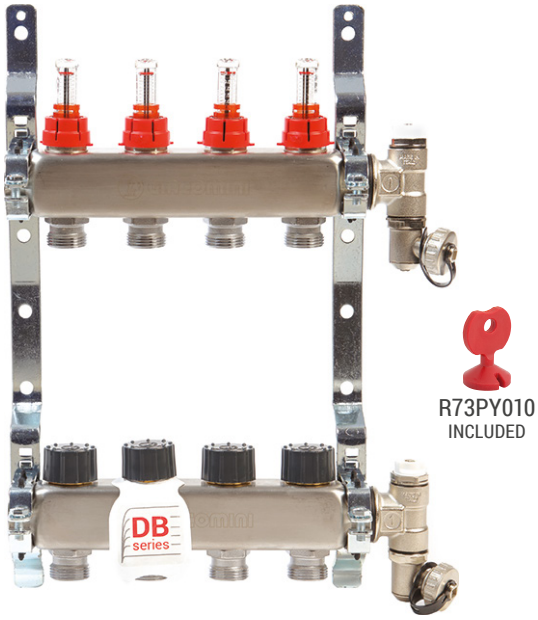
R553FSDB

Stainless steel manifold with dynamic flow balancing

Radiant Systems

Datasheet
1026EN 10/2023



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

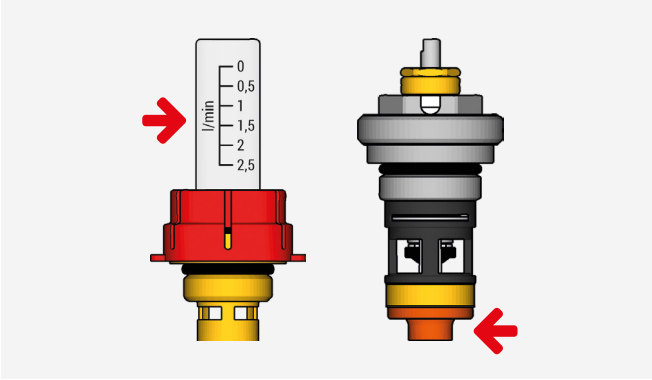
- supply manifold with flow meters with fluid shut-off function;
- return manifold with dynamic flow balancing valves and manual handwheel (M30 x 1,5 mm connection), pre-arranged for thermo-electric command via R473/R473M actuators that can be installed after fitting the relative R453FY002 ring nut (to be ordered separately);
- pair of end pieces with self-sealing complete with drain cocks, manual air vent valves and specific R74 key;
- R588Z metal brackets;
- 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 R553FSDB manifolds are available in 2 versions, with distinct characteristics:

Low Flow version

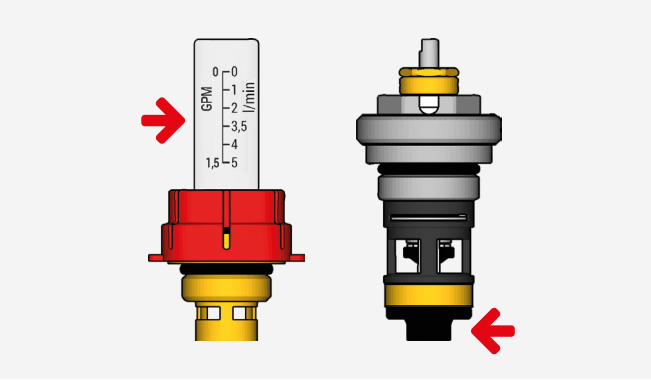
- Flow meters scale: 0÷2,5 l/min
- Internal membrane of the bonnet: red color (visible only in case of bonnet replacement)



⚠ Working differential pressure range: 20÷60 kPa

High Flow version

- Flow meters 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

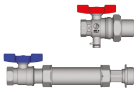
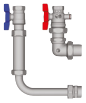
Low Flow version: Δp 20÷60 kPa

PRODUCT CODE	CONNECTIONS: MANIFOLD x OUTLETS	No. OUTLETS	CABINET R500-2 L x H x D
R553FSDB142	G 1" x 3/4"E	2	R500Y221 400x650x85÷130 mm
R553FSDB143		3	
R553FSDB144		4	R500Y222 600x650x85÷130 mm
R553FSDB145		5	
R553FSDB146		6	
R553FSDB147		7	
R553FSDB148		8	R500Y223 800x650x85÷130 mm
R553FSDB149		9	
R553FSDB150		10	
R553FSDB151		11	R500Y224 1000x650x85÷130 mm
R553FSDB152		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
R553FSDB242	G 1" x 3/4"E	2	R500Y221 400x650x85÷130 mm
R553FSDB243		3	
R553FSDB244		4	R500Y222 600x650x85÷130 mm
R553FSDB245		5	
R553FSDB246		6	
R553FSDB247		7	
R553FSDB248		8	R500Y223 800x650x85÷130 mm
R553FSDB249		9	
R553FSDB250		10	
R553FSDB251		11	R500Y224 1000x650x85÷130 mm
R553FSDB252		12	

Optional kits

	PRODUCT CODE	CONNECTIONS
	R259SX077	G 1"F x G 1"M
	R259KX006	G 3/4"F x G 1"M
	R259KX007	G 1"F x G 1"M
	R859KX016	G 3/4"F x G 1"M
	R859KX017	G 1"F x G 1"M
	R859KX026	G 3/4"F x G 1"M
	R859KX027	G 1"F x G 1"M

✎ **NOTE.** Manifold/cabinet combinations are applicable for manifolds with end pieces only, WITH NO optional kits installed.

Optionals

- R500-2: flush-mounting metal cabinet, with adjustable depth
- R473, R473M: normally closed thermo-electric actuators
- R453FY002: M30 x 1,5 mm plastic ring nut for installing thermo-electric actuators
- R178E, R179E: 3/4"E adaptors

Spare parts

- P12HDBX001: Low Flow bonnet with dynamic balancing (red internal membrane)
- P12HDBX002: High Flow bonnet with dynamic balancing (black internal membrane)
- P78MSX001: flow meter with scale 0÷2,5 l/min
- P78MSX002: flow meter with double scale: 0÷5 l/min and 0÷1,5 GPM
- R588ZY001: metal bracket with supports
- R73PY010: key for presetting

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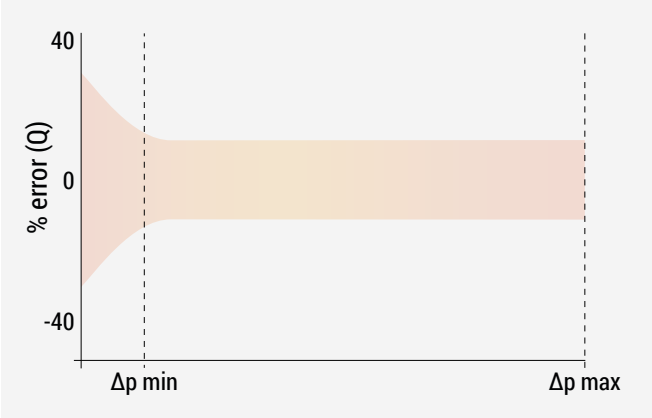
Technical data

Low Flow version performances
- Fluids: water, glycol solutions (max. 30 %)
- Center distance between the outlets: 50 mm
- Temperature range: 5÷70 °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÷2,5 l/min

High Flow version performances
- Fluids: water, glycol solutions (max. 30 %)
- Center distance between the outlets: 50 mm
- Temperature range: 5÷70 °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
- Supply and return manifolds: AISI 304 stainless steel
- End pieces and drain cocks: chrome-plated 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.
- R553FSDB 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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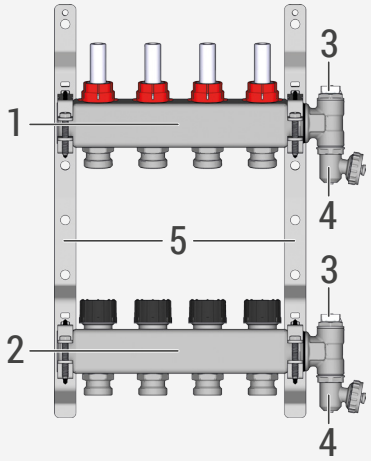
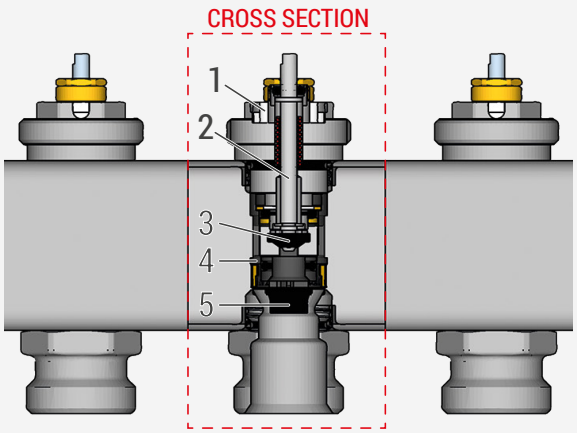
Components

Pre-assembled manifold



1	Supply manifold with outlets equipped with flow meters
2	Return manifold with outlets with dynamic flow balancing valves
3	Manual air vent valve
4	Drain cock
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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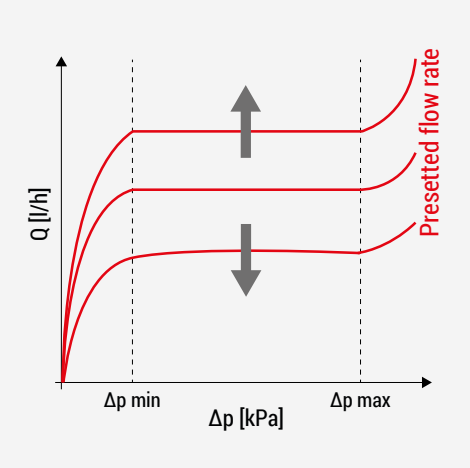
Operation

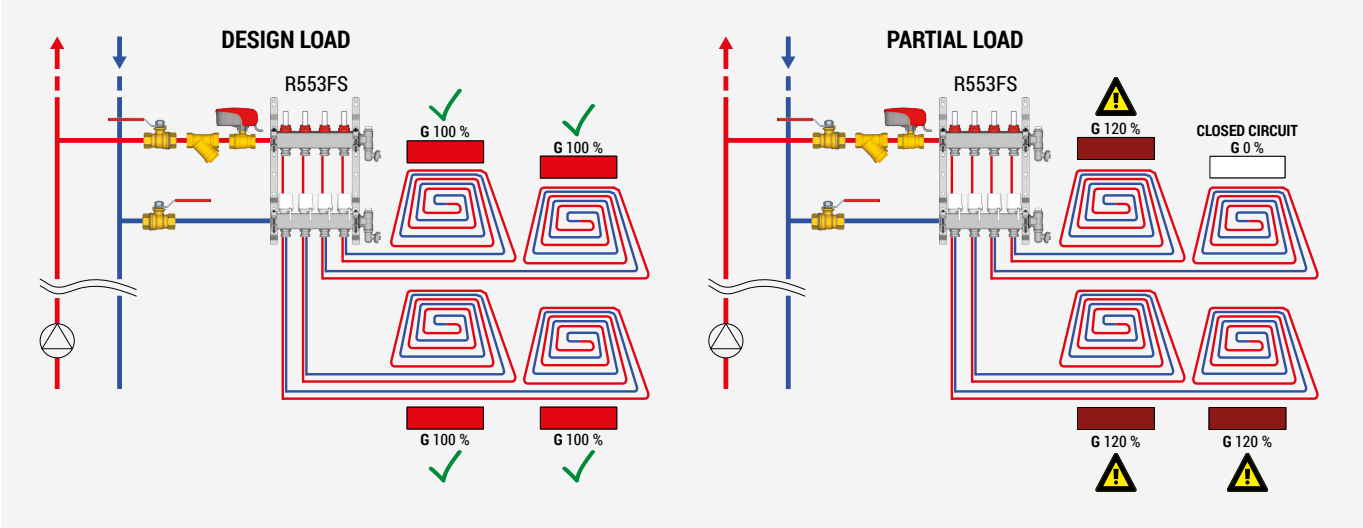
The R553FSDB manifold controls the flow rate in each individual circuit of the system, within a minimum and maximum value of differential pressure, independently of the operating conditions of the other circuits.
The manifold may be used in combination with the thermo-electric actuators to perform different 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.

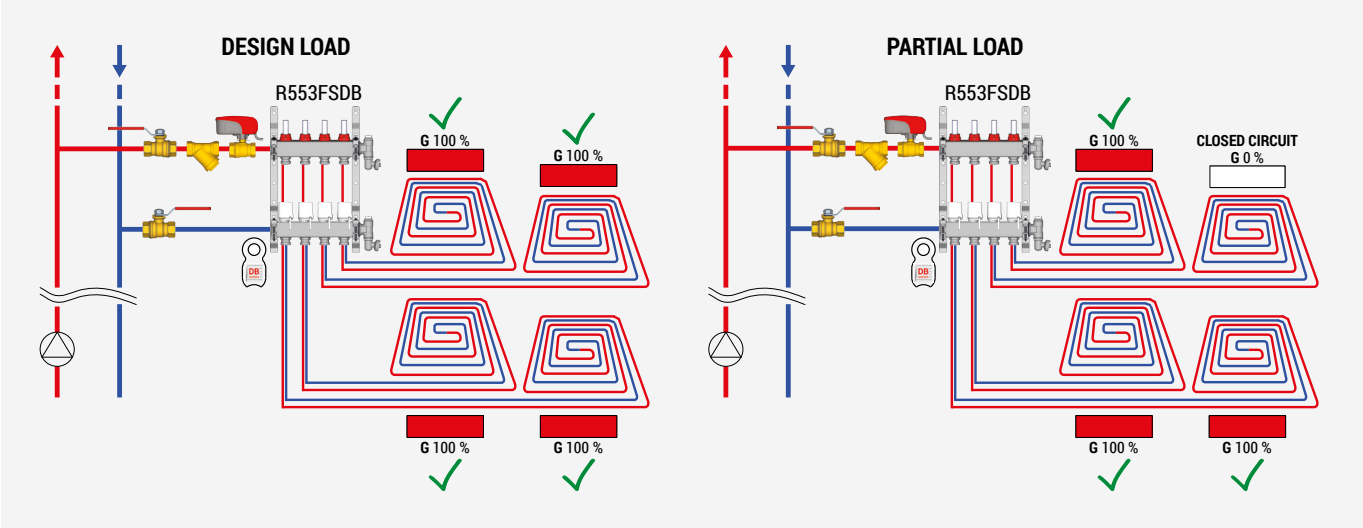


Manifolds with dynamic flow balancing are used primarily in radiant systems.
As can be seen in the example installation diagrams shown below, a system using DB manifolds series with dynamic flow balancing is capable to maintain the flow rates always balanced in all the circuits of the system.

Radiant system with R553FS manifolds, without dynamic flow balancing



Radiant system with R553FSDB manifolds, with dynamic flow balancing



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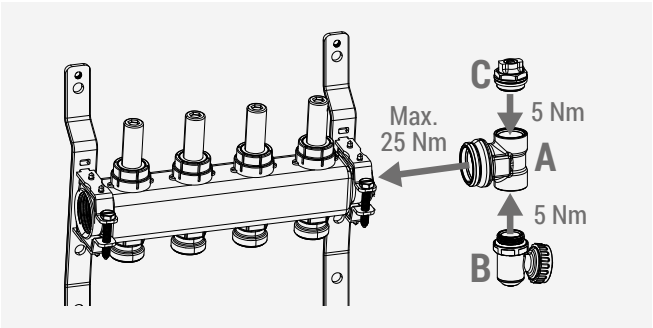
Installation

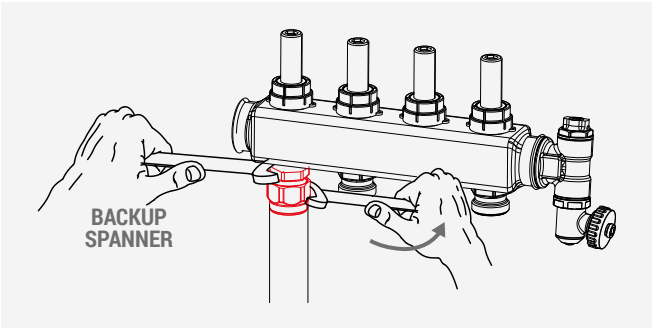
⚠ **WARNING.** Installation must be carried out by qualified personnel, following the instructions included in the packaging.

Installing end pieces



The manifold comes pre-assembled onto the R588Z brackets, pre-arranged for connection of the end pieces.
The end pieces are packaged in boxes as disassembled components.
To assemble, first install the intermediate fitting **(A)** onto the manifold and then install the drain cock **(B)** on the bottom of the intermediate fitting and the air vent valve **(C)** on the top of the fitting. Note that these components are self-sealing and require no additional sealing measures.

Connecting 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 place.

Regulating the system circuits

Supply manifold

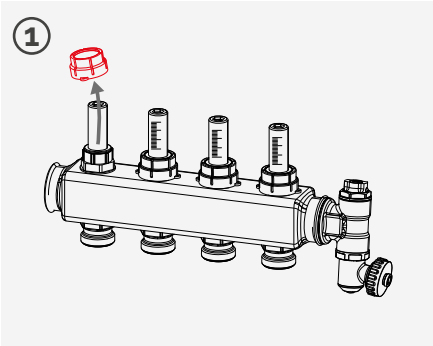
During normal operation, the flow meters on the supply manifold should be in the fully open position.
To shut off the flow of an individual circuit, close the respective flow meter completely.
To open or close a flow meter:

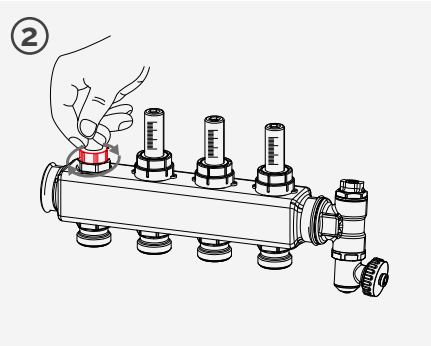
1) remove the protective red cap;
2) manually rotate the black ring nut of the flow meter clockwise to close the circuit or counterclockwise to open the circuit:
- the flow is completely shut off when the flow meter is completely closed;
- when the flow meter is completely opened, the flow rate set with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

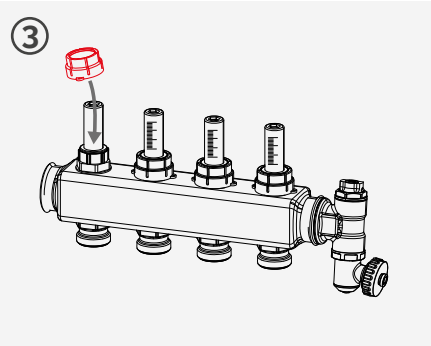
3) when the setting is complete, refit the protective red cap.

⚠ **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:

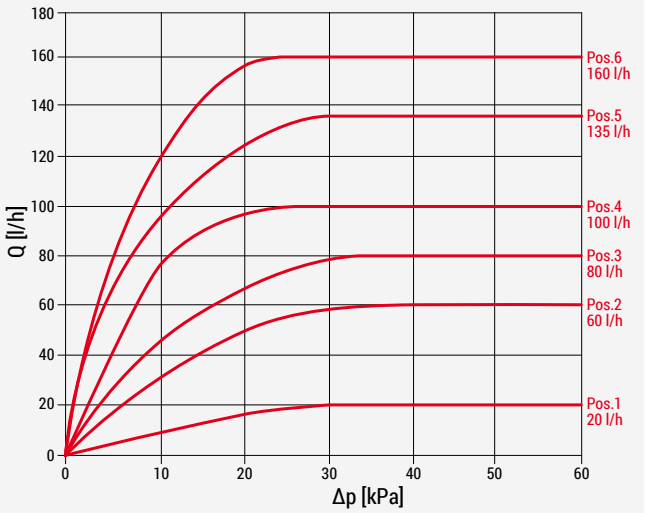
1) identify the cartridge position corresponding to the desired flow rate using the flow rate presetting diagrams or tables;

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;

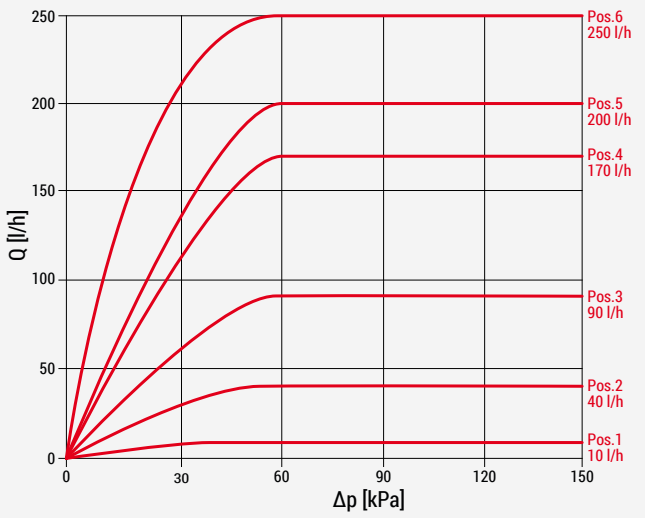
4) remove the regulation key and refit the manual handwheel or the thermo-electric actuator.

1 Low Flow version



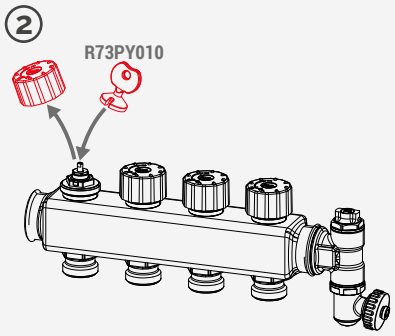
Setting position	1	2	3	4 (factory setting)	5	6
Flow rate [l/h]	20	60	80	100	135	160
Δp min [kPa]	20	20	20	20	20	20
Δp max [kPa]	60					

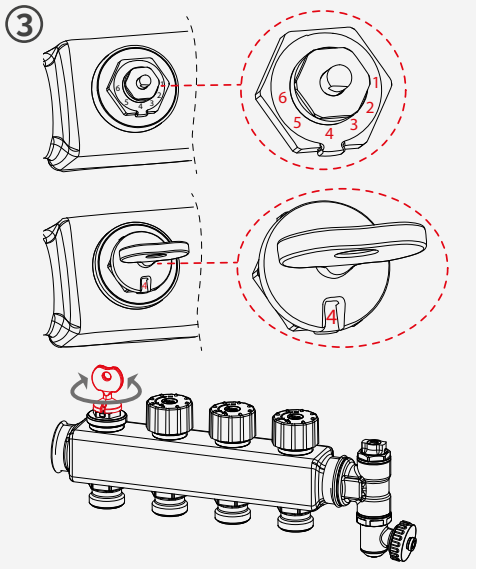
1 High Flow version

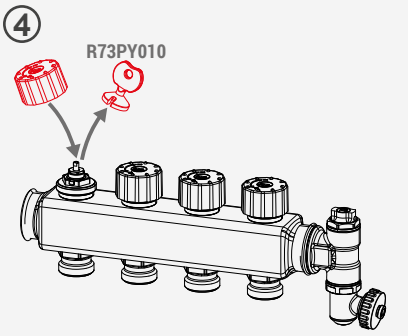


Setting position	1	2	3	4 (factory setting)	5	6
Flow rate [l/h]	10	40	90	170	200	250
Δp min [kPa]	40	40	40	40	40	30
Δp max [kPa]	150					

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







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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:

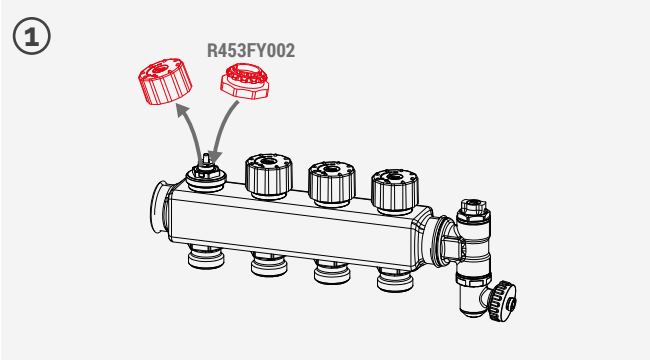
1) remove the manual handwheel and tighten the R453FY002 ring nut with M30 x 1,5 mm connection (to be ordered separately);

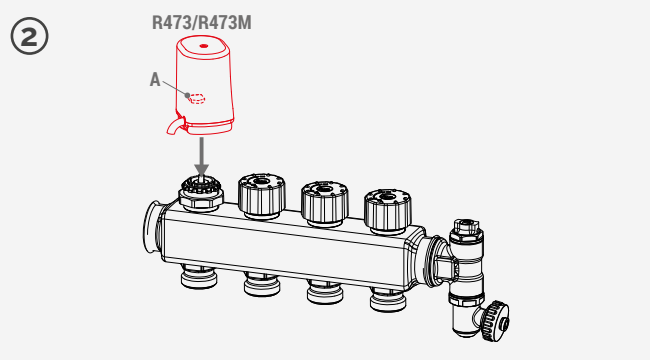
2) assemble the thermo-electric actuator on the ring nut, pressing just enough to lock them together;

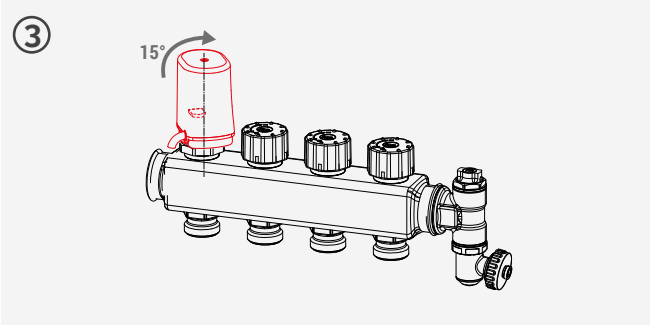
3) turn the actuator about 15° clockwise until a click is heard (max. torque 5 Nm).
To release the actuator, turn it 15° counterclockwise);

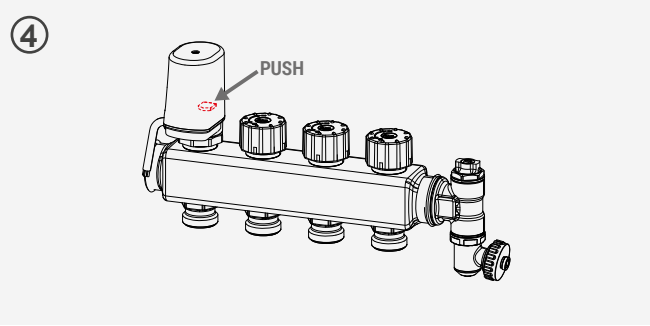
4) press the red lockout button (A) and make the electrical connection of the actuator, following the wired diagram supplied with the actuator instructions.

⚠ **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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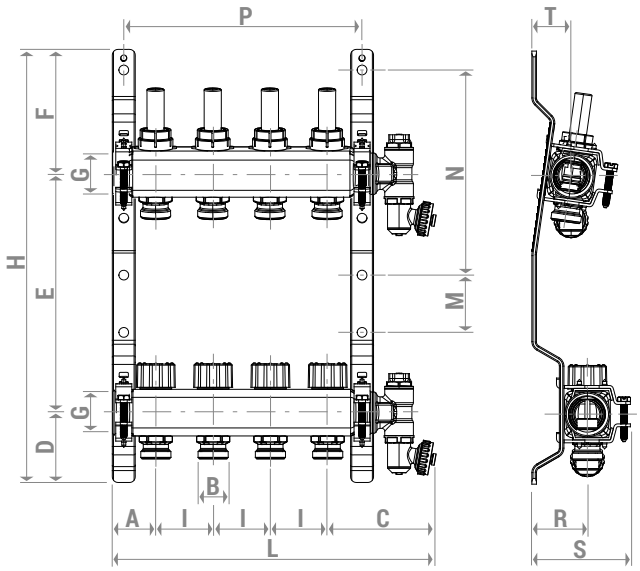
Dimensions



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]	P [mm]	R [mm]	S [mm]	T [mm]	CABINET R500-2
R553FSDB142 R553FSDB242	2										185			110				R500Y221
R553FSDB143 R553FSDB243	3										235			160				
R553FSDB144 R553FSDB244	4										285			210				
R553FSDB145 R553FSDB245	5										335			260				R500Y222
R553FSDB146 R553FSDB246	6										385			310				
R553FSDB147 R553FSDB247	7	38	3/4"E	102	61	209	109	G 1"	378	50	435	50	197	360	49	86	35	
R553FSDB148 R553FSDB248	8										485			410				
R553FSDB149 R553FSDB249	9										535			460				R500Y223
R553FSDB150 R553FSDB250	10										585			510				
R553FSDB151 R553FSDB251	11										635			560				R500Y224
R553FSDB152 R553FSDB252	12										685			610				

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Product specifications

R553FSDB Low Flow

Pre-assembled manifold with dynamic flow balancing. Connections: G 1"F x 3/4"E. Consisting of: stainless steel supply manifold with flow meters with 0÷2,5 l/min scale and fluid shut-off function; stainless steel return manifold with dynamic flow balancing valve (membrane with red color) and manual handwheel pre-arranged for thermo-electric actuators. End pieces and drain cock in chrome-plated brass. EPDM gaskets. Galvanised steel brackets for manifolds. Fluids: water, glycol solutions (max. 30%). Center distance between outlets: 50 mm. Temperature range: 5÷70 °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.

R553FSDB High Flow

Pre-assembled manifold with dynamic flow balancing. Connections: G 1"F x 3/4"E. Consisting of: stainless steel supply manifold with flow meters with double scale 0÷5 l/min and 0÷1,5 GPM and fluid shut-off function; stainless steel return manifold with dynamic flow balancing valve (membrane with black color) and manual handwheel pre-arranged for thermo-electric actuators. End pieces and drain cock in chrome-plated brass. EPDM gaskets. Galvanised steel brackets for manifolds. Fluids: water, glycol solutions (max. 30%). Center distance between outlets: 50 mm. Temperature range: 5÷70 °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.

Safety Warning. Installation, commissioning and periodical maintenance of the product must be carried out by qualified operators in compliance with national regulations and/or local standards. A qualified installer must take all required measures, including use of Individual Protection Devices, for his and others' safety. An improper installation may damage people, animals or objects towards which Giacomini S.p.A. may not be held liable.

Package Disposal. Carton boxes: paper recycling. Plastic bags and bubble wrap: plastic recycling.

Additional information. For more information, go to giacomini.com or contact our technical assistance service. This document provides only general indications. Giacomini S.p.A. may change at any time, without notice and for technical or commercial reasons, the items included herewith. The information included in this technical sheet do not exempt the user from strictly complying with the rules and good practice standards in force.

Product Disposal. Do not dispose of product as municipal waste at the end of its life cycle. Dispose of product at a special recycling platform managed by local authorities or at retailers providing this type of service.

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