

CONTROL UNIT FOR UNDERFLOOR HEATING SYSTEMS



Low temperature control unit



Low+high temperature control unit

1. CONTROL UNIT APPLICATION

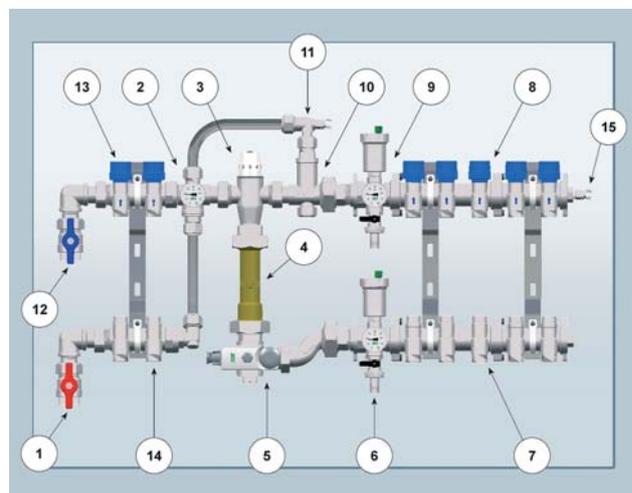
The FAR control unit is suitable for systems combining both high and low temperature circuits e.g. projects with underfloor heating in some areas and radiators in, say, the bathrooms. It is designed for connection to both flow and return with provision for an integral pump.

The painted metal inspection box is designed for wall mounting prior to the laying of the thermoinsulation

panels. It will house a range of control options and permits easy operation of the distribution system. Temperature is controlled by means of the thermostatic mixer, which depending on the preset valve blends water from the return circuit with hot water coming direct from the boiler. A safety thermostat on the flow ensures that very high temperature water cannot enter the heating loops.

2. DESCRIPTION

- 3/4" ball valve for connection to the flow.
- Diverter connection complete with fixed by-pass for the return of hot temperature water to the boiler and the return water from the heating loops; complete with thermometer for reading the temperature of water entering the mixer.
- Thermostatic mixer for regulation of the temperature of the water circulating in the UFH system; adjustable to a range of temperature levels from 20°C to 55°C.
- Template with set distance of 130mm between the connections - must always be replaced with a pump.
- Safety thermostat with immersion probe with adjustable temperature setting from 0 to 90°C (preset at 55°C). This limits the flow temperature, shutting down the circulator when the pre-set temperature is reached.
- Intermediate connection complete with automatic air vent valve, bimetallic thermometer with scale from 0 to 80°C for reading temperature of premixed water flow to the UFH loops and drain cock.
- Pre-assembled, chrome-plated, flanged 1" brass manifolds with built-in micrometric lockshield valves for system set-up, with interchangeable sizes for copper, plastic and multilayer pipe, or with a 3/4" eurokonus connection. These are distribution manifolds for supply of water flow to the heating loops.
- Pre-assembled, chrome-plated, flanged 1" brass manifolds with built-in valves available in interchangeable sizes for copper, plastic and multilayer pipe, or with a 3/4" eurokonus connection. These are return manifolds from the heating loops.
- Intermediate connection complete with automatic air vent valve, bimetallic thermometer with scale from 0 to 80°C for



- reading temperature of water returning from the heating loops and drain cock.
- Return connection with built-in non-return valve for distribution to the mixer and the return line to the boiler.
- Elbow with manual air vent valve.
- 3/4" ball valve for the return pipeline connection into the boiler.
- Thermoelectric manifolds for return from the high temperature operating system (radiators).
- Thermoelectric manifolds with built-in micrometric lockshield valves for supply to the high temperature operating system (radiators).
- Manual air vent valve for system filling.

2.1 THERMOSTATIC MIXER

Supply temperature regulation is carried out by means of a thermostatic mixer, which is designed to ensure a constant supply of water for the low temperature system. The supply temperature setup must be carried out when starting up the system, making reference to the design temperature.

An initial set-up can be achieved based on the relationship between the setting on the mixer and the flow water temperature.

POSITION	MIN	1	2	3	4	5	MAX
T(°C)	18±2	20±2	22±2	30±2	40±2	50±2	56±2

The temperature value can be read on the unit's thermometers. Once the control knob of the mixer is set, the system is regulated. The temperature values at the different positions will not correspond exactly to the values in the table. Tolerance is built in to match the features of the individual system served by the unit. Temperature regulation must be carried out with reference to the value on the thermometer located on the delivery manifolds.

2.2 IMMERSION SAFETY THERMOSTAT

The immersion thermostat located on the regulating unit, is designed to shut down the pump, or the boiler when required. It is a liquid-filled type thermostat. The graduated knob allows the operator to set the maximum temperature value for the system.

Temperature setting range: 0-90°C

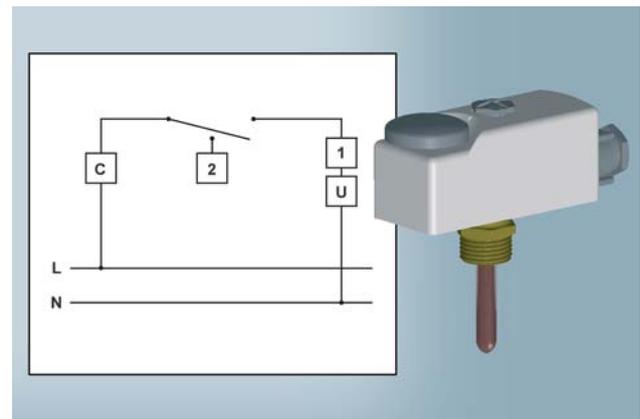
Level of protection: IP40

TERMINAL 1: Opens the circuit when temperature rises and shuts down the connected device (for example the pump). This is the terminal to which the phase of pump should be connected.

TERMINAL 2: Shuts down the circuit when temperature rises (by using a pump, this terminal must not be used)

TERMINAL C: Common contact

TERMINAL U: Connected device

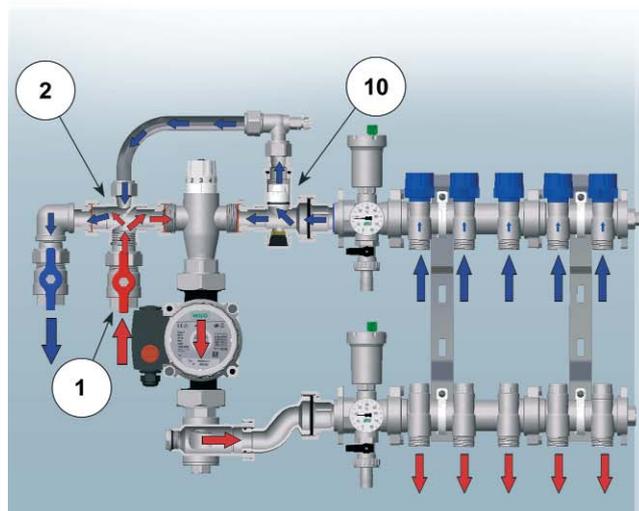


2.3 FUNCTION

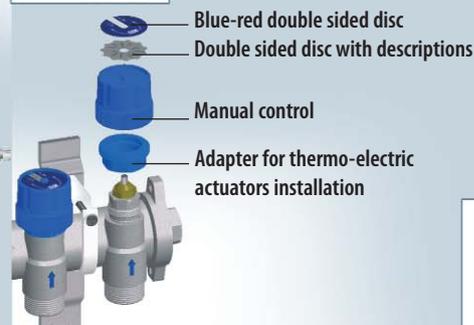
Circulation is as follows: the high temperature water supplied from the boiler reaches the mixer unit through a ball valve (1) and a by-pass diverter connection (2). The connection (2) permits the high temperature water refused by the thermostatic mixer to divert back to the boiler, while at the same time directing the water coming from the manifolds via the return connection back to the boiler (10).

The mixer unit is designed to ensure a constant supply water to the underfloor heating loops at the required temperature - blending in supplies of high temperature water from the boiler as necessary. Water leaves the mixer unit and is pumped to the flow side of the manifolds from whence it is distributed to the individual underfloor heating loops. Water coming

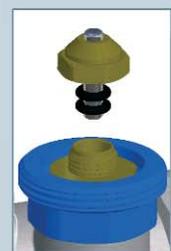
back from the loops enters the return side of the manifolds and through the return connection (10) a proportion of the water re-enters the mixing unit starting up circulation once again, while the remainder is diverted back to the boiler.



The special design of FAR manifolds makes for easier flow through by reducing flow resistance. This feature permits optimal choice of manifold diameter in relation to number of circuits to be connected.



A practical sealing system makes it possible to replace the two O-rings on the body without draining the system.



2.4 SYSTEM FILLING

To speed up system filling, we suggest setting the regulating knob of the thermostatic mixer to the MAX position, in order to achieve the maximum inlet opening. We also recommend opening the drain cock on the return manifold. Once filled, the system will discharge any air in the return pipe via the manual air vent valves (11 and 15 on the drawing on page 2). When the system comes into operation, the air vent valves

will automatically discharge air as the temperature rises. To completely fill the heating circuits it is necessary to close each valve on the return manifold and then open them one by one. We recommend cleaning the system to prevent any impurities obstructing the waterways, or even causing a malfunction of the regulating controls.

2.5 CIRCUIT BALANCING

Balancing the circuits can be achieved by regulating the micrometric lockshield valves through a 5 mm wrench, taking away the protective cap. The following pages show the flow resistances on the single connection as a function of the gear setting of the lockshield valve.

It is also possible to install flowmeters or temperature gauges on the manifold connection to give visual indication of the return water temperature of each individual loop.



2.6 COMPONENTS FOR INSTALLATION

Flowmeter and temperature gauge

To balance the circuit it will be necessary adjust the lockshield valve and set up the flow rate. To do this flowmeters are available with two measuring scales: from 1 to 3,5 l/min or from 2 to 8 l/min, depending on system requirement.

Moreover, the flowmeters make it possible to use a thermometer Art.3434 to reveal the temperature of the return water on every single circuit and balance the system on temperature rather than on flow.



Thermo-electric actuators

To control the opening of a single circuit, it's possible to use the thermoelectric actuators with microswitch. In this case you can switch off the pump when all the valves are closed.



By-pass kit

During operation it is possible to verify that one or more outlets are closed, or rather that there are zones in which flow is not required. In this event there will be an increasing resistance in the circuits. At this time the pump is working at high pressure. To avoid this drawback a bypass connection with an integral differential pressure control valve is available for fitting to the manifolds.

When a set level of pressure is reached, this valve ensures that the excess flow is drained onto the return manifold. In this way the pump can work at a constant head.



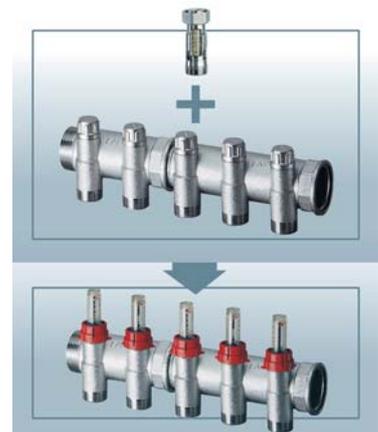
2.7 MANIFOLDS WITH FLOWMETERS

FAR offers a range of manifolds complete with flowmeters which can monitor, regulate and check the flow to each connection. Compared to traditional systems with a flowmeter located on the primary, this new version is more compact – making for easier system installation and regulation.

This is possible because the flow meter is a combination between a lockshield valve – which regulates flow of fluid in the circuit - and a flowmeter which measures the volume of fluid circulating in the system (l/minute).

The flow measurement principle is based on the movement of a baffle disc located in a measuring pipe. Position is replicated on the indicator by means of a longitudinal stem which connects the baffle disc to the indicator body.

Fluid enters the flowmeter in a radial direction in relation to the axis of movement and exits with an axial direction investing the baffle disc.



(For more information see data sheet ST.008 on manifolds with FAR flowmeters)

3. MODULATING CONTROL UNITS

MODULATING UNIT FOR LOW TEMPERATURE SYSTEMS, ART. 3490

The control unit with modulating actuator, Art. 3490, is suitable for use in systems requiring distribution of low temperature water to panel radiators. The unit is designed for connection of supply and return pipelines to boilers with built-in circulators.

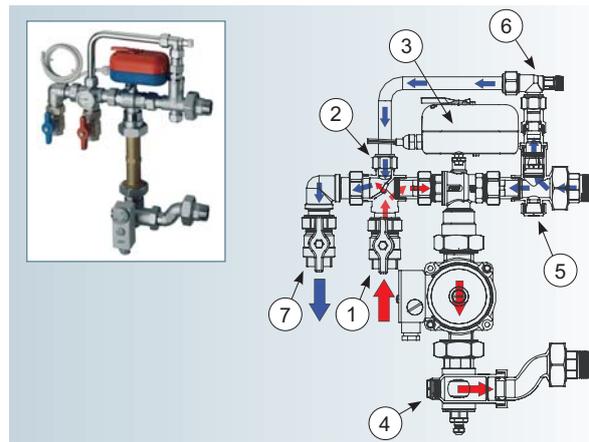
Regulation of supply water temperature is controlled by a 3 point actuator, which, depending on the value set on the control unit, mixes water returning from the radiator system with high temperature water coming from the boiler. A safety thermostat guards against water at too high temperature circulating in the radiator circuit – even in the event of an actuator malfunctioning.

The modulating unit for underfloor heating systems is available in ONLY HOT or HOT-COLD versions. These units – together with an electronic control unit – can manage system supply temperature to the loops in relation to weather conditions.

The MODULATING version is suitable for both heating and cooling systems and is characterized by the ability to manage the system by modulating supply temperature via a control unit equipped with an external temperature probe. It is still possible to manage supply temperature around a fixed value. A circulator must be installed at the outlet of the mixing valve in place of the brass template.

The unit is equipped with a by-pass between supply and return connections of the heat emitter and a safety thermostat.

It is also available with preassembled thermo-electric manifolds for flow distribution for “low temperature only”, “high temperature only” or both.



The unit comprises:

1. 3/4" ball valve for connection to the flow
2. diverter connection complete with fixed by-pass for the return of hot temperature water to the boiler and return water from the heating loops; complete with temperature gauge for reading the temperature of water entering the mixer
3. mixing valve with 3-point actuator
4. Safety thermostat with immersion probe with adjustable temperature range from 0°C to 90°C (pre-set at 60°C). This limits the flow temperature, shutting down the circulator when the pre-set temperature is reached.
5. Return connection with built-in non-return valve for distribution to the mixer and the return line to the boiler.
6. Elbow with manual air vent valve
7. 3/4" ball valve for connection to the return pipeline.

OPERATION

The mixing valve is designed to ensure a constant supply of water blended to the required temperature to the underfloor heating loops. Circulation is as follows: water leaves the mixing valve (3), passes through the pump (installed in place of the template) and is pumped to the flow side of the manifold(s) from whence it is distributed to the individual underfloor heating loops. Water coming back from the loops enters the return connection (5) and

re-enters the mixing valve. High temperature water is supplied from the boiler to the mixing valve via a ball valve (1) and diverter connection (2). As it enters the mixing valve an equal quantity of lower temperature return water coming out from the upper part of connection 5 and through the connection 2, is diverted back to the boiler, thus automatically keeping the system in balance.

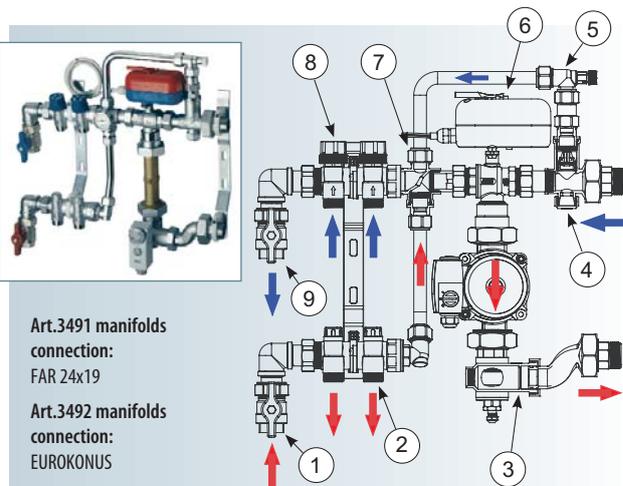
MODULATING UNIT FOR HIGH AND LOW TEMPERATURE SYSTEMS, ART. 3491 – 3492

The control unit with modulating actuator, Arts. 3491 - 3492, is suitable for use in systems requiring distribution of both high to radiators and low floor temperature water. The unit is designed for connection of supply and return pipeline to boilers with built-in circulators. The unit is provided with manifolds with from 2 to 5 ports for connection of circuits operating with high temperature water (radiators).

Supply flow temperature is regulated by a 3-point actuator, which blends low temperature return water with the high temperature water coming from the boiler in accordance with the pre-set value on the electronic controller. In case the mixer malfunctions, a safety thermostat prevents water flowing within the system at too high a temperature.

The unit comprises:

1. 3/4" ball valve for connection to the flow
2. High temperature supply manifold
3. Safety thermostat with immersion probe with adjustable temperature setting from 0 to 90°C (preset at 55°C). This limits the flow temperature, shutting down the circulator when the pre-set temperature is reached.
4. Return connection with built-in non-return valve for distribution to the mixer and the return line to the boiler.
5. Elbow with manual air vent valve.
6. Mixing valve with 3-point actuator
7. Diverter connection complete with fixed by-pass for the return of hot temperature water to the boiler and the return water from the heating loops; complete with temperature gauge for reading the temperature of water entering the mixer
8. High temperature return manifolds
9. 3/4" ball valve for the return pipelines connection to the boiler.



Art.3491 manifolds connection: FAR 24x19
Art.3492 manifolds connection: EUROKONUS

OPERATION

The mixing valve is designed to ensure a constant supply of water blended to the required temperature to the underfloor heating loops. Circulation is as follows: water leaves the mixing valve (6), passes through the pump (installed in place of the template) and is pumped to the flow side of the manifold(s) from whence it is distributed to the individual underfloor heating loops. Water coming back from the loops enters the return connection (4) and

re-enters the mixing valve. High temperature water is supplied from the boiler to the mixing valve via a ball valve (1) and diverter connection (7). As it enters the mixing valve an equal quantity of lower temperature return water, coming out from the upper part of connection 4 and through the connection 7 is diverted back to the boiler, thus automatically keeping the system in balance.

3.1 ELECTRONIC CONTROLLER FOR "HOT ONLY" SYSTEMS (HEATING)

If you wish to set up a "hot only" system, you will require both the regulating unit and AC electronic controller, Art. 9611, comprising:

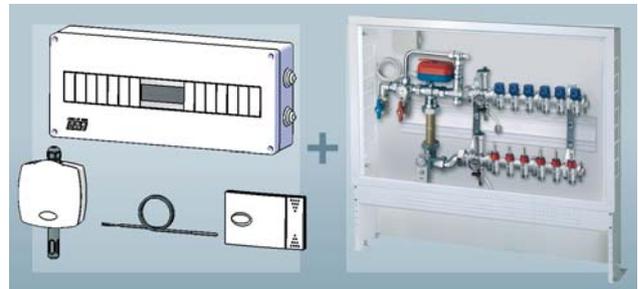
- HOT ONLY electronic controller
- Supply temperature probe
- External temperature probe
- Seat for supply probe



3.2 ELECTRONIC CONTROLLER FOR "HOT-COLD" SYSTEMS (HEATING and COOLING)

However, if you need to use a climatic control which operates the circuits in winter and summer, you will also require a control unit, Art. 9610. It comprises:

- HOT ONLY electronic controller
- Supply temperature probe
- External temperature probe
- Internal temperature + humidity probe
- Seat for supply probe
- Box for controller



3.3 ACTUATOR

The actuator incorporates an appropriate servomotor to permit automatic operation of a mixing valve in response to a signal from an electronic controller.



Manual Release

In order to manually open or close the actuator, push the red key and simultaneously turn the position indicator counter-clockwise through 90°C. Normal functioning will return automatically.

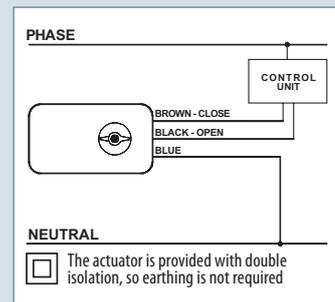
Electrical connections

Before connecting the actuator make sure that the selected model is fully compatible with the available network voltage. All connections must be made by qualified personnel and with respect for the overall electrical system - also indicated on the actuator itself - taking care that the electricity supply is switched off. Incorrect connection may endanger both persons and equipment.

All actuator versions are provided with an auxiliary micro-switch, i.e. without voltage, suitable for low voltage signals (max 230 V) and/or for use of low supply (max 2A).

3 wiring connections: control through the electronic controller

To control opening and closing of a zone valve via an actuator, connect the blue wire to the neutral, the brown and the black wire to the electronic controller. The valve opens in the presence of phase on the black wire, while the actuator closes in the presence of phase on the brown wire.



3.4 PUMP FOR UNDERFLOOR HEATING SYSTEMS

In order to operate correctly, the brass template on the unit must ALWAYS be replaced with an appropriately sized pump in order to avoid flow resistance in the low temperature circuit.

FAR offers 3 kinds of pumps to complement these units:

- Art. 2185 130: 3-speed pump with 130mm centre line. Max. head: 6 m.
- Art. 2185 130EB: electronic pump, energy class B,



with 130 mm centre line.

Variable head: from 1 to 5 m.

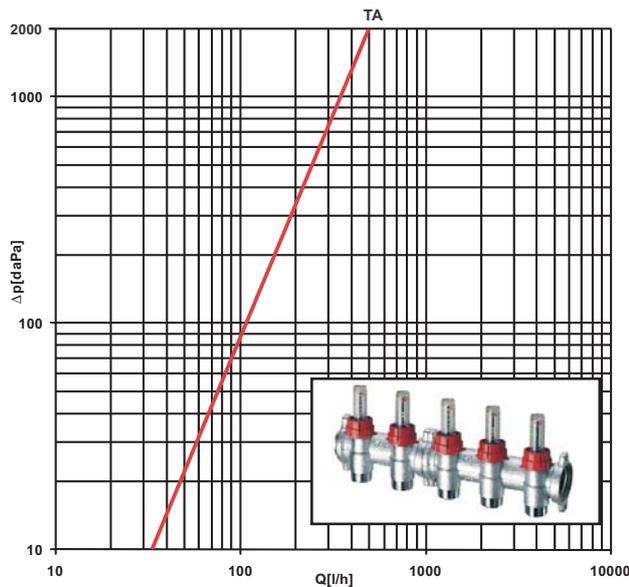
- Art. 2185 130EA: electronic pump, energy class A, with 130 mm centre line.

Variable head: from 1 to 7 m.

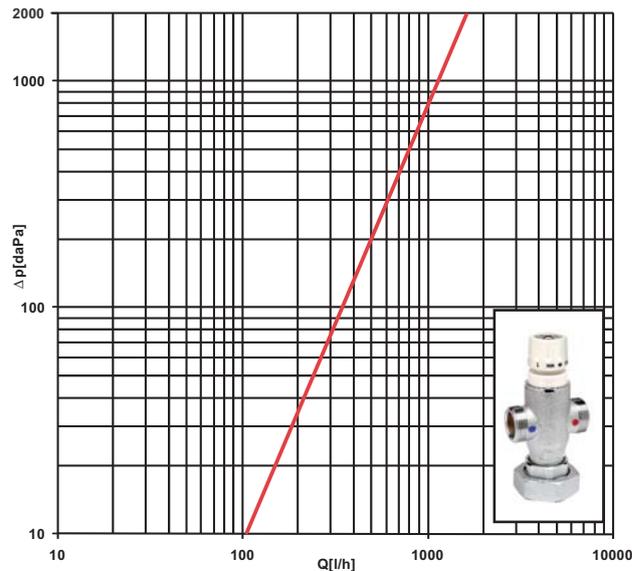
All pumps have a 130mm centre line, 1 1/2 male connections and 230 V supply.

The pumps are only sold in combination with pre-assembled units.

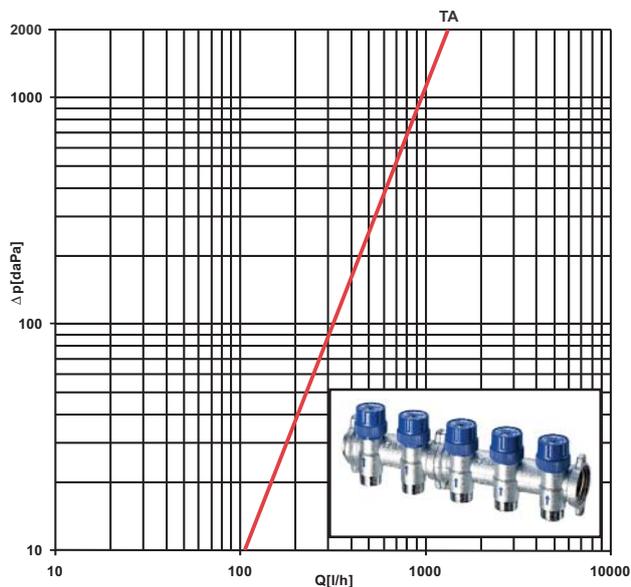
4. TECHNICAL AND FLUID-DYNAMIC FEATURES



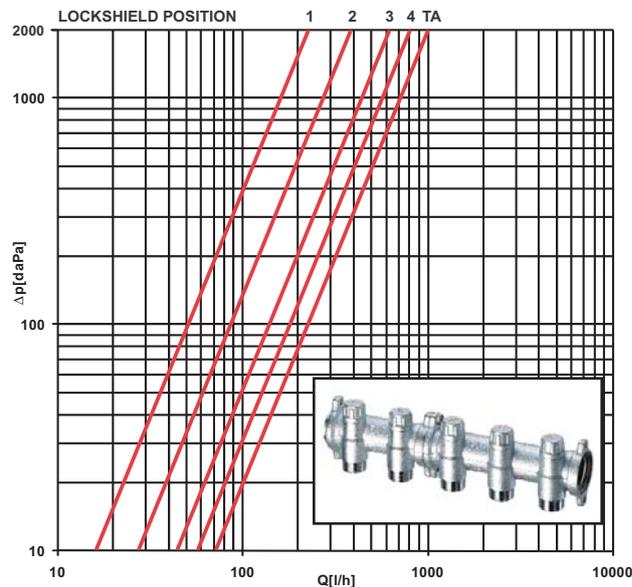
Art. 3972 1 thermoelectric flanged manifold with built-in lockshield valves
Kv = 1,13 m³/h



Art. 3951 1 thermostatic mixer for control unit
Kv = 3 m³/h



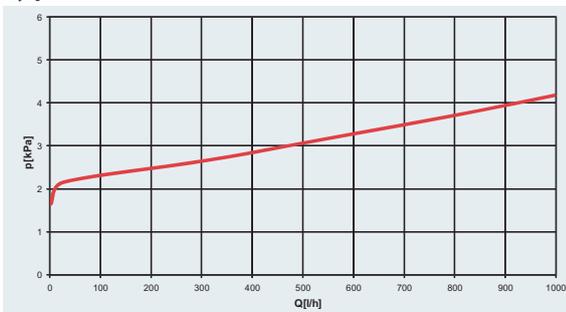
Art. 3914 1 thermoelectric flanged manifold with built-in valves
Kv = 2,74 m³/h



Art. 3915 1 thermoelectric flanged manifold with built-in lockshield valves

TURNS	1	2	3	4	TA
Kv [m³/h]	0,5	0,92	1,36	1,82	2,16

By-pass kit

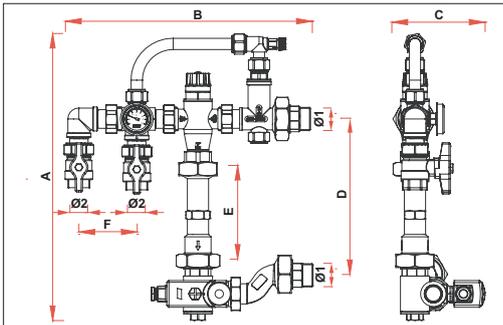


The diagram shows the curve of fluid flowing from the by-pass differential valve as a function of the upstream pressure. The valve opens at 0,2 bar, and the excess flow is diverted back to the boiler.

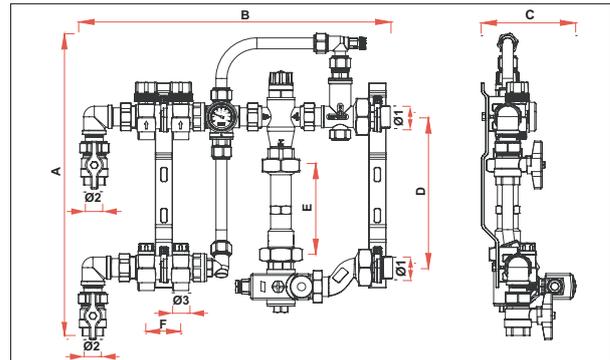
Technical features

Nominal pressure:	10 bar
Max.working pressure:	4 bar
Mixer temperature range:	18°C - 55°C
Max.mixer inlet temperature:	95°C
Pump centre line::	130 mm

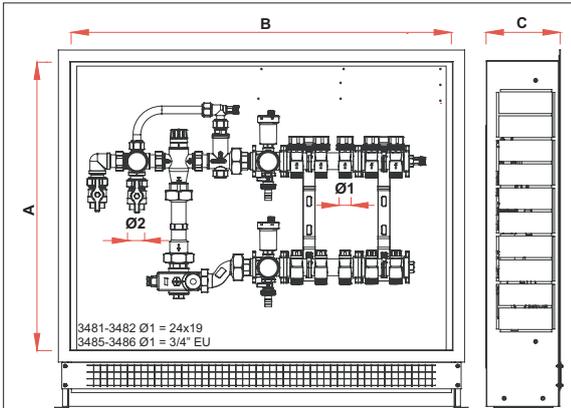
5. DIMENSIONAL FEATURES



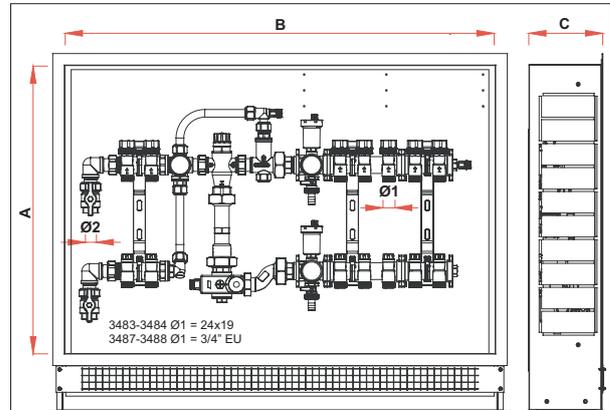
CODE	A	B	C	D	E	F	Ø1	Ø2
3480 34	408	352	129	221	130	80	G3/4	G3/4
3480 1	408	352	129	221	130	80	G1	G3/4
3480 114	408	352	129	221	130	80	G1 1/4	G3/4



CODE	A	B	C	D	E	F	Ø1	Ø2	Ø3
3477 102 - 3489 13402	449	458	137	221	130	50	G1	G3/4	24x19-G3/4
3477 103 - 3489 13403	449	508	137	221	130	50	G1	G3/4	24x19-G3/4
3477 104 - 3489 13404	449	558	137	221	130	50	G1	G3/4	24x19-G3/4
3477 105 - 3489 13405	449	608	137	221	130	50	G1	G3/4	24x19-G3/4

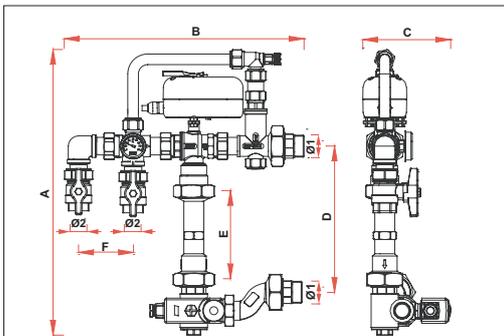


CODE	A	B	C	D	E	Ø1	Ø2
3481 103 - 3485 13403	--	--	--	424	600	24x19-G3/4	G3/4
3481 104 - 3485 13404	--	--	--	424	650	24x19-G3/4	G3/4
3481 105 - 3485 13405	--	--	--	424	705	24x19-G3/4	G3/4
3481 106 - 3485 13406	--	--	--	424	755	24x19-G3/4	G3/4
3481 107 - 3485 13407	--	--	--	424	805	24x19-G3/4	G3/4
3481 108 - 3485 13408	--	--	--	424	855	24x19-G3/4	G3/4
3481 109 - 3485 13409	--	--	--	424	910	24x19-G3/4	G3/4
3481 110 - 3485 13410	--	--	--	424	960	24x19-G3/4	G3/4
3481 111 - 3485 13411	--	--	--	424	1010	24x19-G3/4	G3/4
3481 112 - 3485 13412	--	--	--	424	1060	24x19-G3/4	G3/4
3482 103 - 3486 13403	600	700	150	424	600	24x19-G3/4	G3/4
3482 104 - 3486 13404	600	700	150	424	650	24x19-G3/4	G3/4
3482 105 - 3486 13405	600	800	150	424	705	24x19-G3/4	G3/4
3482 106 - 3486 13406	600	800	150	424	755	24x19-G3/4	G3/4
3482 107 - 3486 13407	600	900	150	424	805	24x19-G3/4	G3/4
3482 108 - 3486 13408	600	900	150	424	855	24x19-G3/4	G3/4
3482 109 - 3486 13409	600	1000	150	424	910	24x19-G3/4	G3/4
3482 110 - 3486 13410	600	1000	150	424	960	24x19-G3/4	G3/4
3482 111 - 3486 13411	600	1100	150	424	1010	24x19-G3/4	G3/4
3482 112 - 3486 13412	600	1100	150	424	1060	24x19-G3/4	G3/4

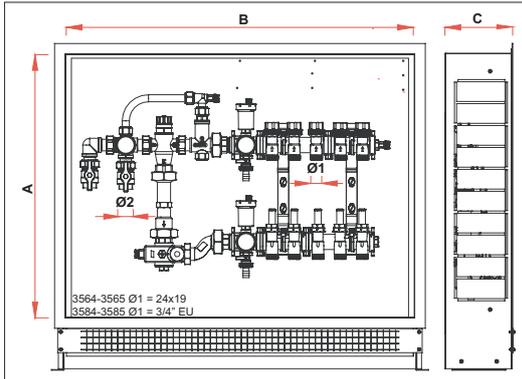


CODE	D	E	Ø1	Ø2
3483 10302 - 3487 1340302	450	705	24x19-G3/4	G3/4
3483 10402 - 3487 1340402	450	755	24x19-G3/4	G3/4
3483 10502 - 3487 1340502	450	810	24x19-G3/4	G3/4
3483 10602 - 3487 1340602	450	860	24x19-G3/4	G3/4
3483 10702 - 3487 1340702	450	910	24x19-G3/4	G3/4
3483 10802 - 3487 1340802	450	960	24x19-G3/4	G3/4
3483 10902 - 3487 1340902	450	1015	24x19-G3/4	G3/4
3483 11002 - 3487 1341002	450	1065	24x19-G3/4	G3/4
3483 11102 - 3487 1341102	450	1115	24x19-G3/4	G3/4
3483 10303 - 3487 1340303	450	755	24x19-G3/4	G3/4
3483 10403 - 3487 1340403	450	810	24x19-G3/4	G3/4
3483 10503 - 3487 1340503	450	860	24x19-G3/4	G3/4
3483 10603 - 3487 1340603	450	910	24x19-G3/4	G3/4
3483 10703 - 3487 1340703	450	960	24x19-G3/4	G3/4
3483 10803 - 3487 1340803	450	1015	24x19-G3/4	G3/4
3483 10903 - 3487 1340903	450	1065	24x19-G3/4	G3/4
3483 11003 - 3487 1341003	450	1115	24x19-G3/4	G3/4

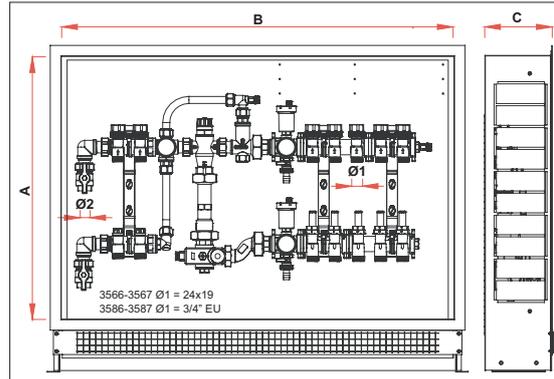
CODE	A	B	C	Ø1	Ø2
3484 10302 - 3488 1340302	600	800	150	24x19-G3/4	G3/4
3484 10402 - 3488 1340402	600	800	150	24x19-G3/4	G3/4
3484 10502 - 3488 1340502	600	900	150	24x19-G3/4	G3/4
3484 10602 - 3488 1340602	600	900	150	24x19-G3/4	G3/4
3484 10702 - 3488 1340702	600	1000	150	24x19-G3/4	G3/4
3484 10802 - 3488 1340802	600	1000	150	24x19-G3/4	G3/4
3484 10902 - 3488 1340902	600	1100	150	24x19-G3/4	G3/4
3484 11002 - 3488 1341002	600	1100	150	24x19-G3/4	G3/4
3484 11102 - 3488 1341102	600	1200	150	24x19-G3/4	G3/4
3484 10303 - 3488 1340303	600	800	150	24x19-G3/4	G3/4
3484 10403 - 3488 1340403	600	900	150	24x19-G3/4	G3/4
3484 10503 - 3488 1340503	600	900	150	24x19-G3/4	G3/4
3484 10603 - 3488 1340603	600	1000	150	24x19-G3/4	G3/4
3484 10703 - 3488 1340703	600	1000	150	24x19-G3/4	G3/4
3484 10803 - 3488 1340803	600	1100	150	24x19-G3/4	G3/4
3484 10903 - 3488 1340903	600	1100	150	24x19-G3/4	G3/4
3484 11003 - 3488 1341003	600	1200	150	24x19-G3/4	G3/4



CODE	A	B	C	D	E	F	Ø1	Ø2
3490 3410	452	360	132	221	130	80	G3/4	G3/4
3490 110	452	360	132	221	130	80	G1	G3/4
3490 11410	452	363	132	221	130	80	G1 1/4	G3/4

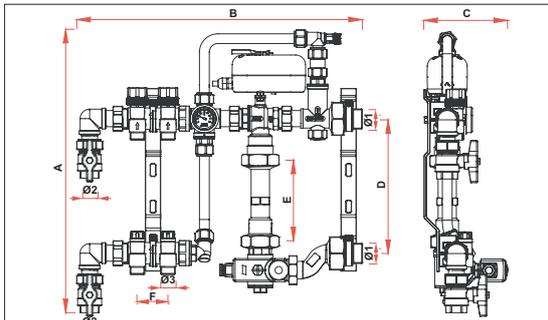


CODE	A	B	C	D	E	Ø1	Ø2
3564 103 - 3584 13403	--	--	--	424	600	24x19-G3/4	G3/4
3564 104 - 3584 13404	--	--	--	424	650	24x19-G3/4	G3/4
3564 105 - 3584 13405	--	--	--	424	705	24x19-G3/4	G3/4
3564 106 - 3584 13406	--	--	--	424	755	24x19-G3/4	G3/4
3564 107 - 3584 13407	--	--	--	424	805	24x19-G3/4	G3/4
3564 108 - 3584 13408	--	--	--	424	855	24x19-G3/4	G3/4
3564 109 - 3584 13409	--	--	--	424	910	24x19-G3/4	G3/4
3564 110 - 3584 13410	--	--	--	424	960	24x19-G3/4	G3/4
3564 111 - 3584 13411	--	--	--	424	1010	24x19-G3/4	G3/4
3564 112 - 3584 13412	--	--	--	424	1060	24x19-G3/4	G3/4
3565 103 - 3585 13403	600	700	150	424	600	24x19-G3/4	G3/4
3565 104 - 3585 13404	600	700	150	424	650	24x19-G3/4	G3/4
3565 105 - 3585 13405	600	800	150	424	705	24x19-G3/4	G3/4
3565 106 - 3585 13406	600	800	150	424	755	24x19-G3/4	G3/4
3565 107 - 3585 13407	600	900	150	424	805	24x19-G3/4	G3/4
3565 108 - 3585 13408	600	900	150	424	855	24x19-G3/4	G3/4
3565 109 - 3585 13409	600	1000	150	424	910	24x19-G3/4	G3/4
3565 110 - 3585 13410	600	1000	150	424	960	24x19-G3/4	G3/4
3565 111 - 3585 13411	600	1100	150	424	1010	24x19-G3/4	G3/4
3565 112 - 3585 13412	600	1100	150	424	1060	24x19-G3/4	G3/4

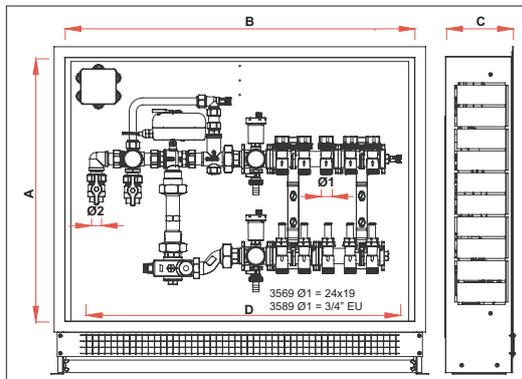


CODE	D	E	Ø1	Ø2
3566 10302 - 3586 1340302	450	703	24x19-G3/4	G3/4
3566 10402 - 3586 1340402	450	753	24x19-G3/4	G3/4
3566 10502 - 3586 1340502	450	808	24x19-G3/4	G3/4
3566 10602 - 3586 1340602	450	868	24x19-G3/4	G3/4
3566 10702 - 3586 1340702	450	918	24x19-G3/4	G3/4
3566 10802 - 3586 1340802	450	968	24x19-G3/4	G3/4
3566 10902 - 3586 1340902	450	1013	24x19-G3/4	G3/4
3566 11002 - 3586 1341002	450	1063	24x19-G3/4	G3/4
3566 11102 - 3586 1341102	450	1113	24x19-G3/4	G3/4
3566 10303 - 3586 1340303	450	753	24x19-G3/4	G3/4
3566 10403 - 3586 1340403	450	818	24x19-G3/4	G3/4
3566 10503 - 3586 1340503	450	868	24x19-G3/4	G3/4
3566 10603 - 3586 1340603	450	918	24x19-G3/4	G3/4
3566 10703 - 3586 1340703	450	968	24x19-G3/4	G3/4
3566 10803 - 3586 1340803	450	1013	24x19-G3/4	G3/4
3566 10903 - 3586 1340903	450	1063	24x19-G3/4	G3/4
3566 11003 - 3586 1341003	450	1113	24x19-G3/4	G3/4

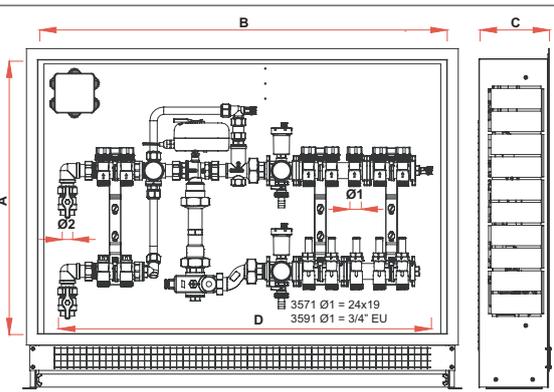
CODE	A	B	C	Ø1	Ø2
3567 10302 - 3587 1340302	600	800	150	24x19-G3/4	G3/4
3567 10402 - 3587 1340402	600	800	150	24x19-G3/4	G3/4
3567 10502 - 3587 1340502	600	900	150	24x19-G3/4	G3/4
3567 10602 - 3587 1340602	600	900	150	24x19-G3/4	G3/4
3567 10702 - 3587 1340702	600	1000	150	24x19-G3/4	G3/4
3567 10802 - 3587 1340802	600	1000	150	24x19-G3/4	G3/4
3567 10902 - 3587 1340902	600	1100	150	24x19-G3/4	G3/4
3567 11002 - 3587 1341002	600	1100	150	24x19-G3/4	G3/4
3567 11102 - 3587 1341102	600	1200	150	24x19-G3/4	G3/4
3567 10303 - 3587 1340303	600	800	150	24x19-G3/4	G3/4
3567 10403 - 3587 1340403	600	900	150	24x19-G3/4	G3/4
3567 10503 - 3587 1340503	600	900	150	24x19-G3/4	G3/4
3567 10603 - 3587 1340603	600	1000	150	24x19-G3/4	G3/4
3567 10703 - 3587 1340703	600	1000	150	24x19-G3/4	G3/4
3567 10803 - 3587 1340803	600	1100	150	24x19-G3/4	G3/4
3567 10903 - 3587 1340903	600	1100	150	24x19-G3/4	G3/4
3567 11003 - 3587 1341003	600	1200	150	24x19-G3/4	G3/4



CODE	A	B	C	D	E	F	Ø1	Ø2	Ø3
3491 10210 - 3492 1340210	470	465	137	221	130	50	G1	G3/4	24x19-G3/4
3491 10310 - 3492 1340310	470	515	137	221	130	50	G1	G3/4	24x19-G3/4
3491 10410 - 3492 1340410	470	565	137	221	130	50	G1	G3/4	24x19-G3/4
3491 10510 - 3492 1340510	470	615	137	221	130	50	G1	G3/4	24x19-G3/4



CODE	A	B	C	D	Ø1	Ø2
3569 105 - 3589 13405	800	500	150	709	24x19-G3/4	G3/4
3569 106 - 3589 13406	800	500	150	759	24x19-G3/4	G3/4
3569 107 - 3589 13407	900	500	150	809	24x19-G3/4	G3/4
3569 108 - 3589 13408	900	500	150	859	24x19-G3/4	G3/4
3569 109 - 3589 13409	1000	500	150	914	24x19-G3/4	G3/4
3569 110 - 3589 13410	1000	500	150	964	24x19-G3/4	G3/4
3569 111 - 3589 13411	1100	500	150	1014	24x19-G3/4	G3/4
3569 112 - 3589 13412	1100	500	150	1064	24x19-G3/4	G3/4



CODE	A	B	C	D	Ø1	Ø2
3571 10502 - 3591 1340502	600	900	150	815	24x19-G3/4	G3/4
3571 10602 - 3591 1340602	600	900	150	865	24x19-G3/4	G3/4
3571 10702 - 3591 1340702	600	1000	150	915	24x19-G3/4	G3/4
3571 10802 - 3591 1340802	600	1000	150	965	24x19-G3/4	G3/4
3571 10902 - 3591 1340902	600	1100	150	1020	24x19-G3/4	G3/4
3571 11002 - 3591 1341002	600	1100	150	1070	24x19-G3/4	G3/4
3571 11102 - 3591 1341102	600	1200	150	1120	24x19-G3/4	G3/4
3571 10503 - 3591 1340503	600	900	150	865	24x19-G3/4	G3/4
3571 10603 - 3591 1340603	600	1000	150	915	24x19-G3/4	G3/4
3571 10703 - 3591 1340703	600	1000	150	965	24x19-G3/4	G3/4
3571 10803 - 3591 1340803	600	1100	150	1020	24x19-G3/4	G3/4
3571 10903 - 3591 1340903	600	1100	150	1070	24x19-G3/4	G3/4
3571 11003 - 3591 1341003	600	1200	150	1120	24x19-G3/4	G3/4