

# Electric Actuator with Process Controller TROVIS 5725-7 (with fail-safe action)



for heating and cooling applications

## Application

Electric actuator with integrated digital controller for heating, ventilation and air-conditioning systems. For globe and three-way valves, e.g. Types 3213, 3214, 3260, 3222 or 3226 Valves in nominal sizes DN 15 to 50.



The TROVIS 5725-7 is a combination of an electric actuator with fail-safe action and an integrated digital controller. It is particularly suitable for mounting to SAMSON Types 3213, 3214, 3260, 3222 and 3226 Valves.

## Special features

- Outdoor-temperature-compensated control of a heating circuit:  
The flow temperature is controlled based on the outdoor temperature over an adjustable heating characteristic. An external binary contact allows switching between rated and reduced operation or between rated and stand-by operation with frost monitoring. As an alternative to the binary input, the gradient or a level displacement of the heating characteristic can be changed by the adjustment knob of a room sensor.
- Fixed set point control · This function is used to control the heating circuit to a fixed set point.
- Fixed set point control with room sensor · The set point is changed by the room temperature. A permanently active flash adaptation adapts the supply of heat to the required demand by changing the flow temperature.
- Return flow temperature limitation · The temperature of the return flow is monitored. When an adjustable maximum limit is exceeded, the flow temperature is reduced until it remains below the limit.
- Type 5257-7 Room Panel can be connected:
  - Convenient room panel with various operating mode settings (Day mode · Night mode · OFF/frost protection)
  - Binary input on room panel for remote switchover
  - Possible override of the flash adaptation based on the room temperature or heating characteristic (gradient or level with outdoor-temperature-compensated control) implemented by the controller
- Frost monitoring and automatic initiation of protective action
- Automatic anti-blocking function prevents circulating pumps from seizing up

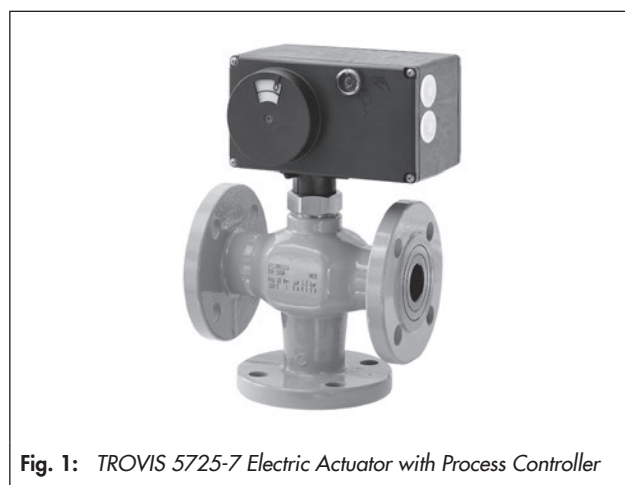


Fig. 1: TROVIS 5725-7 Electric Actuator with Process Controller

- Configuration, parameterization, diagnostic function and direct connection for monitoring in TROVIS-VIEW software:
  - Direct data transmission using a connecting cable (direct connection to PC)
  - Data transmission using a memory pen

## Accessories

- TROVIS-VIEW configuration software for TROVIS 5725-7 Electric Actuator with Process Controller
- Hardware package with a memory pen-64, a connecting cable and a modular adapter (order no. 1400-9998)
- Memory pen-64 (order no. 1400-9753)
- Type 5267-2 Contact Sensor (Pt 1000)
- Type 5257-7 Room Panel (Pt 1000) with potentiometer and mode selector switch
- Type 5227-2 Outdoor Sensor (Pt 1000)

**Note:** Refer to Data Sheets ▶ T 5768, ▶ T 5769, ▶ T 5761, ▶ T 5766, and ▶ T 5763 for details on Type 3213, Type 3214, Type 3260, Type 3222, and Type 3266 Valves.

### Principle of operation (Fig. 3)

The TROVIS 5725-7 Electric Actuator with Process Controller consists of a digital controller integrated into an electric actuator with fail-safe action. The digital controller is connected to a flow temperature sensor on the input side, which can optionally be upgraded by a return flow sensor, outdoor sensor, or a room sensor. In addition to the temperature sensor input to measure the flow temperature, the digital controller has a potentiometer input (1000 to 1100 Ω/2000 Ω). This changes the heating characteristic when outdoor-temperature-compensated control is used. Alternatively, the room set point is changed when a fixed set point control with room sensor is used. The heating characteristic and set point can be changed over the TROVIS-VIEW configuration software.

The actuator contains a reversible synchronous motor and a maintenance-free gear. The motor is switched off by torque-dependent switches when an end position is reached or in case of overload. The force of the electric motor is transmitted via gearing and crank disk to the actuator stem (3) and to the plug stem of the mounted valve. As the actuator stem retracts, the plug stem follows the movement of the spring installed in the valve. A coupling nut (4) provides a force-locking connection between the actuator and the plug stem of the valve. The actuator contains a spring assembly (8) and an electromagnet. When the electromagnet is de-energized, the actuator moves the valve to its fail-safe position.

After disconnecting the actuator from the power supply and removing the housing cover (1.1), manual override is possible using an Allen key. As soon as the Allen key is released, the actuator immediately moves back to its original position.

### Electrical equipment

The actuator requires a Pt 1000 temperature sensor to be connected to measure the flow temperature. Depending on the control task, an outdoor sensor or a room sensor or room panel (Type 5257-7 only) can be connected. They can all be combined with a return flow sensor. The control circuit can be influenced over the potentiometer input. The non-floating switching output can alternatively be used as a binary output for a demand for an externally required signal.

<b>Type 5267-2 Contact Sensor</b> (▶ Data Sheet T 5220)	
Perm. medium temperature	-20 to 120 °C
Perm. ambient temperature	-20 to 120 °C
Degree of protection	IP 42
<b>Type 5257-7 Room Panel with potentiometer and mode selector switch</b> (▶ Data Sheet T 5220)	
Mode selector switch	Day and night mode, OFF/frost protection
Operating temp. range	-20 to 60 °C
Perm. ambient temperature	-20 to 60 °C
Degree of protection	IP 30
<b>Type 5227-2 Outdoor Sensor</b> (▶ Data Sheet T 5220)	
Operating temp. range	-35 to 85 °C
Perm. ambient temperature	-35 to 85 °C
Degree of protection	IP 44

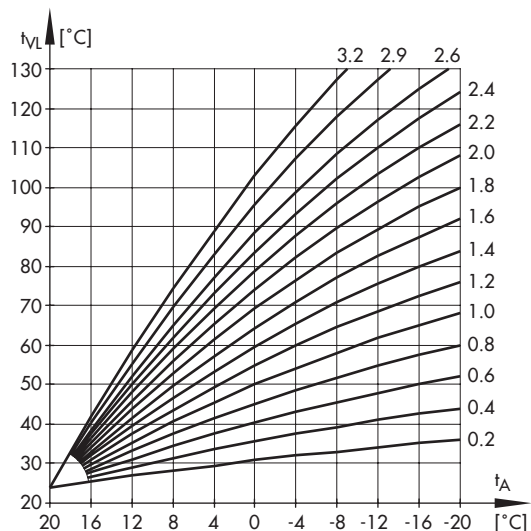
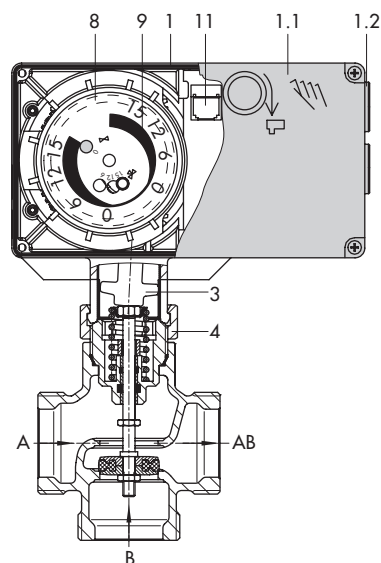


Fig. 2: Heating characteristics: Correlation between outdoor temperature ( $t_A$ ) and flow temperature ( $t_M$ ) in the outdoor-temperature-compensated control



- |   |                                  |
|---|----------------------------------|
| 1 Electric actuator with process controller | 8 Spring assembly                |
| 1.1 Front cover                             | 9 Travel indication scale        |
| 1.2 Cable entry                             | 10 Plug stem                     |
| 3 Actuator stem                             | 11 Serial interface (RJ-12 jack) |
| 4 Coupling nut                              |                                  |

Fig. 3: Functional diagram

## Digital controller settings

The digital controller settings can be changed in the TROVIS-VIEW Configuration and Operator Interface.

Function		Default setting
F01 –	Control mode: 0: Fixed set point control 1: Control with reference variable	1
F02 –	Selecting the reference variable 0: Outdoor sensor 1: Room sensor	0
F03 –	Direction of stem action 0: Increasing/increasing >> 1: Increasing/decreasing <<	0
F04 –	Delayed outdoor temperature 0: Without delay 1: With delay	0
F05 –	Potentiometer input 0: Inactive, binary input 1 active 1: Active	0
F06 –	Resistance range of potentiometer 0: Type 5257-7 Room Panel 1: Remote adjuster	0
F07 –	Function of potentiometer 0: Heating characteristic level shift 1: Gradient shift	0
F08 –	Function of binary input BE1 0: BE1 short-circuited: OFF with frost protection 1: BE1 short-circuited: Reduced operation	0
F09 –	Function of switching output 0: BA as circulation pump control 1: BA as heat demand (ON in rated operation)	0
F10 –	Anti-block protection of pumps 0: No anti-block protection 1: When pumps are deactivated: switched on every 24 h for 1 min.	1
F11 –	Return flow temperature sensor 0: Inactive, binary input 2 active 1: Active, with return flow temperature limitation	1
F12 –	Function of binary input BE2 0: BE2 short-circuited: OFF with frost protection 1: BE2 short-circuited: Reduced operation	0
F13 –	Manual mode 0: Inactive 1: Manual mode (absolute priority)	0/1

Parameters		Default setting
P01 –	Flow temperature set point 0 to 150 °C	70 °C
P02 –	Flow temperature set-back in reduced operation 0 to 50 K	15 K
P03 –	Minimum flow temperature 0 to 150 °C	20 °C
P04 –	Maximum flow temperature 0 to 150 °C	120 °C
P05 –	Heating characteristic gradient 0.2 to 3.2	1.6
P06 –	Heating characteristic level –30 to 30 K	0 K
P07 –	Gradient shift range via potentiometer 0.0 to 1.5	1.0
P08 –	Level shift range via potentiometer 0 to 30 K	15 K
P09 –	Kp flow temperature control 0.1 to 50.0	2.0
P10 –	Tn flow temperature control 0 to 999 s	120 s
P11 –	Ty actuator transit time for valve travel 10 to 240 s	35 s
P12 –	Dead band (switching range) 0.5 to 5.0 %	2.0 %
P13 –	Max. return flow temperature 10 to 90 °C	50 °C
P14 –	Kp return flow temperature limitation 0.1 to 50.0	1.0
P15 –	Tn return flow temperature limitation 0 to 999 s	400 s
P16 –	Delayed time for outdoor temperature 1.0 to 6.0 °C/h	3.0 °C/h
P17 –	Outdoor temperature limit at rated operation 0 to 50 °C	22 °C
P18 –	Outdoor temperature limit at reduced operation 0 to 50 °C	15 °C
P19 –	Room temp. set point at rated operation 10 to 40 °C	20 °C
P20 –	Room temp. set point at reduced operation 10 to 40 °C	15 °C
P21 –	Max. room temperature boost for switch-off 1 to 6 K	2 K
P22 –	Time interval for flash adaptation 0 to 100 min	10 min
P23 –	Pump lag time 1 to 999 min	5 min

## Mounting

Prior to mounting the actuator on the valve, retract the actuator stem. To do this, first remove the housing cover. Place a 4 mm hex screwdriver on the actuating shaft, turn it counterclockwise to retract the stem and hold it in position. The coupling nut may only be tightened after the stem has been retracted.

Any mounting position may be used, however, the actuator may not be installed in a suspended position.

## Ordering text

TROVIS 5725-7 Electric Actuator with Process Controller

Closing force ... N

Valve travel ... mm

Power supply 230 V/50 Hz

## Mounting position

The control valve can be installed in the pipeline in any desired position. However, a suspended mounting position of the actuator is not permissible (see Fig. 4).

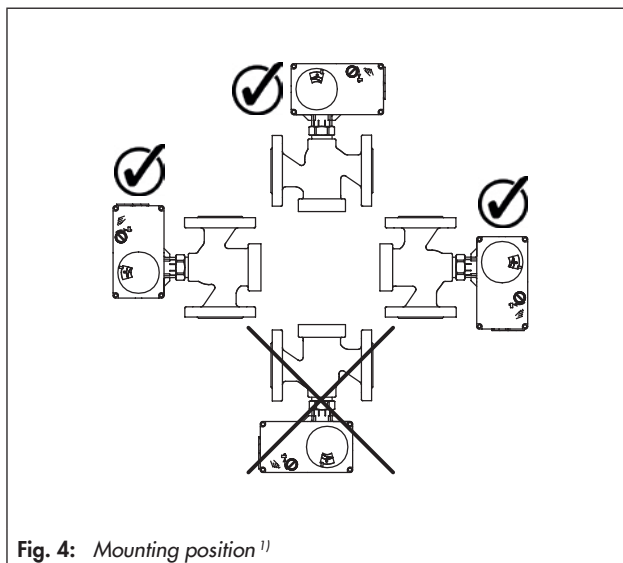


Fig. 4: Mounting position <sup>1)</sup>

- <sup>1)</sup> The degree of protection IP 54 can only be achieved up to device index .03 when the actuator is installed in the upright position. See last two figures of the configuration ID (Var.-ID) written on the nameplate.

## Technical data

TROVIS 5725 Electric Actuator with Process Controller	-710	-715	-720	-725	-730	-735
Connection to valve	Force locking		Force locking		Form fit	
Rated travel	6 mm		12 mm		15 mm	
Transit time for rated travel	35 s		70 s		90 s	
Transit time for fail-safe action	4 s		6 s		7 s	
Fail-safe action	Stem extends	Stem retracts	Stem extends	Stem retracts	Stem extends	Stem retracts
Nominal thrust	500 N		500 N		280 N	
Power supply	230 V (10 %), 50 Hz					
Power consumption	Approx. 5 VA					
Manual override	Possible <sup>1)</sup>					
Permissible temperatures <sup>3)</sup>						
Ambient	0 to 50 °C					
Storage	-20 to 70 °C					
Degree of protection	IP 54 <sup>2)</sup>					
Class of protection	II					
Electromagnetic compatibility	Acc. to EN 61000-6-2, EN 61000-6-3 and EN 61326					
Weight	Approx. 1.3 kg					
Compliance	CE · EAC					

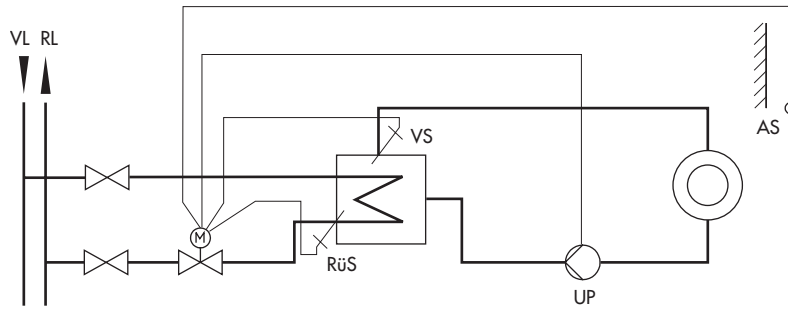
<sup>1)</sup> Manual override using a 4 mm Allen key (after removing the housing cover), always returns to fail-safe position after release.

<sup>2)</sup> Only when installed in the upright position up to device index .03.

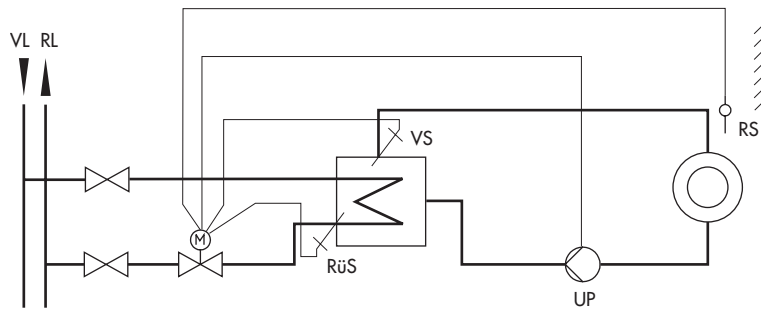
See last two figures of the configuration ID (Var.-ID) written on the nameplate, e.g. Var.-ID xxxxxx.xx, for the device index.

<sup>3)</sup> The permissible medium temperature depends on the valve on which the electric actuator is mounted. The limits specified in the valve documentation apply.

## Typical applications



Outdoor-temperature-compensated flow temperature control with return flow temperature limitation;  
with binary contact to switch between operating modes



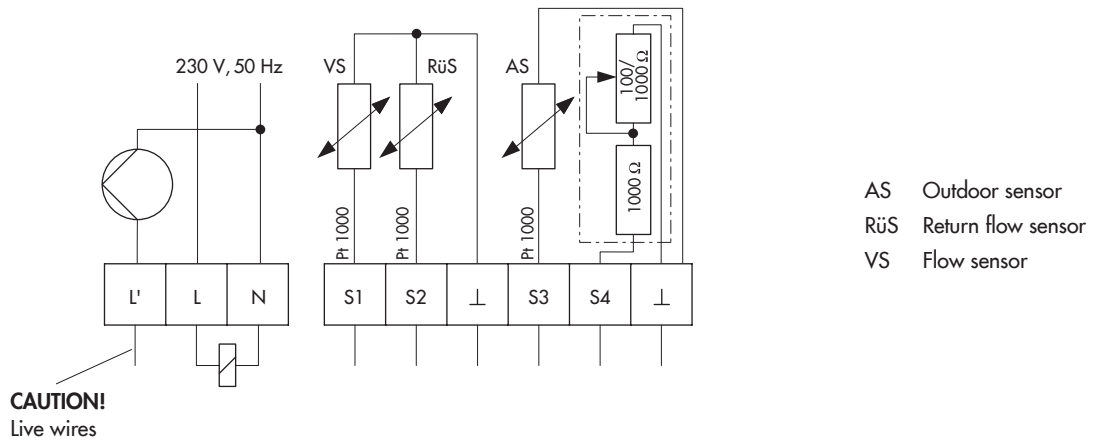
Type 5257-7  
Room Panel

Fixed set point control with room sensor with return flow temperature limitation;  
Operating mode switchover at room panel (Type 5257-7)

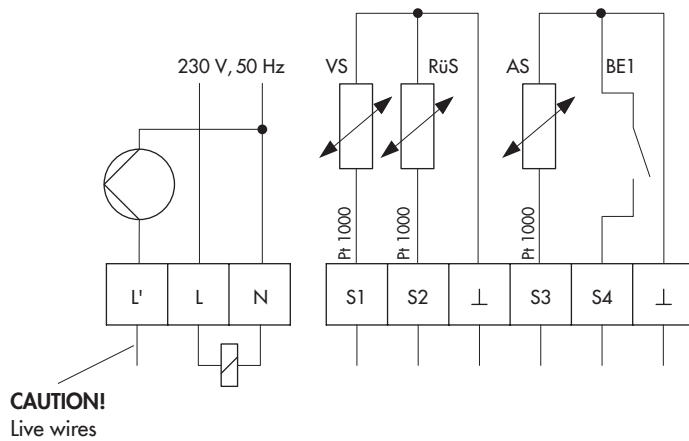
- AS Outdoor sensor
- RS Room sensor/room panel
- RüS Return flow sensor
- VS Flow sensor
  
- UP Circulation pump (heating)
- RL Return flow to district heating network
- VL Supply from district heating network

## Electrical connection

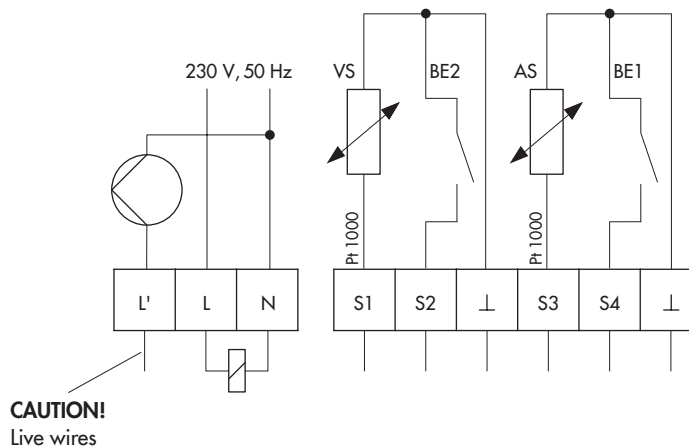
Application with flow sensor (VS), return flow sensor (RüS) and outdoor sensor (AS) and potentiometer functioning as set point adjuster



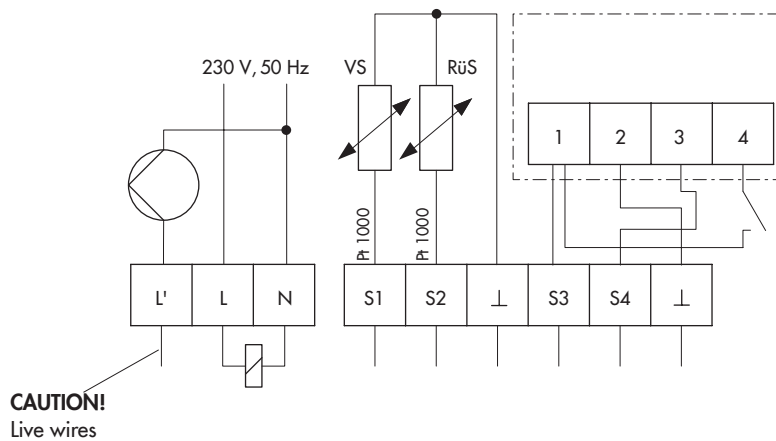
Application with flow sensor (VS), return flow sensor (RüS) and outdoor sensor (AS) and binary input to switch between operating modes



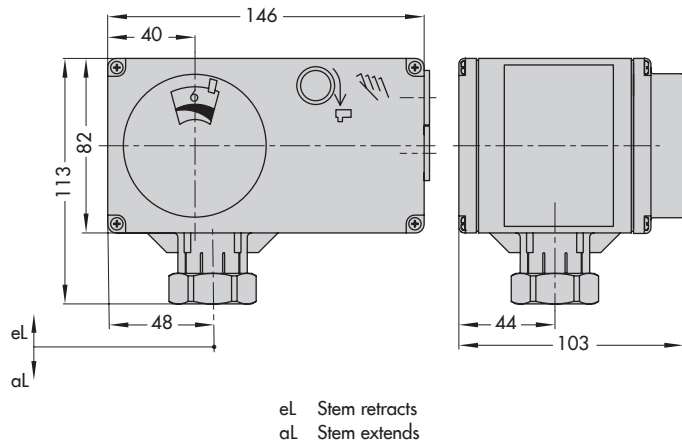
Application with flow sensor (VS) and outdoor sensor (AS)



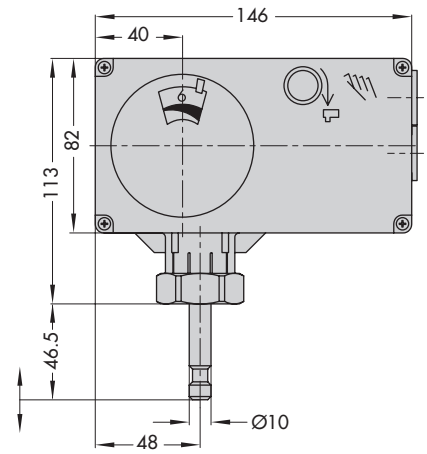
Application with flow sensor (VS), return flow sensor (RüS) and room sensor with mode selector switch and room set point adjuster



**TROVIS 5725-7 Electric Actuator with Process Controller**

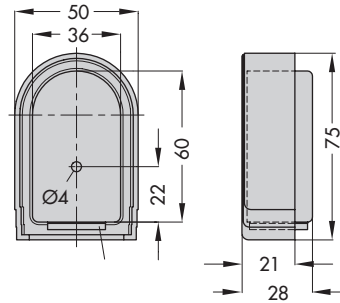


TROVIS 5725-710/-715/-720/-725

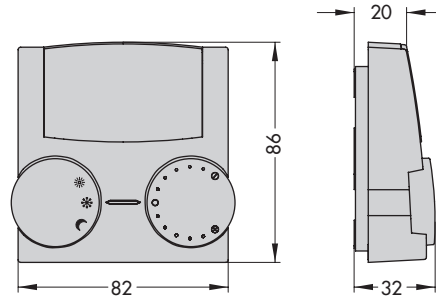


TROVIS 5725-730/-735

**Accessories for heating control**

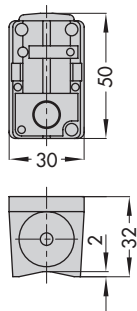


Type 5227-2 Outdoor Sensor (Pt 1000)  
Color: RAL 9016



Type 5257-7 Room Panel (Pt 1000)

- ☀ Continuous day mode (rated operation)
- ☾ Continuous night mode (reduced operation)
- ❄ Off/frost protection



Type 5267-2 Contact Sensor (Pt 1000)  
(flow and return flow temperature measurement)

Specifications subject to change without notice



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