

CirCon/TemCon - thermostatic valves for domestic hot water

Application

CirCon and TemCon are control valves designed for domestic hot water installations with circulation.

The valves automatically control the temperature of the water that circulates through the valves. Thus the thermal balance is ensured throughout the domestic hot water system. The valve is adjusted on a scale to a desired temperature in a range between 37°C and 65°C.

TemCon is equipped with a by-pass located outside the thermal part of the valve. TemCon is used in hot water installations with bacterial problems, e.g. Legionella. Here a procedure of raising the temperature of the water to between 70°C and 80°C is carried out to periodically pasteurise the system.

CirCon/ TemCon is constructed in stainless steel AISI 316 for all parts in connection with water, to secure the highest resistance against corrosion.



Advantages

CirCon/TemCon:

- CirCon/ TemCon is constructed in stainless steel AISI 316 for all parts in connection with water
- Insulation supplied as standard for increased energy efficiency
- The thermostatic element is out of contact with the circulating water, and its dry location prevents scale problems
- Each valve is calibrated individually
- Approved according to the Danish VA standard
- The thermostatic element can be disassembled without closing the water. Hereby the valve can be exercised
- Built in magnifying glass to make reading of pre-setting easier

Functions

CirCon/TemCon:

- The setting of the valves is stepless between 37°C and 65°C with an accuracy of $\pm 2^\circ\text{C}$
- Available in DN15 Female/Female and DN20 Female/Female and Male/Male

CirCon:

- Factory pre-setting 52.5°C

TemCon:

- Factory pre-setting 57°C
- By-pass for high temperature operation from 70°C to 80°C
- Manual adjustment of By-pass
- Automatic legionella treatment is possible by mounting the actuator kit on the by-pass in connection with the BMS control

CirCon - thermostatic valves for domestic hot water

CirCon · Thermal control

CirCon controls the temperature of the water that circulates through the valve.

Example

If the valve is set to a temperature of 50°C, and the temperature of the circulating water is under 50°C, the valve opens. If the temperature is over 50°C, the valve closes.



CirCon female/female with scale



CirCon male/male with scale

Setting the valve

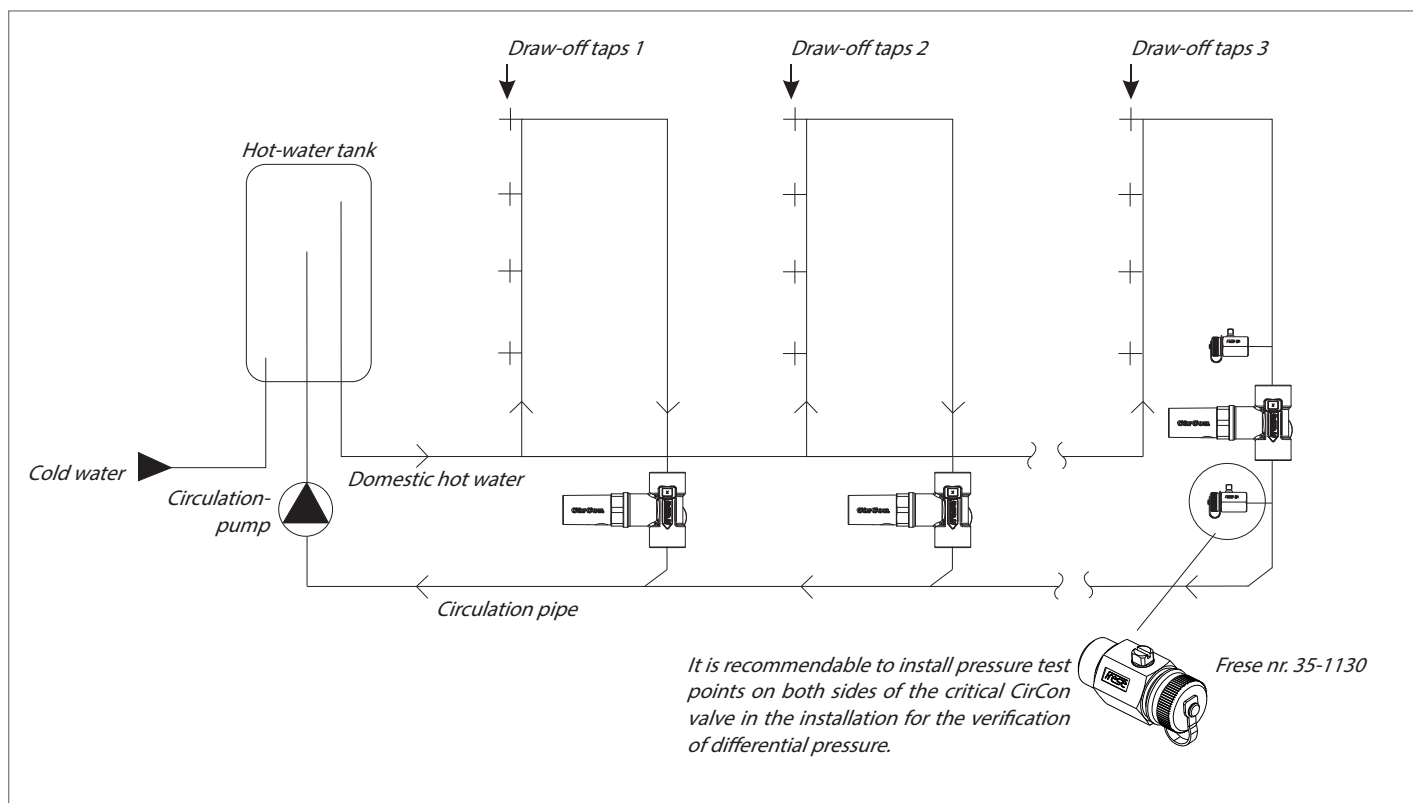
Temperature setting between 37°C and 65°C.

Remove the cap, and the temperature is easily set e.g. by a screwdriver as shown here.



CirCon - thermostatic valves for domestic hot water

CirCon · Application example



CirCon · Dimensioning example

CirCon is dimensioned on the basis of the thermal loss in the circuit, in which it is located. An example of dimensioning CirCon and the overall quantity of water for the circulating pump is described in the following.

In an installation with 4 floors and basement a circulation line is dimensioned.

The following parameters should be known for the calculation of the flow rate.

Length of pipe: 30 meters

Total length of pipe controlled by CirCon.

Thermal loss: 9 W/meter pipe

Thermal loss in an external 27 mm pipe with 30 mm insulation and a difference of 40°C between room temperature and temperature of the fluid.

Δ temperature differential: 5°C

Temperature in hot-water tank 55°C. CirCon was set to 50°C on the scale. The flow rate of CirCon can be calculated from the following formula:

$$Q = \frac{(30\text{m} \times 9\text{W/m}) \times 0.86}{5^\circ\text{C}} = 46 \text{ l/h}$$

So, the total quantity of water from 3 delivery pipes to the circulating pump is approx. 138 l/h (3 x 46 l/h).

The Kv-value of CirCon at 46 l/h and a differential pressure of 10 kPa across the valve can be found from the following formula:

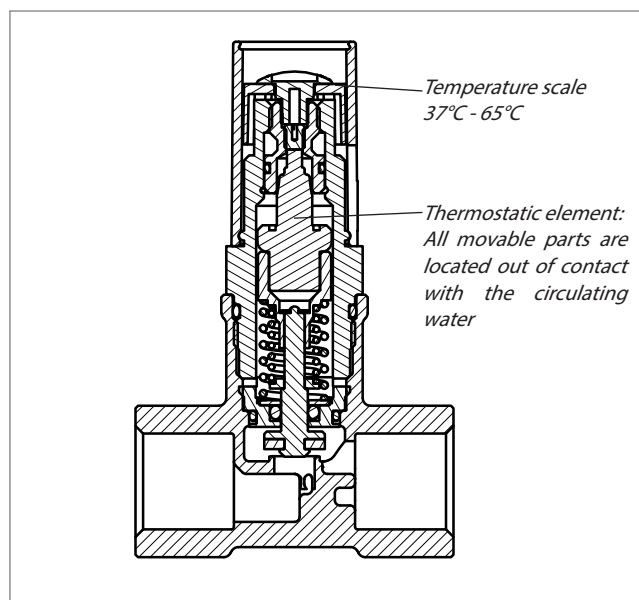
$$K_v = \frac{Q}{\sqrt{\Delta p}} = \left(\frac{46}{\sqrt{10}} \right) / 100 = 0.15$$

CirCon - thermostatic valves for domestic hot water

CirCon · Technical data

Materials:

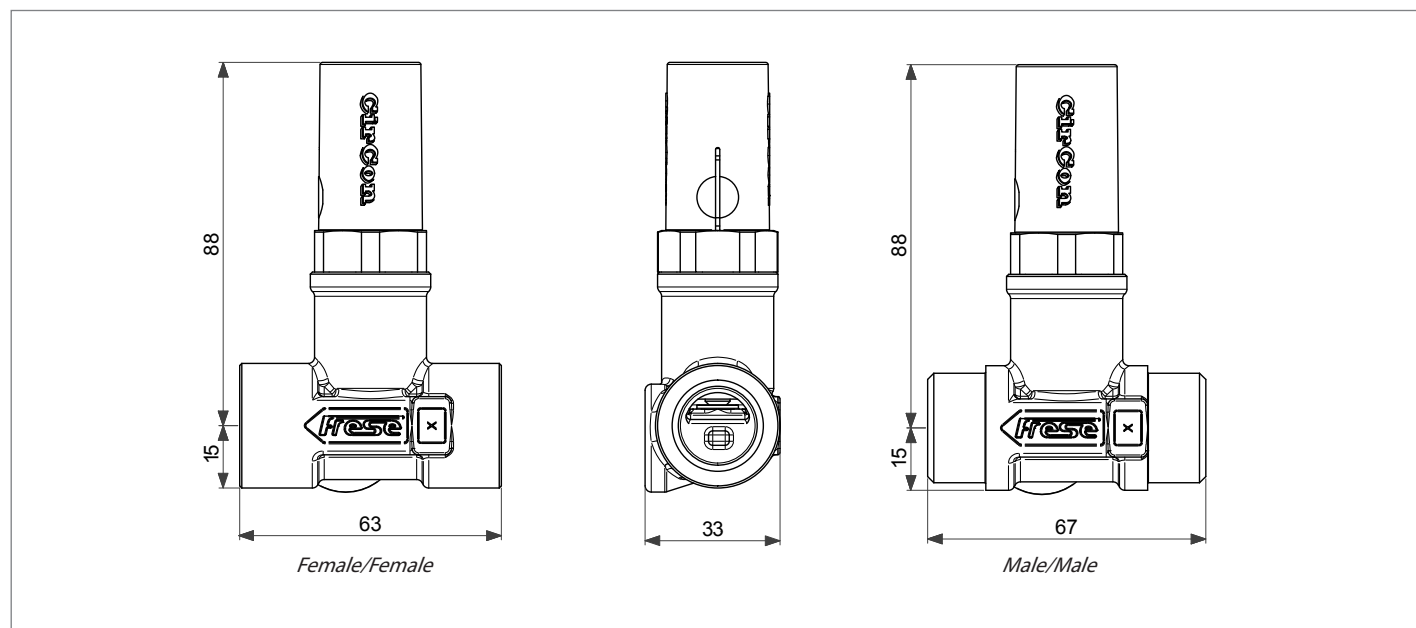
| | |
|---------------------------|---------------------------|
| Valve body: | Stainless steel AISI 316 |
| O-rings: | EPDM |
| Springs: | Stainless steel AISI 304 |
| Element: | Wax |
| Plastic parts: | POM, ABS, PC |
| Insulation jacket: | EPS (Max 80°C) |
| Temperature range: | 37°C - 65°C |
| Accuracy: | +/- 2°C < 100 kPa Dp |
| P-band: | 10°C (Xp = 10K) |
| Max. Kv-value: | 1.10 (m³/h) |
| Recommended DP: | 3 - 10 kPa |
| Max. DP: | 100 kPa |
| Pressure range: | PN10 |
| Approvals: | VA approval (ETA Denmark) |



CirCon Female/Female section drawing

CirCon · Product programme

| Dimension | Frese no. | Weight [kg] |
|--------------------|-----------|-------------|
| DN15 Female/Female | 47-2820 | 0.43 |
| DN20 Female/Female | 47-2821 | 0.37 |
| DN20 Male/Male | 47-2822 | 0.43 |



TemCon - thermostatic valves for domestic hot water

TemCon · Control at two operating temperatures

TemCon is designed to control at two sets of temperatures.

Normal operating temperature:

Normal operation occurs at temperatures from approx. 50°C to 60°C. That is economic operation at low precise flow rates, which ensures a high level of comfort at all draw-off taps and exact temperature in all circuits.

High operating temperature:

High operating temperature is used at intervals for the pasteurization of domestic water at 70°C to 80°C through the by-pass.



TemCon with scale and built in by-pass

Temperature setting between 37°C and 65°C.

Remove the cap, and the temperature is easily set.



Manual setting of by-pass

The plastic cap is removed by means of a screwdriver that fits into the slot in the cap. Once removed, the manually operated by-pass can be set to a Kv-value between 0.0 and 0.3.



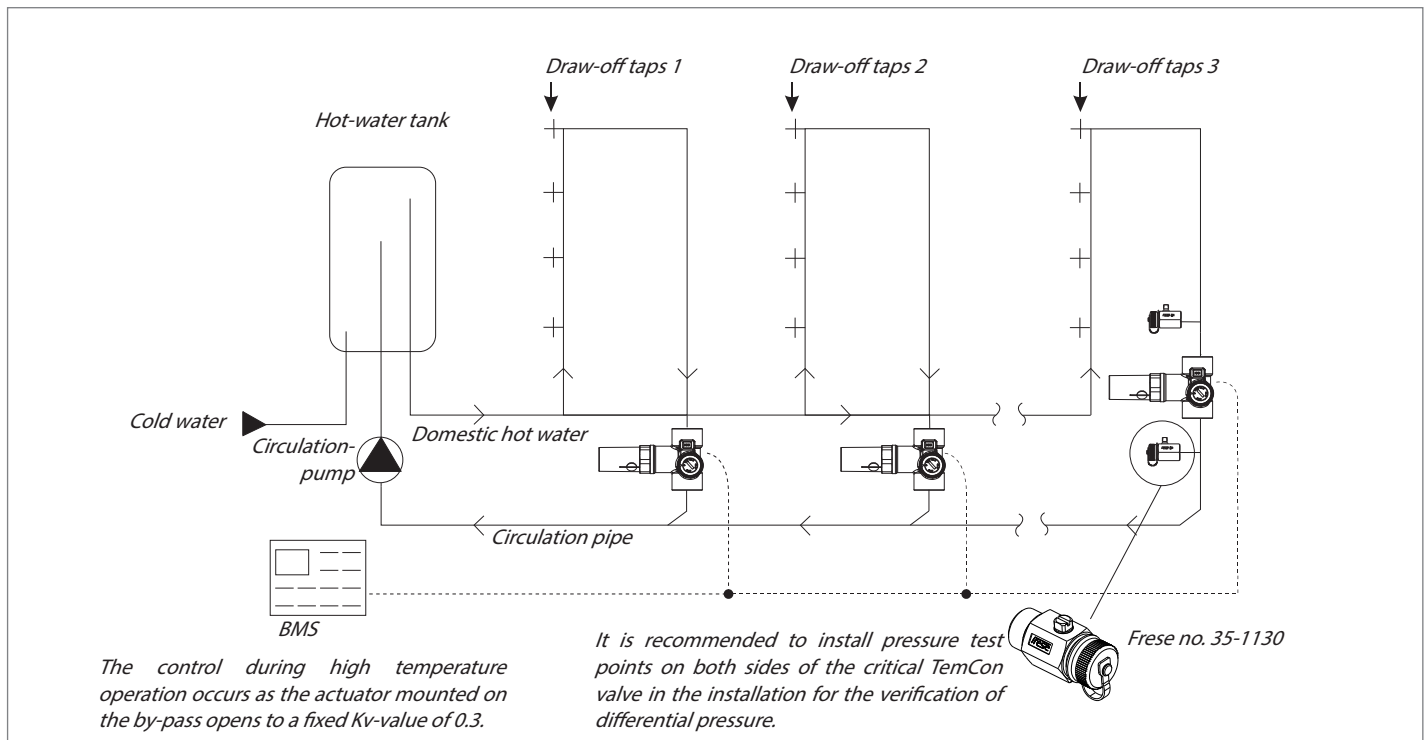
Mounting of actuator kit

The manual by-pass is unscrewed and the actuator kit is fitted in its place. The adapter ring is then mounted and the actuator fitted.



TemCon - thermostatic valves for domestic hot water

TemCon actuator operated by-pass · Application example ·



Dimensioning example · actuator operated by-pass

During normal operation:

During normal operation a TemCon with actuator operated by-pass is dimensioned in the same way as thermal control (CirCon - see page 3).

High temperature operation:

The automatic heater or the BMS opens the by-pass to a fixed Kv-value of 0.3. In this example, a sufficient quantity of water is ensured to compensate for the thermal loss in the pipe.

In an installation with 4 floors and basement a circulation line is dimensioned.

Length of pipe: 30 meters

Total length of pipe controlled by TemCon.

Thermal loss

(high temperature operation):

14 W/meter pipe.

Thermal loss in an external 27 mm pipe with 30 mm insulation (laminated Rockwool) and a difference of 60°C between room temperature and pasteurization temperature.

Δ temperature differential: 8°C

Between a temperature of 80°C in the hot-water tank and a temperature of 72°C after the TemCon.

The flow rate Q of the TemCon valve can be calculated using from the following formula:

$$Q = \frac{(30\text{m} \times 14\text{W/m}) \times 0.86}{8^\circ\text{C}} = 45 \text{ l/h}$$

The minimum differential pressure of the TemCon valve at a constant Kv-value of 0.3 can be calculated using the following formula:

$$\Delta p = \left(\frac{45}{0.3 \times 1000} \right)^2 = 2 \text{ kPa}$$

Example · adjustable by-pass

High temperature operation:

On the basis of the dimensioning example for actuator controlled by-pass and high temperature operation the flow rate is calculated using the formula:

$$Q = \frac{30 \times 14 \times 0.86}{8} = 45 \text{ l/h}$$

The differential pressure across TemCon at the given location in the system should be known in order to determine the value of the adjustable by-pass.

Here we use 35 kPa across the valve. The value can be calculated using the formula:

$$K_v = \frac{Q}{\sqrt{\Delta p}} = \left(\frac{0.045}{\sqrt{0.35}} \right) = 0.08$$

Consequently, the by-pass should be opened to min. 0.08 to ensure a temperature of 72°C after the valve.

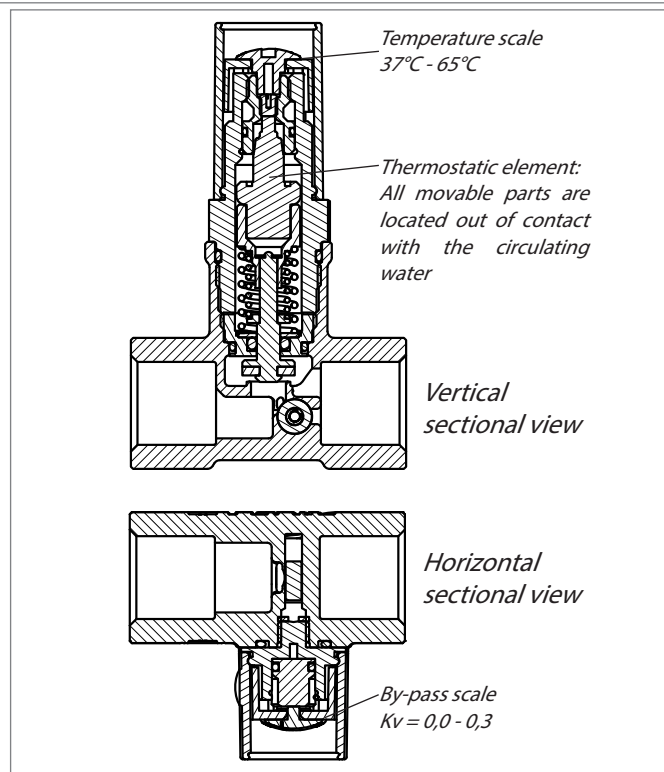
Normal operation:

During normal operation, it is recommended to close the adjustable by-pass to gain all the benefits of the thermal control of the TemCon valve.

TemCon - thermostatic valves for domestic hot water

TemCon · Technical data

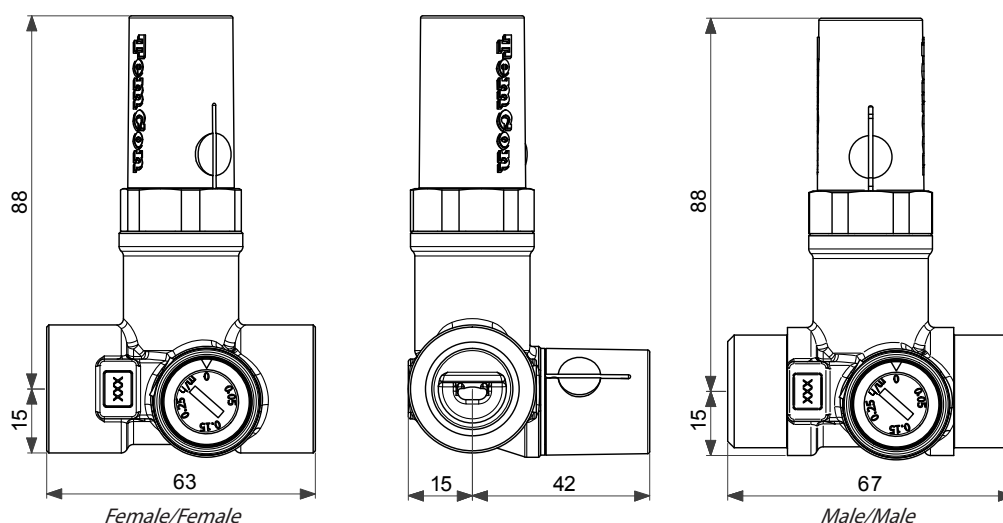
| | |
|------------------------------------|---------------------------|
| Materials: | |
| Valve body: | Stainless steel AISI 316 |
| O-rings: | EPDM |
| Springs: | Stainless steel AISI 304 |
| Element: | Wax |
| Plastic parts: | POM, ABS, PC |
| By-pass: | Stainless steel AISI 316 |
| Insulation jacket: | EPS (Max 80°C) |
| Temperature rating: | 37°C - 65°C |
| Accuracy: | +/- 2°C < 100 kPa Dp |
| P-band: | 10°C (Xp = 10K) |
| Max. Kv-value: | 1.10 (m ³ /h) |
| Recommended DP: | 3 - 10 kPa |
| Max. differential pressure: | 100 kPa |
| Max. temperature: | 100°C |
| Pressure rating: | PN10 |
| Approvals: | VA approval (ETA Denmark) |
| Kv-value, open by pass: | 0.3 (m ³ /h) |



TemCon female/female section drawing

TemCon · Product programme

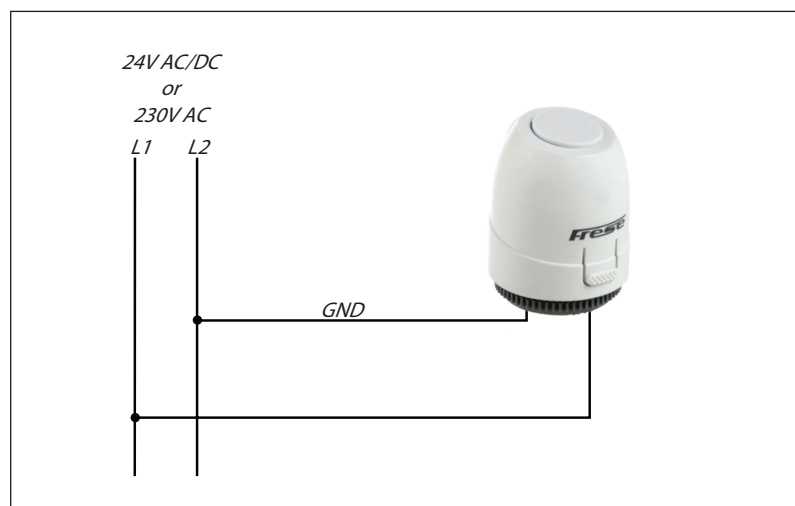
| Dimension | Frese no. | Weight [kg] |
|--------------------|-----------|-------------|
| DN15 Female/Female | 47-2890 | 0.46 |
| DN20 Female/Female | 47-2891 | 0.41 |
| DN20 Male/Male | 47-2892 | 0.46 |



CirCon/TemCon - thermostatic valves for domestic hot water

TemCon · Actuators

| Item | Frese no. | Weight | Supply voltage | Power consumption | Running time |
|-------------------|-----------|---------|----------------|-------------------|--------------|
| Actuator kit 230V | 47-2899 | 0.15 kg | 230V AC | 1W | 180s |
| Actuator kit 24V | 47-2898 | 0.15 kg | 24V AC/DC | 1W | 180s |



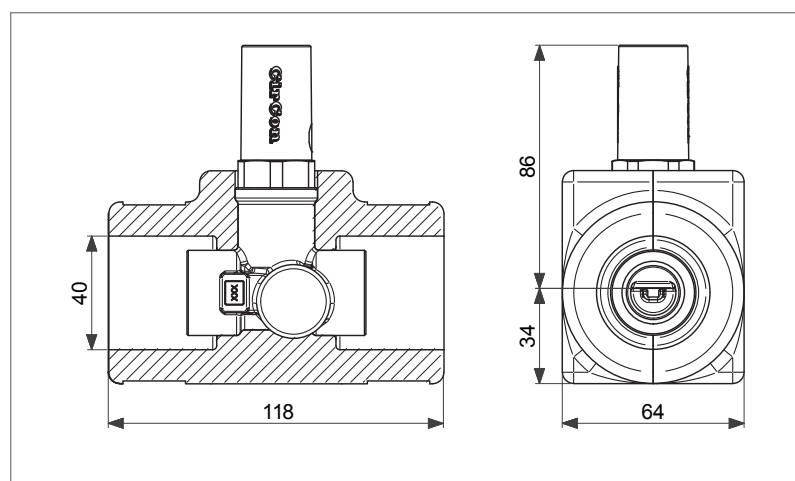
Actuator wiring



TemCon mounted with actuator

CirCon/TemCon · Insulation jacket

| Dimension | Frese no. | Weight [kg] |
|---------------------------|-----------|-------------|
| Insulation jacket DN15/20 | 38-0856 | 0.03 |



Dimensions incl. insulation



CirCon/TemCon valves are delivered as standard with insulation for increased energy efficiency.

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