Thermostatic radiator valves

220 series





Function

Thermostatic radiator valves are typically used for regulating the medium flow to the radiators of heating systems. When combined to a thermostatic or thermo-electric control head, they keep the ambient temperature of the room where they are installed constant at the set value. This prevents unwanted temperature rises and achieves considerable energy savings.

These valves have a special tailpiece with rubber hydraulic seal, permitting quick, safe connection to the radiator without the use of additional sealing materials.

Product range

VALVES:

For steel pipes: sizes 3/8", 1/2", 3/4" (*) sizes 3/8", 1/2", 3/4" (*) sizes 3/8", 1/2" 220 series Angled thermostatic radiator valve for steel pipe Straight thermostatic radiator valve for steel pipe 221 series 224 series Reverse thermostatic radiator valve for steel pipe sizes 3/8" and 1/2" RH version, 3/8" and 1/2" LH version sizes 3/8" and 1/2" RH version, 3/8" and 1/2" LH version 225 series Double-angled thermostatic radiator valve for steel pipe 225 series Double-angled lockshield valve for steel pipe For plastic and copper pipes: 222 series Angled thermostatic radiator valve for copper pipe sizes 3/8", 1/2" radiator x 23 p.1,5 piping sizes 3/8", 1/2" radiator x 23 p.1,5 piping sizes 1/2" radiator x 23 p.1,5 piping RH and LH version Straight thermostatic radiator valve for copper pipe 223 series 226 series Double angled thermostatic radiator valve for copper pipe sizes 1/2" radiator x 23 p.1,5 piping RH and LH version sizes /2" radiator x 23 p.1,5 piping 226 series Radiator lockshield valve for copper pipe 227 series Reverse thermostatic radiator valve for copper pipe THERMOSTATIC CONTROL HEADS 200 series Thermostatic control head with built-in sensor with liquid-filled element adjustment scale #-5 corresponding to 7-28°C 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 LCD type room temperture indicator 203 series Thermostatic control head with contact probe for fluid temperature limitation adjustment scale 20-50°C, 40-90°C Code 204000 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 Code 209000 Tamper-proof anti-theft cap for use in public places

Code 209000 Tamper-proof anti-theft cap Code 209001 Special allen key for tamper-proof anti-theft cap

* 3/4" with tailpiece without rubber seals

Technical specification of valve bodies

Material

Body: Obturator stem:		nrome plated tainless steel -3 (AISI 303)
Hydraulic seals: Control knob and cap:		EPDM 6 (RAL 9010)
Performance		
Medium:	water, gly	col solutions
Max. percentage of glyc	col:	30%
Max. differential pressur	e with control head fitted:	1 bar
Max. working pressure:		10 bar
Working temperature rar	nge of thermal medium:	5–100°C

Control adjustment scale, 200/201/202/204 series

0	*	1	2.	••3•	••4	5
5°C	7°C	12°C	16°C	20°C	24°C	28°C

Technical specification of control heads 200/201/202/204 series

Adjustment scale:	≉–5
Temperature adjustment range:	7–28°C
Frost protection cut-in:	7°C
Max. ambient temperature:	50°C
Length of capillary, 201 series and code 204100:	2 m
LCD type ambient temperture indicator 202 series:	16–26°C

Technical specification of control heads 203 series

Adjustment temperature range:	- code 203502	20–50°C
	- code 203702	40–90°C
Max. sensor temperature:		100°C
Max. pocket pressure:		10 bar
Length of capillary:		2 m



Dimensions

ò

Code

200001

Α

30 p.1,5

201000 30 p.1,5

203502 30 p.1,5

203702 30 p.1,5

С

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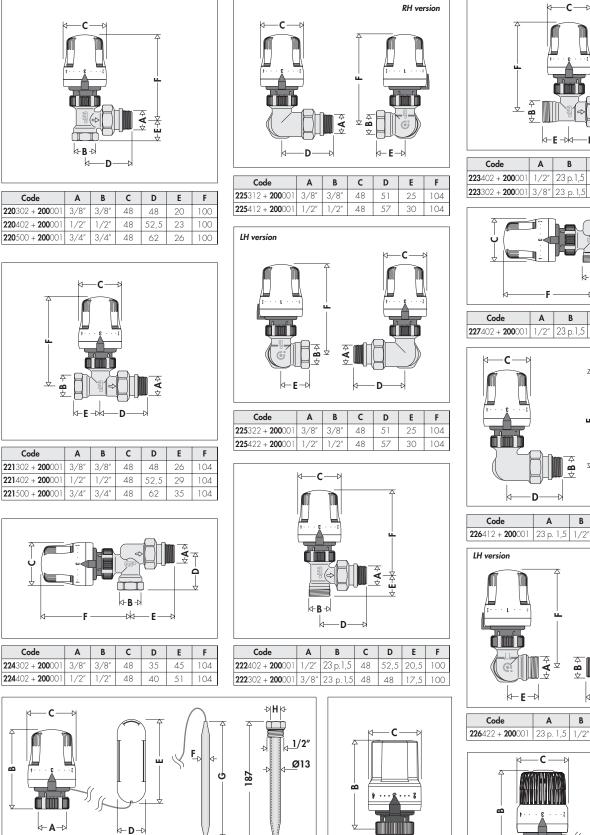
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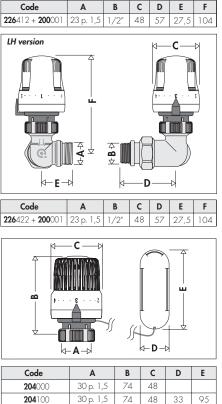
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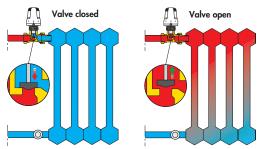
E F

RH version

104

Operating principle of thermostatic control head

The thermostatic valve control head is a proportional temperature regulator, consisting of bellows containing liquid. When the ambient temperature increases, this causes an expansion in volume in the bellows, which, in turn, dilate. When the temperature falls, the reverse takes place: the bellows contract due to the effect of the thrust generated by the return spring. The axial movement of the sensitive element is trasmitted to the valve obturator through the connecting spindle, thus regulating the flow of liquid to the heat emitter.



Construction details

Valve

The control stem is stainless steel with EPDM O-Ring double seal. This means that the upper part of the control device can be replaced even when the system is in operation. The obturator is shaped in such a way as to optimise the fluid-dynamic characteristics of the valve during the progressive opening and closing actions in thermostatic operation. The large passage between seat obturator and causes reduced pressure drops in manual use

Tailpiece with rubber seal

The coupling union to the radiator connection thread has a specially shaped rubber ring. This system guarantees the hydraulic seal with no need for further sealing materials, such as PTFE tapes etc.

Thermostatic control head with temperature indicator, 202 series

Room temperature indicator

The room temperature indicator, mounted on the front of the thermostatic control, is of the LCD type. It highlights the actual room temperature reading in green, to enable precise regulation of the temperature to the desired value.



lighting

Pivoting system

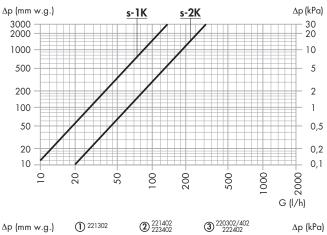
A particular pivoting system keeps the indicator always vertical thus allowing its optimal visualization.

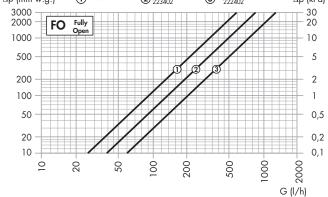


Hydraulic charateristics

Details are given in accordance with the specification in standard EN 215.

Thermostatic valves with angled connections 220 series, with straight connections 221 series for steel pipe (3/8" and 1/2") and thermostatic valves with angled connections 222 series and with straight connections 223 series for copper pipe (*); with thermostatic control head 200, 201 or 204 series





Valves with angled connections

Code	Size	Kv (m³/h) Proportional band (K)				
		1	1,5	2	3	Kvs
220 302	3/8″	0,32	0,49	0,57	0,85	2,29
220 402/ 222 402	1/2″	0,32	0,49	0,57	0,85	2,39

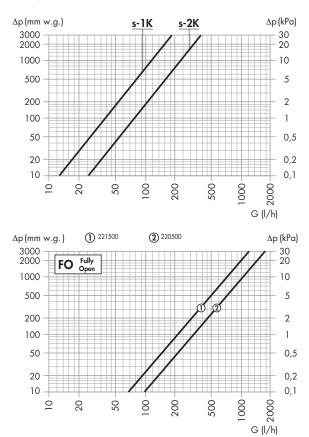
Code	Size	Nominal flow rate (l/h)	Obturator autority	Max. diff. press. (bar)
220 302	3/8″	180	0,92	0,1
220 402/ 222 402	1/2″	180 (170*)	0,92	0,1
		×	With control	head 201 series

Valves with straight connections

Code	Size	Kv (m³/h) Proportional band (K)				
		1	1,5	2	3	Kvs
221 302	3/8″	0,32	0,49	0,57	0,85	1,09
221 402/ 223 402	1/2″	0,32	0,49	0,57	0,85	1,52

Code	Size	Nominal flow rate (l/h)	Obturator autority	Max. diff. press. (bar)
221 302	3/8″	180	0,60	0,1
221 402/ 223 402	1/2″	180/200	0,60	0,1

Kv = Flow rate in m^3/h producing a pressure drop of 1 bar **Kvs** = Kv with valve fully open Thermostatic valves with angled connections 220 series, with straight connections 221 series for steel pipe (3/4") (*); with thermostatic control head 200, 201 or 204 series.



Valves with angled connections

Code	Size	Kv (m³/h) Proportional band (K)					
		1	1,5	2	3	Kvs	
220 500	3/4″	0,40	0,63	0,76	1,00	3,19	

Code	Size	Nominal flow rate (l/h)	Obturator autority	Max. diff. press. (bar)
220 500	3/4″	240	0,93	0,1

Valves with straight connections

Code	Size	Kv (m³/h) Proportional band (K)				
		1	1,5	2	3	Kvs
221 500	3/4″	0,40	0,63	0,76	1,00	2,20

Code	Size	Nominal flow rate (l/h)	Obturator autority	Max. diff. press. (bar)
221 500	3/4″	240	0,86	0,1

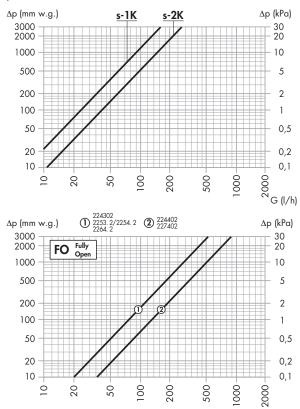
(*) Certification

Caleffi valves 220, 221 series sizes 3/8", 1/2", 3/4"; 222, 223, 224 and 225 series sizes 3/8", 1/2"; 226 and 227 series size 1/2", in combination with control heads 200, 201 and 204 series, are approved to standard EN 215. 202 and 203 series control heads are not approved according to EN 215 standard.

Code	Hysteresis [C]	Influence of differential pressure [D]	Influence of water temperature [W]	Response time minutes [Z]
200 000	0,4 K	0,5 K	1 K	18 minutes
201 000	0,4 K	0,5 K	0,5 K	18 minutes
204 000	0,4 K	0,5 K	1 K	23 minutes
204 100	0,4 K	0,5 K	0,5 K	18 minutes

Additional information available on request.

Thermostatic valves with reverse connections for steel pipe 224 series and for plastic and copper pipe 227 series (*); thermostatic valves with double angled connections for steel pipe 225 series and for copper pipe 226 series with thermostatic control head 200, 201 or 204 series.



Valves with reverse connections

Code	Size	Kv (m³/h) Proportional band (K)				
		1	1,5	2	3	Kvs
224 302	3/8″	0,36	0,49	0,57	0,77	0,93
224 402	1/2″	0,36	0,49	0,57	0,77	1,39
227 402	1/2″	0,36	0,49	0,57	0,77	1,39

Code	Size	Nominal flow rate (l/h)	Obturator autority	Max diff. press. (bar)
224 302	3/8″	180	0,65	0,1
224 402	1/2″	180	0,93	0,1
227 402	1/2″	180	0,93	0,1

Valves with double angled connections

Code	Size	Kv (m³/h) Proportional band (K)				
		1	1,5	2	3	Kvs
225 3.2	3/8″	0,36	0,49	0,57	0,77	0,96
225 4.2	1/2″	0,36	0,49	0,57	0,77	1,40
226 4.2	1/2″	0,36	0,49	0,57	0,77	1,40

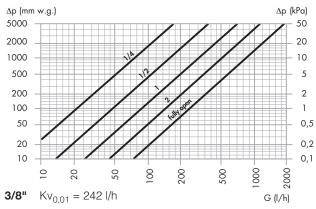
Code	Size	Nominal flow rate (l/h)	Obturator autority	Max diff. press. (bar)
225 3.2	3/8″	180	0,60	0,1
225 4.2	1/2″	180	0,80	0,1
226 4.2	1/2″	180	0,80	0,1

System sizing

For correct system sizing, the valves are normally selected by identifying the pressure drop in accordance with the flow on diagrams s-2K as above (regulation with proportional band of 2K).

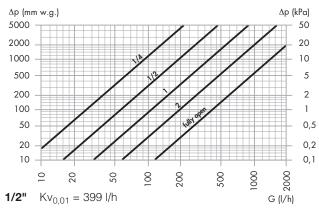
Lockshield valve

with angled connections 3/8", 342 and 431 series



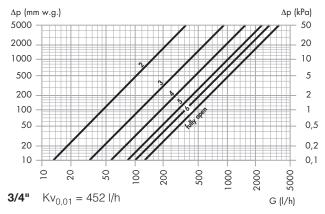
Lockshield valve

with angled connections 1/2", 342 and 431 series

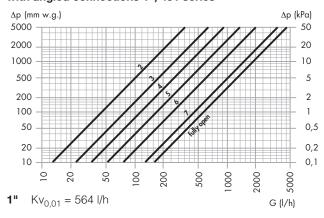


Lockshield valve

with angled connections 3/4", 431 series

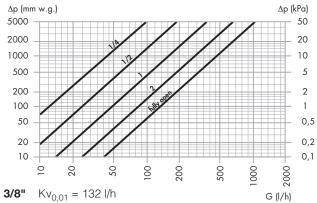


Lockshield valve with angled connections 1", 431 series



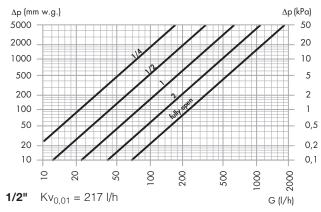
Lockshield valve

with straight connections 3/8", 343 and 432 series

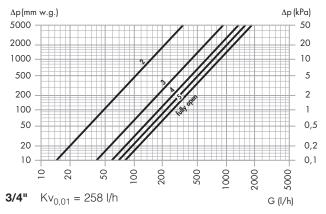


Lockshield valve

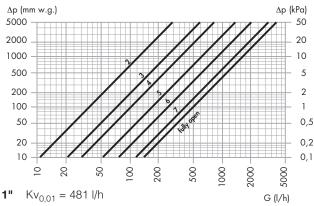
with straight connections 1/2", 343 and 432 series



Lockshield valve with straight connections 3/4", 432 series

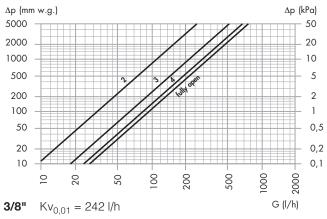


Lockshield valve with straight connections 1", 432 serie



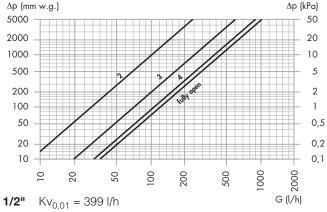
Lockshield valve

with double angled connections 3/8", 225 series



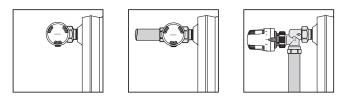
Lockshield valve

with double angled connections 1/2", 225 and 226 series



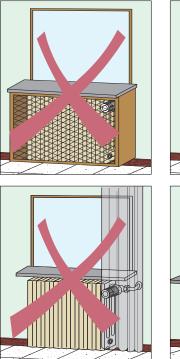
Installation

Thermostatic control heads should be installed in horizontal position, by respecting the flow direction as indicated by the arrow on the valve body.



- Warnings: in case of uncorrect installation of the valve complete with thermostatic control head, two possible problems can arise in the system:
- Presence of vibrations similar to hammering is caused by the medium flowing through the valve in the opposite way with respect to the direction indicated by the arrow on the body. The problem can be solved by resetting the correct flow direction.
- 2) Presence of a sound or whistle during modulation phase is due to eccessive head on the valve. The problem can be solved by keeping under control the system pressure with devices such as variable speed pumps combined to pressure differential regulators or using differential by-pass valves.

The sensitive element of the thermostatic control heads must not be sited in niches, alcoves, behind curtains, directly exposed to sunlight or underneath projecting shelves which would falsify the readings. In these cases the thermostatic control head with remote sensor code 201000 or 204100 is requested.



Before fitting the thermostatic control head, turn the control knob to the number 5 position.

Control head with remote sensor

the In some situations. installation of the thermostatic control head in horizontal position could be impossible (for example in case of interference with an opening of a door). In these cases, using the thermostatic control head with remote sensor, the control head can be installed also in vertical position. This can be done because the remote sensor guarantees correct ambient temperature reading.

The remote sensor of this type of thermostatic control head must be installed at a height range between 10 cm and 1,5 m.

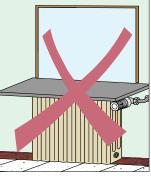
Tamper-proof and antitheft cap

The thermostat control can be protected against tampering and theft by mounting the cover (code 209000) on the knob as shown in the figure at side.

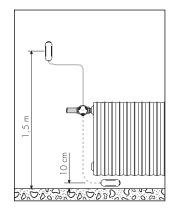
The cover is fastened with two screws with special heads that can only be tightened or loosened by means of the appropriate wrench. (code 209001).

Suitable for control heads 200, 202 series and code 204000











Locking and restricting the thermostat control temperature

Temperature restriction



1. Turn the knob to the fully open position (Pos.5). Using a screw driver, unlock the ring, pressing it fully towards the valve body.



2. Turn the knob to the new maximum open position required (e.g. Pos.3). Turn the ring anti-clockwise up to the stop.

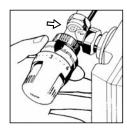


3. Re-lock the ring. The valve will now have a temperature range restriction from 0 to the set value.

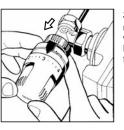
Locking the temperature



1. Turn the knob to the fully open position (Pos.5). Using a screw driver, unlock the ring, pressing it fully towards the valve body.



2. Position the valve at the required temperature and turn the ring **clockwise** up to the stop.



3. Re-lock the ring. The valve will now be locked at the set temperature.

Resetting the temperature restriction and temperature lock



1. Using a screw driver, unlock the ring, pressing it fully towards the valve body.



2. Turn the knob to the fully open position and the ring **anti-clockwise**, up to the stop. The RESET arrows will match up..



3. Re-lock the ring. The valve will now no longer have any temperature restriction or lock

SPECIFICATION SUMMARIES

220 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Angled connections for steel pipes 3/8", 1/2" and 3/4". Radiator connection 3/8" and 1/2" M with tailpiece equipped with EPDM seal, 3/4" with tailpiece without seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

221 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Straight connections for steel pipes 3/8", 1/2" and 3/4". Radiator connection 3/8" and 1/2" M with tailpiece equipped with EPDM seal, 3/4" with tailpiece without seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

222 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Angled connections for copper and single and multilayer plastic pipes 23 p1,5 M. Radiator connection 3/8" and 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

223 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Straight connections for copper and single and multilayer plastic pipes 23 p1,5 M. Radiator connection 3/8" and 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

224 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Reverse connections for steel pipes 3/8" and 1/2" F. Radiator connection 3/8" and 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

225 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Double angled connections for steel pipes 3/8" and 1/2" F. Radiator connection 3/8" and 1/2" M, right-hand or left-hand version with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

225 series

Lockshield valve. Double angled connections for steel pipes 3/8" and 1/2". Radiator connection 3/8" and 1/2" M right-hand or left-hand version with tailpiece equipped with EPDM seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Working temperature range 5–100°C. Maximum working pressure 10 bar.

226 series

Thermostatic valve for radiators fitted for thermo-electric and thermostatic control heads. Double angled connections for copper, single and multilayer plastic pipes. Radiator connection 1/2" right-hand or left-hand version with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5-100°C. Maximum working pressure 10 bar.

226 series

Lockshield valve. Double angled connections for copper, single or multilayer plastic pipes. Radiator connection 1/2" right-hand or left-hand version with tailpiece equipped with EPDM seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Working temperature range 5–100°C. Maximum working pressure 10 bar.

227 series

Thermostatic valve for radiators suitable for thermo-electric and thermostatic control heads. Reverse connections for copper and single and multilayer plastic pipes 23 p.1,5 M. Radiator connection 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. Control knob in ABS white RAL 9010. Double seal on control stem with EPDM O-Rings. Working temperature range 5–100°C. Maximum working pressure 10 bar.

342 series

Lockshield valve. Angled connections for copper, single or multilayer plastic pipes. Pipe connections 23 p.1,5 and 3/4" M. Radiator connection 3/8" or 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Outward seal consisting of EPDM O-Ring on control stem. Working temperature range 5-100°C. Maximum working pressure 10 bar.

343 series

Lockshield valve. Straight connections for copper, single or multilayer plastic pipes. Pipe connections 23 p.1,5 and 3/4" M. Radiator connection 3/8" or 1/2" M with tailpiece equipped with EPDM seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Outward seal consisting of EPDM O-Ring on control stem. Working temperature range 5–100°C. Maximum working pressure 10 bar.

431 series

Lockshield valve. Angled connections for steel pipes 3/8", 1/2", 3/4" or 1". Radiator connection 3/8" or 1/2" M with tailpiece equipped with EPDM seal, 3/4" and 1" M with tailpiece without seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Outward seal consisting of EPDM O-Ring on control stem. Working temperature range 5–100°C. Maximum working pressure 10 bar.

432 series

Lockshield valve. Straight connections for steel pipes 3/8", 1/2", 3/4" or 1". Radiator connection 3/8" or 1/2" M with tailpiece equipped with EPDM seal, 3/4" and 1" M with tailpiece without seal. Brass body. Chrome plated. White cap RAL 9010 in ABS. Outward seal consisting of EPDM O-Ring on control stem. Working temperature range 5–100°C. Maximum working pressure 10 bar.

200 series

Thermostatic control head for thermostatic and convertible radiator valves. Sensor incorporated with liquid-filled element. Maximum ambient temperature 50°C. Graduated scale from # to 5 corresponding to a temperature range from 7 to 28°C, with possibility of temperature restriction and locking. Frost protection cut-in at 7°C. TELL certification, class A.

201 series

Thermostatic control head for thermostatic and convertible radiator valves. Remote sensor incorporated with liquid-filled element. Maximum ambient temperature 50°C. Graduated scale from % to 5 corresponding to a temperature range from 7 to 28°C, with possibility of temperature restriction and locking. Frost protection cut-in at 7°C. TELL certification, class A.

202 series

Thermostatic control head for thermostatic and convertible radiator valves. Sensor incorporated with liquid-filled element, with LCD digital room temperature indicator. Maximum ambient temperature 50°C. Graduated scale from % to 5 corresponding to a temperature range from 7 to 28°C, with possibility of temperature restriction and locking. Frost protection cut-in at 7°C. Room temperature indicator range from 16 to 26°C.

203 series

Thermostatic control head with contact probe, for fluid temperature restriction. Setting temperature range 20–50°C (40–90°C). Maximum sensor temperature 100°C. Numbered scale, with possibility of temperature restriction and locking. Length of capillary 2 m.

Code 204000

Thermostatic control head for thermostatic and convertible radiator valves. Sensor incorporated with liquid-filled element. Maximum ambient temperature 50°C. Graduated scale from % to 5 corresponding to a temperature range from 7 to 28°C, with possibility of temperature restriction and locking. Frost protection cut-in at 7°C.

Code 204100

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

209 series

Tamper-proof and antitheft cap for thermostatic control head, for use in public places.

We reserve the right to make changes and improvements to the products and related data in this publication, at any time and without prior notice.



Caleffi S.p.A. S.R. 229 n. 25 · 28010 Fontaneto d'Agogna (NO) · Italy Tel. +39 0322 8491 · Fax +39 0322 863723 info@caleffi.com · www.caleffi.com © Copyright 2015 Caleffi