

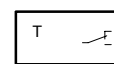
TSO, TSH: Room thermostats

For flexible individual-room control in residential and business premises. Suitable for operating electric heating systems, burners, pumps, thermal drives or cooling equipment in air-conditioning systems.

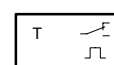
Housing 76 × 76 mm of pure-white (RAL 9010), flame-retardant thermoplastic. Front in modern design with °C scale. Black baseplate with membrane sensor and contact system (variants: thermal feedback, night setback, additional switch, pilot light). Setpoint adjuster with mechanical min./max. limitation of the setting range. Suitable for mounting onto walls or recessed junction boxes. Cable inlet at rear. Screw terminals for wire of up to 1.5 mm².



Type	Mode switch	Additional feature ¹⁾	Output for ¹⁾	Voltage	Wiring diagrams
Without thermal feedback ²⁾ : switching difference 1.3 K					
TSO 670 F001	–	–	H/C	–	A05777
TSO 625 F002	Clock-Day-Night	N/R; LED	H only	230 V~	A05776
TSO 672 F001	Heating-Off-Cooling	–	H//C	–	A05779
TSO 673 F001	Heating-Off-Cooling	Ventilator: I-II	H//C	–	A05774
TSO 674 F001	for ventilator	I-II-III-Off	H/C	–	A05775
With thermal feedback ³⁾ : dynamic switching difference 0.5 K					
TSH 670 F002	–	–	H/C	230 V~	A05778
TSH 672 F002	Heating-Off-Cooling	–	H//C	230 V~	A07876
TSH 676 F002	–	N/R	H/C	230 V~	A07877

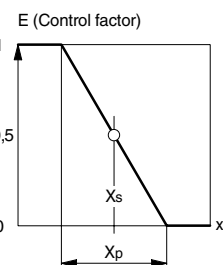


Y01933



Y01934

Power supply 230 V~ ⁴⁾	± 10%, 50...60 Hz	With feedback	
Switch rating 230 V~	10 (2.5) A	P-band	approx. 3 K
TSO 672, 673	Cooling: 5 (1.5) A	Shortest switching period	approx. 19 min (E = 0.5)
Switch rating 24 V~	min. 0.2 A	Ambient temperature	0...50 °C
24 V=	max. 1 A	Weight	0.11
Range	5...30 °C	Degree of protection	IP 20 (EN 60529)
Night reduction (N/R)	approx. 5K	Protection class	II (IEC 60730)
Time behaviour in air		Wiring diagram	see table of types
still	17 min	Dimension drawing	M06652
moving (0.2 m/s)	13 min	Fitting instructions	MV 505473



B01806

Accessories

0362225 001* Intermediate cover plate, pure white, for fitting onto recessed junction boxes on walls

0303124 000* Recessed junction box (only in conjunction with the cover plate 0362225 001)

^{*)} Dimension drawing or wiring diagram are available under the same number

- 1) N/R= Normal/Reduced for external clock
H/C = Heating or Cooling, depending on the connection; H//C = Heating or Cooling, switchable
- 2) Devices without thermal feedback are pure 2-point controllers. Stated here is the static switching difference, i.e. for very slow changes in temperature. Where temperatures change more quickly, the time constant must be taken into account.
- 3) Devices with thermal feedback are made to pulse by an integrated heating resistor. The control factor falls as the temperature rises, i.e. control is proportional. The pulsing causes a small temperature deviation of ± 0.1...0.5 K, depending on the room's time constant.
- 4) 10% higher voltage results in: a P-band of approx. 4 K; a switching period of 15 min; a reduction of approx. 0.5 K in the actual value.

Operation

A membrane sensor expands in relation to temperature, thereby activating an electric switch. The operating points of the controller are determined by the setpoint and the switching difference.

Without thermal feedback

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

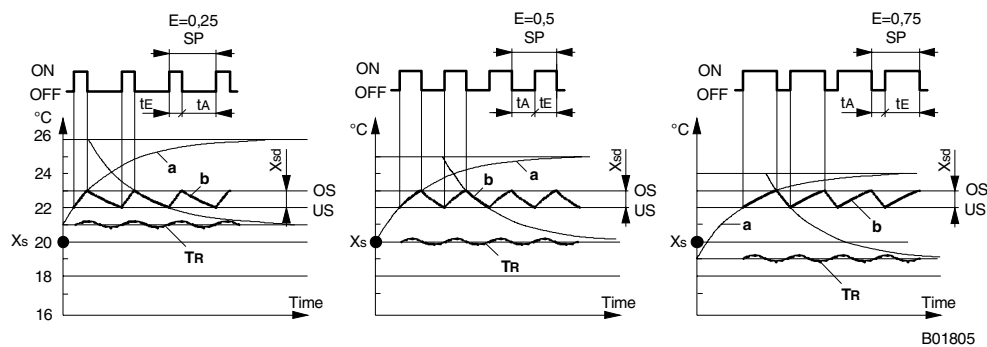
With thermal feedback

To keep the temperature variation in the room as low as possible, the membrane sensor is warmed up in the heating phase by a heating element. The maximum excess temperature of 5.5 K is larger than the switching difference; for this reason, the thermostat switches itself on and off, even when the room temperature remains constant. When the room temperature equals the setpoint, the switching pulses are the same length for both on and off (control factor $E = 0.5$). When the room temperature rises a little, the 'on' pulses become shorter and the 'off' pulses longer. This provides quasi-continuous P-control with a P-band $X_p = 3$ K and a maximum remaining control deviation of $X_p/2$. Due to the pulse modulation, the room temperature varies by an amount such as that which arises from the shortest switching period (10 minutes ON, 10 minutes OFF). The resultant temperature variation amounts to only 0.1 to 0.5 K, depending on the time constant.

With thermal night setback

In order to reduce the room temperature, the membrane sensor is heated by a small heating element. This causes the temperature level in the housing to increase by about 5 K; the controller reacts by reducing the room temperature accordingly. This 'night setback' can be activated externally via a time-switch.

- On the TSO 625, the night setback can be switched on and off at the controller. A red LED lights up whenever the setback is activated.



Key

X_s	setpoint	t_E	length of time switched on
X_p	P-band	t_A	length of time switched off
X_{Sd}	switching difference	SP	switching period ($t_E + t_A$)
T_R	room temperature	E	control factor (t_E/SP)
OS	upper switching point	a	transient response of thermal feedback
US	lower switching point	b	temperature at membrane sensor

Engineering and fitting notes

The voltage tolerances stated above are necessary because the rating of the feedback heating element is dependent on them to a great extent. An over-voltage of 10% results in: 20% more performance; a P-band of 4 K; a switching period of 15 minutes instead of 19; and a setback in room temperature of 0.5 K.

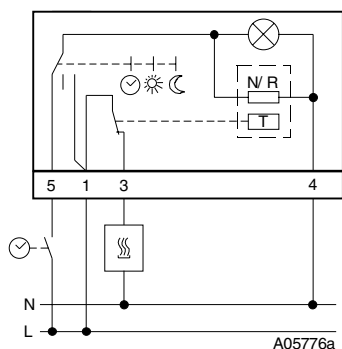
Additional technical data

Conforms to:-	
Directive 73/23/EEC	EN 60730-1/ EN 60730-2-9
EMC directive 89/336/EEC	EN 55014 Art. 4.2

Wiring diagrams

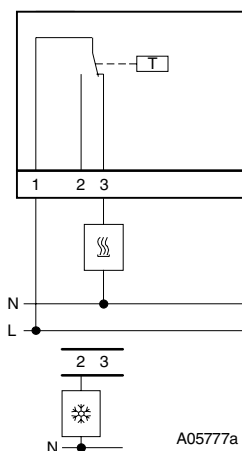
TSO 625

with night reduction,
by hand or time-switch



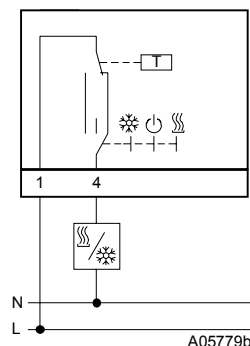
TSO 670

heating or cooling



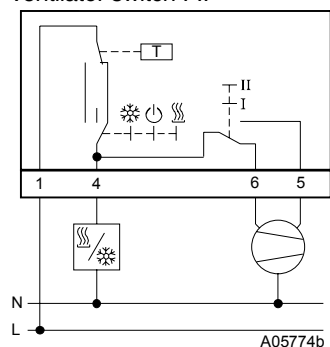
TSO 672

heating-off-cooling



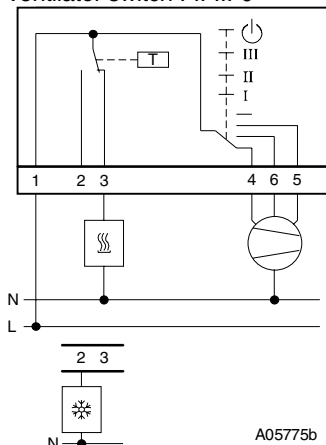
TSO 673

heating-off-cooling,
ventilator switch I-II



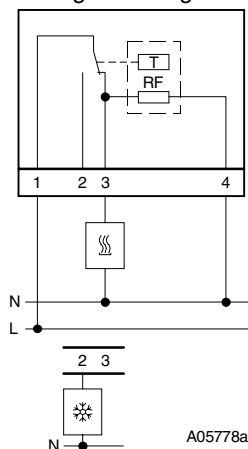
TSO 674

heating or cooling,
ventilator switch I-II-III-0



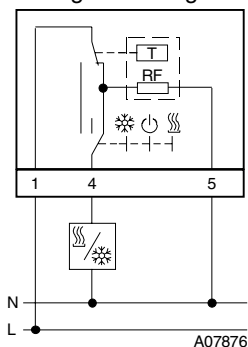
TSH 670

with feedback,
heating or cooling



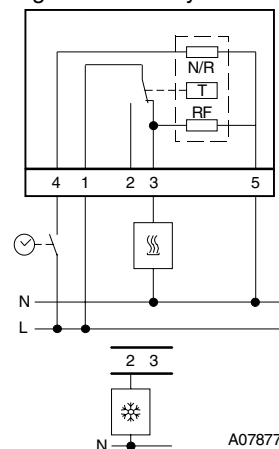
TSH 672

with feedback,
heating-off-cooling



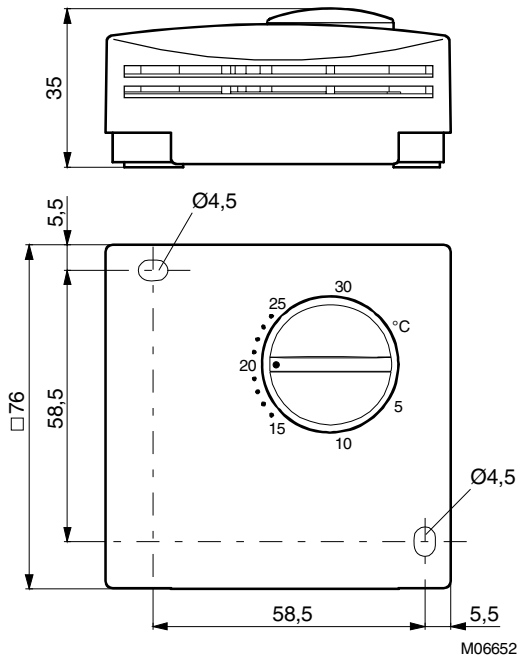
TSH 676

with feedback,
night reduction by clock

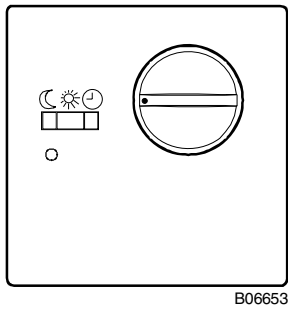


RF thermal feedback
N/R normal/reduced (night reduction)

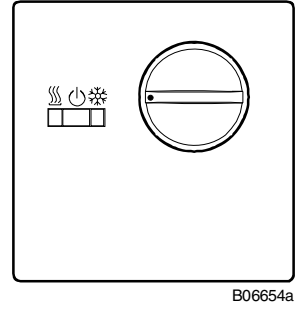
Dimension drawings



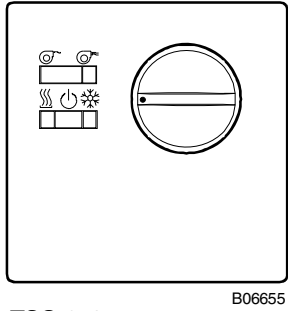
TSO 625



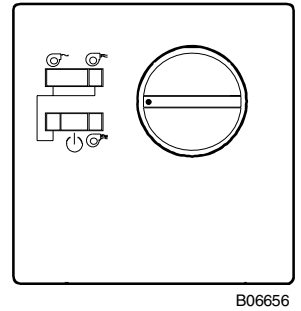
TSO 672, TSH 672



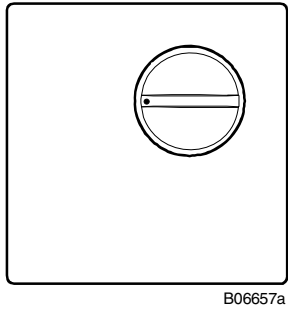
TSO 673



TSO 674

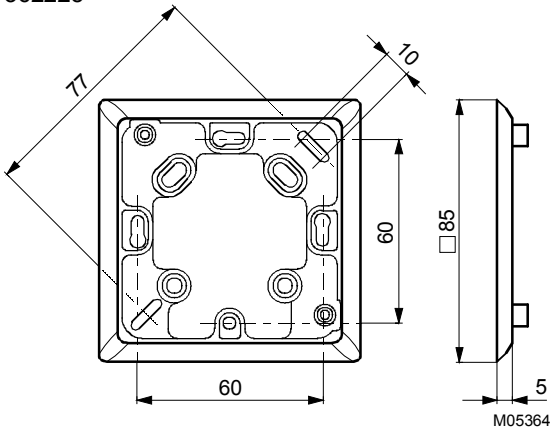


TSO 670
TSH 670, TSH 676



Accessories

362225



303124

