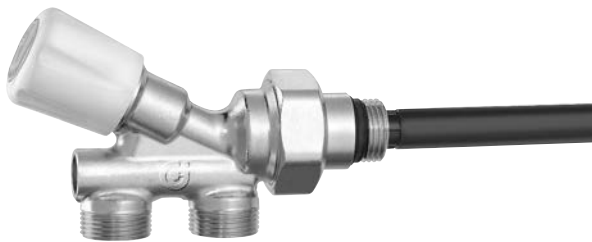


Convertible radiator valve for one-pipe systems, centre distance 35 mm



456 series



Function

456 series convertible radiator valves are used on one-pipe radiator systems. The valves are fitted for coupling with thermo-electric actuators or thermostatic control heads for automatic ambient temperature adjustment. They can be installed on the radiator only in the bottom connection, which is used for the medium inlet and outlet.

Reference documentation

- Tech. broch. 01009 Convertible radiator valves. Thermostatic control heads
- Tech. broch. 01042 Thermo-electric actuator
- Tech. broch. 01263 Electronic thermal control system for radiators
- Tech. broch. 01118 Radio wave temperature control systems

Product range

Valve

456 series Convertible radiator valve for one-pipe systems, centre distance 35 mm _____ size 1/2" and 3/4"

Thermostatic, thermo-electric and electronic control heads

200 series Thermostatic control head with built-in sensor with liquid-filled element _____ adjustment scale *–5 corresponding to 7–28°C

201 series Thermostatic control head with remote sensor with liquid-filled element _____ adjustment scale *–5 corresponding to 7–28°C

202 series Thermostatic control head with built-in sensor with liquid-filled element with LCD type room temperature indicator _____ adjustment scale *–5 corresponding to 7–28°C

Code 204000 CNT Thermostatic control head with built-in sensor with liquid-filled element _____ adjustment scale *–5 corresponding to 7–28°C

Code 204100 Thermostatic control head with remote sensor with liquid-filled element _____ adjustment scale *–5 corresponding to 7–28°C

472 series Thermostatic control head with remote adjustment knob, liquid-filled element _____ temperature range 6–28°C

209 series Tamper-proof antitheft cap for use in public places

6561 series Thermo-electric actuator _____ electric supply 230 V (ac) or 24 V (ac/dc)

741 series Electronic actuator with radio receiver - 868 MHz _____ electric supply with LR14 batteries

Code 210510 Radio wave electronic control head. For thermostatic and convertible radiator valves

Code 210500 Stand alone chrono-thermostatic control head with backlit display. For thermostatic and convertible radiator valves

Technical specifications

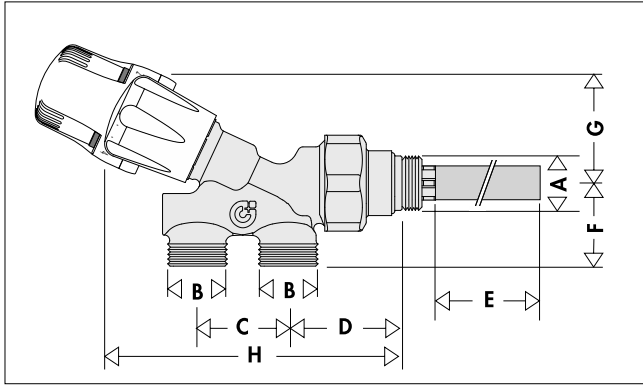
Materials

| | |
|---------------------------|---------------------------------------|
| Body: | brass EN 12165 CW617N, chrome plated |
| Headwork: | brass EN 12164 CW614N |
| Obturator control stem: | stainless steel EN 10088-3 (AISI 303) |
| Spring: | stainless steel EN 10270-3 (AISI 302) |
| Lockshield valve: | brass EN 12164 CW614N |
| Seals: | EPDM |
| Control knob: | ABS (RAL 9010) |
| Probe holder (deflector): | POM |
| Probe: | PP |

Performance

| | |
|---|--|
| Medium: | water, glycol solutions |
| Max. percentage of glycol: | 30% |
| Max. working pressure: | 10 bar |
| Working temperature range: | 5–100°C |
| Max differential pressure (with thermostatic control head): | 1 bar |
| Flow rates to the radiator: | |
| - with manual control knob: | 27% |
| - with thermostatic control head (proportional band 2K): | 20% |
| Threaded connections: | - to radiator: 1/2", 3/4" - to pipe: 23 p.1,5 |
| Centre distance: | 35 mm |
| Probe length: | 330 mm |
| Probe inner diameter: | 11 mm |

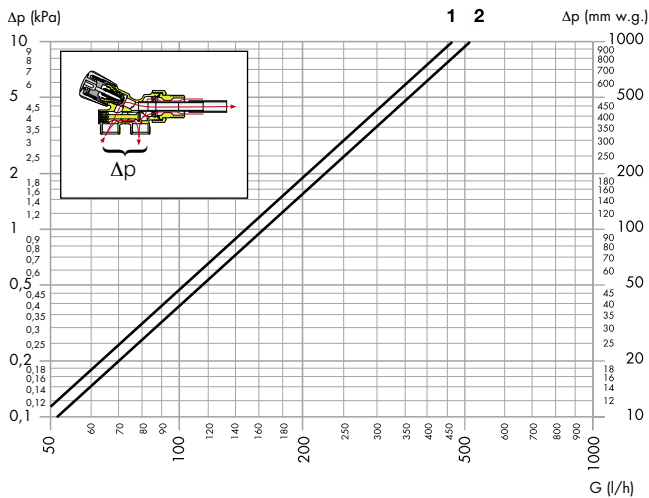
Dimensions



| Code | A | B | C | D | E | F | G | H | Mass (kg) |
|--------|------|----------|----|----|-----|----|----|-----|-----------|
| 456400 | 1/2" | 23 p.1,5 | 35 | 40 | 330 | 32 | 42 | 111 | 0,35 |
| 456500 | 3/4" | 23 p.1,5 | 35 | 34 | 330 | 32 | 42 | 105 | 0,36 |

Hydraulic characteristics

Overall hydraulic characteristics of the valve with lockshield valve built into in the horizontal sleeve in "fully open" position. Head losses measured at the pipe connections.



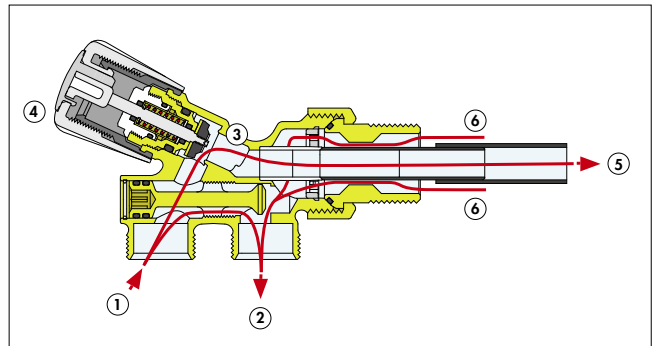
| | | |
|---------|--|---------------------|
| Curve 1 | Thermostatic control head instead of the control knob, proportional band 2K, 20% of flow rate to radiator, 80% in by-pass. | $K_v (m^3/h) = 1,5$ |
| Curve 2 | Knob fully open, 27% of flow rate to radiator, 73% in by-pass. | $K_v (m^3/h) = 1,6$ |

Operating principle

The following figure shows the path of the medium: the water enters through the outer connection (furthest from radiator) (1) and separates into two parts. One part is by-passed and sent to the next radiator, through the inner connection (nearest to radiator) (2). The other part enters the radiator passing through the obturator (3), controlled by the knob (4) and probe (5).

After the heat exchange, the medium exits the radiator through the apertures outside the probe (6) and, mixing with the by-passed flow rate, reaches the radiator downstream. In manual operation, the valve sends 27% of the flow rate to the radiator, whereas the rest of the medium is by-passed and sent to the next radiator. In this way the radiators can be shut off individually (for exclusion or maintenance), in any case allowing the operation of the radiators installed further downstream. With thermostatic control head fitted, only the 20% of the flow rate goes to the radiator (proportional band 2K), due to the increase in head losses caused by the continuous flow rate modulation.

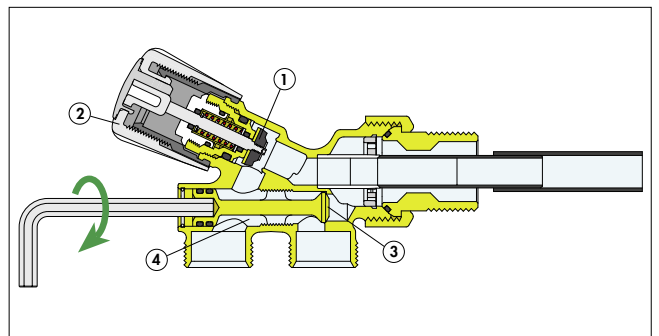
The connection to the pipes does not have a compulsory inlet and outlet direction, therefore the valve can be used with directions of flow opposite to those shown in the figure, to adapt it to any installation requirement.



Radiator shut-off

The radiator can be excluded for temporary maintenance by completely closing the obturator (1) by means of the manual knob (2), and by closing the lockshield (3) with a 6 mm Allen key. In this configuration, the rest of the circuit remains active thanks to the medium flow through the by-pass (4).

NOTE: The radiator can be shut off only in the context of temporary works and with constant supervision.



Construction details

Installation versatility

The 456 series valve can be installed in both new and old systems. The tilted control knob reduces the overall dimensions of the valve, enabling it to be used in confined spaces. The 456 valve is suitable for building renovations or refurbishment of old heating systems. The system can be constructed by chasing the pipes exclusively in the floor slab or by using the skirting boards to conceal external pipes, without having to cut chases in the walls.

Sizing method

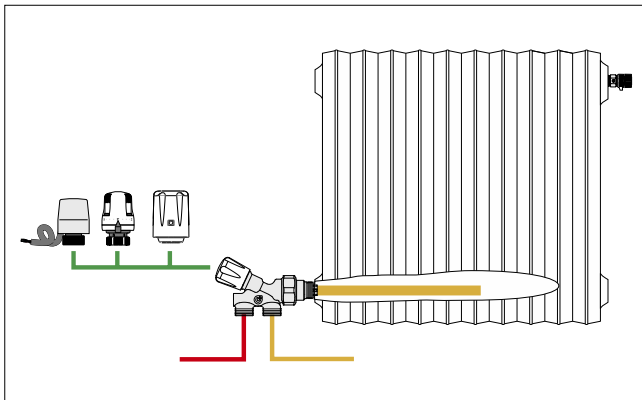
For correct system sizing, the 456 valves series are selected by identifying the total head loss in accordance with the flow rate, using the hydraulic characteristics diagrams in the left hand column of the previous page. The total head losses of the valve, combined with the thermostatic control head, were calculated with 2K proportional band (standard EN 215).

Conversion into thermostatic valve

456 series valves can be converted into thermostatic valves by fitting a control head of the 199, 200, 201, 202, and 210 series in place of the manual knob. The thermostatic control head can be used with the pipe connections either facing the wall or pointing to the floor. The sensor built into the control head is far enough from the valve body and is able to perform a correct ambient temperature reading, without being influenced by the heat radiated by the valve body itself.

Probe sizing

After having checked with the manufacturer whether the radiator is suitable for installation in a one-pipe system, the correct operation of the valve is guaranteed by the structure of the body and by the body-probe connection.



Installation

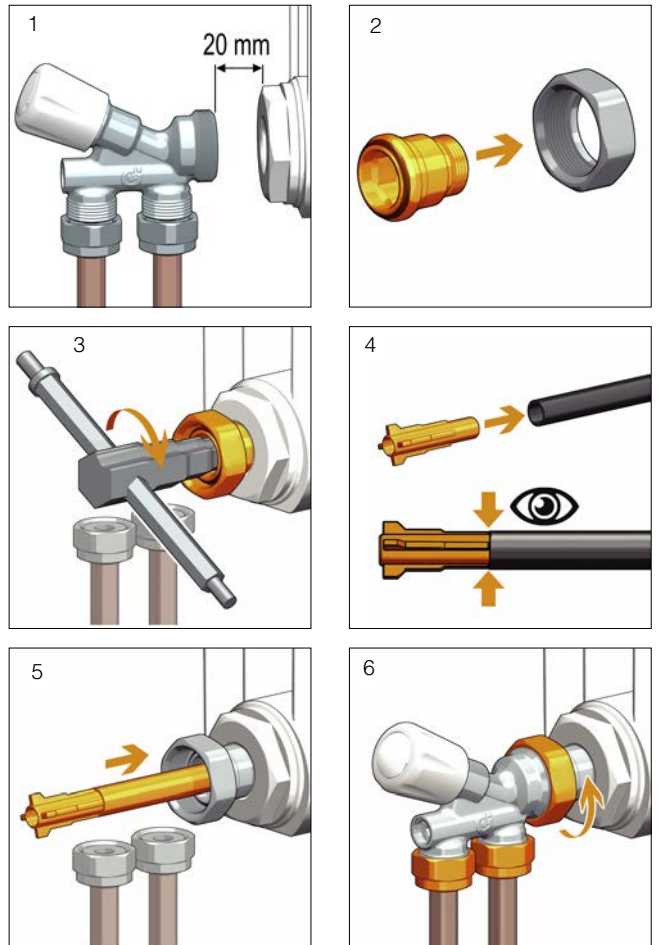
The valve can be fitted with connections facing the wall or downwards, but always with the probe horizontal.



The connection to the pipes does not have a compulsory inlet or outlet direction. To exclude the heating unit, it is necessary to close the knob and, with a 6 mm Allen key, the lockshield valve.

The installation procedure is as follows:

- Fig. 1** Install the valve on the medium flow and return pipes, respecting the value shown in the figure. The valve is reversible; there is no preferential direction of flow of the heating medium.
- Fig. 2** Insert the nut on the tailpiece.
- Fig. 3** Unscrew the valve. Screw the tailpiece with nut onto the radiator, using the multi-purpose wrench code 387127.
- Fig. 4** Insert the probe into the sleeve. Make sure the probe fits properly in place. In case of small heating units, the probe can be cut as required.
- Fig. 5** Insert the probe+sleeve into the radiator.
- Fig. 6** Refit the valve and screw the nut onto the valve.





200 tech. broch. 01034

Thermostatic control head for convertible radiator valves and thermostatic valves, built-in sensor with liquid-filled element.
For 338, 339, 401, 402, 425, 426, 421, 422, 455, 456, 220, 221, 222, 223, 224, 225, 226, and 227 series valves.
Graduated scale for adjustment from * to 5, corresponding to a temperature range of 7°C to 28°C.
With adapter.

Code

200000

201000 with remote sensor - length of capillary pipe: 2 m



472

Thermostatic control head with remote adjustment knob and liquid-filled sensor.
For 338, 339, 401, 402, 425, 426, 421, 422, 455, and 456 series valves (coupled using an adapter).
For 220, 221, 222, 223, 224, 225, 226, and 227 series valves (direct coupling).
Temperature range: 6–28°C.
Length of capillary pipe: 2 metres.

Code

472000



202 tech. broch. 01009

Thermostatic control head for convertible radiator valves and thermostatic valves, built-in sensor with liquid-filled element.
With LCD digital ambient temperature display.
For 338, 339, 401, 402, 425, 426, 421, 422, 455, 456, 220, 221, 222, 223, 224, 225, 226, and 227 series valves.
Graduated adjustment scale from * to 5, corresponding to a temperature range of 7°C to 28°C.
Ambient temperature indicator from 16°C to 26°C.
With adapter.
PATENTED.



Ambient temperature indicator

The ambient temperature indicator is of the digital LCD type. The display digits are green in correspondence with the actual measured temperature. A particular pivoting system keeps the indicator always vertical thus allowing its optimal visualization.

Visible in sufficient light levels

Code

202000



6561 tech. broch. 01042

Thermo-electric actuator.
For 338, 339, 401, 402, 425, 426, 421, 422, 455, 456, 220, 221, 222, 223, 224, 225, 226, and 227 series valves.
Normally closed.
With auxiliary microswitch.
Electric supply: 230 V (ac) or 24 V(ac)/(dc).
Auxiliary microswitch contact rating: 0,8 A (230 V).
Running power consumption: 3 W.
Starting current: ≤ 1A.
Ambient temperature range: 0–50°C.
Protection class: IP 44 (in vertical position).
Electric supply cable: 80 cm.



Code

Voltage
V

| | | |
|---------------|-----|-------------------------------|
| 656112 | 230 | |
| 656114 | 24 | |
| 656102 | 230 | without auxiliary microswitch |
| 656104 | 24 | without auxiliary microswitch |

204 tech. broch. 01242

Thermostatic control head for convertible radiator valves and thermostatic valves, built-in sensor with liquid-filled element.
For 338, 339, 401, 402, 425, 426, 421, 422, 455, 456, 220, 221, 222, 223, 224, 225, 226, and 227 series valves.
Graduated adjustment scale from * to 5, corresponding to a temperature range of 7°C to 28°C.
With adapter.



Code

204000

204100 with remote sensor - length of capillary pipe: 2 m



741 tech. broch. 01118

Electronic actuator with radio receiver - 868 MHz.
For convertible radiator valves or thermostatic valves.
Compatible with 740 series chrono-thermostats and thermostat.
Electric supply: 2 x 1,5 V LR14 batteries.
Protection class: IP 30.



Code

741000



210 WiCal®

tech. broch. 01263

Stand alone chrono-thermostatic control head with backlit display. For thermostatic and convertible radiator valves.
Touch button operation, built-in temperature sensor.
Programmable directly, with displaying of temperatures and comfort-set back cycles.
Battery electric supply: 2 x 1,5 V AA (in package).
Quick-coupling installation with adaptor.
Protection class: IP 30.

Code

210500



210 WiCal®

tech. broch. 01263

Electronic **radio wave** control head. For thermostatic and convertible radiator valves.
Touch button operation, built-in temperature sensor.
Compatible with multi-zone thermal controller code 210100.
Radio communication RF 868 MHz - EnOcean® standard.
Battery electric supply: 2 x 1,5 V AA (in package).
Quick-coupling installation with adaptor.
Protection class: IP 30.



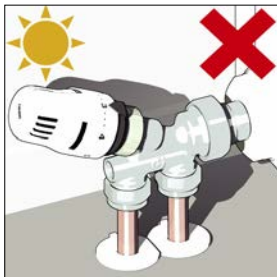
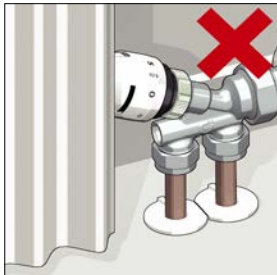
Code

210510

Compatible with thermostatic or thermo-electric control heads

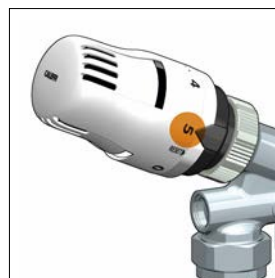
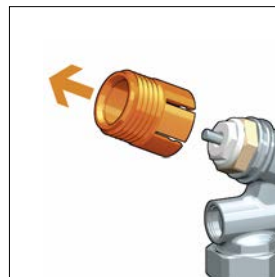
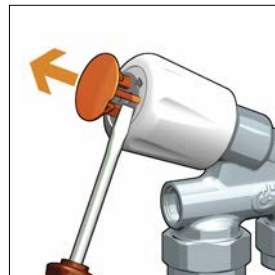
456 series valves can be used in combination with a 204, 200, 202, 210, 472, 6561 or 741 series control head, to be installed in place of the manual knob.

Thermostatic and thermo-electric control heads must be installed in a horizontal position. The sensitive element of the thermostatic control heads must never be installed in niches, radiator cabinets, behind curtains or exposed to direct sunlight, otherwise it may produce false readings.



Conversion into thermostatic valve

The thermostatic control head can be used with the pipe connections either facing the wall or pointing to the floor. The sensor built into the control head is far enough from the valve body and is able to perform a correct ambient temperature reading, without being influenced by the heat radiated by the valve body itself.



SPECIFICATION SUMMARY

456 series

Convertible radiator valve for one-pipe systems fitted for thermostatic, thermo-electric and electronic control heads. For copper, simple plastic and multi-layer plastic pipes. Pipe connection 23 p.1,5. Centre distance 35 mm. Radiator connection 1/2", 3/4". Chrome plated brass body. ABS control knob (RAL 9010). POM probe holder (deflector). EPDM seals. 330 mm PP probe. Brass lockshield valve. Working temperature range 5–100°C. Maximum working pressure 10 bar. Max differential pressure (with thermostatic control head) 1 bar. Flow rate to the radiator with manual knob 27%, with thermostatic control head 20%.

200 series

Thermostatic control head for convertible radiator valves and thermostatic valves. Built-in sensor with liquid-filled sensitive element. Maximum ambient temperature 50°C. Graduated scale from * to 5, corresponding to a temperature range of 7 to 28°C, with locking and temperature limiting features. Frost protection cut-in 7°C. With adapter.

201 series

Thermostatic control head for convertible radiator valves and thermostatic valves. Remote sensor with liquid-filled element. Length of capillary pipe 2 m. Maximum ambient temperature 50°C. Graduated scale from * to 5, corresponding to a temperature range of 7 to 28°C, with the possibility of locking and limiting the temperature. Frost protection cut-in 7°C. With adapter.

202 series

Thermostatic control head with digital LCD room temperature indicator. Maximum ambient temperature 50°C. Graduated scale from * to 5, corresponding to a temperature range of 7 to 28°C, with the possibility of locking and limiting the temperature. Frost protection cut-in 7°C. Room temperature display range from 16°C to 26°C. With adapter.

Code 204000

Thermostatic control head for convertible radiator valves and thermostatic valves. Built-in sensor with liquid-filled element. Maximum ambient temperature 50°C. Graduated scale from * to 5, corresponding to a temperature range of 7 to 28°C, with the possibility of locking and limiting the temperature. Frost protection cut-in 7°C. With adapter.

Code 204100

Thermostatic control head for convertible radiator valves and thermostatic valves. Remote sensor with liquid-filled element. Length of capillary pipe 2 m. Maximum ambient temperature 50°C. Graduated scale from * to 5, corresponding to a temperature range of 7 to 28°C, with the possibility of locking and limiting the temperature. Frost protection cut-in 7°C. With adapter.

472 series

Thermostatic control head with remote adjustment knob and liquid-filled sensor for convertible radiator valves and thermostatic valves. Temperature range 6–28°C. Capillary pipe length 2 metres.

6561 series

Thermo-electric actuator. Normally closed. Electric supply 230 V (ac); 24 V (ac); 24 V (dc). Starting current 1 A. Running current 13 mA (230 V (ac)); 140 mA (24 V (ac) - 24 V (dc)). Running power consumption 3 W. Protection class IP 44 (in vertical position). Ambient temperature range 0–50°C. Operating time from 120 to 180 seconds. Length of supply cable 80 cm.

Code 741000

Electronic actuator with radio receiver. Electric supply: 2 x 1,5 V LR14 alkaline batteries. Maximum power consumption 9 mA. Battery life 1 year. Reception frequency 868 MHz. Protection class IP 30. Insulation class III. Signal transmission range in free air 120 m.

Code 210510

Radio wave electronic control head for thermostatic or convertible radiator valves. Compatible with multi-zone thermal controller code 210100. Radio communication RF 868 MHz - EnOcean® standard. White RAL 9010. Touch button operation, built-in temperature sensor. Electric supply by two AA/LR6/1,5 V alkaline/lithium batteries; average battery life 2 years. Radiator valve connection with M30x1,5 threading, actuator stroke up to 4 mm. Protection class IP 30, ambient conditions (valve + control), thermal medium temperature range 5–75°C, working temperature 0–50°C, storage temperature -20–70°C. Relative humidity 10–90%, non condensing.

Code 210500

Stand alone chrono-thermostatic control head with backlit display. White RAL 9010. Touch button operation, built-in temperature sensor. Electric supply by two AA/LR6/1,5 V alkaline/lithium batteries; average battery life 2 years. Radiator valve connection with M30 x 1,5 threading, actuator stroke up to 4 mm, constantly enabled anti-freeze function with non user-editable 8°C fixed value, anti-seizing function, automatic window opening detection. Protection class IP 30, ambient conditions (valve + control), thermal medium temperature range 5–75°C, working temperature 0–50°C, storage temperature -20–70°C. Relative humidity 10–90%, non condensing.

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