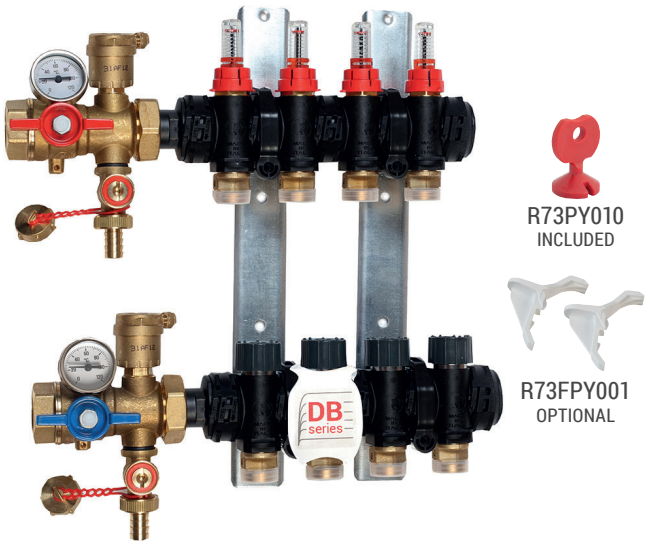
R553FPDB

Radiant Systems

Technopolymer manifold with dynamic flow balancing

Datasheet
1031EN 09/2024



Technopolymer pre-assembled modular manifold for HVAC systems, with dynamic flow balancing and independent setting for each individual circuit, consisting of:

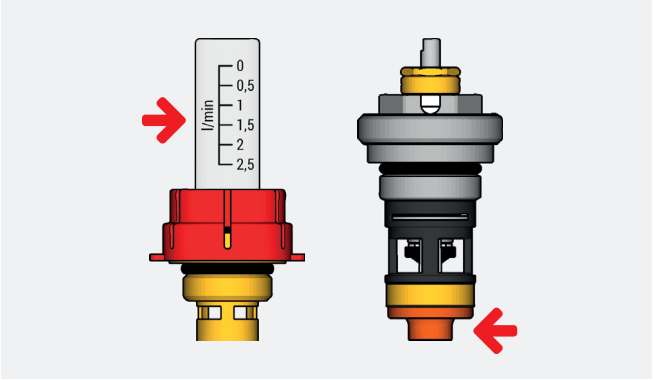
- supply manifold with flow meters and lockshields for fluid shut-off function;
- return manifold with shut-off valves with manual handwheel (connection M30 x 1,5 mm), pre-arranged for thermo-electric command via R473/R473M actuators that can be installed after fitting the relative ring nut R453FY002 (included with the kit) on the module;
- pair of R269T multifunction valves (supply and return);
- R588FP brackets with spacer on the return;
- R73PY010 key for presetting.

NOTE. Manifolds with dynamic flow balancing are equipped with a data-tag with the "DB series" identification, the flow and Δp characteristics for both versions of the manifolds: Low Flow and High Flow.

The R553FPDB manifolds are available in 2 versions, with distinct characteristics:

Low Flow version

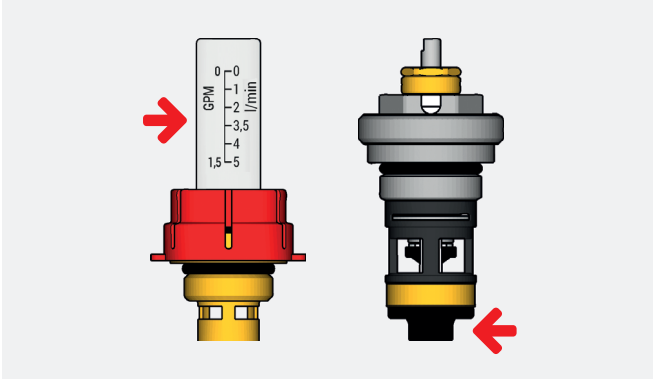
- Flow meters scale: 0÷2,5 l/min
- Internal membrane of the bonnet: red color (visible only in case of bonnet replacement)



⚠ Working differential pressure range: 20÷60 kPa

High Flow version

- Flow meters with double scale: 0÷5 l/min and 0÷1,5 GPM
- Internal membrane of the bonnet: black color (visible only in case of bonnet replacement)



⚠ Working differential pressure range: 30/40÷150 kPa

GIACOMINI WATER E-MOTION

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Versions and product codes

Low Flow version: Δp 20÷60 kPa

PRODUCT CODE	CONNECTIONS: MANIFOLD x OUTLETS	No. OUTLETS	CABINET R500-2 L x H x D
R553FPDB342	G 1" x 3/4"E	2	R500Y221 400x650x85÷130 mm
R553FPDB343		3	
R553FPDB344		4	R500Y222 600x650x85÷130 mm
R553FPDB345		5	
R553FPDB346		6	
R553FPDB347		7	
R553FPDB348		8	R500Y223 800x650x85÷130 mm
R553FPDB349		9	
R553FPDB350		10	
R553FPDB351		11	
R553FPDB352		12	R500Y224 1000x650x85÷130 mm

High Flow version: Δp 30/40÷150 kPa

PRODUCT CODE	CONNECTIONS: MANIFOLD x OUTLETS	No. OUTLETS	CABINET R500-2 L x H x D
R553FPDB362	G 1" x 3/4"E	2	R500Y221 400x650x85÷130 mm
R553FPDB363		3	
R553FPDB364		4	R500Y222 600x650x85÷130 mm
R553FPDB365		5	
R553FPDB366		6	
R553FPDB367		7	
R553FPDB368		8	R500Y223 800x650x85÷130 mm
R553FPDB369		9	
R553FPDB370		10	
R553FPDB371		11	
R553FPDB372		12	R500Y224 1000x650x85÷130 mm

Optionals

- R500-1, R500-2: metal cabinets with adjustable depth
- R473, R473M: normally closed thermo-electric actuators
- R73FPY001: pair of spanners for removing the manifold modules
- R178E, R179E: 3/4"E adaptors

Spare parts

- R588FPY001: bracket with supports with spacer on the return
- R73PY010: key for presetting
- R453FY002: plastic ring nut M30 x 1,5 mm for installing the thermo-electric actuators
- P553FPY017: supply module with flow meter with scale 0÷2,5 l/min and 3/4"E outlet
- P553FPY011: supply module with flow meter with doble scale 0÷5 l/min and 0÷1,5 GPM, and 3/4"E outlet
- P553FPDB011: return module with dynamic Low Flow balancing bonnet and 3/4"E outlet
- P553FPDB012: return module with dynamic Hihg Flow balancing bonnet and 3/4"E outlet
- P553FPY005: cap module
- P553FPY006: inlet module (without nut)
- P553FPDB030: kit composed of supply module with flow meter with scale 0÷2,5 l/min + return module with dymic Low Flow balancing bonnet and 3/4"E outlets
- P553FPDB031: kit composed of supply module with flow meter with double scale 0÷5 l/min and 0÷1,5 GPM + return module with dynamic High Flow balancing bonnet and 3/4"E outlets
- P583Y004: nut and gasket for inlet module

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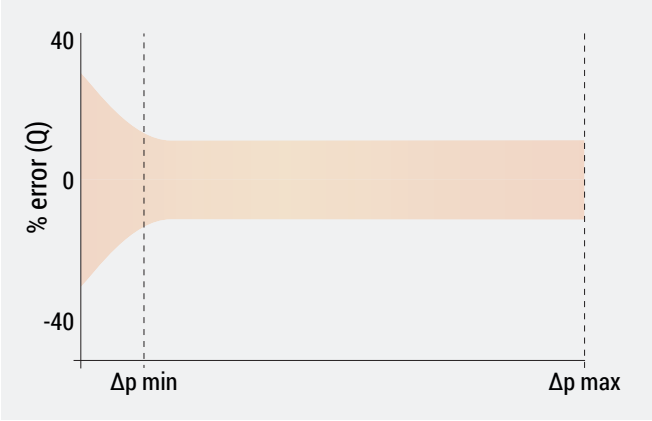
Technical data

Low Flow version performances
- Fluids: water, glycol solutions (max. 30 %)
- Center distance between the outlets: 50 mm
- Temperature range: 5÷60 °C
- Max. working pressure: 6 bar (10 bar for system testing)
- Flow rate setting range for each individual circuit: 20÷160 l/h
- Working differential pressure range: 20÷60 kPa
- Flow meters: scale 0,4÷2,6 l/min

High Flow version performances
- Fluids: water, glycol solutions (max. 30 %)
- Center distance between the outlets: 50 mm
- Temperature range: 5÷60 °C
- Max. working pressure: 6 bar (10 bar for system testing)
- Max. differential pressure with thermo-electric actuators installed: 1,5 bar
- Flow rate setting range for each individual circuit: 10÷250 l/h
- Working differential pressure range: 30/40÷150 kPa
- Flow meters: double scale 0÷5 l/min and 0÷1,5 GPM

Materials
- Manifolds: internal and external structure in technopolymer
- Multifunction valves: brass
- Gaskets: EPDM
- Manifold brackets: galvanised steel
- Manual handwheel: plastic material
- Bonnet with dynamic balancing on return manifold:
  - command stem: stainless steel
  - bonnet body: UNI EN 12164 CW617N brass
  - sleeve and indicator ring: plastic material
  - O-Ring and stopper: EPDM
  - membrane: elastomeric material

Adjustment accuracy



⚠ WARNINGS.
- R553FPDB manifolds are suitable for use in closed circuit systems and with non-aggressive fluids (water or water-glycol mix in compliance with VDI 2035/ONORM 5195).
- Mineral oils or mineral oil based lubricants in the heat transfer fluid may cause swelling and damage to EPDM gaskets.
- In case of using nitrite-free, ethylene glycol-based antifreeze and anti-corrosion products, observe the instructions in the documentation provided by the manufacturer and, in particular, the instructions concerning concentration and the use of specific additives.
- In case of high levels of sludge and other contaminants in the system water, is recommend flushing the system using a chemical cleaning product before installing the manifolds.

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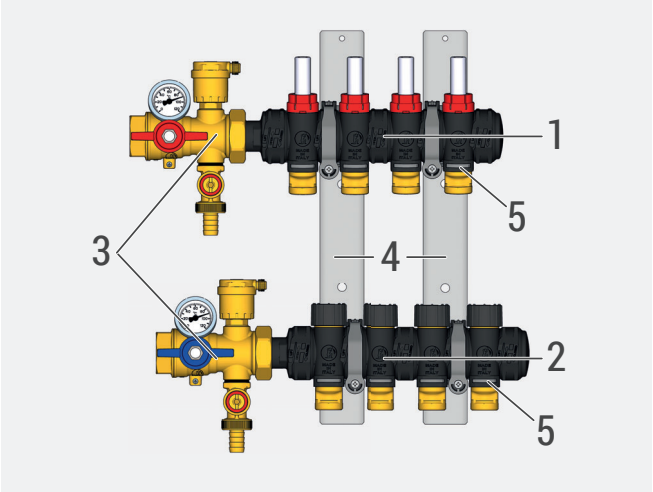
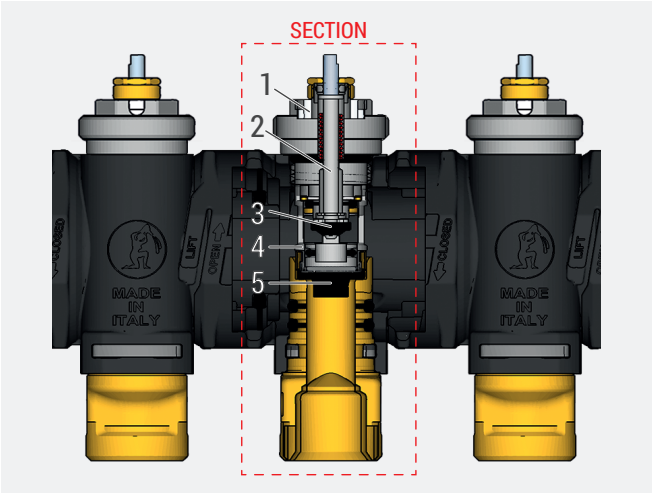
Components

Pre-assembled manifold



1	Supply manifold with outlets equipped with flow meters
2	Return manifold with outlets with dynamic flow balancing valves
3	Multifunction valves equipped with drain cock, automatic air vent valve, thermometer and shut-off ball valve
4	Brackets with supports and spacer on the return
5	Clip for fixing the eccentric fitting

Bonnet with dynamic flow balancing



1	Indicator ring
2	Command stem
3	Stopper
4	Regulator sleeves
5	Balancing membrane with controlled deformation

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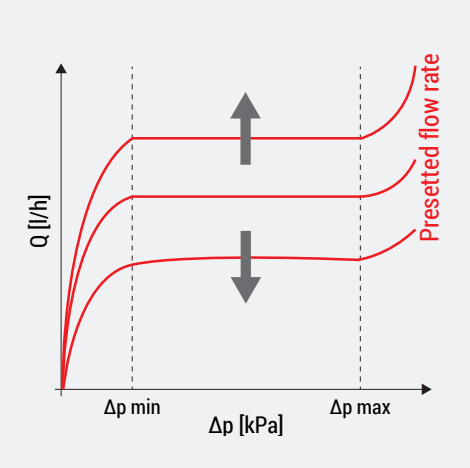
Operation

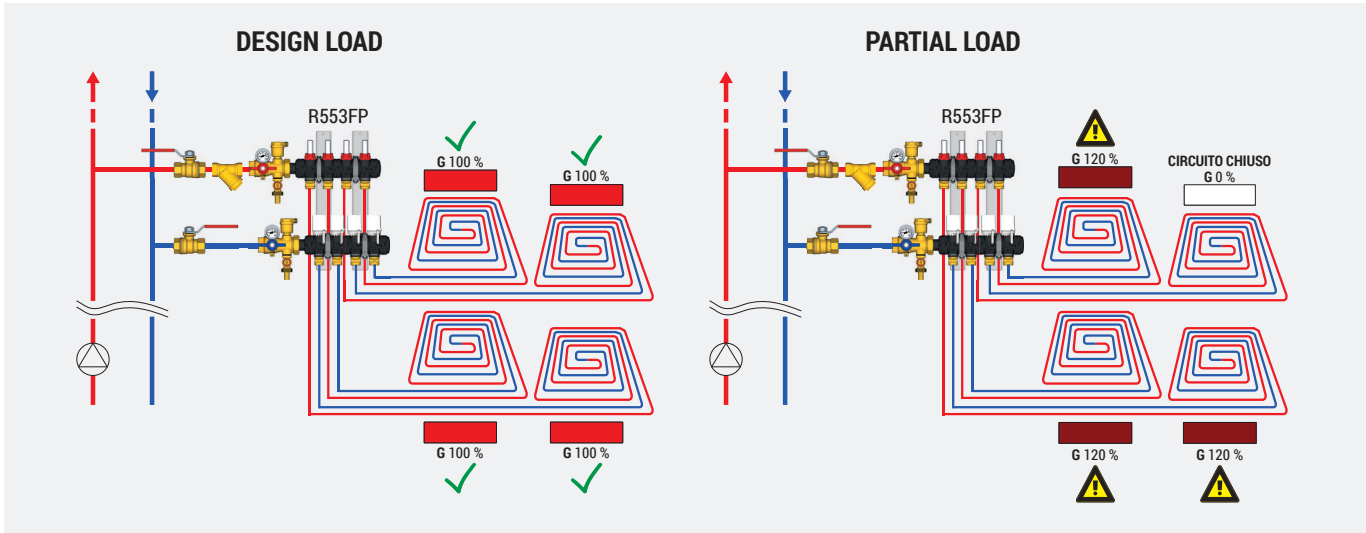
The R553FPDB manifold controls the flow rate in each individual circuit of the system, within a minimum and maximum value of differential pressure, independently of the operating conditions of the other circuits.
The manifold may be used in combination with the thermo-electric actuators to perform different functions:

- **flow rate regulator: when the pressure changes, due to the opening or closing of some other circuits**, the membrane of the bonnet cartridge deforms to alter the cross section of the fluid passage through the membrane itself and keep the flow rate at the preset value, even with high differential pressures: up to 60 kPa for the Low Flow version; up to 150 kPa for the High Flow version.
- **presetting flow rate:** the maximum design flow rate for each individual circuit may be set and maintained accurately at all times;
- **optimising room temperature:** the manifold may be used in combination with thermo-electric actuators and thermostats to allow more effective and efficient temperature control in multiple interior rooms.

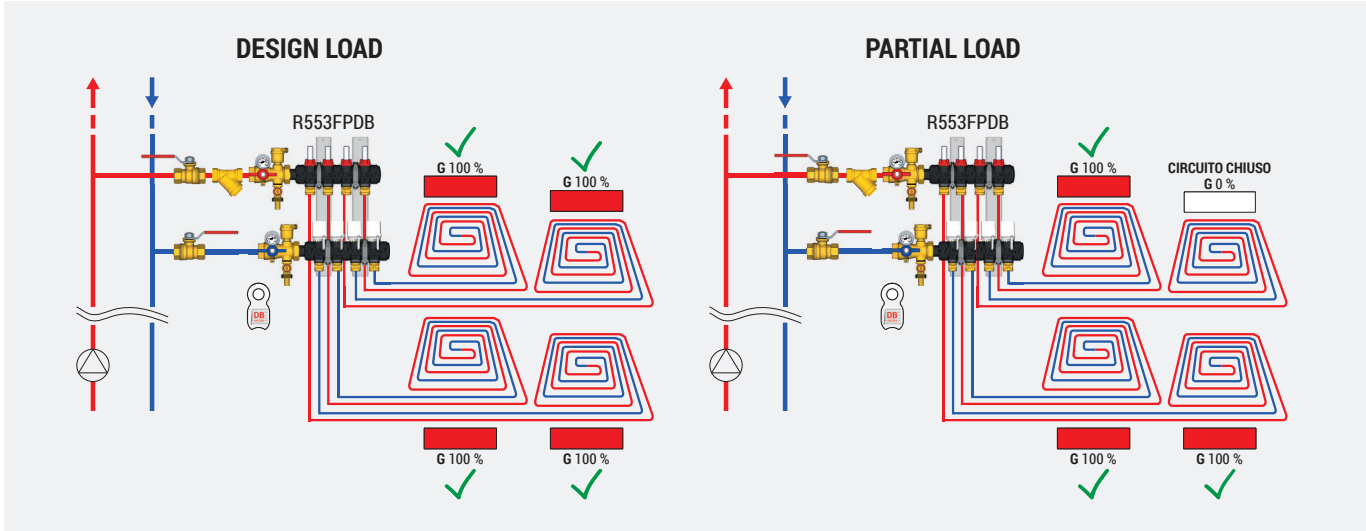


Manifolds with dynamic flow balancing are used primarily in radiant systems.
As can be seen in the example installation diagrams shown below, a system using DB manifolds series with dynamic flow balancing is capable to maintain the flow rates always balanced in all the circuits of the system.

Radiant system with R553FP manifolds, without dynamic flow balancing



Radiant system with R553FPDB manifolds, with dynamic flow balancing



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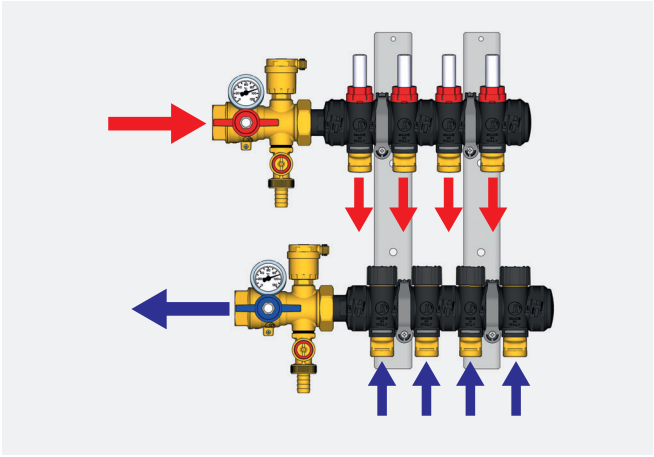
Installation

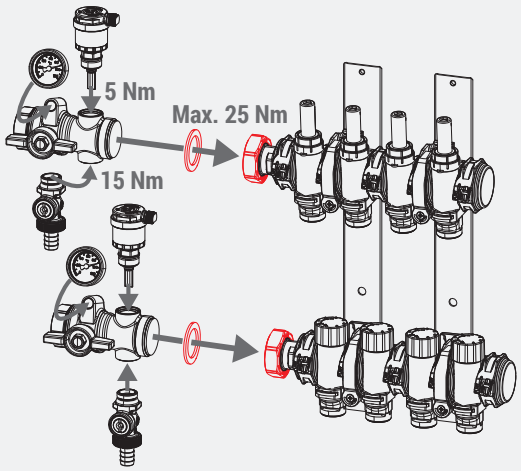
⚠ **WARNING** The installation must be carried out by qualified personnel, following the instructions provided in the package.

Pipe inlet from the left



The manifold is supplied pre-assembled on the R588FP brackets, and pre-arranged for connecting R269T multi-function valves with left connection (recommended configuration).
The R269T multi-function valves are supplied in boxes, with the components disassembled.
To assemble them, first of all assemble the air vent valve, the thermometer and the drain cock on the main body, then connect the unit to the distribution manifold using the nut and gasket.

⚠ **WARNING** The manifold can only be installed on the R588FP brackets, so these must never be replaced with other models.



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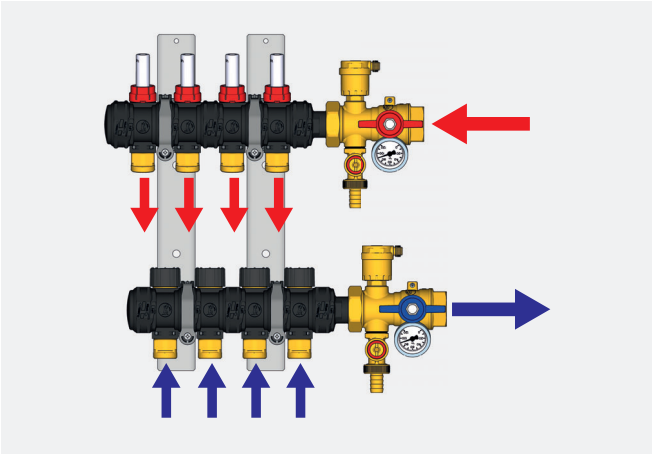
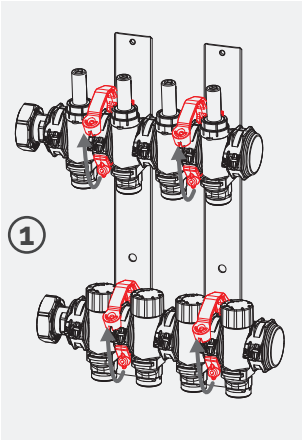
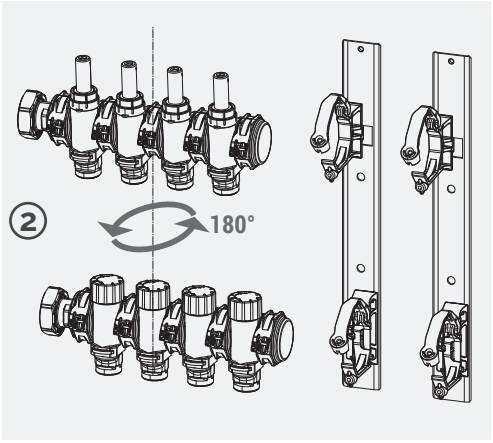
Pipe inlet from the right

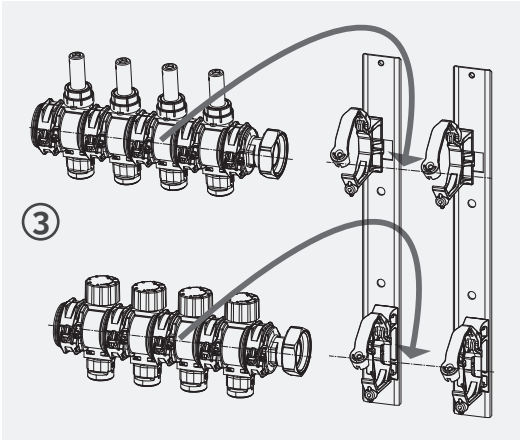


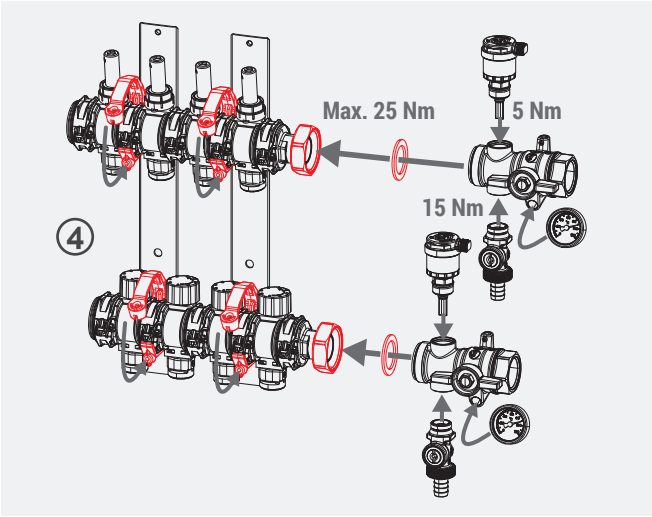
Depending on system requirements, the R269T multi-function valves can also be installed to the right of the manifold.
In this case, proceed as follows:

1) open the supports with clip connection and remove the manifolds from the brackets;
2) rotate the manifolds by 180°;
3) replace the manifolds on the brackets and close the supports with clip connection;
4) the R269T multi-function valves are supplied in boxes, with the components disassembled. To assemble them, first of all assemble the air vent valve, the thermometer and the drain cock on the main body, then connect the unit to the distribution manifold using the nut and gasket.









NOTE. Thanks to the eccentric fittings, even in the installation with piping inlet from the right, the connection of the pipe's system circuits will be easy and practical.

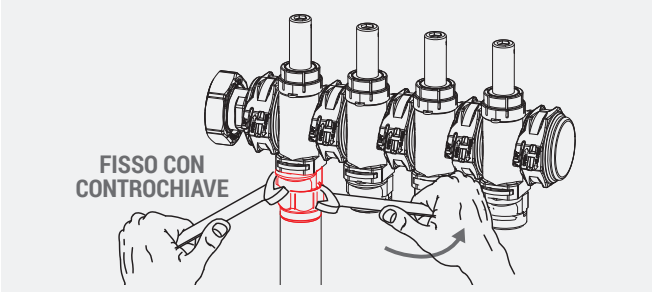
NOTE. In the package of the multifunction valves there are also screws, to be used if necessary to more securely close the supports with clip hooks.

WARNING In the case of installation with pipe inlet from the right, the thermometer of the R269T multi-function valves is assembled in the lower part of the main body, as shown in the figure.

WARNING In the case of installation with pipe inlet from the right, the adaptor clips (components - ref.5) will not be accessible because they will be facing towards the inside of the cabinet.

WARNING The manifold can only be installed on the R588FP brackets, so these must never be replaced with other models.

Connection the system circuits



To connect the system circuit pipes use suitable adaptors for copper, plastic or multilayer pipes from the R178E and R179E (Eurocone) series.

WARNING. When tightening the adaptor it is necessary to use a backup spanner to hold the manifold fitting in stationary.

NOTE. Thanks to the eccentric fittings, even in the installation with piping inlet from the right, the connection of the pipe's system circuits will be easy and practical.

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Assembling/disassembling the modules

WARNING The module assembly/disassembly operations must take place in a free, accessible place with the manifold NOT connected to the system pipes and NOT supported on the relative brackets.

WARNING. The module assembly/disassembly operations must be carried out only in case of real necessity in order not to risk compromising the hydraulic seal.

The manifold is supplied pre-assembled, but new modules can be added or existing ones removed.

To **disassemble** a module, proceed as follows:

1) open the supports with clip connection and remove the manifolds from the brackets;

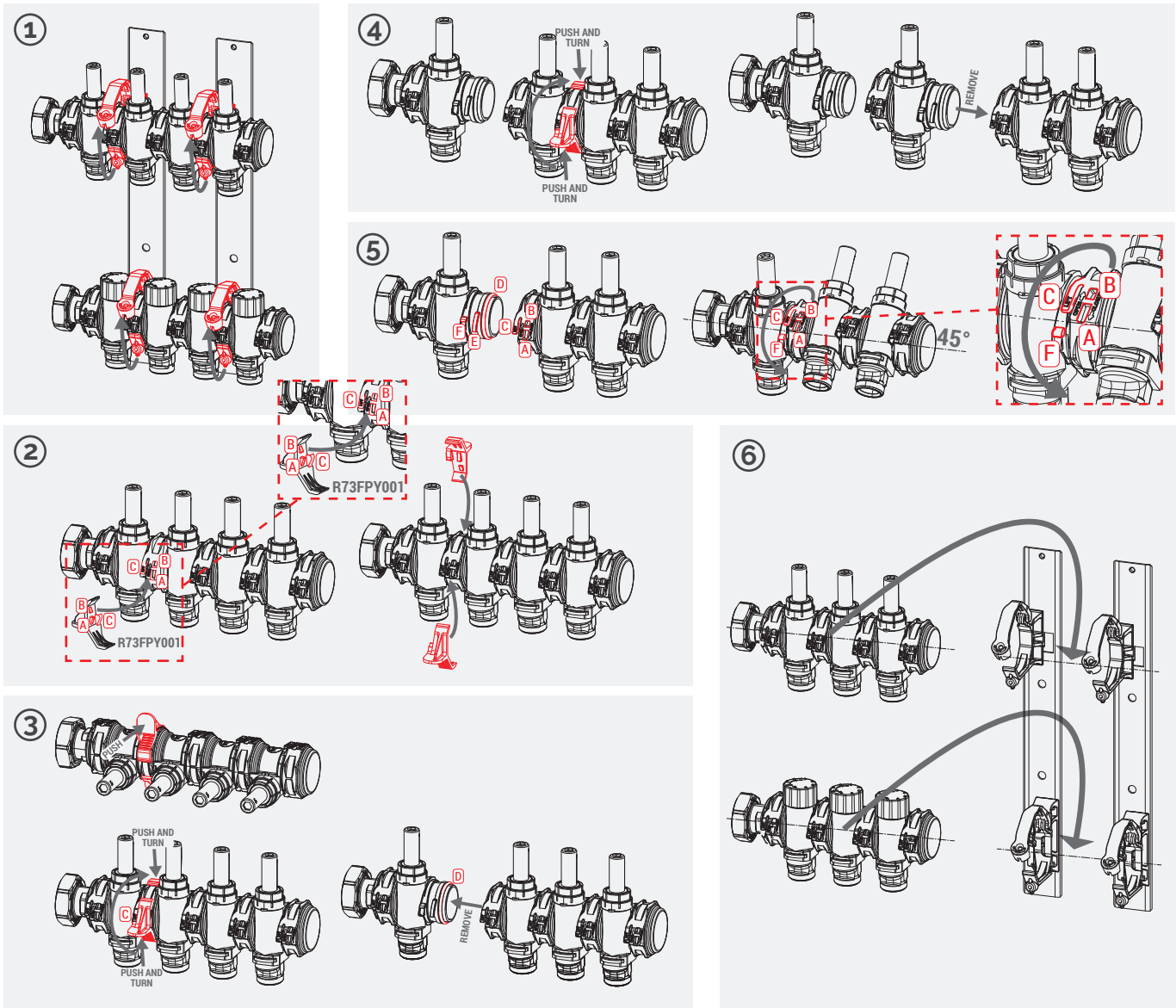
2) position one of the two R73FPY001 spanners in the front part of the module and the other in the rear part, so that the protrusions "A", "B" and "C" of the spanners slide into the slots "A", "B" and "C" on the module;

3) press one spanner at a time against the module to raise the fins "C" and rotate the module, so that it can be disassebled from the first side; when doing this, be careful not to lose or damage the O-Ring "D";

4) repeat steps 2 and 3 to disasseble the second side of the module that needs to be removed;

5) after removing the module, reassemble the manifold:
- make sure the O-Ring "D" is correctly inserted on the male fitting of the module (pushed down as far as it will go), lubricating it with a suitable lubricant for the material (EPDM) and for the intended use of the system (eg. silicone lubricants). During this operation pay attention to lubricate the O-Ring only and not the adjacent plastic parts;
- insert the module with the male fitting in the corresponding female fitting of the adjacent module (rotated by about 45°);
- rotate both modules to align them, ensuring that protrusion "E" slides into slots "A" and "B" and protrusion "F" slides into slot "C" until a click is heard;

6) replace the manifolds on the brackets and close the supports with clip connection.



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To **assemble** a new module, proceed as follows:

1) open the supports with clip connection and remove the manifolds from the brackets;

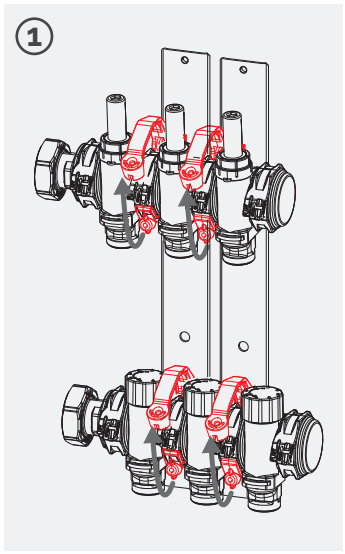
2) position one of the two R73FPY001 spanners in the front part of the module and the other in the rear part, so that the protrusions "A", "B" and "C" of the spanners slide into the slots "A", "B" and "C" on the module;

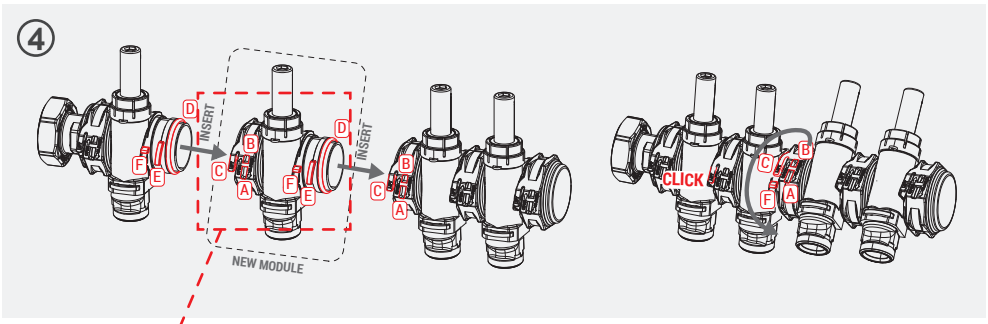
3) press one spanner at a time against the module to raise the fins "C" and rotate the module, so that it can be disassembled from the first side; when doing this, be careful not to lose or damage the O-Ring "D";

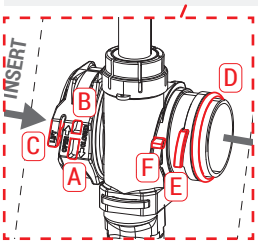
4) insert the new module, then reassemble the manifold:

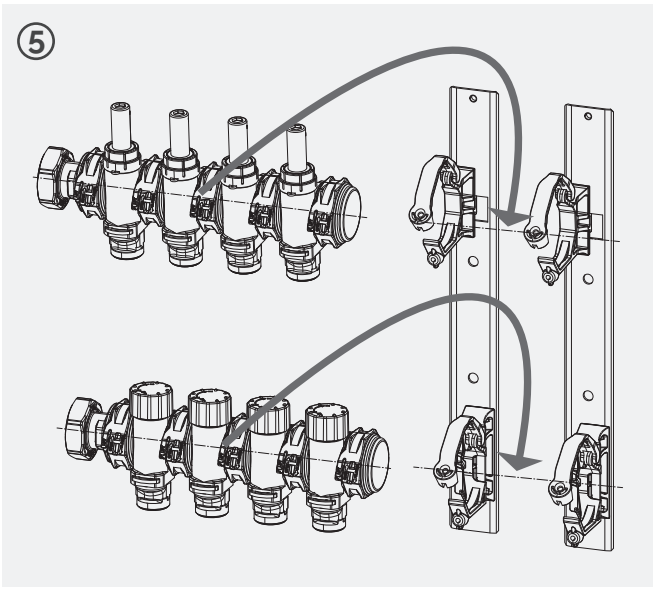
- make sure the O-Ring "D" is correctly inserted on the male fitting of the module (pushed down as far as it will go), lubricating it with a suitable lubricant for the material (EPDM) and for the intended use of the system (eg. silicone lubricants). During this operation pay attention to lubricate the O-Ring only and not the adjacent plastic parts;
- insert the module with the male fitting in the corresponding female fitting of the adjacent module (rotated by about 45°);
- rotate both modules to align them, ensuring that protrusion "E" slides into slots "A" and "B" and protrusion "F" slides into slot "C" until a click is heard;

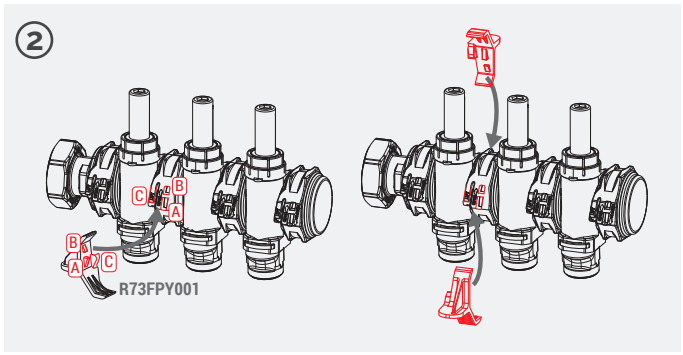
5) replace the manifolds on the brackets and close the supports with clip connection.

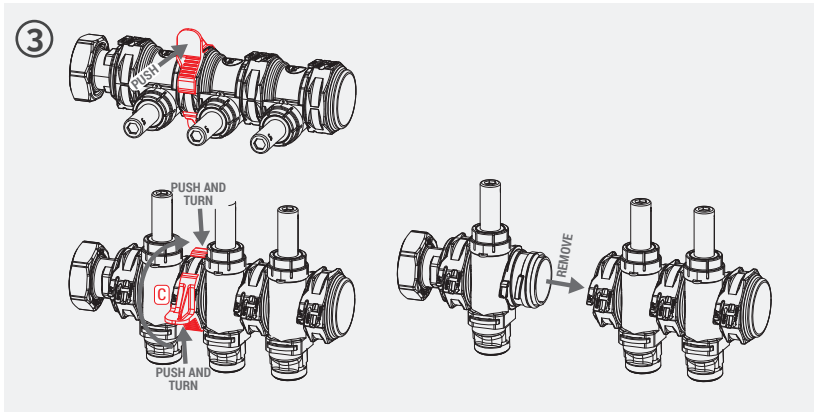












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Regulating the system circuits

Supply manifold

During normal operation, the flow meters on the supply manifold should be in the fully open position.
To shut off the flow of an individual circuit, close the respective flow meter completely.
To open or close a flow meter:

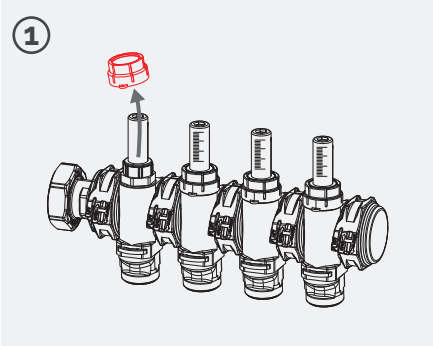
1) remove the protective red cap;

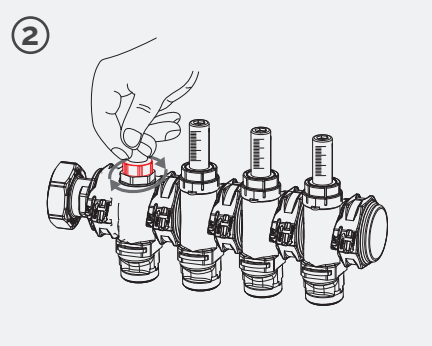
2) manually rotate the black ring nut of the flow meter clockwise to close the circuit or counterclockwise to open the circuit:
- the flow is completely shut off when the flow meter is completely closed;
- when the flow meter is completely opened, the flow rate set with the dynamic balancing bonnet (return manifold) is circulating within the circuit and indicated on the graduated scale of the flow meter;

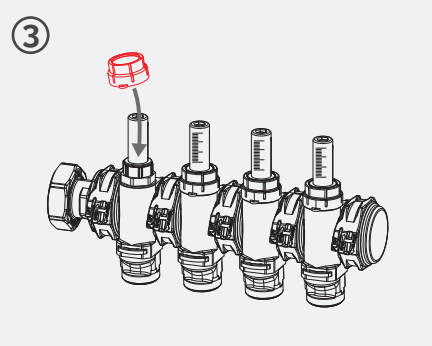
3) when the setting is complete, refit the protective red cap.

⚠ **WARNING.** To ensure the correct functioning of the system, it is important that the flow meters are set to either the fully open position or, if it is necessary to shut off the respective circuit, the completely closed position. Do not set the flow meters to any position between fully open and fully closed.

✎ **NOTE.** The flow meter is equipped with a flow indicator, to be positioned at the flow rate set for the relative hydraulic circuit.







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Return manifold: presetting flow rate

The flow rates of the individual circuits connected to the return outlets may be preset with the R73PY010 regulation key (included in package) within a setting range from 1 to 6, indicated on the cartridge of the bonnet.

To preset the flow rates of the individual circuits:

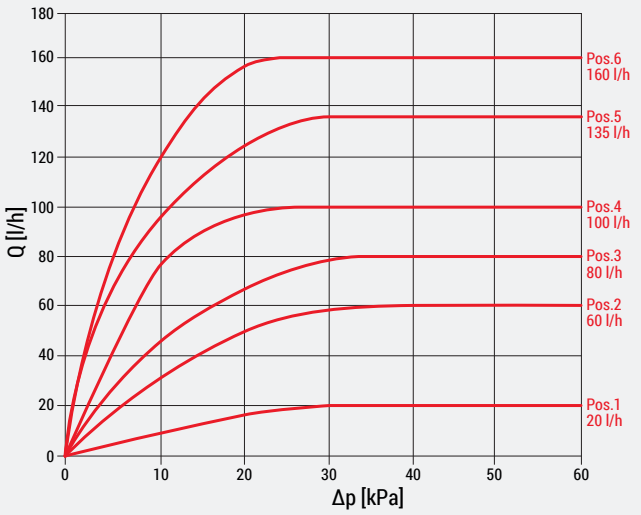
1) identify the cartridge position corresponding to the desired flow rate using the flow rate presetting diagrams or tables;

2) remove the manual handwheel from the bonnet and fit the regulation key onto the cartridge;

3) turn the regulation key till the desired position appears in the key slot;

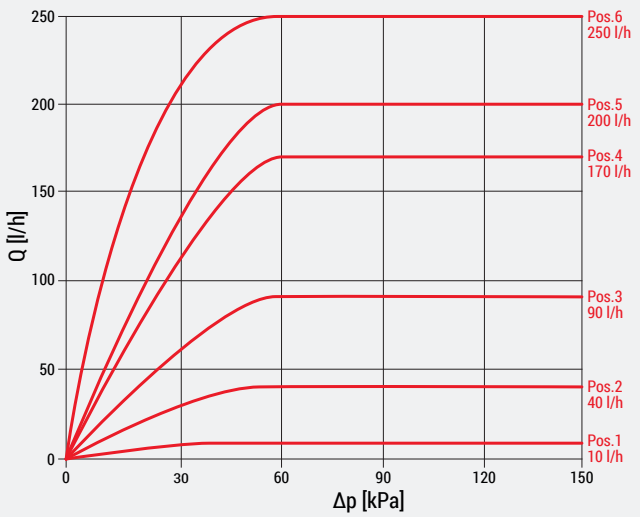
4) remove the regulation key and refit the manual handwheel or the thermo-electric actuator.

1 Low Flow version



Setting position	1	2	3	4 (factory setting)	5	6
Flow rate [l/h]	20	60	80	100	135	160
Δp min [kPa]	20	20	20	20	20	20
Δp max [kPa]	60					

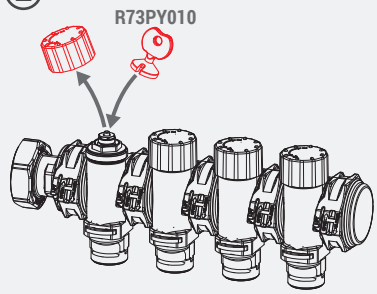
1 High Flow version



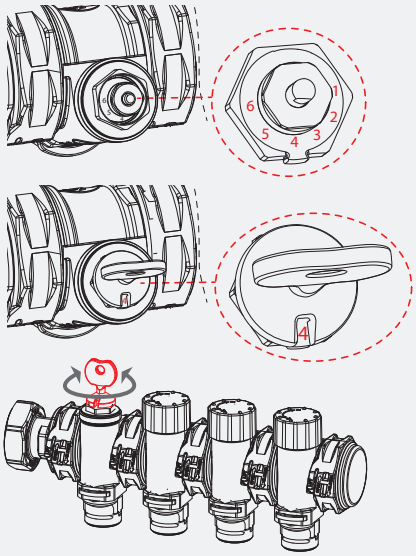
Setting position	1	2	3	4 (factory setting)	5	6
Flow rate [l/h]	10	40	90	170	200	250
Δp min [kPa]	40	40	40	40	40	30
Δp max [kPa]	150					

NOTE. Δp min = Δp corresponding to a value ≥ 80 % of the preset flow rate.

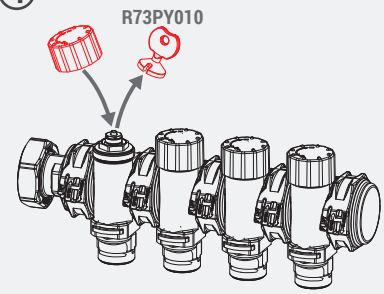
2



3



4



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Return manifold: installing thermo-electric actuators

Using normally closed thermo-electric actuators (R473, R473M) installed on the return manifold outlets, in combination with room thermostats, allows the room temperature to be maintained at the value set on the thermostats.

The thermo-electric actuators must only be installed after presetting the flow rate on the dynamic balancing bonnet.

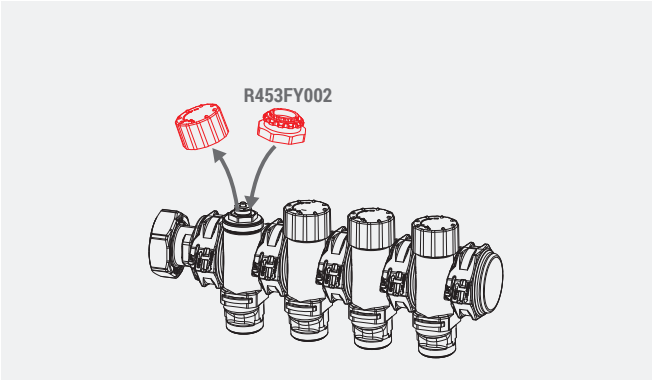
To install the thermo-electric actuators proceed as follows:

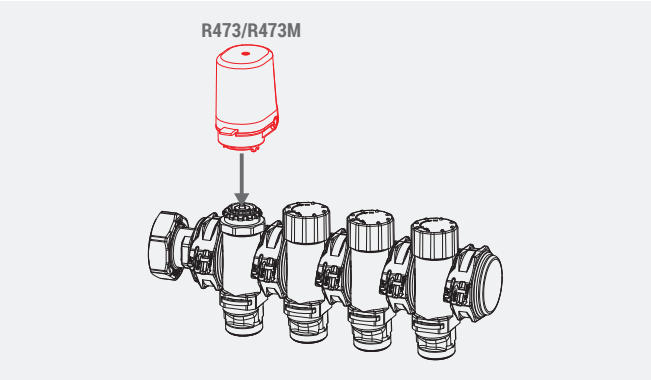
1) remove the manual handwheel and tighten the R453FY002 ring nut with M30 x 1,5 mm connection (included with the kit);

2) assemble the thermo-electric actuator on the ring nut, pressing just enough to lock them together;

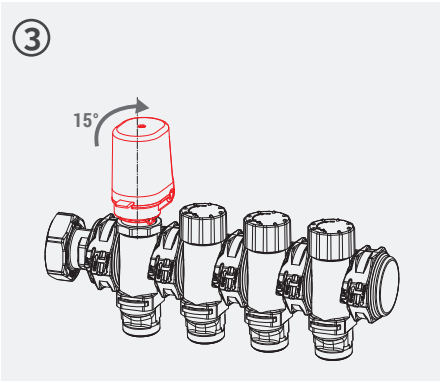
3) turn the actuator about 15° clockwise until a click is heard (max. torque 5 Nm).
To release the actuator, turn it 15° counterclockwise);

4) press the red lockout button (A) and make the electrical connection of the actuator, following the wired diagram supplied with the actuator instructions.

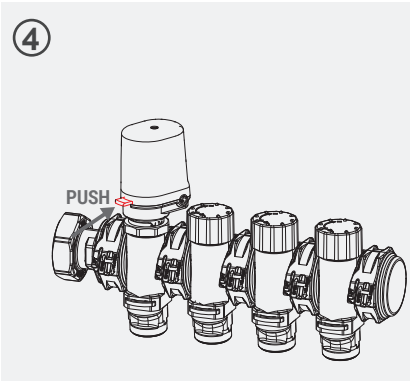




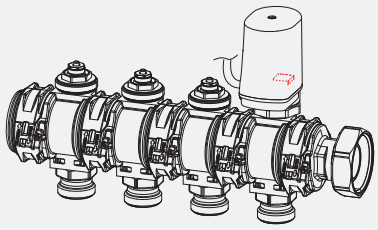
③



④



⚠ **WARNING.** To allow the installation in case of pipe inlet from the right, the thermo-electric actuators must be mounted with the red button facing the inside of the cabinet.



▶ VIDEO TUTORIAL
FLUSHING AND FILLING PROCEDURE

⚠ **WARNING.** The system flushing and filling procedure for manifolds with dynamic balancing is different from "standard" manifolds.
Carefully follow the instructions with the product to avoid damage to people or property.

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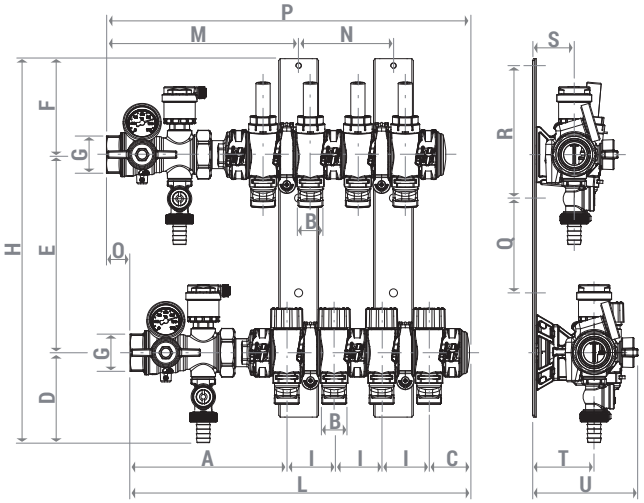
Dimensions



R500Y221 (400x650x85÷130 mm)
R500Y222 (600x650x85÷130 mm)
R500Y223 (800x650x85÷130 mm)
R500Y224 (1000x650x85÷130 mm)

PRODUCT CODE	No. OUTLETS	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	O [mm]	P [mm]	Q [mm]	R [mm]	S [mm]	T [mm]	U [mm]	CABINET R500-2
R553FPDB342 R553FPDB362	2										258		-		283						
R553FPDB343 R553FPDB363	3										308		50		333						R500Y221
R553FPDB344 R553FPDB364	4										358		100		383						
R553FPDB345 R553FPDB365	5										408		150		433						
R553FPDB346 R553FPDB366	6										458		200		483						R500Y222
R553FPDB347 R553FPDB367	7	165	3/4"E	43	95	209	101	G1"	405	50	508	202	250	25	533	100	140	44	65*	111*	
R553FPDB348 R553FPDB368	8										558		300		583						
R553FPDB349 R553FPDB369	9										608		350		633						
R553FPDB350 R553FPDB370	10										658		400		683						R500Y223
R553FPDB351 R553FPDB371	11										708		450		733						
R553FPDB352 R553FPDB372	12										758		500		783						R500Y224

* Dimension with plastic spacer (thickness 18 mm) installd on the return bracket. It's possible to remove the spacer in case of installation needs.

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Product specifications

R553FPDB Low Flow

Pre-assembled modular manifold with dynamic balancing. Connections: 1" x 3/4"E. Consisting of: technopolymer supply manifold with flow meters with 0÷2,5 l/min scale and fluid shut-off function; technopolymer return manifold with dynamic flow balancing valves (membrane with red color) and manual handwheel pre-arranged for thermo-electric actuators. Multifunction valves with drain cock, automatic air vent valve, thermometer and shut-off valve. EPDM gaskets. Galvanised steel brackets for manifolds. Fluids: water, glycol solutions (max. 30%). Center distance between outlets: 50 mm. Temperature range: 5÷60 °C. Max. working pressure: 6 bar (10 bar for system testing). Flow rate setting range for each individual circuit: 20÷160 l/h. Working differential pressure range: 20÷60 kPa.

R553FPDB High Flow

Pre-assembled modular manifold with dynamic balancing. Connections: 1" x 3/4"E. Consisting of: technopolymer supply manifold with flow meters with double scale 0÷5 l/min and 0÷1,5 GPM, and fluid shut-off function; technopolymer return manifold with dynamic flow balancing valves (membrane with black color) and manual handwheel pre-arranged for thermo-electric actuators. Multifunction valves with drain cock, automatic air vent valve, thermometer and shut-off valve. EPDM gaskets. Galvanised steel brackets for manifolds. Fluids: water, glycol solutions (max. 30%). Center distance between outlets: 50 mm. Temperature range: 5÷60 °C. Max. working pressure: 6 bar (10 bar for system testing). Max. differential pressure with thermo-electric actuators installed: 1,5 bar. Flow rate setting range for each individual circuit: 10÷250 l/h. Working differential pressure range: 30/40÷150 kPa.

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