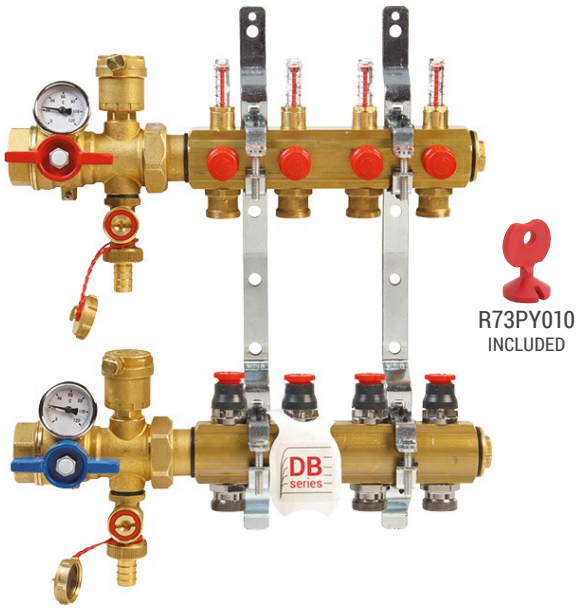
R553FKDB

Brass manifold with dynamic flow balancing

Radiant Systems

Datasheet
1028EN 09/2023



Brass manifold for HVAC systems with dynamic flow balancing and independent setting for each individual circuit, consisting of:

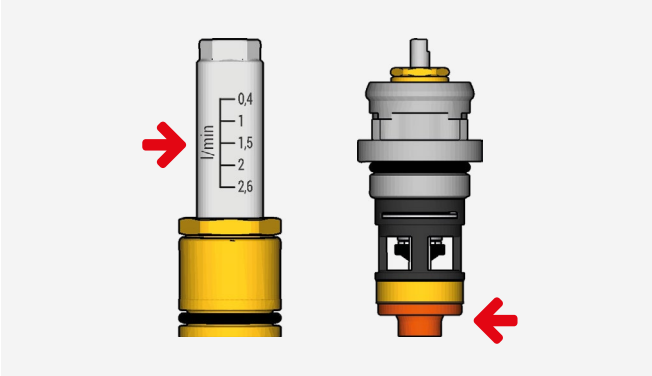
- delivery manifold with flow meters and lockshields for fluid shut-off function;
- return manifold with dynamic flow balancing valves and manual handwheel, pre-arranged for thermo-electric command via R473/R473M actuators;
- pair of R269T multifunction valves (delivery and return);
- R588Z metal brackets;
- R558Y001 key for lockshields shut-off;
- 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 R553FKDB manifolds are available in 2 versions, with distinct characteristics:

Low Flow version

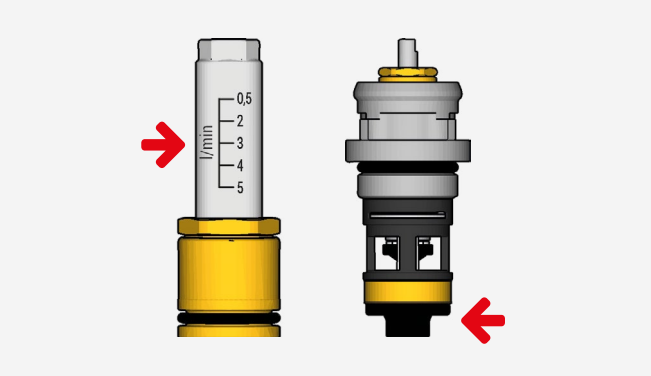
- Flow meters scale: 0,4÷2,6 l/min
- Internal membrane of the bonnet: red color (visible only in case of bonnet replacement)



⚠ Working differential pressure range: 20÷60 kPa

High Flow version

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



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

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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
R553FKDB102	G 1" x B.18	2	R500Y221 400x650x85÷130 mm
R553FKDB103		3	
R553FKDB104		4	R500Y222 600x650x85÷130 mm
R553FKDB105		5	
R553FKDB106		6	
R553FKDB107		7	
R553FKDB108		8	R500Y223 800x650x85÷130 mm
R553FKDB109		9	
R553FKDB110		10	
R553FKDB111		11	R500Y224 1000x650x85÷130 mm
R553FKDB112		12	

High Flow version: Δp 30/40÷150 kPa

PRODUCT CODE	CONNECTIONS: MANIFOLD x OUTLETS	No. OUTLETS	CABINET R500-2 L x H x D
R553FKDB122	G 1" x B.18	2	R500Y221 400x650x85÷130 mm
R553FKDB123		3	
R553FKDB124		4	R500Y222 600x650x85÷130 mm
R553FKDB125		5	
R553FKDB126		6	
R553FKDB127		7	
R553FKDB128		8	R500Y223 800x650x85÷130 mm
R553FKDB129		9	
R553FKDB130		10	
R553FKDB131		11	R500Y224 1000x650x85÷130 mm
R553FKDB132		12	

Optionals

- **R500-2**: flush-mounting metal cabinet, with adjustable depth
- **R473, R473M**: normally closed thermo-electric actuators equipped with R453Y002 plastic ring nut
- **R178, R179, R179AM**: B.18 adaptors

Spare parts

- **P12ADBX001**: Low Flow bonnet with dynamic balancing (red internal membrane)
- **P12ADBX002**: High Flow bonnet with dynamic balancing (black internal membrane)
- **P78MY002**: flow meter with scale 0,4÷2,6 l/min
- **P78MY001**: flow meter with scale 0,5÷5 l/min
- **R453Y002**: plastic ring nut for thermo-electric actuators installation
- **R588ZY001**: metal bracket with supports
- **R73PY010**: regulation key for presetting

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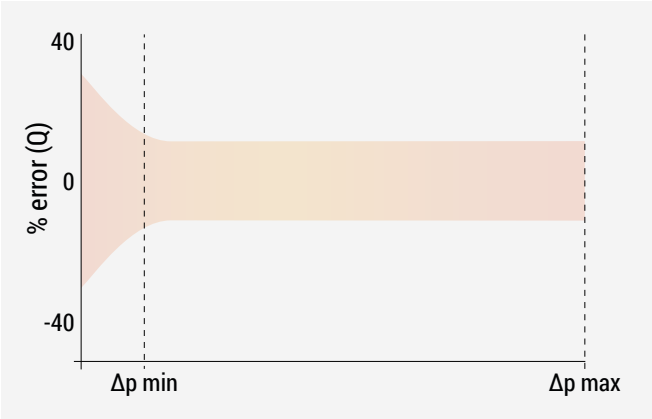
Technical data

Low Flow version performances
- Fluids: water, glycol solutions (max. 30 %)
- Center distance between the outlets: 50 mm
- Temperature range: 5÷95 °C
- Max. working pressure: 10 bar
- Max. working pressure for air vent valves: 7 bar
- 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÷95 °C
- Max. working pressure: 10 bar
- Max. working pressure for air vent valves: 7 bar
- 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:scale 0,5÷5 l/min

Materials
- Delivery and return manifolds: UNI EN 12165 CW617N brass
- Multifunction valves: UNI EN 12165 CW617N 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.
- R553FKDB 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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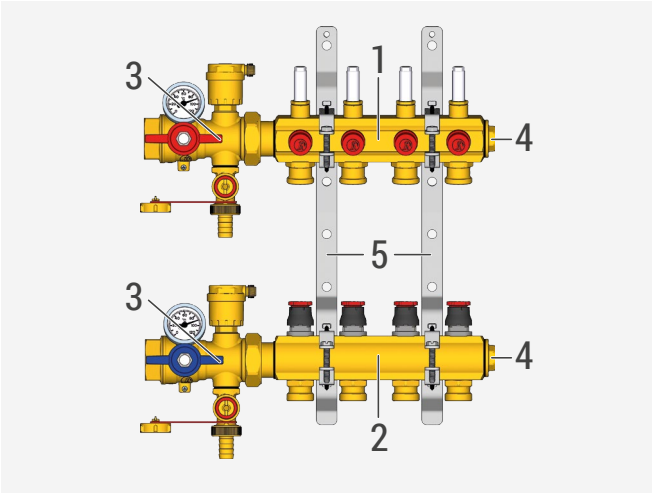
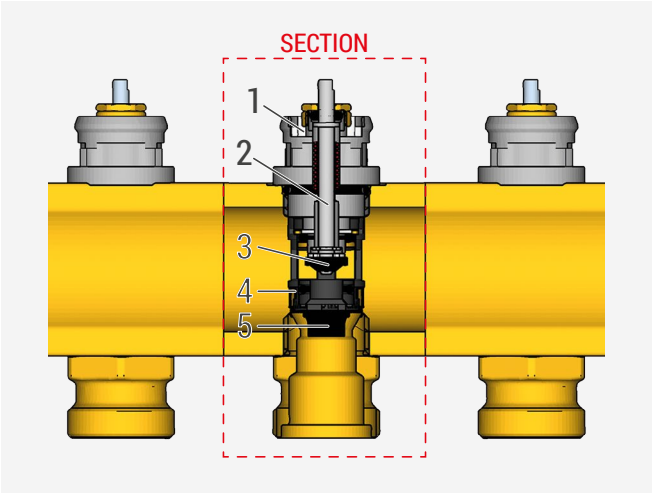
Components

Pre-assembled manifold



1	Delivery 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	End plug
5	Metal brackets

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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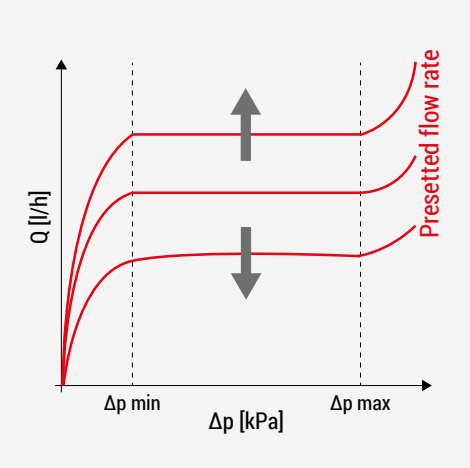
Operation

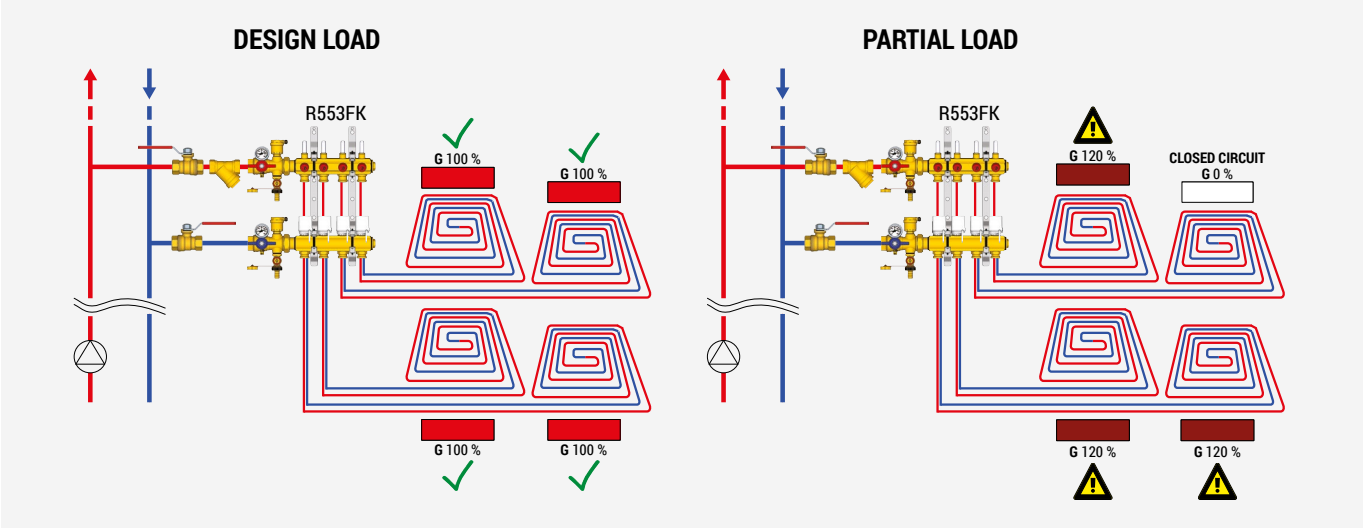
The R553FKDB manifold controls the flow rate in each individual circuit of the system, within a minimum and maximum value of differential pressure, independently of the operating conditions of the other circuits.
The manifold may be used in combination with the thermo-electric actuators to perform different 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.

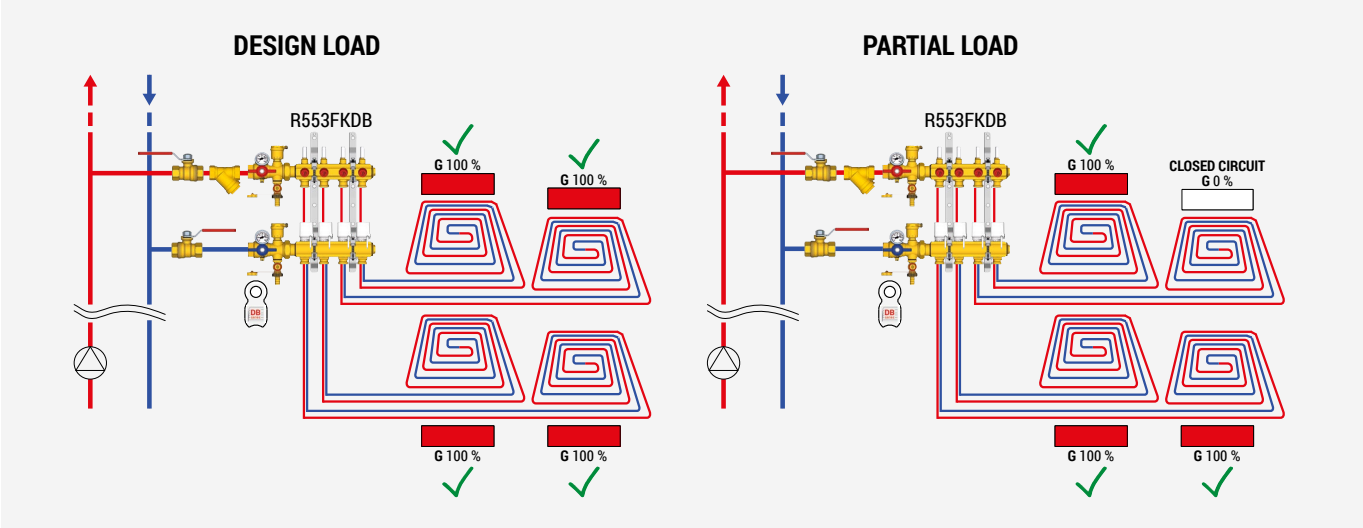


Manifolds with dynamic flow balancing are used primarily in radiant systems.
As can be seen in the example installation diagrams shown below, a system using DB manifolds series with dynamic flow balancing is capable to maintain the flow rates always balanced in all the circuits of the system.

Radiant system with R553FK manifolds, without dynamic flow balancing



Radiant system with R553FKDB manifolds, with dynamic flow balancing



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Installation

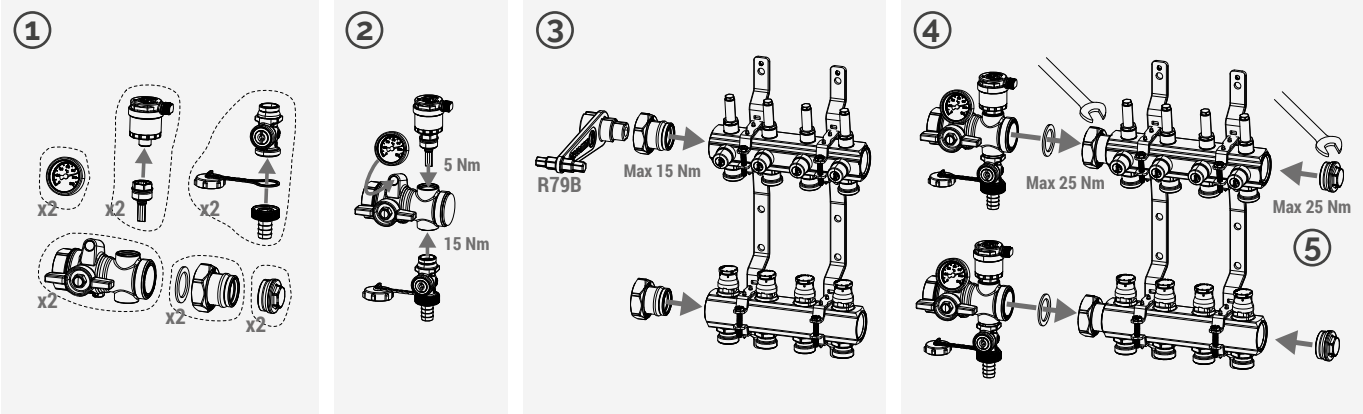
⚠ **WARNING.** Installation must be carried out by qualified personnel, following the instructions included in the packaging.

Installation of R269T multifunction valves

The R553FKDB manifold is supplied assembled on the R588Z metal brackets, pre-arranged for the connection of the R269T multifunction valves. The R269T valves are supplied with disassembled components and can be easily mounted with fluid supply both from the left and from the right using the self-sealing components.

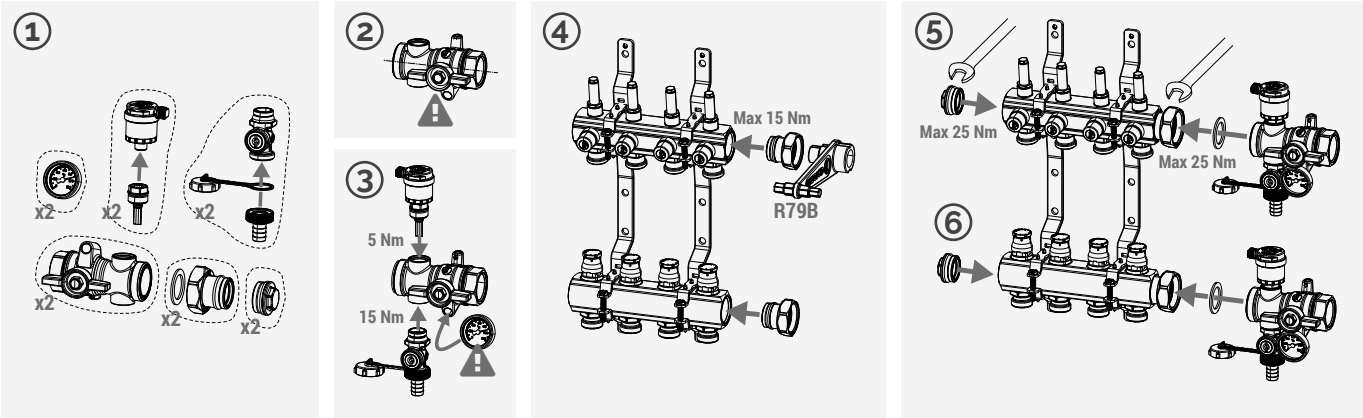
Fluid supply from the left

1) manually assemble the air vent valve and the drain cock using the self-sealing components;
2) manually install the air vent valve, the drain cock and the thermometer on the main body using the self-sealing components;
3) install the flat seat tail piece on the manifold bar using the self-sealing component and a R79B key;
4) connect the R269T valve to the manifold by inserting the gasket and tightening the flat seat tail piece nut;
5) install the end plug on the manifold bar using the self-sealing component and tightening it with a key.



Fluid supply from the right

1) manually assemble the air vent valve and the drain cock using the self-sealing components;
2) for installation with adduction pipes from the right, the thermometer connection on the main valve body must face in the lower part;
3) manually install the air vent valve, the drain cock and the thermometer on the main body using the self-sealing components;
4) install the flat seat tail piece on the manifold bar using the self-sealing component and a R79B key;
5) connect the R269T valve to the manifold by inserting the gasket and tightening the flat seat tail piece nut;
6) install the end plug on the manifold bar using the self-sealing component and tightening it with a key.



⚠ **WARNING.** For installation with adduction pipes from the right, the main valve body must face with the thermometer connection in the lower part.

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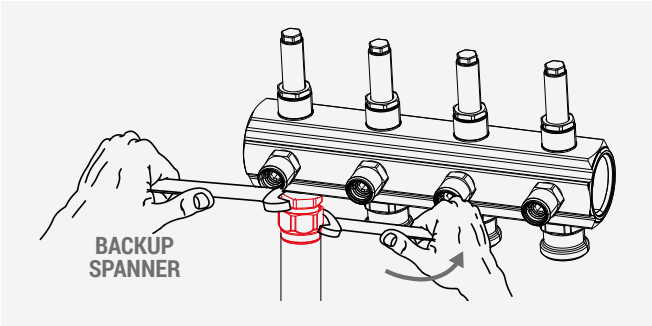
Connecting the system circuits



To connect the system circuit pipes use suitable adaptors for copper, plastic or multilayer pipes from the R178, R179, R179AM (Base 18) series.

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

Regulating the system circuits

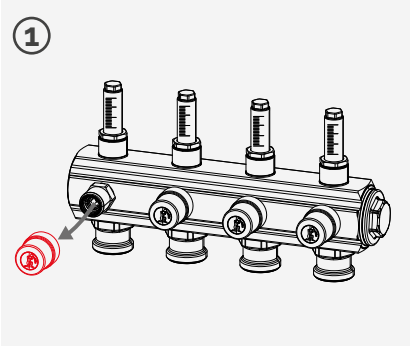
Delivery manifold

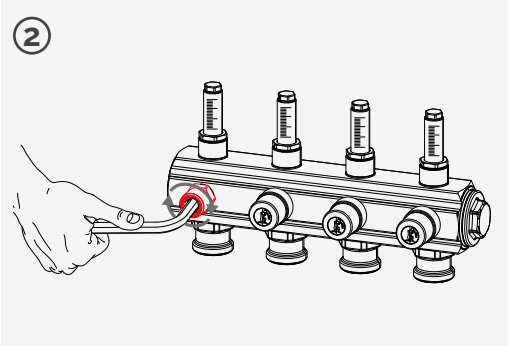
During normal operation, the lockshields on the delivery manifold should be in the fully open position.
To shut off the flow of an individual circuit, close the respective lockshield completely.
To open or close a lockshield proceed as follow:

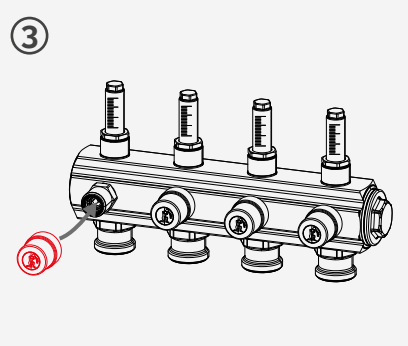
1) remove the protective red cap;
2) rotate the lockshield with the appropriate Allen wrench, clockwise to close the circuit or counterclockwise to open the circuit:
- the flow is completely shut off when the lockshield is completely closed;
- when the lockshield is completely opened, the flow rate set 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 lockshields 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 lockshields to any position between fully open and fully closed.







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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:

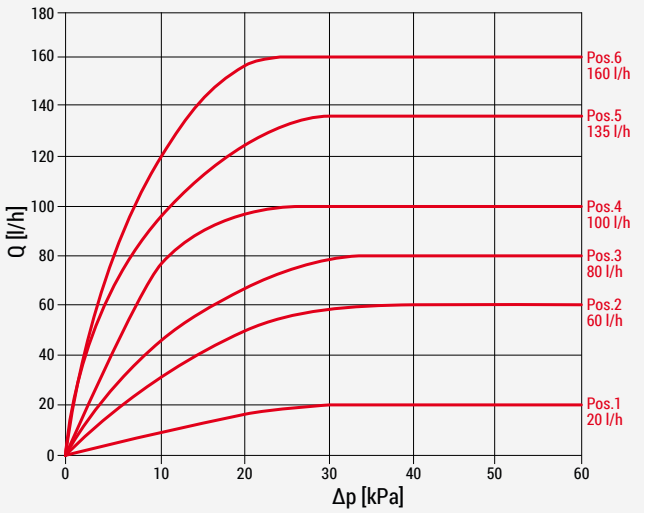
1) identify the cartridge position corresponding to the desired flow rate using the flow rate presetting diagrams or tables;

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;

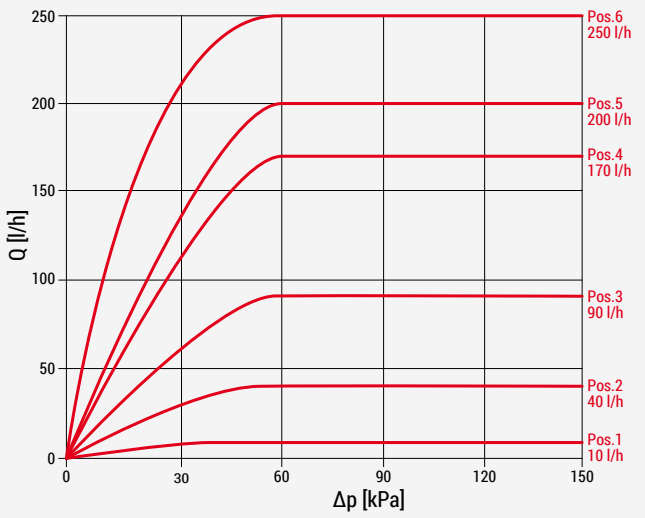
4) remove the regulation key and refit the manual handwheel or the thermo-electric actuator.

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					

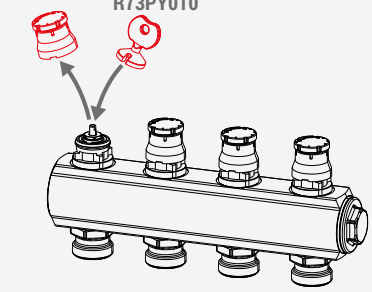
① High Flow version



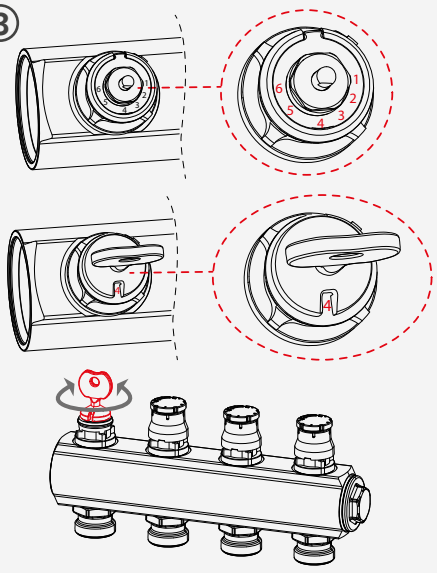
Setting position	1	2	3	4 (factory setting)	5	6
Flow rate [l/h]	10	40	90	170	200	250
Δp min [kPa]	40	40	40	40	40	30
Δp max [kPa]	150					

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

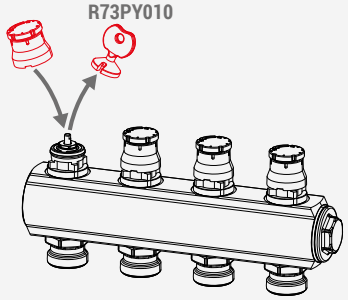
② R73PY010



③



④ R73PY010



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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:

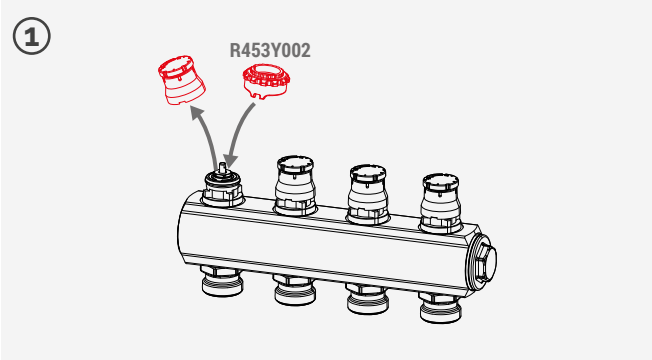
1) remove the manual handwheel and fit the R453Y002 ring nut (inclued with the actuators package);

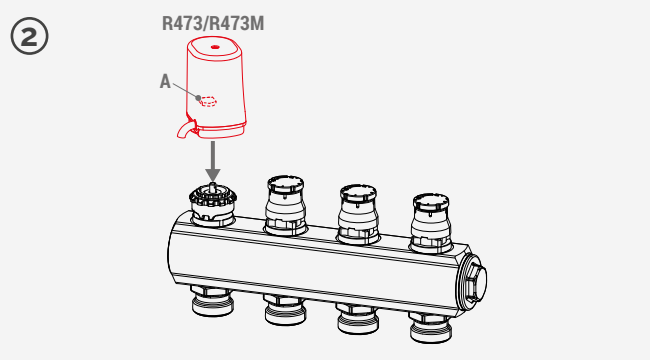
2) assemble the thermo-electric actuator on the ring nut, pressing just enough to lock them together;

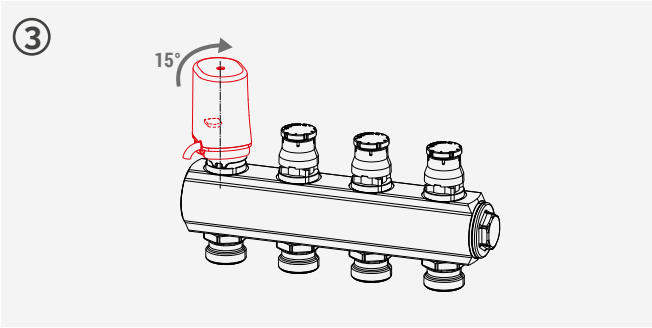
3) turn the actuator about 15° until a click is heard (max. torque 5 Nm).
To release the actuator, turn it again 15°);

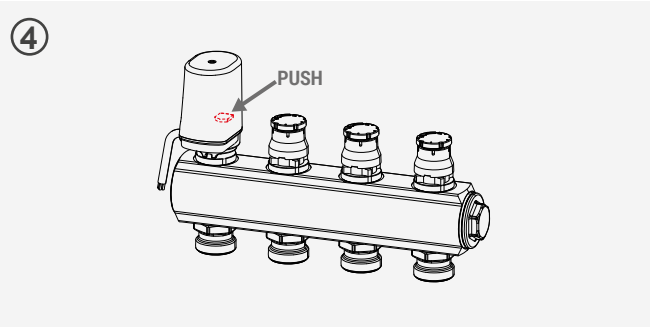
4) press the red lockout button (A) and make the electrical connection of the actuator, following the wired diagram supplied with the actuator instructions.

⚠ **WARNING.** In case of use of R500-2 cabinets, to facilitate installation the thermo-electric actuators must be fitted with the red button (A) turned towards the interior of the cabinet. If required, the red button may be pressed before fitting the actuator onto the manifold. In this case, slightly more force will be necessary to subsequently connect the actuator.









▶ 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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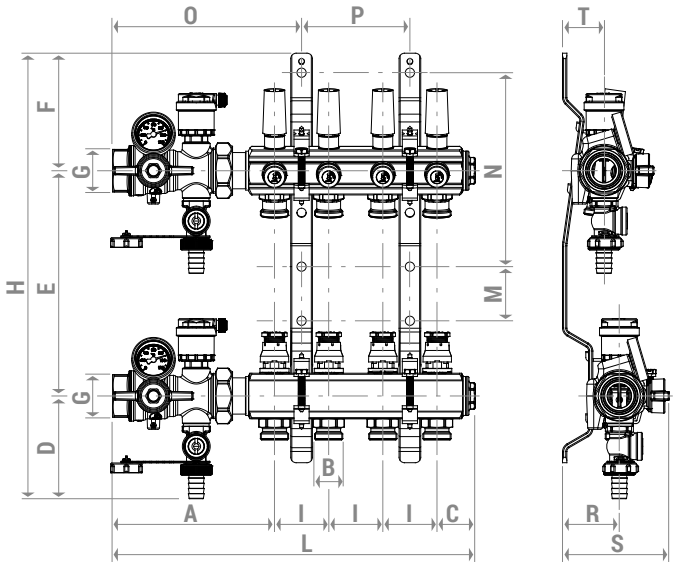
Dimensions



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

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]	R [mm]	S [mm]	T [mm]	CABINET R500-2
R553FKDB102 R553FKDB122	2										235				-				R500Y221
R553FKDB103 R553FKDB123	3										285				50				
R553FKDB104 R553FKDB124	4										335				100				
R553FKDB105 R553FKDB125	5										385				150				R500Y222
R553FKDB106 R553FKDB126	6										435				200				
R553FKDB107 R553FKDB127	7	149	B.18	36	95	208	108	G 1"	411	50	485	50	179	174	250	53	99	38	
R553FKDB108 R553FKDB128	8										535				300				
R553FKDB109 R553FKDB129	9										585				350				R500Y223
R553FKDB110 R553FKDB130	10										635				400				
R553FKDB111 R553FKDB131	11										685				450				R500Y224
R553FKDB112 R553FKDB132	12										735				500				

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Product specifications

R553FKDB Low Flow

Pre-assembled manifold with dynamic flow balancing. Connections: G 1"F x B.18. Consisting of: brass delivery manifold with flow meters with 0,4÷2,6 l/min scale and lockshields for fluid shut-off function; brass 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÷95 °C. Max. working pressure: 10 bar. Max. working pressure of air vent valve: 7 bar. Flow rate setting range for each individual circuit: 20÷160 l/h. Working differential pressure range: 20÷60 kPa.

R553FKDB High Flow

Pre-assembled manifold with dynamic flow balancing. Connections: G 1"F x B.18. Consisting of: brass delivery manifold with flow meters with 0,5÷5 l/min scale and lockshields for fluid shut-off function; brass 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÷95 °C. Max. working pressure: 10 bar. Max. working pressure of air vent valve: 7 bar. 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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