

## T 5724 EN

**TROVIS 5724-3 Electric Actuator with Process Controller (without fail-safe action)**

**TROVIS 5725-3 Electric Actuator with Process Controller (with fail-safe action)**

for domestic hot water heating



### Application

Electric actuators with process controller for heating, ventilation and air-conditioning systems

The electric actuators with process controller can be used for DHW heating in instantaneous heating systems for small to medium-sized buildings and for fixed set point control circuits in mechanical engineering applications.

### Special features

The TROVIS 5724-3 and TROVIS 5725-3 Electric Actuators with Process Controller are a combination of an electric actuator and an integrated digital controller with two PID control modules. They are especially suitable for attachment to SAMSON Types 3213, 3214, 3260, 3222 and 3226 Valves. A special version of Type 3222 (DN 15) and Type 3222 N (DN 15) with a special plug design is available for small installations (apartment or house). As a result, even small tapping amounts can be controlled.

The TROVIS 5724-3 Actuator is without fail-safe action and TROVIS 5725-3 has fail-safe action. The TROVIS 5724-3 has a manual override to manually move the valve in de-energized state.

- TROVIS 5724-3 with manual override (handwheel)
- Control using two different set points, e.g. DHW temperature and DHW temperature for thermal disinfection.
- Manual setting possible at the set point potentiometer or using the TROVIS-VIEW software
- Function to maintain water temperature constant, preventing the heat exchanger from cooling down between tapping
- Pump output to control a circulation pump can alternatively be used as a fault alarm output or to register tapping.
- Reversible direction of action
  - Globe valve opens when the actuator stem retracts (increasing/increasing)
  - Three-way mixing valve mixes/diverts the flow(s) when the actuator stem extends (increasing/decreasing)



**Fig. 1:** TROVIS 5725-3 Electric Actuator with Process Controller

- Limit value monitoring:
  - The valve is closed by the actuator when the maximum adjustable limit is exceeded
  - The frost protection function is started when the temperature falls below the minimum adjustable limit
- Configuration, parameterization, diagnostic function and online connection for monitoring using the TROVIS-VIEW software
  - Direct data transmission using a connecting cable (direct connection to computer)
  - Data transmission over a memory pen

- Testing according to DIN EN 14597
    - The TROVIS 5725-3 Electric Actuator with Process Controller with fail-safe action "actuator stem extends" is tested by the German technical surveillance association TÜV according to DIN EN 14597 in combination with different SAMSON valves. Such actuators have a test mark on their nameplate.
- The registration number is available on request.

### Options

- Faster motor
  - Version with double speed

### Design and principle of operation

The electric actuator with process controller consists of a digital controller that is integrated into the electric actuator housing. The digital controller is connected to a temperature sensor on the input side which can be optionally upgraded by a flow rate sensor or a flow switch.

The set point of the digital controller can be set manually or using the TROVIS-VIEW software.

The electric actuator with process controller contains a reversible synchronous motor and a maintenance-free gear. The synchronous motor is switched off by torque-dependent switches in the end positions or in case of overload.

The output signal of the integrated digital controller acts over the positioner on the synchronous motor of the actuator. The force of the motor is transmitted to the actuator stem (3) via gear and crank disk. When the actuator stem extends, it presses on the plug stem (10) of the valve. When the actuator stem retracts (force-locking attachment), the plug stem follows the movement of the actuator stem as a result of the return spring in the valve. Actuator and valve are connected by the coupling nut (4).

When the actuator stem retracts (form-fit attachment), the plug stem is connected to the actuator stem and follows its movement.

### – TROVIS 5724-3

The electric actuator without fail-safe action has a handwheel (2) used to manually position the valve (only when the actuator is disconnected from the power supply). Travel and direction of action can be read off the travel indication scale (9).

### – TROVIS 5725-3

The electric actuator with process controller **with fail-safe action** largely corresponds to the TROVIS 5724-3. However, it contains a spring assembly (8) and an electromagnet which in de-energized state move the connected valve to the appropriate fail-safe position. Only the version with fail-safe action "actuator stem extends" is available.

A handwheel (2) is not fitted. After the actuator is switched off and the cover (1.1) removed, manual override with an Allen key is possible. As soon as the Allen key is released, the actuator immediately moves back to its original position.

### – Version with faster motor

The Types 5724-313/-323/-333 and Types 5825-313/-323/-333 are equipped with a faster motor in a housing attached to the back of the actuator.

### Electrical equipment

#### – Inputs

The integrated digital controller must be connected to a temperature sensor on the input side, which can be optionally upgraded by a water flow sensor or a flow switch.

Alternatively, a current signal can be used for mechanical engineering applications.

A binary input is used to switch between two internal set points or, alternatively, can be used to deactivate the function to maintain the heat exchanger at a constant temperature.

#### – Output

A circulation pump can be control with the 230 V switching output (see Table 1). The switching output can be configured as either a pump output (circulation pump for the DHW circuit or heating circuit), a fault alarm output or an output to indicate when hot water is tapped.

### Setting

The set point of the digital controller is set to 60 °C and a second set point is set to 70 °C. They can be changed in TROVIS-VIEW using a connecting cable connected to the RS-232 interface (serial interface) on the actuator or using a memory pen.

The set point can also be adjusted at the set point potentiometer on the device.

The controlled variable, control behavior and other parameters can be changed in this way.

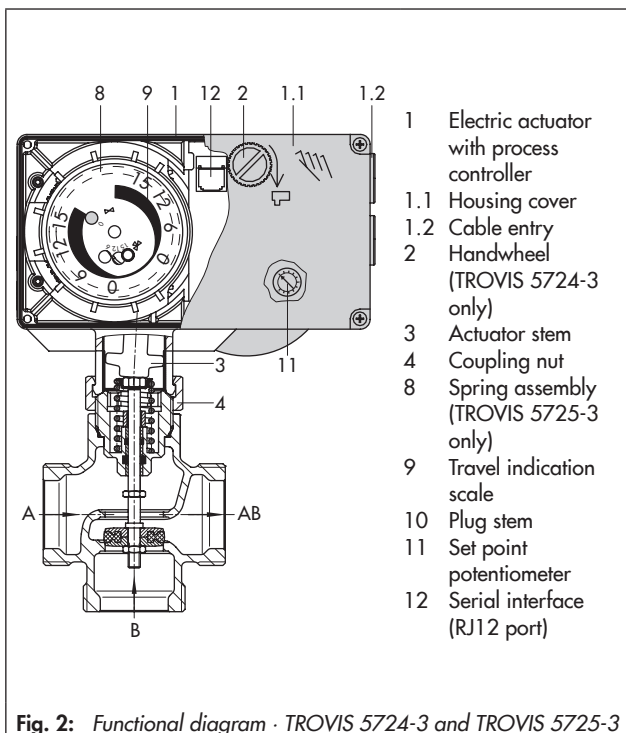


Fig. 2: Functional diagram · TROVIS 5724-3 and TROVIS 5725-3

### Option to improve control accuracy in small installations

The use of the Type 5207-0060 Pt 1000 Sensor is recommended in conjunction with a sensor pocket to provide optimal positioning of the temperature sensor at the heat exchanger.

In addition, a water flow sensor or a flow switch can be connected to quickly recognize when hot water is being tapped or to improve the control accuracy even further. A hot water circulation pipe improves the control accuracy considerably.

### Mounting

Before mounting the actuator on the valve, retract the actuator stem.

To retract the actuator stem of TROVIS 5725-3, remove the front housing cover and retract and retain the actuator stem by turning the actuating shaft counterclockwise using a 4 mm Allen key. Hold the actuator stem in this position, while tightening the coupling nut.

### 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. 3).

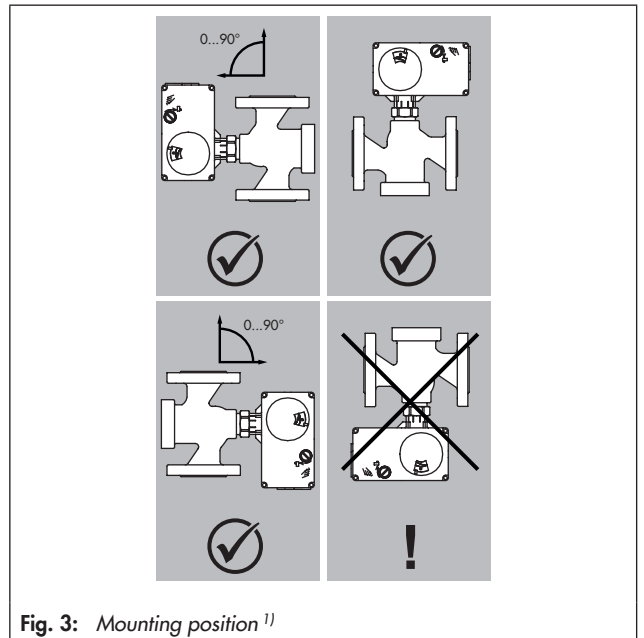


Fig. 3: Mounting position <sup>1)</sup>

- <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 the last two figures of the configuration ID written on the nameplate for the device index.

### Operation

- LEDs to indicate the operating state
- Manual adjustment of the set point at the set point potentiometer located on the printed circuit board
- SSP interface for communication located underneath the housing cover

### Sample application

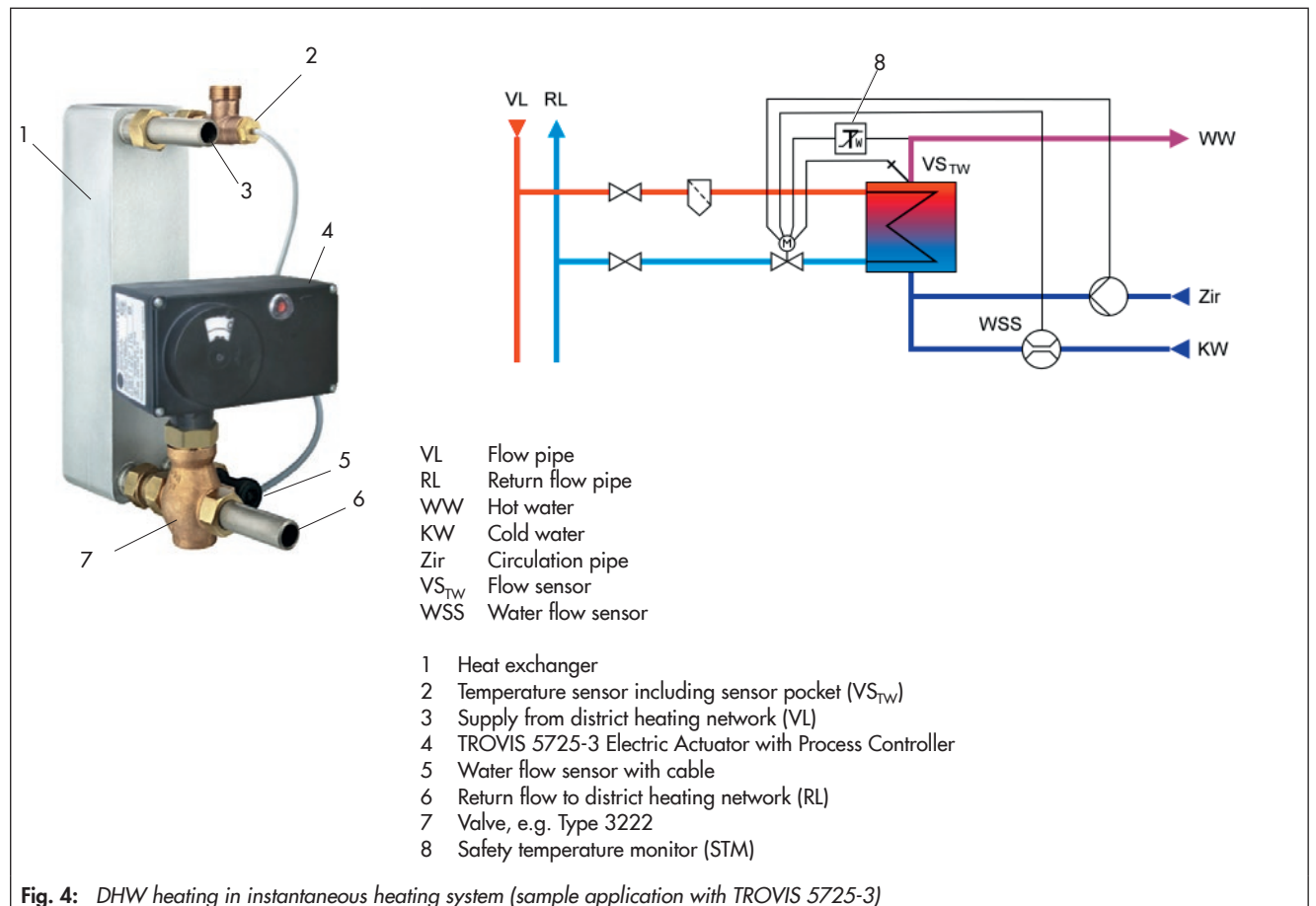


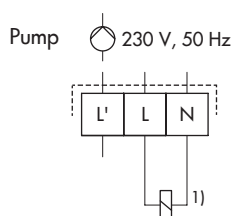
Fig. 4: DHW heating in instantaneous heating system (sample application with TROVIS 5725-3)

### Supply voltage and switching output



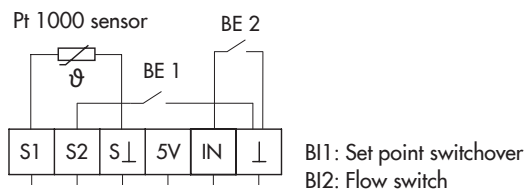
## Live terminal L'!

➔ *Do not touch.*

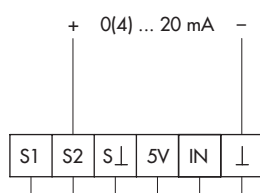


1) Version with fail-safe action only

### Temperature sensor and binary inputs

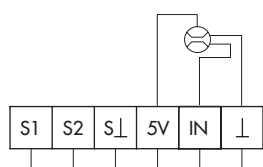


**Current input for set point or measured value**

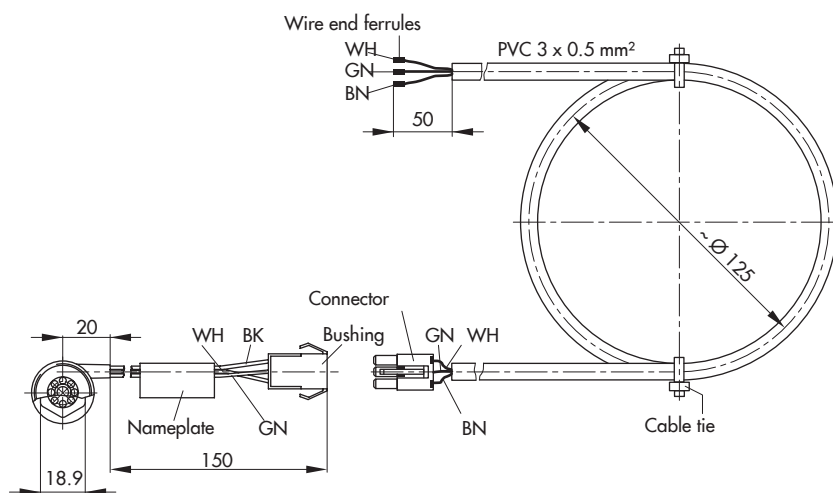


**Fig. 5:** *Electrical connection*

## Water flow sensor (WSS)



| WSS    |      | Extension cable |      | TROVIS 5724-3<br>TROVIS 5725-3 |
|--------|------|-----------------|------|--------------------------------|
| GND    | BK — | —               | BN — | — ⊥                            |
| Signal | GN — | —               | GN — | — IN                           |
| 5 V    | WH — | —               | WH — | — 5 V                          |



BN: Brown  
GN: Green  
BK: Black  
WH: White

**Fig. 6:** Connection of water flow sensor (WWS)

## Technical data

**Table 1:** Technical data · Electric actuators with process controllers

| Electric Actuator with Process Controller    |               | TROVIS       | 5724-                                                                                                                                     |      |      |      |      | 5725                   |      |      |      |      |      |      |
|----------------------------------------------|---------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------------------------|------|------|------|------|------|------|
|                                              |               |              | -310                                                                                                                                      | -313 | -320 | -323 | -330 | -333                   | -310 | -313 | -320 | -323 | -330 | -333 |
| Fail-safe action                             |               |              | Without                                                                                                                                   |      |      |      |      | Extends                |      |      |      |      |      |      |
| Rated travel                                 |               | mm           | 6                                                                                                                                         | 6    | 12   | 12   | 15   | 15                     | 6    | 6    | 12   | 12   | 15   | 15   |
| Transit time for rated travel                |               | s            | 35                                                                                                                                        | 18   | 70   | 36   | 90   | 45                     | 35   | 18   | 70   | 36   | 90   | 45   |
| Transit time for fail-safe action            |               | s            | –                                                                                                                                         |      |      |      |      | 4                      | 4    | 6    | 6    | 7    | 7    |      |
| Thrust                                       |               | N            | 700                                                                                                                                       |      |      |      |      | 500                    |      |      |      |      | 280  |      |
| Thrust in the event of fail-safe action      |               | N            | –                                                                                                                                         |      |      |      |      | 500                    |      |      |      |      | 280  |      |
| Attachment                                   | Force-locking |              | •                                                                                                                                         | •    | •    | •    |      |                        | •    | •    | •    | •    |      |      |
|                                              | Form-fit      |              |                                                                                                                                           |      |      |      | •    | •                      |      |      |      |      | •    | •    |
| Manual override                              |               |              | Yes                                                                                                                                       |      |      |      |      | Possible <sup>1)</sup> |      |      |      |      |      |      |
| Supply voltage                               |               |              | 230 V (±10 % <sup>2)</sup> ), 50 Hz                                                                                                       |      |      |      |      |                        |      |      |      |      |      |      |
| Power consumption                            |               | Approx. VA   | 4                                                                                                                                         | 8    | 4    | 8    | 4    | 8                      | 5.5  | 9.5  | 5.5  | 9.5  | 5.5  | 9.5  |
| Permissible temperature ranges <sup>3)</sup> |               |              |                                                                                                                                           |      |      |      |      |                        |      |      |      |      |      |      |
| Ambient                                      |               |              | 0 to 50 °C                                                                                                                                |      |      |      |      |                        |      |      |      |      |      |      |
| Storage                                      |               |              | –20 to +70 °C                                                                                                                             |      |      |      |      |                        |      |      |      |      |      |      |
| Safety                                       |               |              |                                                                                                                                           |      |      |      |      |                        |      |      |      |      |      |      |
| Degree of protection                         |               |              | IP 54 according to EN 60529 <sup>4)</sup>                                                                                                 |      |      |      |      |                        |      |      |      |      |      |      |
| Class of protection                          |               |              | II according to EN 61140                                                                                                                  |      |      |      |      |                        |      |      |      |      |      |      |
| Device safety                                |               |              | II according to EN 61010-1                                                                                                                |      |      |      |      |                        |      |      |      |      |      |      |
| Noise immunity                               |               |              | According to EN 61000-6-2 and EN 61326-1                                                                                                  |      |      |      |      |                        |      |      |      |      |      |      |
| Noise emission                               |               |              | According to EN 61000-6-3 and EN 61326-1                                                                                                  |      |      |      |      |                        |      |      |      |      |      |      |
| Vibration                                    |               |              | According to EN 61000-6-2 and EN 60068-2-27                                                                                               |      |      |      |      |                        |      |      |      |      |      |      |
| Conformity                                   |               |              | CE                                                                                                                                        |      |      |      |      |                        |      |      |      |      |      |      |
| Inputs and outputs                           |               |              |                                                                                                                                           |      |      |      |      |                        |      |      |      |      |      |      |
| Binary input BI1 <sup>5)</sup>               |               |              | Floating contact for internal set point switchover or to deactivate the function to maintain the heat exchanger at a constant temperature |      |      |      |      |                        |      |      |      |      |      |      |
| Binary input BI2 <sup>5)</sup>               |               |              | Floating contact to connect a flow switch                                                                                                 |      |      |      |      |                        |      |      |      |      |      |      |
| Switching output                             |               |              | 230 V, 50 Hz, max. 1 A                                                                                                                    |      |      |      |      |                        |      |      |      |      |      |      |
| Weight                                       |               | kg (approx.) | 1.1                                                                                                                                       |      |      |      |      | 1.3                    |      |      |      |      |      |      |

| Accessories |                           |                                             |
|-------------|---------------------------|---------------------------------------------|
|             | Temperature sensor        | Pt 1000, fast response                      |
|             | Water flow sensor         | 530 pulses/l, measuring range 1 to 30 l/min |
|             | Flow switch <sup>6)</sup> | Yes · Alternative to water flow sensor      |

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

<sup>2)</sup> For actuators tested according to DIN EN 14597: –15/+10 %

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

<sup>4)</sup> Up to device index .03 only when the actuator is installed in the upright position. See last two figures of the configuration ID written on the nameplate, e.g. Var.-ID xxxxxxx.xx, for the device index.

<sup>5)</sup> Recommendation: use versions with gold contacts when using relays.

<sup>6)</sup> The flow switch or water flow sensor is not required in DHW heating in instantaneous systems with a constant circulation.

**Table 2:** Technical data · Accessories: Typ 5207-0060 Sensor (Pt 1000) · Optimized temperature sensor with fast response which is simple to install

|                                |                                                                        |
|--------------------------------|------------------------------------------------------------------------|
| Electrical connection          | Wire ends fitted with wire end ferrules including plastic sleeves      |
| Connecting cable               |                                                                        |
| Length                         | 2000 mm                                                                |
| Material                       | PVC                                                                    |
| Permissible temperature ranges |                                                                        |
| Ambient                        | −5 to +80 °C                                                           |
| Medium                         | −5 to +90 °C                                                           |
| Time response                  | $t_{0.5} < 1 \text{ s} \cdot t_{0.9} < 3 \text{ s}$ , 0.4 m/s in water |
| Immersion depth                | 52 mm                                                                  |
| Pressure rating                | PN 16                                                                  |
| Mechanical connection          | Brass (2.0401.20)                                                      |
| Protective tubing              | Inconel® 600 (2.4816)                                                  |

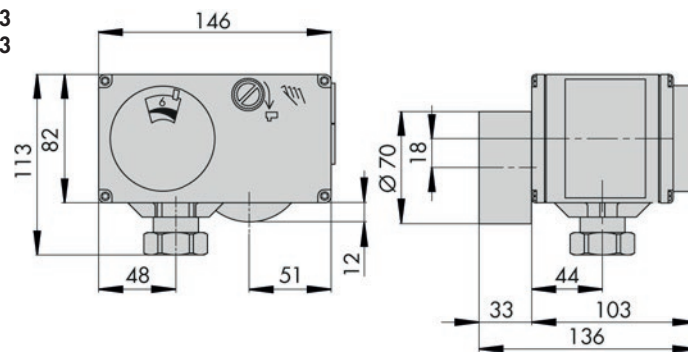
**Table 3:** Technical data · Accessories: sensor pocket for Pt 1000 Sensor for mounting to heat exchangers for optimal positioning instantaneous heating systems

|                         |                              |
|-------------------------|------------------------------|
| Material                | Red brass CC491K (2.1096.01) |
| Mechanical connection   |                              |
| G ¾ male thread         | Pipe connection for ½" pipes |
| G ¼ female thread       | Sensor connection            |
| G ¾ or G 1 coupling nut | Heat exchanger connection    |
| Pressure rating         | PN 16                        |

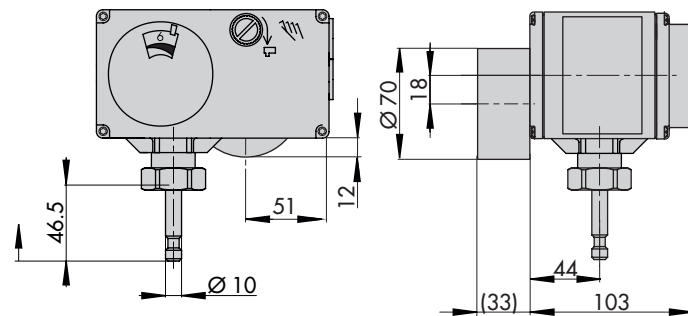
**Table 4:** Technical data · Accessories: water flow sensor with extension cable · Axial turbine flowmeter

|                                 |                                                              |
|---------------------------------|--------------------------------------------------------------|
| Measuring range                 | 1 to 30 l/min                                                |
| Measuring accuracy              | 1 % of upper measuring range value                           |
| Mechanical connection           | G ¾ male thread                                              |
| Valve size                      | DN 10                                                        |
| Pressure rating                 | PN 10                                                        |
| Max. medium temperature         | 70 °C, briefly 90 °C                                         |
| Supply voltage                  | 4.5 to 24 V DC                                               |
| Degree of protection            | IP 54                                                        |
| Electrical connection           | Three single wires with connector (JST), approx. 150 mm long |
| Sensor                          | Hall effect sensor                                           |
| Pressure loss                   | 0.25 bar at 15 l/min                                         |
| Pipe socket/vane wheel material | PPO Noryl                                                    |

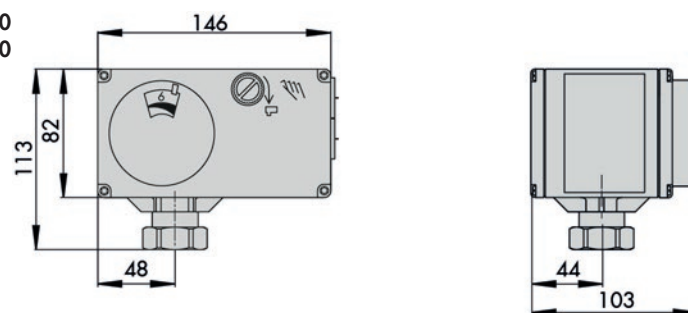
TROVIS 5724-313/-323  
TROVIS 5725-313/-323



TROVIS 5724-333  
TROVIS 5725-333



TROVIS 5724-310/-320  
TROVIS 5725-310/-320



TROVIS 5724-330  
TROVIS 5725-330

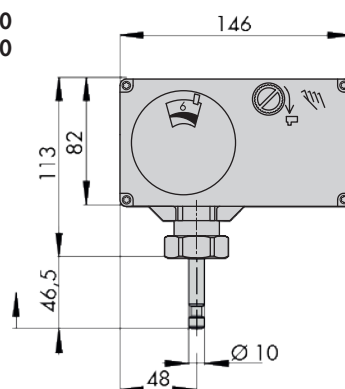
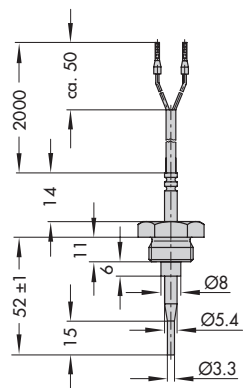
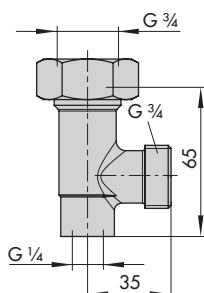


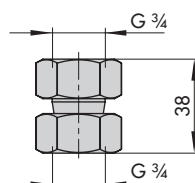
Fig. 7: Dimensions in mm · TROVIS 5724-3 and 5725-3 Electric Actuators with Process Controller



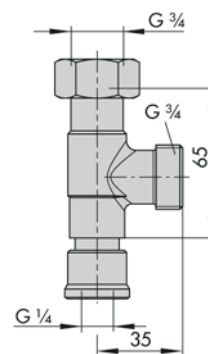
Type 5207-0060 Temperature Sensor (Pt 1000)



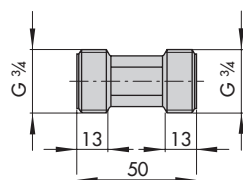
Sensor pocket (including gasket) for heat exchanger with G  $\frac{3}{4}$  (order no. 1400-9249)



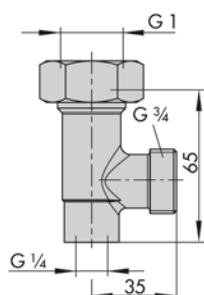
Connecting piece (including gasket) for valve G  $\frac{3}{4}$  (order no. 1400-9236)



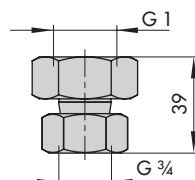
Circulation pipe connection (including gasket) (order no. 1400-9232)



Water flow sensor with extension cable (order no. 1400-9246)



Sensor pocket (including gasket) for heat exchanger with G 1 (order no. 1400-9252)



Connecting piece (including gasket) for valve G 1 (order no. 1400-9237)

**Fig. 8:** Dimensions in mm and inches · Accessories

**Table 5: Accessories**

| Communication                                                                                                                                            | Order no.                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Hardware package consisting of: <ul style="list-style-type: none"> <li>– Memory pen-64</li> <li>– Connecting cable</li> <li>– Modular adapter</li> </ul> | 1400-9998                                                                                                    |
| Memory pen-64                                                                                                                                            | 1400-9753                                                                                                    |
| Connecting cable RJ-12/D-sub, 9 pin                                                                                                                      | 1400-7699                                                                                                    |
| Modular adapter D-sub 9-pin/RJ-12 for memory pen                                                                                                         | 1400-7698                                                                                                    |
| USB to RS232 adapter                                                                                                                                     | 8812-2001                                                                                                    |
| Software                                                                                                                                                 |                                                                                                              |
| TROVIS-VIEW (free of charge)                                                                                                                             | ► <a href="http://www.samsongroup.com">www.samsongroup.com</a> > Service & Support > Downloads > TROVIS-VIEW |
| Sensors                                                                                                                                                  | Order no.                                                                                                    |
| Water flow sensor (WSS)                                                                                                                                  | 1400-9246                                                                                                    |
| Pt 1000 temperature sensor, fast response                                                                                                                | Type 5207-0060                                                                                               |
| Pipeline                                                                                                                                                 | Order no.                                                                                                    |
| Sensor pocket for heat exchanger with G ¾                                                                                                                | 1400-9249                                                                                                    |
| Sensor pocket for heat exchanger with G 1                                                                                                                | 1400-9252                                                                                                    |
| Connecting piece for valve G ¾                                                                                                                           | 1400-9236                                                                                                    |
| Connecting piece for valve G 1                                                                                                                           | 1400-9237                                                                                                    |
| Circulation pipe connection                                                                                                                              | 1400-9232                                                                                                    |

## Ordering text

TROVIS 5724-3xx/TROVIS 5725-3xx Electric Actuator with Process Controller

Fail-safe action:

Without

Extends

Stroking speed

Standard

Fast

Supply voltage:

230 V, 50 Hz

Rated travel:

6 mm

12 mm

15 mm

Thrust:

280 N

500 N

700 N

## Associated Mounting and Operating Instructions

- TROVIS 5724 and TROVIS 5725 ► **EB 5724**
- TROVIS-VIEW ► **EB 6661**

## Associated Data Sheet

- TROVIS-VIEW ► **T 6661**

## Associated configuration manual

- TROVIS 5724 and TROVIS 5725 ► **KH 5724**

## Associated Information Sheet

- Control valve for heating, ventilation and air-conditioning systems ► **T 5800**