

FlowCon T-JUST

Thermostatic Insert for Thermostatic Valves in Domestic Water



The FlowCon T-JUST is a thermostatic element insert which fits in a standard FlowCon valve body of your choice and is used as a thermostatic control valve designed to control the thermal balance in domestic hot water circulation installations.

The valve automatically controls the temperature of the water which circulates through the system and therefore a thermal balance is achieved throughout the entire system. Further, the proper temperature is immediate available at all draw-off taps to ensure optimal comfort.

The T-JUST insert can be adjusted to the required temperature within a scale of +35°C to +65°C. Also, it is equipped with a manual or actuated by-pass. The purpose of the by-pass is to increase the temperature of the water to maximum temperature for a certain period of time to avoid bacterial problems such as Legionella.

Legionnaire's disease is an infection which in 90% of the cases is caused by Legionella Pheumphila. Since the infection is transmitted when inhaling aerosolized, contaminated water into the lungs, the presence of bacteria in water systems creates a risk wherever there are aerosol-producing devices. The perfect conditions for transmission of infection exist in water tanks and water installations in dwelling buildings, commercial buildings and public buildings such as hotels, hospitals etc.

The normal recommended physical method of bacteria pasteurization is thermal disinfection, where the water is heated up to "disinfection temperature"

and maintained for a specific "disinfection time". FlowCon T-JUST is designed and ready to perform a regular thermal disinfection at a temperature of up to +70°C to lower the risk of Legionella.

Features and Benefits

- Thermal balancing, the correct water temperature at each draw-off tap.
- The thermostatic element and moving parts are located out of water contact, this will prevent problems with scaling.
- Field adjustable, temperature setting can be changed on demand, from +35°C to +65°C.
- By-passing possibility while the system is working, either manual or automatic with ON/OFF actuator, normally closed.
- Accuracy of $\pm 2^\circ\text{C}$.
- Each T-JUST is calibrated separately.
- Due to design the valve is not susceptible to blockage.
- Product approval, all valve bodies are available in DZR-brass and T-JUST is approved to meet the requirements in the Danish Building Regulations.
- Pressure/temperature measurement plugs available for verifying operating temperature.
- Double union end connections for ease of installation and wide selection of end fittings (ABV) or fixed end female-by-female threaded (A and AB).

Application Note: Thermostatic Balancing Valve for Domestic Hot

Technical Specification

Insert:

Pressure rating:	1000 kPa / 145 psi
Temperature rating, media:	0°C to +95°C / +32°F to +203°F
Temperature rating, ambient:	0°C to +60°C, +32°F to +140°F
Material:	
- Cartridge:	PPS, Polyphenylene sulfide
- Element:	Wax
- Body:	Forged brass ASTM CuZn40Pb2
- Spring:	Stainless steel AISI 302
- Internal components:	PPS, Polyphenylene sulfide
- O-rings:	EPDM
Max. Kv-value:	1.10 m ³ /h
Max. differential pressure:	100 kPaD / 14.5 psid
Temperature range:	+35°C to +65°C / +95°F to +149°F

Valve:

Material:	
- Body:	Forged brass ASTM CuZn40Pb2 or DZR brass CW602N CuZn36Pb2AS
- Ball valve:	ABV: Chemically nickel plated brass ball
End connections:	A: Fixed female ISO AB: Fixed female ISO ABV: Union end conn. in brass alloy ISO FF-unit: Female ISO inlet; male ISO outlet

Applications

The FlowCon T-JUST, to be used in either FlowCon A, AB, ABV1 bodies or the FF-unit, is designed for domestic hot water installations with circulation. The FlowCon T-JUST automatically controls the temperature of the water that circulates through the valve and therefore the thermal balance is ensured throughout the domestic hot water system.

The T-JUST will from factory be pre-set to +60°C. Temperature setting is easy – simply remove the black top cover and set the temperature by means of a FlowCon adjustment key. If for instance a water temperature of +55°C is needed, the T-JUST is set to the temperature of +55°C. If the temperature of the circulating water is below +55°C, T-JUST opens and more water will pass through. If the temperature is higher than +55°C, T-JUST closes. The black top cap must be screwed tightly on the T-JUST to activate the thermostatic control (and to avoid tampering).

The by-pass function can be carried out either manually by installing the red by-pass ring (used as indicator) or by means of an on/off actuator. The by-pass will force the T-JUST to fully open and set the temperature control out of action. This function is used to avoid bacterial problems such as Legionella and therefore it is recommended to flush the system regularly, flushing one branch at a time for a recommended period of time. For manual by-pass, adapt the red by-pass ring on the T-JUST and screw the black cap tight for the flushing period. When using automatic by-pass, the actuator can be either timer controlled or controlled by the BMS-system.

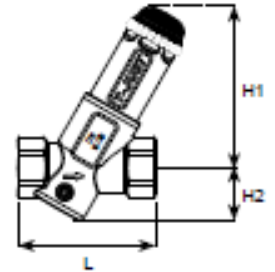
For the valve to work efficiently, a certain heat loss must be present, and since the pipes are normally insulated, insulation of the valve is not necessary. Without insulation of the valve, the valve will operate under optimal working conditions and temperature regulation will be more accurate. If insulation is required the valve will still function, but regulation will be less precise.

Application Note: Thermostatic Balancing Valve for Domestic Hot

Dimensions & Weights

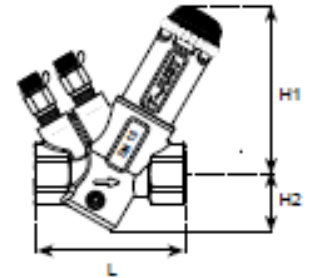
FlowCon T-JUST with FlowCon A-body

Valve size	Insert size	L	H1	H2	H3 (with actuator - not shown)	Weight (kgs.)
15	20	80	97	31	130	0.61
20						0.56



FlowCon T-JUST with FlowCon AB-body

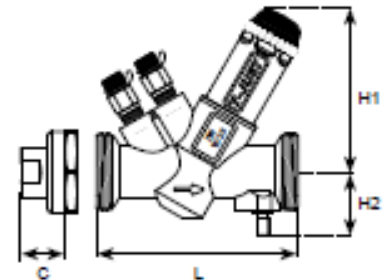
Valve size	Insert size	L	H1	H2	H3 (with actuator - not shown)	Weight (kgs.)
15	20	82	97	31	130	0.60
20		94				0.64



FlowCon T-JUST with FlowCon ABV1-body

Valve size	Insert size	L	H1	H2	H3 (with actuator - not shown)	End connections C ²			Weight (kgs.) (w/o end conn.)
						ISO female	ISO male	US Sweat	
15	20	122	97	34	130	22	25	20	1.20
20						22	25	20	
25						N/A	39	22	

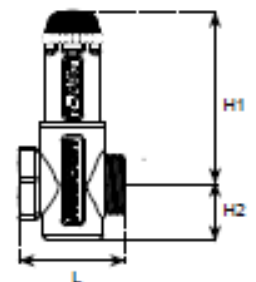
Note 2: Add end connection length to body length.



FlowCon T-JUST with FF-unit³

Valve size	Insert size	L	H1	H2	H3 (with actuator - not shown)	Weight (kgs.)
-	20	56	97	32	130	0.59

Note 3: To be fitted as upgrading element.



Application Note: Thermostatic Balancing Valve for Domestic Hot

Product Configuration Options

Warranty obligation.

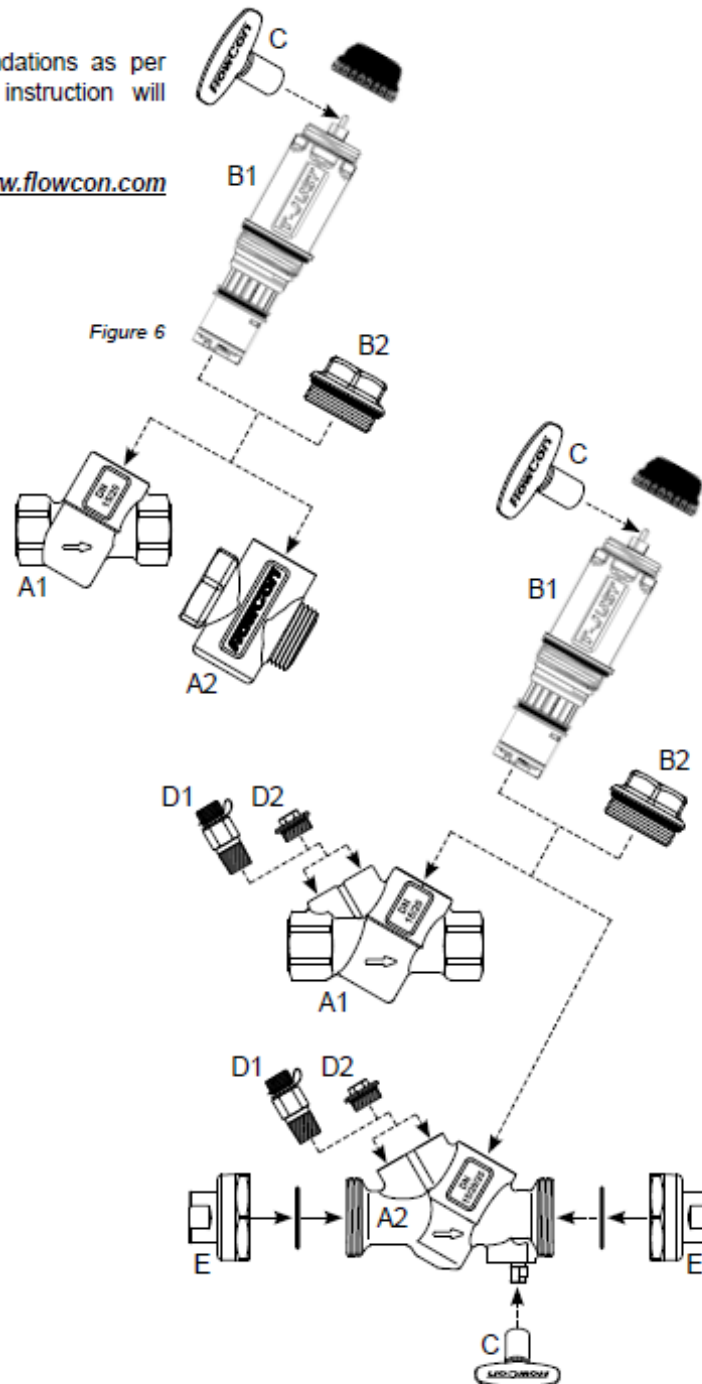
Failure to abide by all recommendations as per this installation and operation instruction will void warranty.

For latest updates please see www.flowcon.com

Assembly drawing FlowCon T-JUST:

- A1: Valve housing (A-body)
- A2: Valve housing (FF-unit)
- B1: T-JUST cartridge
- B2: Blindcap
- C: Adjustment key.

Figure 6



Assembly drawing FlowCon T-JUST:

- A1: Valve housing (AB-body)
- A2: Valve housing (ABV1-body)
- B1: T-JUST cartridge
- B2: Blindcap
- C: Adjustment keys
- D1: P/t plug (2 pcs.)
- D2: Plug and gasket (2 of each)
- E: Union end connections.

Application Note: Thermostatic Balancing Valve for Domestic Hot

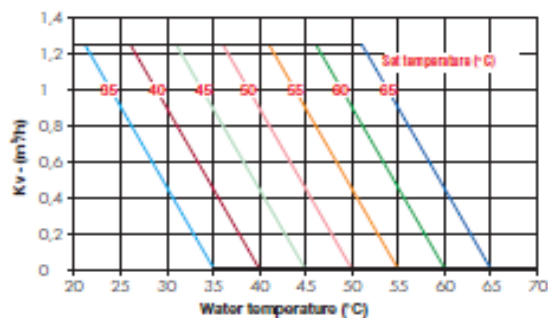
Operating Principle

Operating principle

On reaching the set temperature, the obturator, governed by an internal thermostat, modulates the closure of the hot water orifice, thereby aiding circulation towards the other connected circuits. If the temperature decreases there is the opposite action and the orifice reopens. Thanks to the special design of the preassembled cartridge, the thermostat is not directly in contact with the hot water in circulation. This limits potential trouble with blockage due to limescale. The regulator is equipped with a mechanism that allows circulation regardless of the thermostat action, used to carry out thermal disinfection of the circuit.



Hydraulic characteristics



System sizing

The thermostatic regulators are used for automatic balancing of the various branches of domestic hot water recirculation circuits, so as to ensure the required temperature in each section, to prevent the growth of Legionella and limit heat losses.

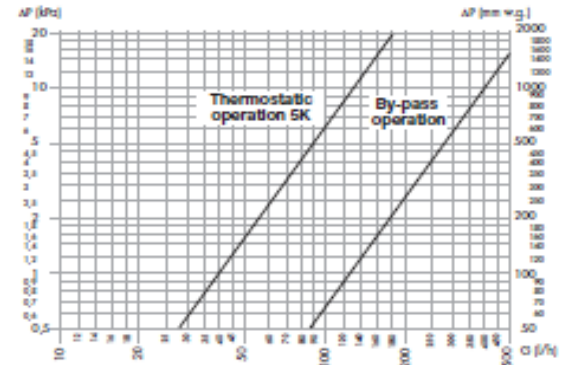
The recirculation circuits are generally sized according to the flow rate required for each branch, based on the allowed heat loss and the corresponding decrease in temperature along the pipe. Generally speaking, the maximum allowed temperature drop between the point of departure from the heating plant and the point of return to the latter is 5°C.

According to the flow rate, determined using the various calculation methods, it is possible to calculate the loss of head caused by passage through the thermostatic regulator, using the graphs provided below.

The curves for the loss of head are shown with:

- valve in thermostatic operating mode. In this case, reference is made to an average aperture corresponding to 5K, between the valve set temperature and the incoming water temperature, bearing in mind the losses along the pipe. This value allows the head required for the recirculation pump to be limited. **It is also always necessary to take care to ensure the minimum flow rate required by the mixers in the heating plant.**
- valve in by-pass operating mode. In this case, the valve obturator is fully open and the minimum loss of head is produced during thermal disinfection against Legionella.

Graph for head loss



To correctly size the recirculation pump head, add the loss of head of the valve to the loss of head of the most disadvantaged circuit.

Example

Recirculation circuit calculated for an average heat loss of 12 W/m and a temperature difference of 2K between the starting point and the most unfavourable delivery point, at the top of a riser 20 m. in height. Thermostatic regulator located at the base of the riser.

Flow rate for the riser, which therefore passes through the thermostatic regulator:

$$G = 12 \cdot 20 \cdot 0,860/2 = 103 \text{ l/h}$$

Thermostatic regulator set temperature:

$$T_{\text{reg}} = 55^\circ\text{C}$$

The graph shows the loss of head of the valve, in thermostatic operation:

$$\Delta p_{\text{reg}} = 6 \text{ kPa}$$

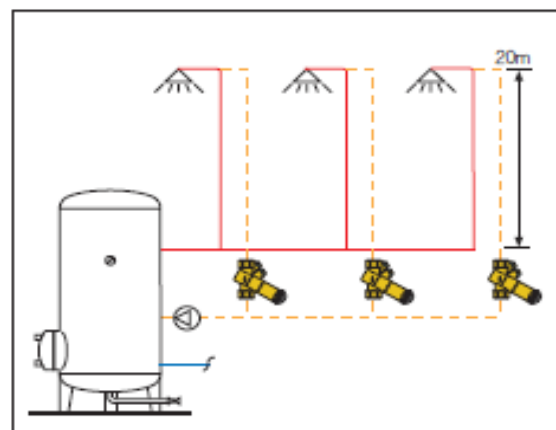
From calculations made based on the nominal flow rates, the loss of head from the pipes in the circuit and from the circuit components such as boiler, mixer, valves of the most disadvantaged circuit can be found.

Let us suppose that this value is known:

$$\Delta p_{\text{circuit}} = 14 \text{ kPa}$$

Pump head at nominal flow rate:

$$H = \Delta p_{\text{circuit}} + \Delta p_{\text{reg}} = 14 + 6 = 20 \text{ kPa}$$



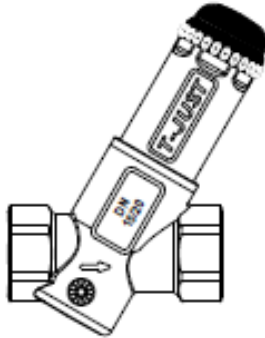
Application Note: Thermostatic Balancing Valve for Domestic Hot

Installation & Operating Instructions

The **FlowCon T-JUST** thermostatic insert is for use with four different FlowCon valve housing, either FlowCon A, FlowCon AB (DN15/20), FlowCon ABV1 or FlowCon FF. Install the selected valve housing as called for in the design drawings. **INSTALL THE VALVE HOUSING WITH THE FLOW DIRECTIONAL ARROW POINTING IN THE CORRECT DIRECTION.**

The **FlowCon A** valve (Model Nos. A15.X and A20.X) is available with fixed female-by-female threaded connections, i.e. Figure 1.

Figure 1

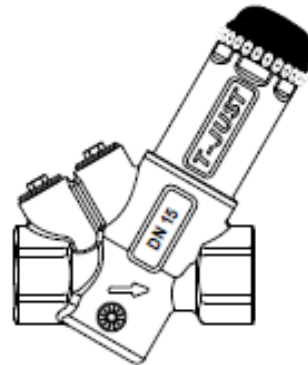


The thread standard for the A model is either ISO 228, which is a straight metric thread (compatible with BS-2779) or NPT threading standard, depending on the product number ordered.

ATTENTION
Please don't wind the
T-JUST below 35°C or
above 65°C in order to
keep the functionality
of the T-JUST.

For all threaded connections please clear threads on both valve and piping of debris. Sealant such as pipe dope or teflon tape is recommended. **WHEN USING HEMP AS PIPE SEALANT, ENSURE NO STRANDS ARE LEFT IN THE VALVE OR PIPING.**

Figure 2



The **FlowCon AB** valve (Model Nos. AB15.X and AB20.X) is similarly available with fixed female-by-female threaded connections, i.e. Figure 2.

The thread standard for the AB model is equal to what is available for the A model.

For all threaded connections pls. clear threads on both valve and piping of debris. Sealant such as pipe dope or teflon tape is recommended. **WHEN USING HEMP AS PIPE SEALANT, ENSURE NO STRANDS ARE LEFT IN THE VALVE OR PIPING.**

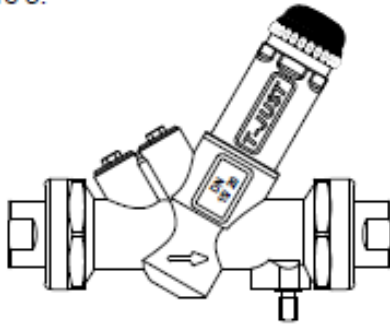
Pressure/temperature fittings are available upon request for the AB valve. Before finger mounting the p/t plugs in the body tappings, please seal the threads of the p/t plugs (**DO NOT OVER TIGHTEN**).

Alternatively to p/t plugs, the valve body can be ordered with plugs for the body tappings. Each plug is sealed by a gasket.

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The **FlowCon ABV** valve (Model No. ABV1) is available with double union endconnections, i.e. Figure 3.

Figure 3



Two types of end connections are available for use with the union nut:

Threaded (male or female):

The thread standard is ISO 228 which is a straight metric thread (compatible with BS 2779) or NPT threading standard, depending on the end connections ordered. The threads on both the connection and piping should be cleaned carefully. As these models are union end connected, the union nuts and the end connections should be removed for installation.

O-rings are supplied with the valve body and used to seal the connections. It is recommended to grease the o-rings with silicone grease before installation. **IMPORTANT:** Never use mineral oil or petrol based grease or oil on the o-rings. Please make sure these are in place in the o-ring grooves in the inlet and out-let of the valve body, when installing the housing and **REMEMBER TO TIGHTEN THE UNION NUTS TO ENSURE SEALING.**

For all threaded connections pls. clear threads on both valve and piping of debris. Sealant such as pipe dope or teflon tape is recommended. **WHEN USING HEMP AS PIPE SEALANT, ENSURE NO STRANDS ARE LEFT IN THE VALVE OR PIPING.**

Soldered end (sweat):

REMOVE THE END CONNECTIONS FROM THE HOUSING BEFORE SOLDERING. THIS ENSURES THAT THE O-RINGS AND INTERNAL PARTS ARE NOT DAMAGED BY HEAT.

Valve bodies can be ordered with either pressure-/temperature fittings or plugs similar to the AB model.

The **FlowCon FF**-unit (Model No. FF20.ID) is available with a female threaded union end inlet and fixed male threaded outlet, i.e. Figure 4. This housing is to be used as a replacement in an already installed mounting set.

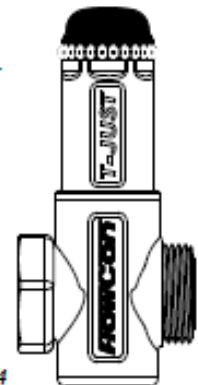


Figure 4

O-rings are supplied with the valve body and used to seal the connections.

It is recommended to grease the o-rings with silicone grease before installation. **IMPORTANT:** Never use mineral oil or petrol based grease or oil on the o-rings. Please make sure these are in place in the o-ring grooves in the inlet and out-let of the valve body, when installing the housing and **REMEMBER TO TIGHTEN THE UNION NUTS TO ENSURE SEALING.**

Inserting the T-JUST cartridge:

It is recommended that the o-rings located around the T-JUST are lubricated with silicone grease (must be food stuff approved), before the T-JUST is installed into the valve body. **IMPORTANT:** Never use mineral oil or petrol based grease or oil on the o-rings.

When inserting the T-JUST be assured to check the placement of the o-ring. There is no need to use tools - the cartridge can be inserted/removed by the fingers.

Standard Operation:

The T-JUST is factory pre-set to +60°C. To change the temperature, remove the black cover and set the scale by means of a special FlowCon adjustment key to the desired temperature between +35°C and +65°C.

ATTENTION: Please don't wind the T-JUST below 35°C or above 65°C in order to keep the functionality of the T-JUST.

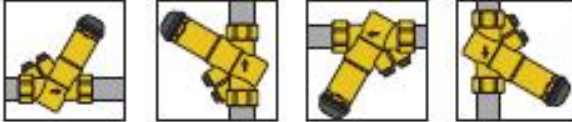
Application Note: Thermostatic Balancing Valve for Domestic Hot

Installation

Before fitting the thermostatic regulator, the pipes must be flushed to ensure that none of the impurities in circulation will affect its performance.

We recommend always installing filters of sufficient capacity at the inlet of the water system.

The thermostatic regulator can be fitted in any position, vertical or horizontal, provided it complies with the direction of flow indicated by the arrow on the valve body.



Temperature setting

The regulator is supplied with a factory temperature setting of 55°C. The temperature is set at the desired value by turning the upper screw with the control key. The graded scale shows the temperatures to which the indicator can be set.

After adjustment, screw the black protective cover all the way down to activate thermostatic operation.



Checking temperature

The valve body is fitted with threaded connectors, which can be used for pressure/temperature ports to check the temperature reached and the loss of head.

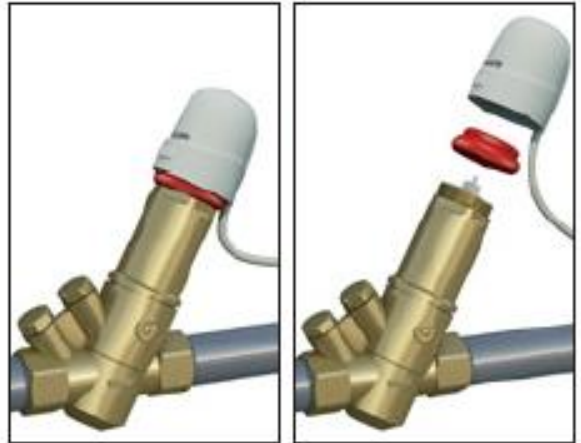


By-pass

The by-pass mechanism operates manually, simply by removing the black protective cover.

By installing the thermoelectric actuator it is possible to govern the mechanism automatically.

To ensure that the valve is in the open position while the system is being put into service, the actuator is supplied in a normally open (NO) position, and remains in this position until it is powered up electrically for the first time.



Maintenance

The preassembled cartridge containing the control components can be removed from the valve body for checking, cleaning or replacement.



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Actuated By-Pass Option



Actuated By-pass Operation:

Alternatively, the by-pass operation can be performed automatically by means of an ON/OFF actuator (FlowCon EV.0.3.R/EV.0.4.R) which is controlled either by a timer or connected directly to the BMS-system.

The actuator types **FlowCon EV.0.3.R** and **EV.0.4.R** (i.e. figure 5) are supplied with a separate red colored adaptor nut. Use this adaptor nut and screw it finger tight to the connection thread at top of the valve. Do not use additional tools. The actuator can now be fitted to the adaptor nut. A click noise will indicate that the actuator is fitted into a correct position. A push button is located on the front side of the actuator. By activating this, the actuator can be released and removed from the adaptor nut.

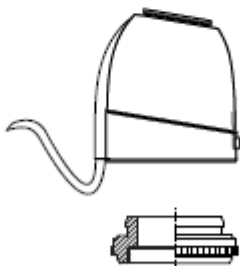
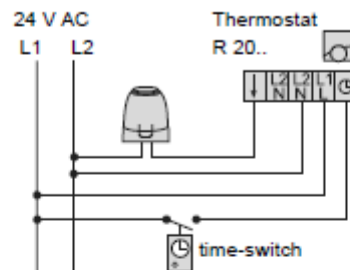


Figure 5

To ensure that the valve is in an open position during commission of the system, the actuator will be delivered in a Normally Open position and remain in this position until it is electrically operated first time. During FIRST TIME POWERING operating voltage is applied for approximately 6 minutes.

Upside down installation is allowed for the EV.0.3.R and EV.0.4.R actuators along with the standard horizontal and vertical installation.

Wiring diagram:



Calculation of maximum cable length (copper cable) for 24 V rated voltage

$$L = K \times A / n$$

A Conductor cross-section in mm²

n Number of actuators

K Constant (269m/mm²)

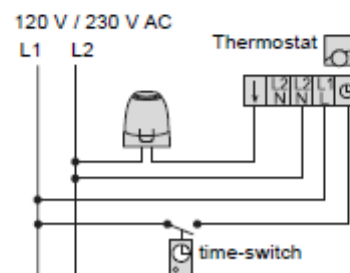
L Cable length in m

It is recommended the following lines for installing a 24 V system:

Bell wire:	Y(R)	0,8 mm ²
Light plastic-sheathed cable:	NYM	1,5 mm ²
Flat webbed building wire:	NYIF	1,5 mm ²

A safety isolation transformer according to EN 60335 must always be used. Transformer dimensioning results from the making capacity of the actuators and based on the rule-of-thumb formula:

$$P_{\text{Transformer}} = 6 W \times n$$

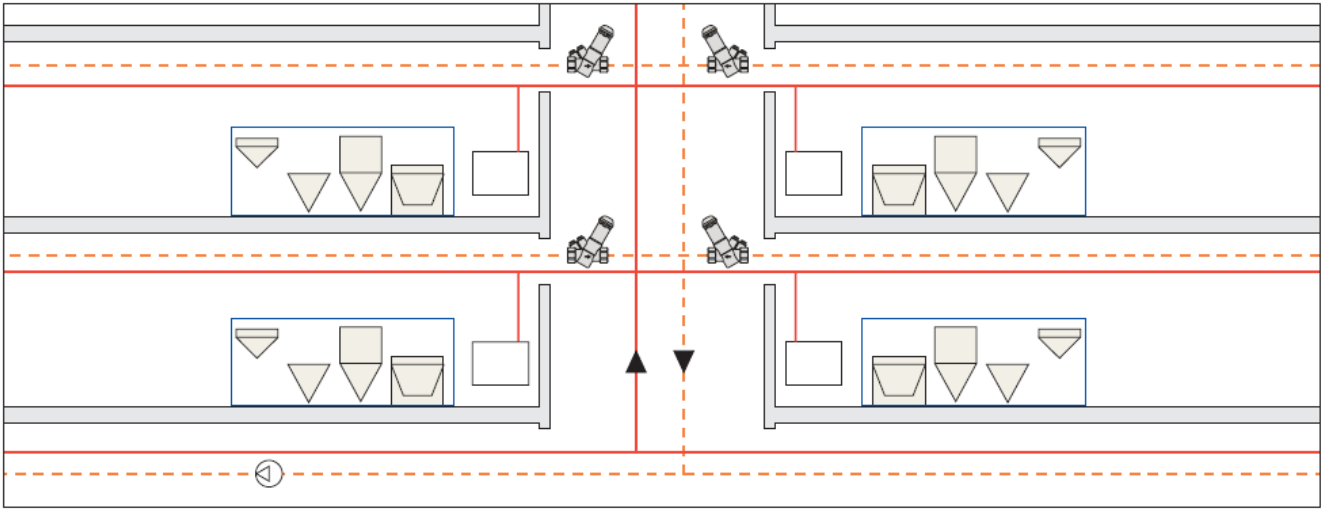
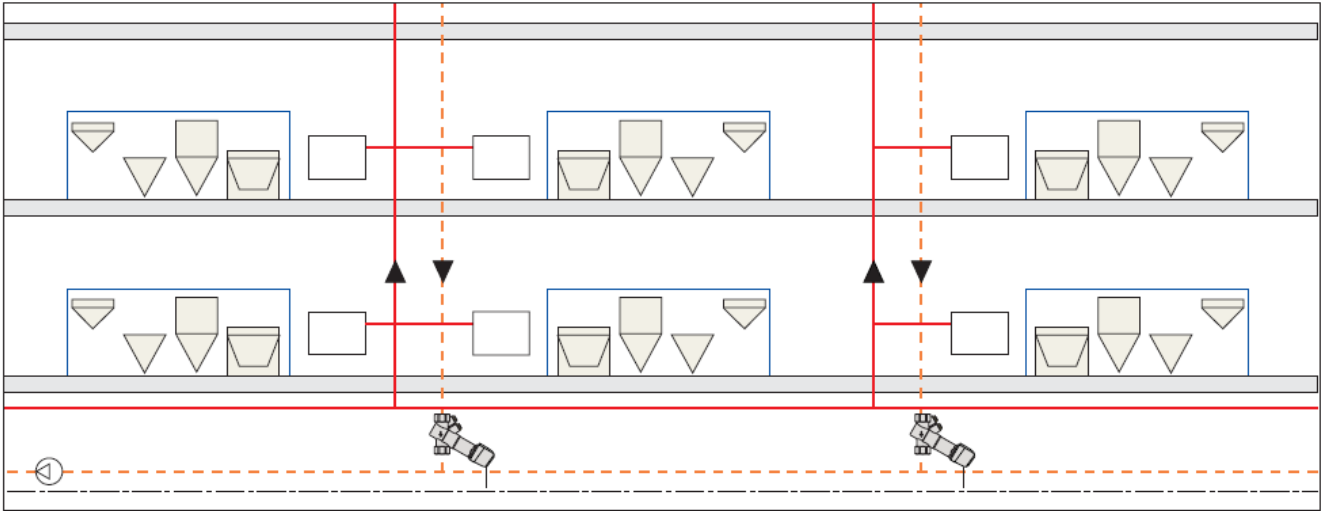


It is recommended the following lines for installing a 120 V / 230 V system:

Light plastic-sheathed cable:	NYM	1,5 mm ²
Flat webbed building wire:	NYIF	1,5 mm ²

Application Note: Thermostatic Balancing Valve for Domestic Hot

Installation Options



General Specification

1. THERMOSTATIC VALVES FOR DOMESTIC WATER - FLOWCON T-JUST

- 1.1. Contractor shall install thermostatic valves where indicated in drawings.
- 1.2. Temperature regulation unit shall be available as a plug-in device for an in-line valve housing and the adjustable element shall be out of contact with the circulating water.

2. VALVE ACTUATOR

- 2.1. Actuator shall provide a visual indication of the valve position.
- 2.2. The valve shall be closing when the actuator is not powered.
- 2.3. The valve shall withstand a shut off pressure of at least 400 kPa without allowing internal leakage.
- 2.4. The seat plug shall be manufactured of EPDM rubber.
- 2.5. The packing box for sealing the stem shall be removable with the system in operation, without allowing external leakage.

3. VALVE HOUSING

3.a. FlowCon A

- 3.a.1. Valve housing shall consist of forged brass ASTM CuZn40Pb2, rated at no less than 2500 kPa static pressure and +120°C.
- 3.a.2. Valve housing shall be permanently marked to show direction of flow.
- 3.a.3. Housing shall be configured for temperature regulation unit accessibility.

OR....

3.b. FlowCon AB

- 3.b.1. Valve housing shall consist of forged brass ASTM CuZn40Pb2, rated at no less than 2500 kPa static pressure and +120°C.
- 3.b.2. Valve housing shall be permanently marked to show direction of flow.
- 3.b.3. Optional pressure/temperature test plugs for verifying accuracy of flow performance shall be available for all valve sizes.
- 3.b.4. Housing shall be configured for temperature regulation unit accessibility.

OR....

3.c. FlowCon ABV

- 3.c.1. Valve housing shall consist of forged brass ASTM CuZn40Pb2, rated at no less than 2500 kPa static pressure and +120°C.
- 3.c.2. Valve housing shall be permanently marked to show direction of flow.
- 3.c.3. Valve ball shall consist of chemically nickel plated brass (ASTM CuZn40Pb2).
- 3.c.4. Optional pressure/temperature test plugs for verifying accuracy of flow performance shall be available for all valve sizes.
- 3.c.5. Valve housing shall be double union end constructed with a range of pipe connections available for the appropriate pipe size.
- 3.c.6. Housing shall be configured for temperature regulation unit accessibility.

OR...

3.d. FLOWCON FF-UNIT

- 3.d.1. Valve housing shall consist of DZR brass CW602N CuZn36Pb2AS, rated at no less than 2500 kPa static pressure and +120°C.
- 3.d.2. Valve housing shall be permanently marked to show direction of flow.
- 3.d.3. Housing shall be configured for temperature regulation unit accessibility.

4. TEMPERATURE REGULATION ASSEMBLY / THERMOSTATIC ELEMENT / T-JUST

- 4.1. Temperature regulation unit shall be manufactured of forged brass ASTM CuZn40Pb2 body, rated at not less than 1000 kPa static pressure and +95°C. Further, the temperature regulation unit shall be manufactured of polyphenylene sulfide cartridge with stainless steel 18-8 spring and wax element.
- 4.2. Temperature regulation unit shall be readily accessible for change-out or maintenance.
- 4.3. Temperature regulation unit shall be stepless adjustable to a temperature between +35°C and +65°C; and shall be capable of controlling the temperature within $\pm 2^\circ\text{C}$ of the rated temperature.
- 4.4. Temperature regulation unit shall be ready for either manual by-pass or actuated by-pass without exchanging the unit.

WRAS

Water Regulations Advisory Scheme

This certifies that

FLOWCON INTERNATIONAL

has had the undermentioned product examined, tested and found, when correctly installed, to comply with the requirements of the United Kingdom Water Supply (Water Fittings) Regulations/Scottish Water Byelaws.

T-JUST RANGE OF THERMOSTATIC REGULATING VALVES

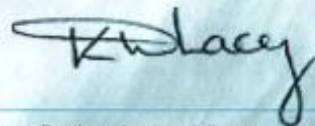
This certificate by itself is not evidence of a valid WRAS Approval. Confirmation of the current status of an approval must be obtained from the WRAS Directory (www.wras.co.uk/directory)

The product so mentioned will be listed in the Water Fittings and Materials Directory for a period until:

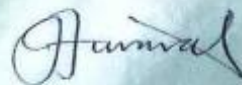
30 JUNE 2019

1406334

Certificate No.



Chairman, Product Approval Group



Secretary

WRAS
APPROVED
PRODUCT