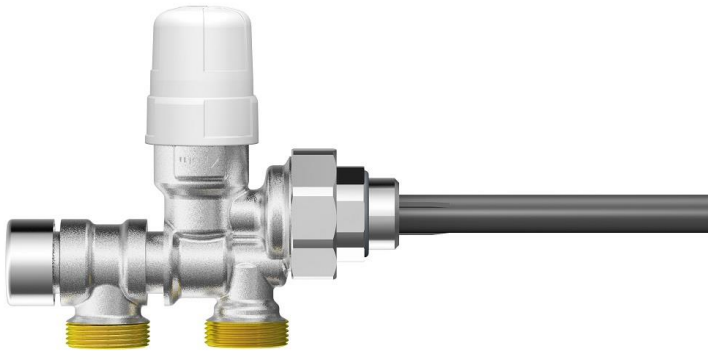




**4-way valve with thermostatic option
with variable centre distance and pre-adjustment
for Single pipe and Dual pipe systems.**

CT3101.0_01
EN
March 2017



- Valve with pre-adjustment;
- Variable centre distance: 35-40 mm;
- Reversible connections system side (delivery/return);
- Installation versatility: suitable both for single pipe and dual pipe systems.

PRODUCTION RANGE

Code	Size	Max operating temperature [°C]	Max operating pressure [bar]	Radiator connection	System connection	Probe length [mm]
3101.04.00	1/2"	110	10 (1000 kPa)	M UNI-EN ISO 228	Standard RBM	110
3101.05.00	3/4"					
3101.06.00	1"					

ACCESSORIES

CODE	DESCRIPTION
590.00.00	Thermostatic head with TL10 liquid expansion sensor
720.00.30	Thermostatic head with TL30 liquid expansion sensor
2633.00.00	Thermostatic head with TL70 liquid expansion sensor
590.00.10	Thermostatic head with TL20 remote sensor
306.00.02	2 wire NC electrothermal actuator: Voltage: 230 Vac
306.00.12	2 wire NC electrothermal actuator: Voltage: 24 Vac
306.00.42	4 wire NC electrothermal actuator. Voltage: 230 Vac
306.00.52	4 wire NC electrothermal actuator. Voltage: 24 Vac

SPARE PARTS

CODE	DESCRIPTION
3518.04.02	Kit inclusive of nut, ball and L110 mm standard length probe – size 1/2"
3518.05.02	Kit inclusive of nut, ball and L110 mm standard length probe – size 3/4"
3518.06.02	Kit inclusive of nut, ball and L110 mm standard length probe – size 1"

DESCRIPTION

The RBM series 3101 4-way valves with thermostatic option are used as shut-off and adjustment parts for the heating bodies in single pipe or dual pipe heating systems.

They are supplied with 1/2", 3/4" and 1" connection to the heating body and with RBM standard connection to the system. Specific fitting is provided for connection to the system, as indicated in the section "Combined fittings" of this technical sheet.

The valves are also equipped with probe to separate the delivery flow in the heating body from the return flow. The probe takes the heat-carrying fluid in the farthest area of the heating body with respect to its inlet, thus improving its heat exchange.

The opening and closing of the valves is manually adjusted by acting on the handwheel.

The valves can also be equipped with RBM thermostatic head or with electrothermal commands.

The thermostatic head allows the valve to self-actuate its opening and closing based on that set on the valve's head.

Whereas, the electrothermal commands allow adjusting the valve opening and closing automatically and can be controlled from adjustment and control devices such as room thermostats or programmable thermostats to make this operation fully automatic.

Thanks to a special ring nut for the pre-setting of pressure drops, they allow quick and effective circuit balancing. When used in conjunction with RBM thermostatic heads they maintain a constant temperature in the environment, ensuring energy savings. The Kv can be adjusted by simply acting on the external end of the control rod of the thermostatic screw unit. No.6 pre-settable Kv values.

THE INSTALLATION

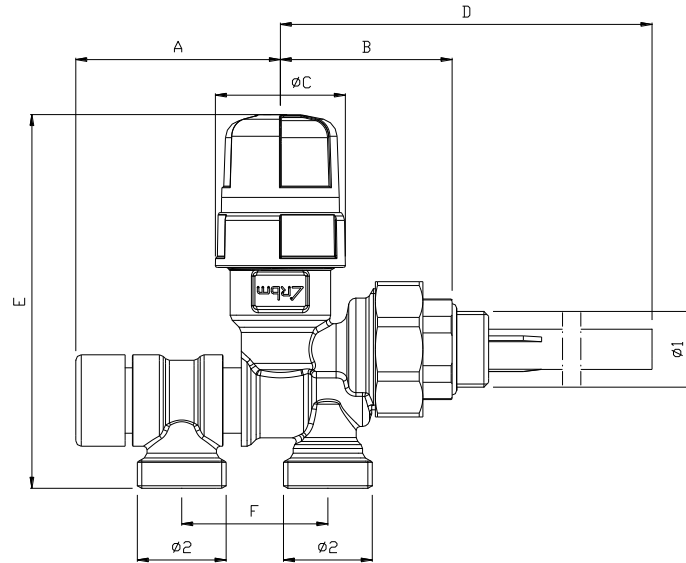
The 4-way valves can be installed on heating systems of any type of civil or industrial building, old or new.

The valves can be mounted on connections facing the wall or the floor. System side connections are reversible, you can then choose where to connect the delivery and return, depending on the installation requirements.

The valves are equipped with shut-off devices to separate the heating body from the single pipe system without interrupting the fluid circulation in the system itself. This is advantageous if wanting to service the heating body.

The 4-way valves with thermostatic option are essential when the heating system connections are adjacent. They can replace RBM Single-flow, Uniflux, Biflux and Termoflux valves.

DIMENSIONAL FEATURES



Code	Ø1	Ø2	A [mm]	B mm	Ø C [mm]	D [mm]	E [mm]	F [mm]
3101.04.00	1/2"	Standard RBM	50	50	35.5	160	102	35÷40
3101.05.00	3/4"	Standard RBM	50	50	35.5	160	102	35÷40
3101.06.00	1"	Standard RBM	50	50	35.5	160	102	35÷40

CONSTRUCTION FEATURES

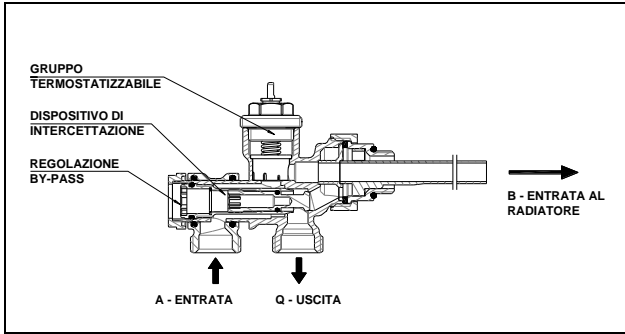
Body	: Nickel-plated brass
Joints Seals	: EPDM PEROX and NBR
Spring	: Stainless steel
Handwheel and cap	: Shockproof ABS
Radiator connection	: M UNI-EN-ISO 228
Line connections	: Standard RBM M W24.5x19F
Connection for ABS handwheel or thermo-electric actuator	: M 30x1,5
Probe length	: 110 mm
External probe diameter	: 11 mm

TECHNICAL FEATURES

Indicated fluid	: Water
	: Water + glycol 30%
Max operating temperature	: +110 °C
Max operating pressure	: 10 bar (1000 kPa)
Maximum differential pressure (with thermostatic control)	: 1 bar (100 kPa)

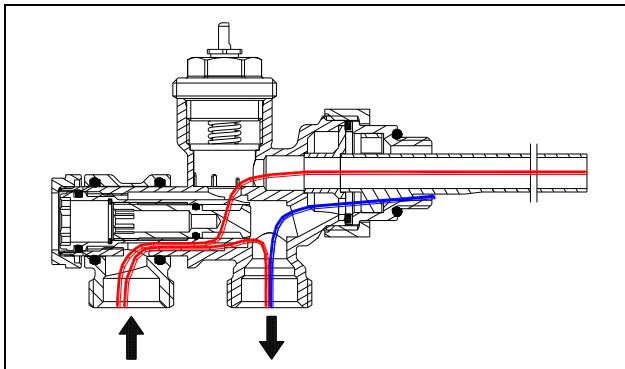
FUNCTIONAL LAYOUT

MAIN ELEMENTS



- **By-pass adjustment**: used to transform the valve configuration from single-pipe to dual-pipe systems, and for by-pass adjustment. The adjustment stroke is limited in its seat from which it cannot come out.
- **Shut-off device**: used to exclude the radiator from the heating system. The adjustment stroke is limited in its seat from which it cannot come out.
- **Unit with thermostatic option**: used to open and close the valve. These operations can be carried out:
 - by turning the valve's handwheel clockwise;
 - with the help of a thermo-electric actuator operable from an ambient control device, such as a thermostat or a programmable thermostat;
 - with the help of a self-actuated thermostatic head.

CONFIGURATION 1 – SINGLE PIPE SYSTEMS



Adjustments:

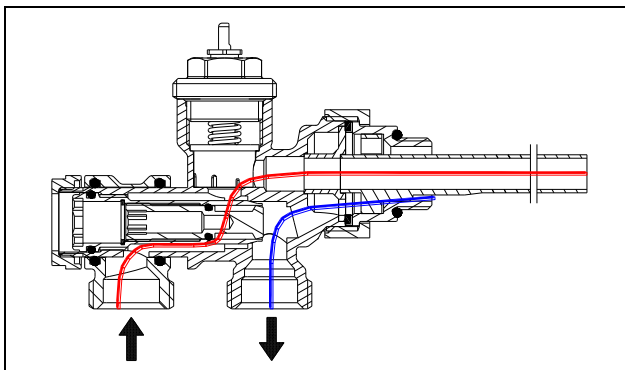
Shut-off device open, by-pass open and unit with thermostatic option open and set to position 6.

The fluid entering the valve from inlet (A) splits in one part that supplies the serviced radiator and the other for the next radiator.

The temperature of the fluid feeding the subsequent heating bodies can be modified by acting on the by-pass adjustment; by operating on the shutter stroke, you can calibrate the flow of fluid destined to mixing with the fluid returning from the heating body.

The by-pass flow ranges from a minimum of 85% (by-pass completely open anti-clockwise) to a complete flow shut-off (by-pass completely closed clockwise – dual pipe valve configuration).

CONFIGURATION 2 – DUAL PIPE SYSTEMS *



Adjustments:

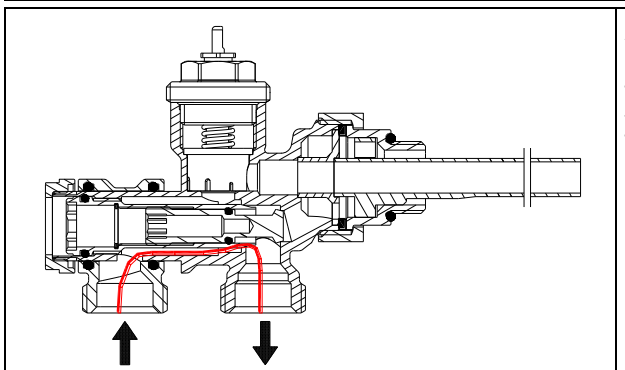
Shut-off device open, by-pass closed and unit with thermostatic option open and set to position 1 to 6.

* Standard valve sale configuration.

The fluid entering the valve from inlet (A) is directed totally to the heat exchange with the heating body.

In this configuration, the 4-way valve with thermostatic option unites in a single product the functions performed by a common thermostatic valve and those of a lockshield, employed in dual pipe systems.

CONFIGURATION 3 – RADIATOR SHUT-OFF (FOR MAINTENANCE)



Adjustments:

Shut-off device closed, by-pass open and unit with thermostatic option closed.

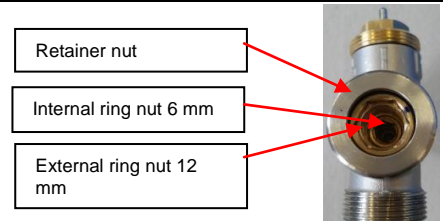
The fluid entering the valve from inlet (A) directly comes out from the valve through its outlet (Q).

This allows excluding the radiator from the heating system, without interrupting the circuit.

To change the settings from single to dual pipe and vice versa, act on the external adjusting screw with the help of a 12 mm Allen key.

To shut-off the radiator, act on the inner adjustment with the help of a 6 mm Allen key.

N.B.: The adjustment procedures, required to turn the valve configuration from single to dual pipe and for shutting-off the radiator, must be made with the retainer nut properly screwed onto the valve body.

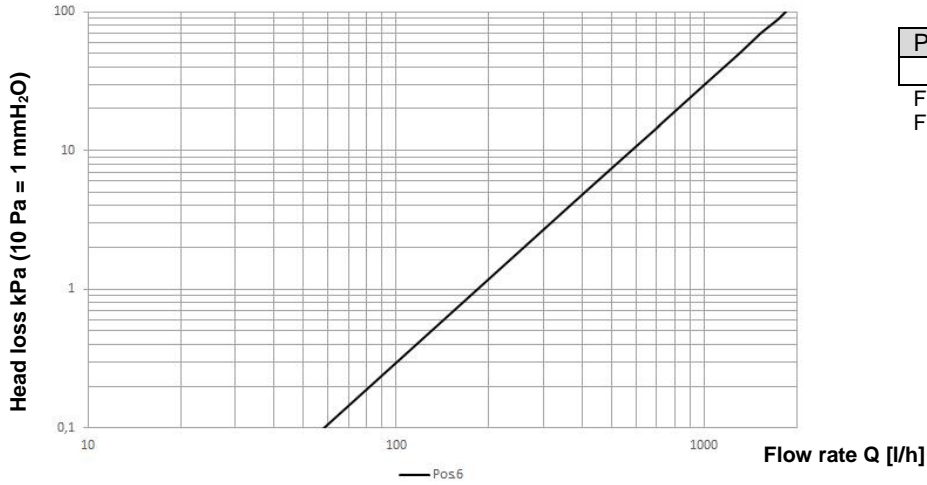


FLUID DYNAMICS FEATURES SINGLE PIPE CONFIGURATION

FLOW RATES/HEAD LOSSES CHART FOR VALVES WITH THERMOSTATIC OPTION AND HANDWHEEL.

Head loss of the valve

Test performed with by-pass completely open, valve without thermostatic head and setting in position 6 (completely open).



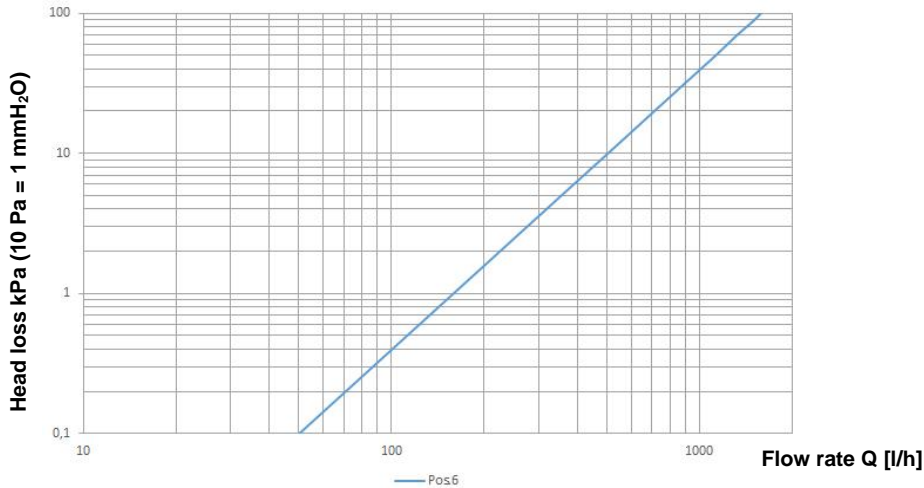
Posit.	Kvs (l/h)
6	1.830

Flow rate in by-pass: 85%
Flow rate to the radiator: 15%

FLOW RATES/HEAD LOSSES CHART FOR VALVES PAIRED WITH THERMOSTATIC HEAD SERIES 590 - 720 - 2633:

Head loss of the valve

Test performed with by-pass completely open, valve paired with thermostatic head and setting in position 6 (completely open).



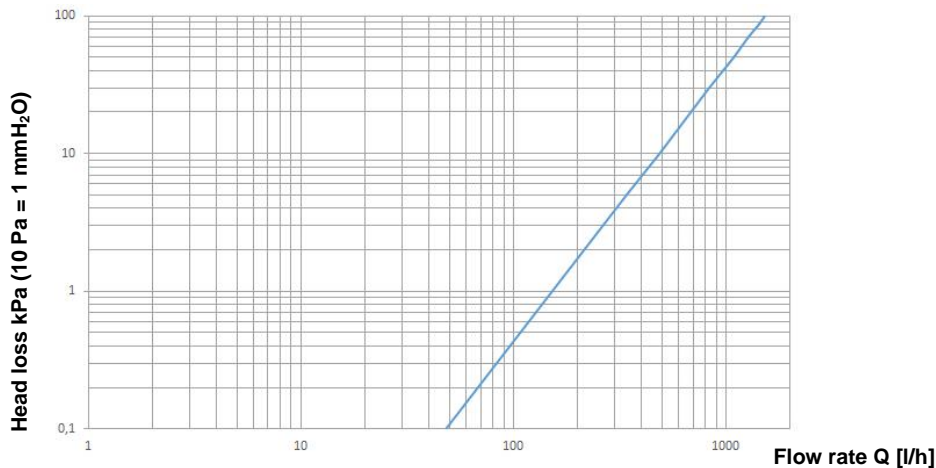
Posit.	Kvs (l/h)
6	1.590

Flow rate in by-pass: 85%
Flow rate to the radiator: 15%

FLOW RATES/HEAD LOSSES CHART FOR VALVES WITH THERMOSTATIC OPTION AND HANDWHEEL.

Head loss in by-pass

Test carried out with valve without thermostatic head and unit with thermostatic option closed.



Posit.	Kvs (l/h)
Open	1.530

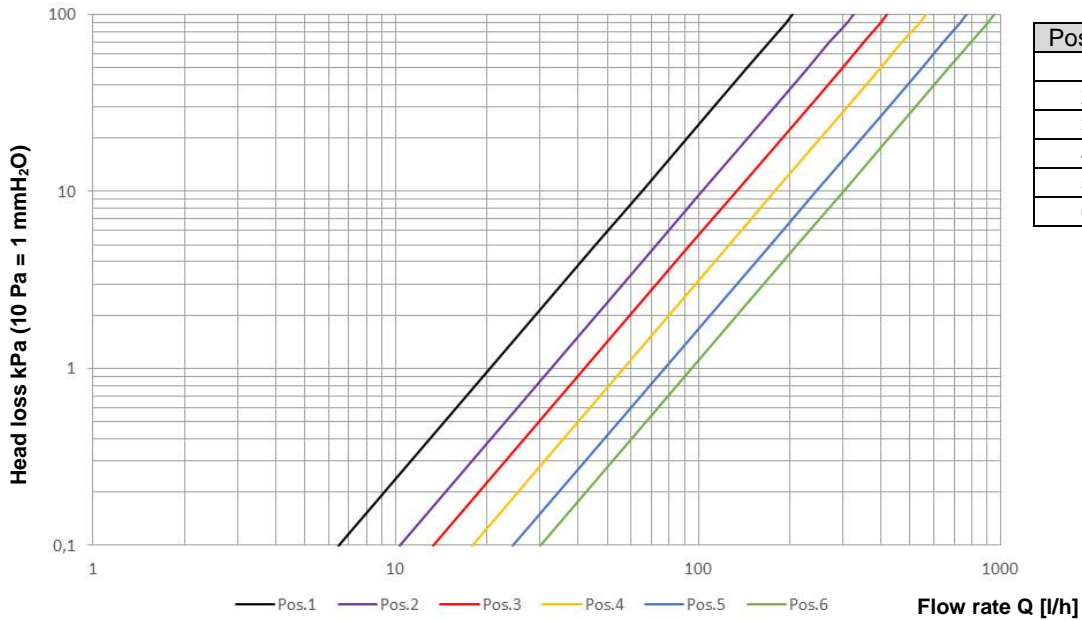
Flow rate in by-pass:

FLUID DYNAMICS FEATURES DUAL PIPE CONFIGURATION

FLOW RATES/HEAD LOSSES CHART FOR VALVES WITH THERMOSTATIC OPTION AND HANDWHEEL.

Head loss of the valve.

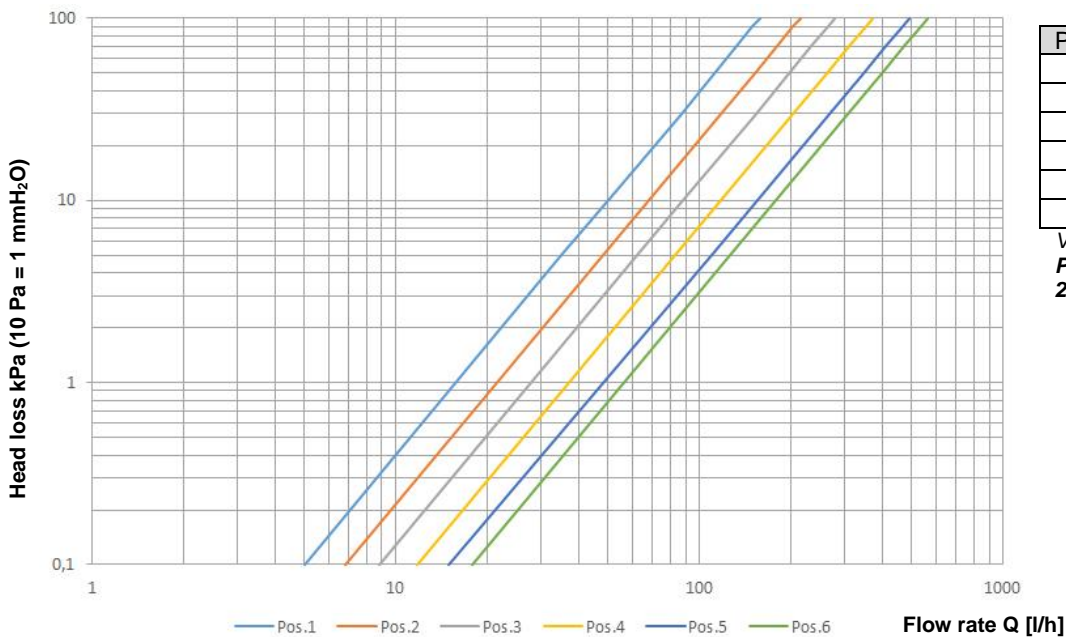
Test performed with by-pass completely closed, valve without thermostatic head and any possible setting position.



FLOW RATES/HEAD LOSSES CHART FOR VALVES PAIRED WITH THERMOSTATIC HEAD SERIES 590 - 720 - 2633:

Head loss of the valve.

Test performed with by-pass completely closed, valve coupled with thermostatic head and any possible setting position.

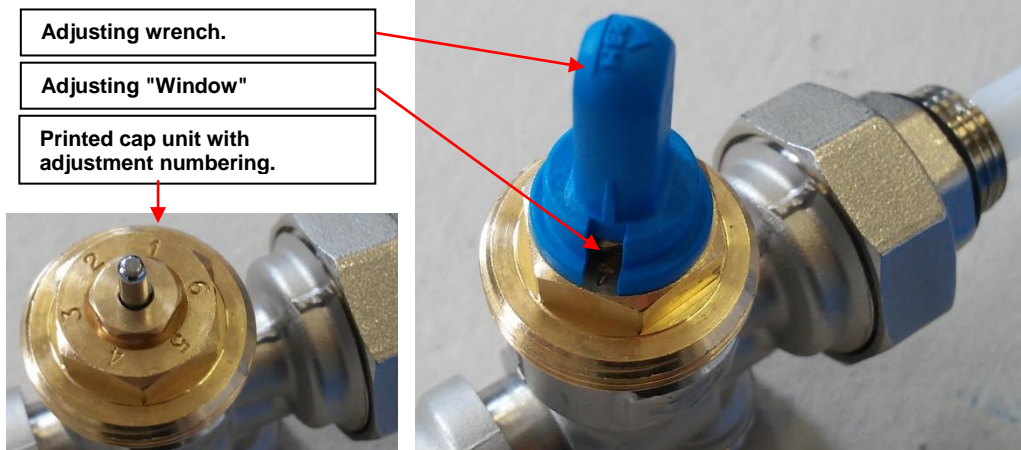


INSTRUCTIONS FOR PRE-ADJUSTMENT:

- 1) The flow rates (Q_i) of each individual circuit (adduction + radiator) and the head losses (ΔP_i) (design data) must be known.
- 2) Determine which circuit is the most deprived, that is the one with the higher head loss (ΔP_{max}).
- 3) Calculate the head loss of the RBM pre-setting valve (installed on this radiator) in the fully open position, at the design flow rate of this radiator ($\Delta P_{RBM\ ref}$).
- 4) Sum the value of head loss of the valve with the one of the most deprived circuit to get the total head loss on the circuit ($\Delta P_{max} + \Delta P_{RBM\ ref} = \Delta P_{tot}$). The value ΔP_{tot} obtained will be used to determine the pre-setting of all remaining valves (balancing).
- 5) Then calculate the head loss of the next valve ($\Delta P_{tot} - \Delta P_i = \Delta P_{RBM\ i}$).
- 6) Locate on the "flow rates/head losses" chart the pre-setting position (Pos.) that, at the design flow rate of the individual radiator, corresponds to the additional pressure drop detected ($\Delta P_{RBM\ i}$).
- 7) This will be the position at which to set the adjustment hexagon of each valve (turn it until it matches the notch).
- 8) Repeat steps 3 to 7 for all remaining valves.

The Kvs can be adjusted by simply acting on the external end of the control rod of the thermostatic screw unit, by means of the accessory adjustment wrench (code **2878.00.00**).

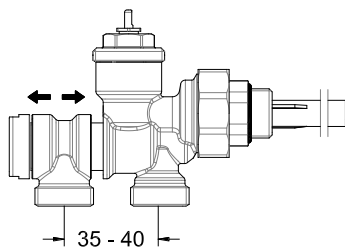
Turn the control and manoeuvre key to trace the number printed on the top of the shutter unit and set it to the desired value. The position set is visible through the window present on the adjusting wrench.



Refer to the tables above for correspondence of the Kvs values to the various adjustment positions.

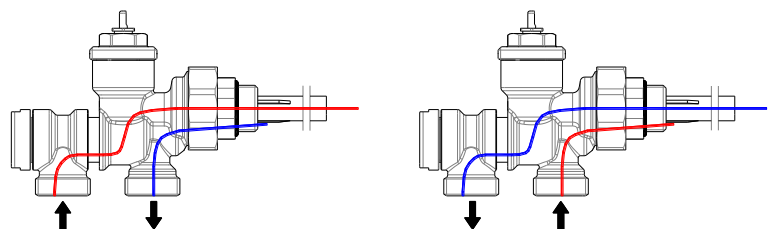
CENTRE DISTANCE ADJUSTMENT:

Manually adjust the centre distance of the valve, so as to adapt to the centre distance of the pipes. The valve allows installation on system connections with centre distance between 35÷40 mm.



SYSTEM DELIVERY/RETURN CONNECTION:

The valves are reversible, you can then choose where to connect the delivery and return, depending on the installation requirements.



THERMOSTATIC HEAD ASSEMBLY

In order to assemble the thermostatic head on the 4-way valve with thermostatic option, follow the instructions below:

1. Remove the manual adjustment handwheel by loosening it anti-clockwise.
2. Bring the thermostatic head numbered knob to position no.5, reached by turning it anti-clockwise.
3. Position the thermostatic head on the valve's body by leaving the adjustment reference window upwards or, however, in visible position.
4. Tighten the knurled metal ring nut of the thermostatic head on the valve's body until blocked. Once the head is assembled, turn the numbered knob a few times from position "5" to position "*", for the parts to adjust.

THERMOSTATIC HEAD WITH REMOTE SENSOR

Where the heating body is located where the heat stores, e.g. behind curtains, inside cabinets, underneath shelves or where solar radiations directly cover the valve, use the **thermostatic head with sensor at a distance (mod. TL 20 code 590.00.10)**. This allows placing the sensitive element in the most suitable place to correctly detect room temperature.



TEMPERATURE ADJUSTMENT

Adjust by turning the numbered knob so the symbol corresponding to the wanted temperature is positioned in the window of reference. (Approximate values)

Symbol	*	1	2	3	4	5
Value °C	7	10	15	20	25	30

(*) Indicates the anti-freeze position where the valve only opens when the room temperature drops below 7°C. It is recommended during long absence or when wanting to ventilate the room.

WARNING

It is a good rule to **remove the RBM thermostatic head from the valve during the summer, when the heating system is inactive**, to protect the RBM thermostatic head's good operation.

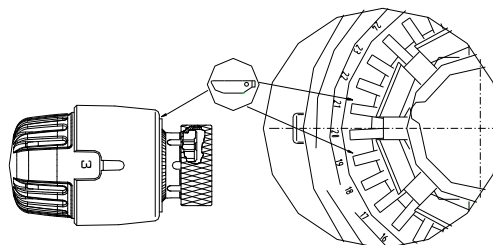
TEMPERATURE LIMIT

We recommend blocking the knob at the temperature or limit its field of intervention, once temperature is adjusted. Example of handwheel blocking on position: **3 (20°C)**.

- Highlight no. 3 in the symbols' display window;
- The knob is set-up with numbers referring to the temperature adjusted by the thermostatic head;
- Search for no. 20 (corresponding to 20°C);
- Introduce the relative inserts in the compartments near no. 20;
- The knob will remain blocked on the position of symbol 3.

Move the inserts to wanted positions, if wanting to limit adjustment to a higher value.

To block or limit movement, use the inserts with code 209.00.00 available as accessory.



ACTUATOR FOR VALVE WITH THERMOSTATIC OPTION

An actuator for electrothermally controlled valves can be used if wanting to control the **4-ways valve with thermostatic option's** opening and closing (code 306.00.x2). The actuator is applied on the valve by means of the present threaded ring nut.

There are two types of electrothermally controlled actuators: 2 wires (code 306.00.02 power supply 230V AC, 306.00.12 power supply 24V AC) and with 4 wires (code 306.00.42 power supply 230V AC, 306.00.52 power supply 24V AC) with auxiliary microswitch.

The actuator brings the normally closed valve to pressure, when without voltage.

The actuator can be connected to a room temperature control device like a timed thermostat or room thermostat, adjusting its opening and closing. Refer to the wiring diagrams of the chosen control and command devices' technical sheets, for the electric connection between actuator and valve.

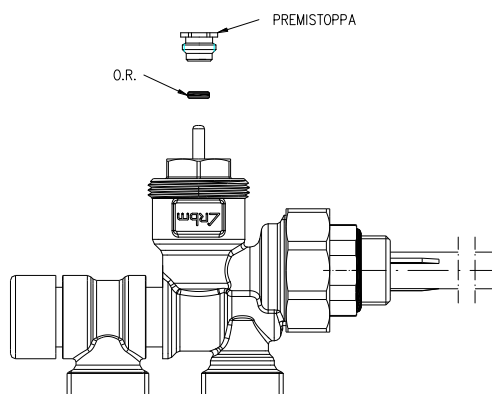


MAINTENANCE INTERVENTIONS

Maintenance interventions can be carried out on the 4-ways valve with thermostatic option. In fact, the valve's OR can be replaced with system running.

Follow the indications below:

- Loosen the valve's handwheel anti-clockwise. Remove the handwheel, uncover the stuffing box housing an OR gasket to be replaced.
- Loosen the stuffing box using CH 10 wrench and replace the OR with the RBM OR (code 5001.045). Appropriately dispose of the replaced OR.
- Using the specific wrench, tighten the stuffing box in its seat and then the valve's handwheel.



COMBINED FITTINGS

POLYETHYLENE PIPING

Type of fitting	Number of Threaded connections	Type of threaded connection	Code
FITTING A TIGHTEN	1	Standard RBM Nut	71.12...20.X0 122.12...20.0

MULTILAYER POLYETHYLENE PIPING














Type of fitting	Number of Threaded connections	Type of threaded connection	Code
FITTING A TIGHTEN	1	Standard RBM Nut	70.10...20.X0 1216.14...16.00
Type of fitting	Number of Threaded connections	Press fittings	Code
FITTING A PRESS	1 Standard RBM	1	826.14...20.X0

COPPER PIPING

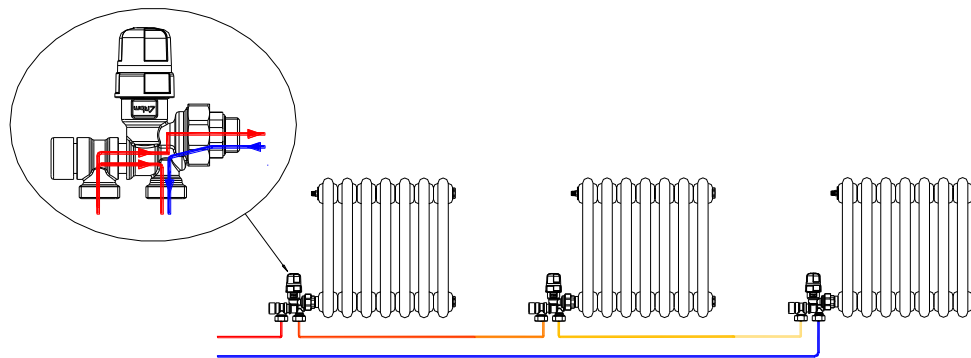
Type of fitting	Number of Threaded connections	Type of threaded connection	Code
FITTING A TIGHTEN	1	Standard RBM Nut	602.10...16.00 41.10...16.20 41.18.20* (Ø18 pipe only)

* Provide a reduction, code **57.18.00**, for fitting connection for copper pipe Ø18

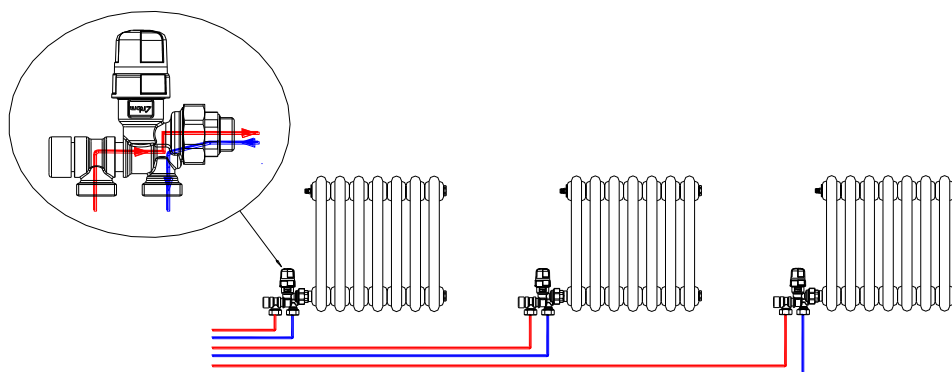
ACCESSORIES

PRODUCT	DESCRIPTION	CODE	PRODUCT	DESCRIPTION	CODE
	Vandal proof and anti-tampering knob (one pack of knobs includes a tool for assembly code 2273.005)	2274.005		2 wire NC actuator Voltage: 230 Vac	306.00.02
				2 wire NC actuator Voltage: 24 Vac	306.00.12
	Specific tool for assembling the vandal proof knob (tool supplied with No. 12 fixing screws)	2273.005		4 wire NC actuator Voltage: 230 Vac	306.00.42
				4 wire NC actuator Voltage: 24 Vac	306.00.52
	Vandal proof collar	316.00.10		Chrome plated-thermostatic head with weekly program	2501.00.22
	Specific tool for assembling the vandal proof collar	2151.005		Programming device	2962.00.02
	Pair of temperature limitation inserts for RBM thermostatic head	209.00.00		Thermostatic head with remote control. It makes programming easier in any installation situation.	2835.00.02
	Cap adjusting wrench	2878.00.00			

APPLICATIONS



Typical connection diagram of the 4-way valves with thermostatic option – Single pipe system



Typical connection diagram of the 4-way valves with thermostatic option – Dual pipe system

SPECIFICATION ITEMS

SERIES 3101

4-way valve with thermostatic option with variable centre distance and pre-adjustment, for single pipe and dual pipe systems. Nickel-plated brass body. Built-in micrometric lockshield valve. Seals in EPDM PEROX and NBR. Shockproof ABS handwheel and cap. Polymer probe. Line connections, variable centre distance 35÷40 mm threaded M standard RBM for copper, polyethylene and multilayer pipe fittings. Connection to the radiator threaded M UNI-EN-ISO 228. Max temperature 110 °C. Max operating pressure 10 bar. Probe length 110 mm Probe outside diameter 11 mm. Available sizes 1/2" - 3/4" - 1"

SERIES 590 - 720 - 2633

Thermostatic command for thermostatically-controlled radiator valve. Internal sensitive element with liquid expansion. Prearranged for temperature limitation and anti-tampering blockage. Max ambient temperature 50°C Anti-freeze triggering (*) 7°C. Setting field (1÷5) 10...30°C. Hysteresis 0.3°C. Max differential pressure (head mounted on valve) 1 Bar. Thermostatic ethyl-acetate bulb liquid.



RBM spa reserves the right to improve and change the described products and related technical data at any moment and without prior notice: always refer to the instructions attached with the supplied components; this sheet is an aid, should the instructions be extremely schematic. Our technical department is always at your disposal for any doubt, problem or clarification.



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