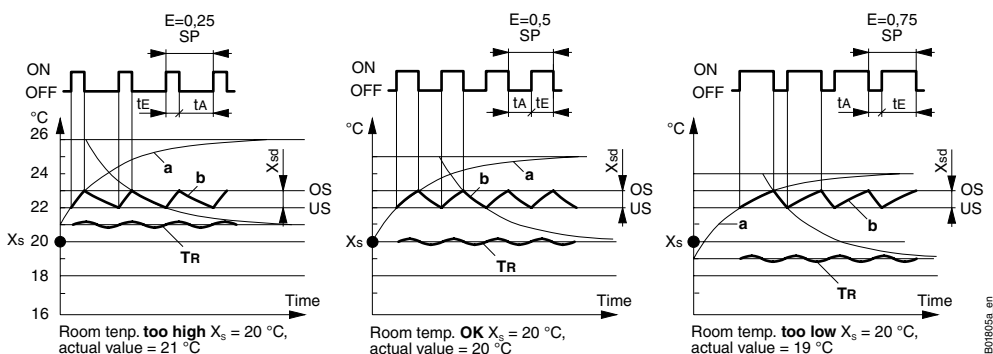
With thermal feedback

To keep the temperature variation in the room as small as possible, the membrane sensor is also heated with a heating resistor in the heating phase. The related max. over-temperature of 5.5 K is greater than the switching difference. Therefore, the thermostat switches itself on and off autonomously even if the room temperature is constant. When the room temperature corresponds to the setpoint applied, the activation and deactivation pulses are the same length (control factor $E = 0.5$). When the room temperature increases, the activation pulses become shorter and the deactivation pulses longer. The result of this is quasi-continuous P-control with a P-band $X_p = 3$ K and a maximum remaining control deviation of $= X_p/2$. The pulse modulation causes the room temperature to vary by an amount that results from the shortest switching period (10 min "On", 10 min "Off"). Depending on the time constant of the room, the resulting temperature variation is only 0.1...0.5 K.

With thermal night set-back mode

To reduce the room temperature, the membrane sensor is additionally heated with a small heating resistor. As a result, the temperature level in the housing is approx. 5 K higher and the controller reacts with a corresponding reduction in room temperature. The "night set-back mode" can be activated externally via a timer.

- For type TSO 625, the night set-back mode can be switched on and off on the controller. When the set-back is switched on, a red LED lights up.



²⁾ Devices without thermal feedback are pure on/off controllers. The static switching difference is given, i.e. for very slow changes in temperature. For faster changes in temperature, the time constant must be taken into account.

³⁾ Devices with thermal feedback are pulsed by an in-built heating element. The control factor falls as the temperature increases, i.e. the controller has proportional behaviour. A small temperature variation of $\pm 0.1...0.5$ K occurs as a result of switching, depending on the time constant of the room.

Key

- | | |
|-------------------------------|---|
| X_S Setpoint | t_E Operating time |
| X_p Proportional band | t_A Duration of 'off' time |
| X_{Sd} Switching difference | SP Switching period ($t_E + t_A$) |
| T_R Room temperature | E Control factor (t_E/SP) |
| OS Upper change-over point | a Transient response of therm. feedback |
| US Lower change-over point | b Temperature at membrane sensor |

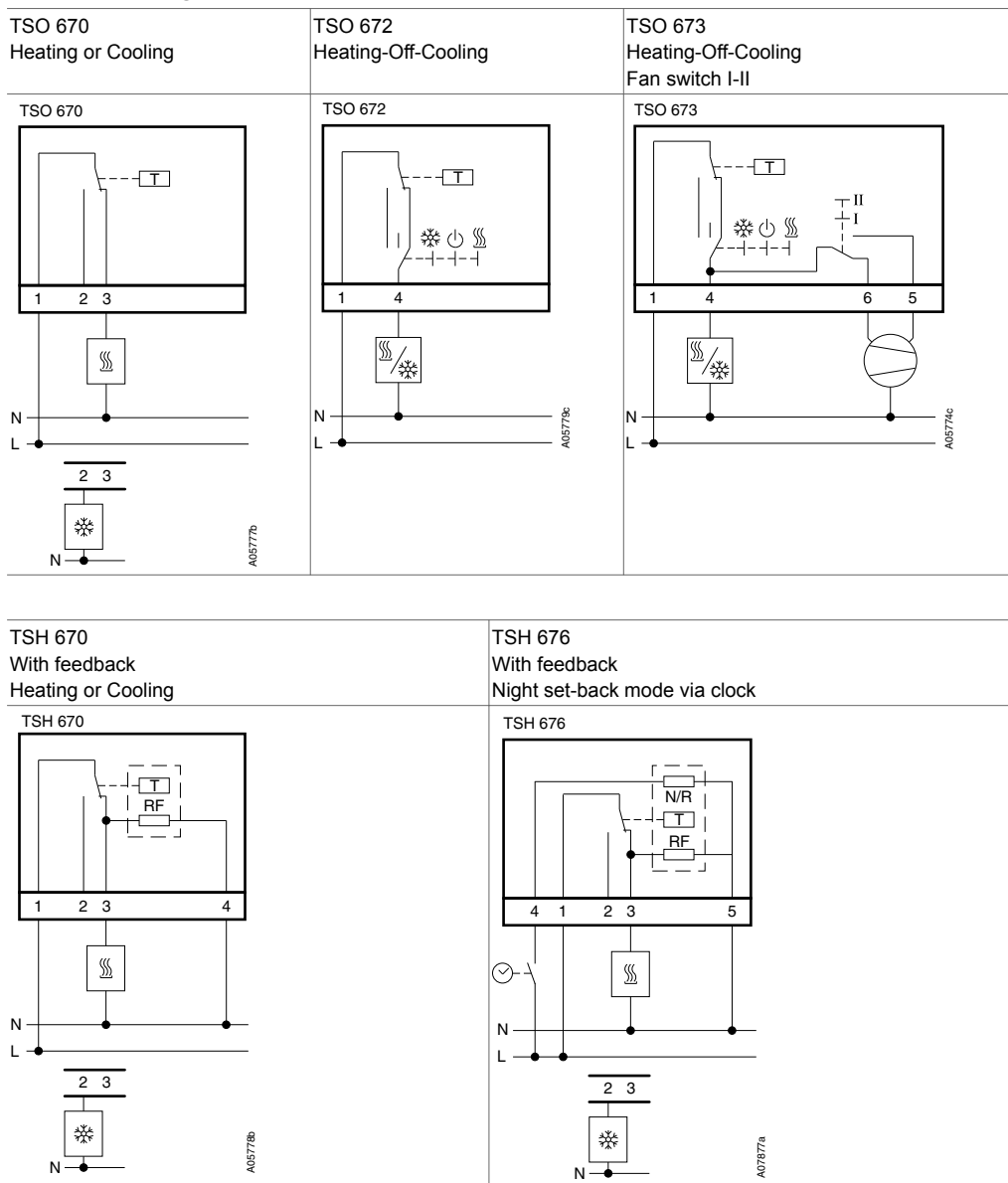
Engineering and fitting notes

The specified voltage tolerances are necessary because the output of the feedback heating resistor is significantly dependent on it. 10% excess voltage results in: 20% more power, P-band 4 K, switching period 15 min instead of 19 min, reduction in room temperature 0.5 K.

Disposal

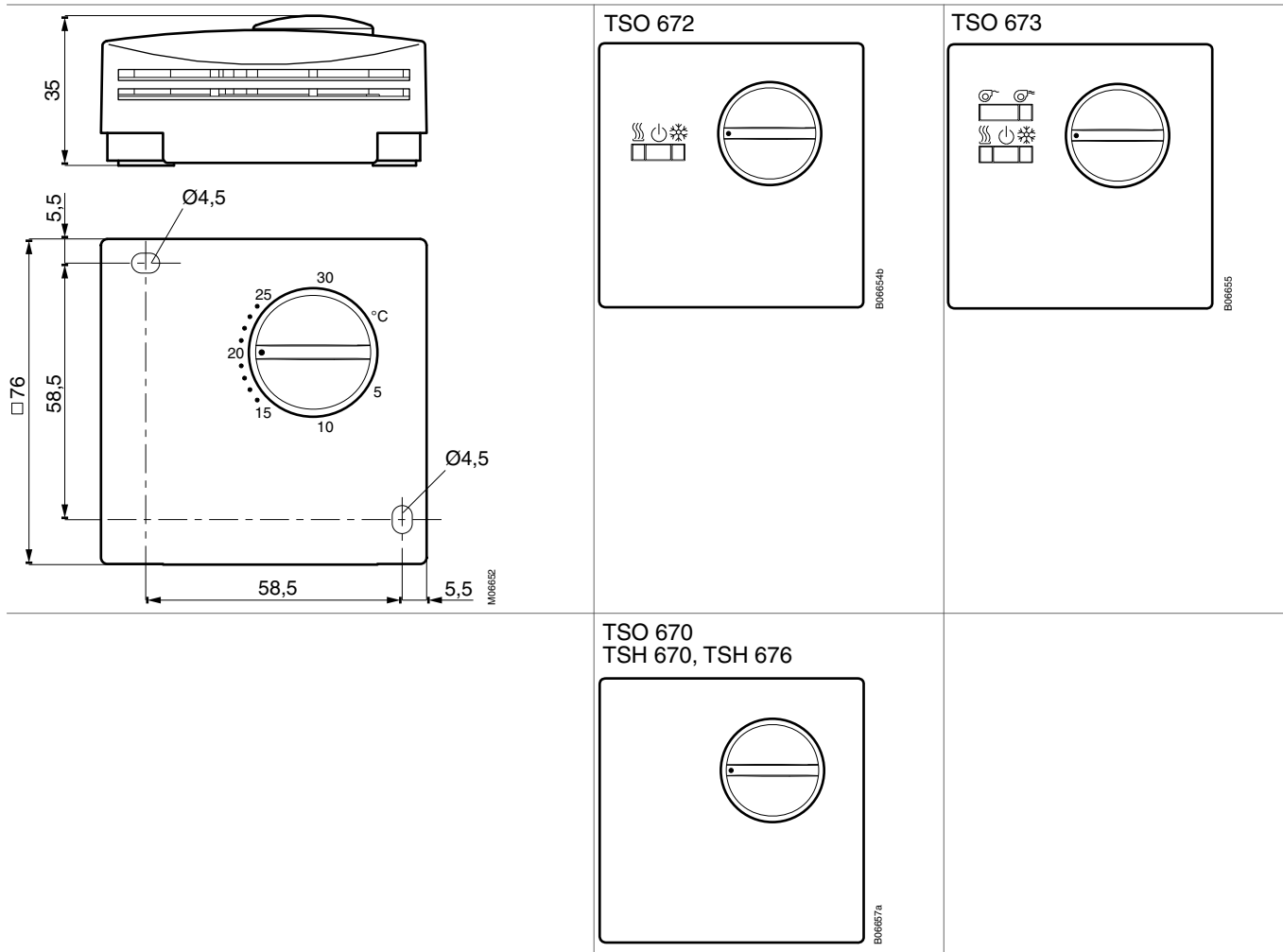
When disposing of the product, observe the currently applicable local laws. More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagrams

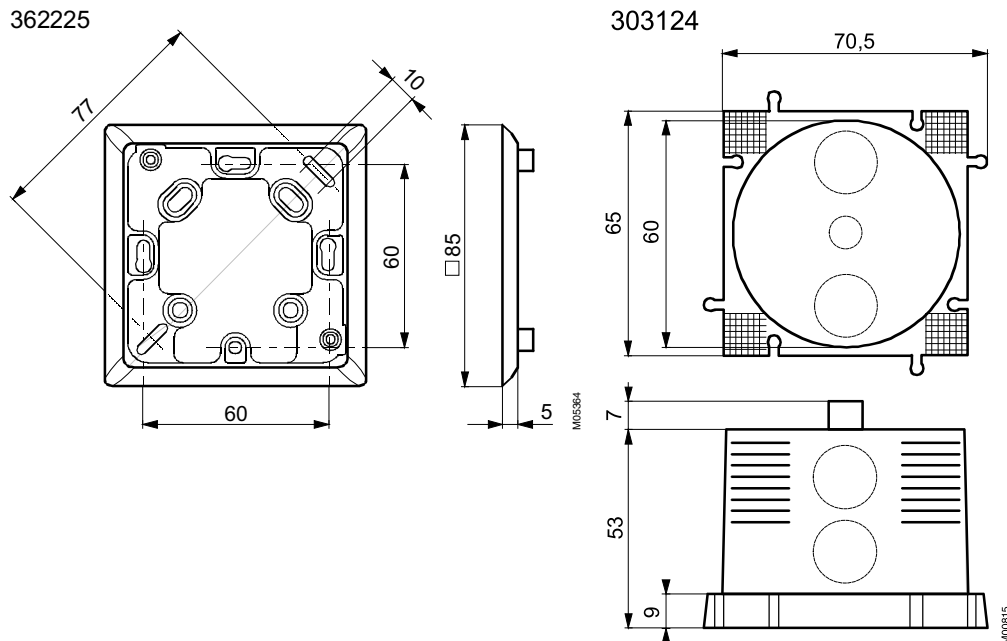


RF Thermal feedback
 N/R Normal/Reduced (night set-back mode)

Dimension drawing



Accessories



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