

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:

220 series	Angled thermostatic radiator valve for steel pipe	sizes 3/8", 1/2", 3/4" (*)
221 series	Straight thermostatic radiator valve for steel pipe	sizes 3/8", 1/2", 3/4" (*)
224 series	Reverse thermostatic radiator valve for steel pipe	sizes 3/8", 1/2"
225 series	Double-angled thermostatic radiator valve for steel pipe	sizes 3/8" and 1/2" RH version, 3/8" and 1/2" LH version
225 series	Double-angled lockshield valve for steel pipe	sizes 3/8" and 1/2" RH version, 3/8" and 1/2" LH version

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
223 series	Straight thermostatic radiator valve for copper pipe	sizes 3/8", 1/2" radiator x 23 p.1,5 piping
226 series	Double angled thermostatic radiator valve for copper pipe	sizes 1/2" radiator x 23 p.1,5 piping RH and LH version
226 series	Radiator lockshield valve for copper pipe	sizes 1/2" radiator x 23 p.1,5 piping RH and LH version
227 series	Reverse thermostatic radiator valve for copper pipe	sizes 1/2" radiator x 23 p.1,5 piping

THERMOSTATIC 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 LCD type room temperature indicator	adjustment scale * -5 corresponding to 7-28°C
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 209001	Special allen key for tamper-proof anti-theft cap	

* 3/4" with tailpiece without rubber seals

Technical specification of valve bodies

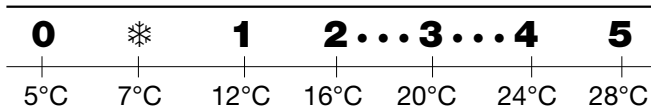
Material

Body:	brass EN 12165 CW617N, chrome plated
Obturator stem:	stainless steel EN 10088-3 (AISI 303)
Hydraulic seals:	EPDM
Control knob and cap:	ABS (RAL 9010)

Performance

Medium:	water, glycol solutions
Max. percentage of glycol:	30%
Max. differential pressure with control head fitted:	1 bar
Max. working pressure:	10 bar
Working temperature range of thermal medium:	5-100°C

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



Technical specification of control heads

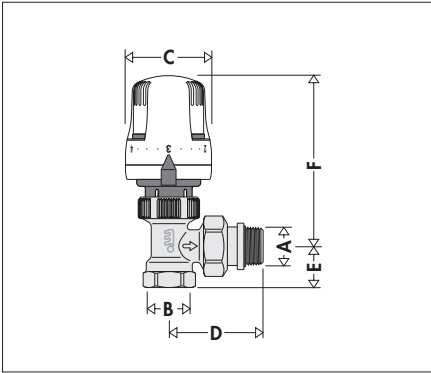
200/201/202/204 series

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 temperature indicator 202 series:	16-26°C

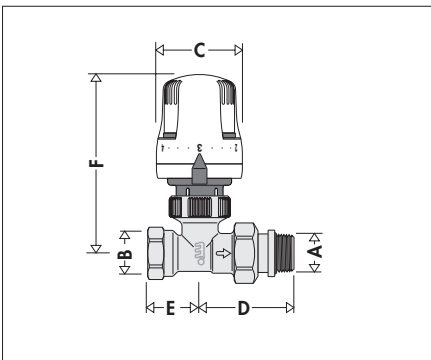
Technical specification of control heads 203 series

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	

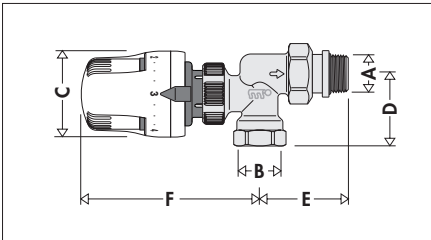
Dimensions



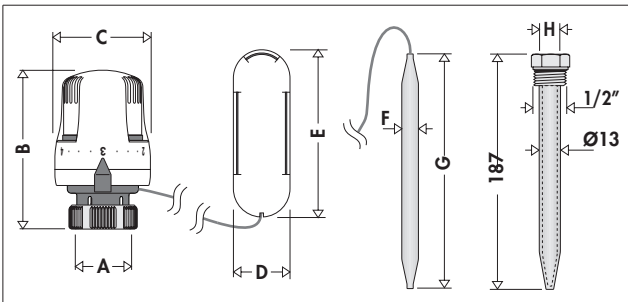
Code	A	B	C	D	E	F
220302 + 200001	3/8"	3/8"	48	48	20	100
220402 + 200001	1/2"	1/2"	48	52,5	23	100
220500 + 200001	3/4"	3/4"	48	62	26	100



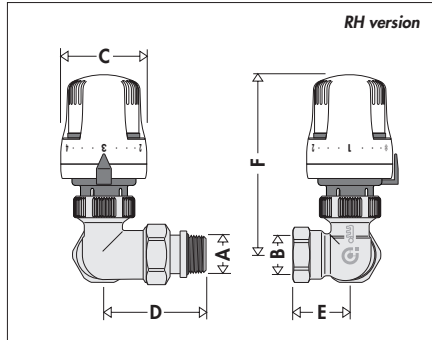
Code	A	B	C	D	E	F
221302 + 200001	3/8"	3/8"	48	48	26	104
221402 + 200001	1/2"	1/2"	48	52,5	29	104
221500 + 200001	3/4"	3/4"	48	62	35	104



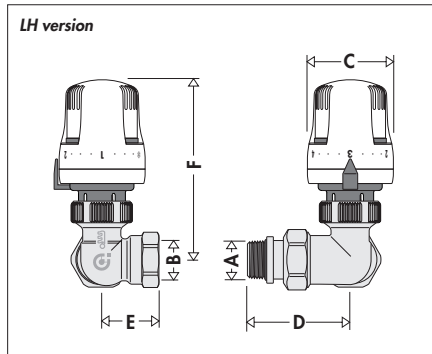
Code	A	B	C	D	E	F
224302 + 200001	3/8"	3/8"	48	35	45	104
224402 + 200001	1/2"	1/2"	48	40	51	104



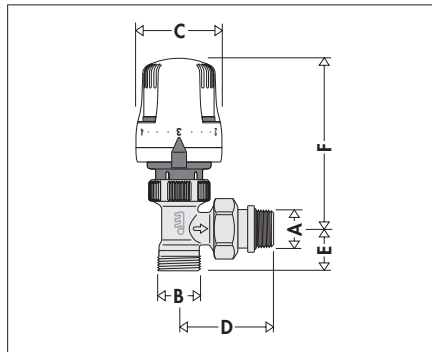
Code	A	B	C	D	E	F	G	Code	H
200001	30 p.1,5	80	48						
201000	30 p.1,5	80	48	33	95				
203502	30 p.1,5	80	48			∅ 11	158	475002	11,5
203702	30 p.1,5	80	48			∅ 9,5	134	475003	10



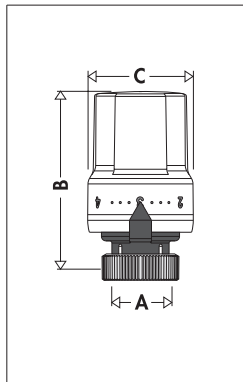
Code	A	B	C	D	E	F
225312 + 200001	3/8"	3/8"	48	51	25	104
225412 + 200001	1/2"	1/2"	48	57	30	104



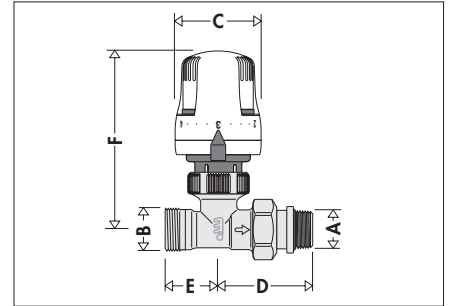
Code	A	B	C	D	E	F
225322 + 200001	3/8"	3/8"	48	51	25	104
225422 + 200001	1/2"	1/2"	48	57	30	104



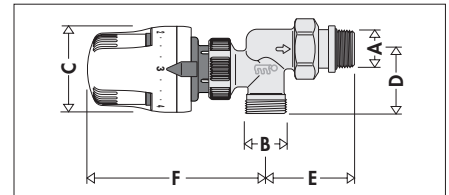
Code	A	B	C	D	E	F
222402 + 200001	1/2"	23 p.1,5	48	52,5	20,5	100
222302 + 200001	3/8"	23 p.1,5	48	48	17,5	100



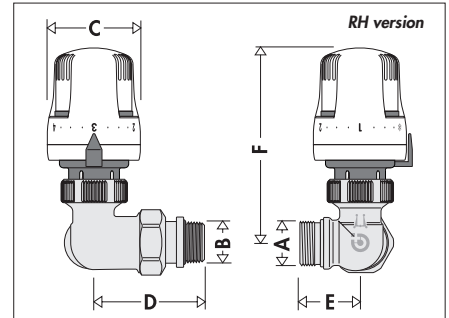
Code	A	B	C
202000	30 p.1,5	85	48



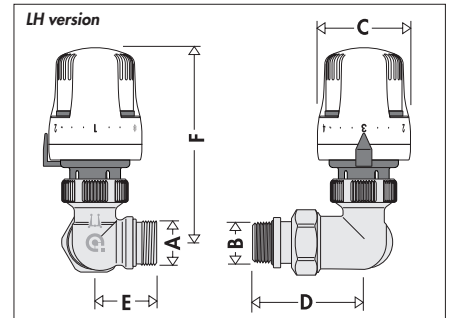
Code	A	B	C	D	E	F
223402 + 200001	1/2"	23 p.1,5	48	52,5	24	104
223302 + 200001	3/8"	23 p.1,5	48	48	21	104



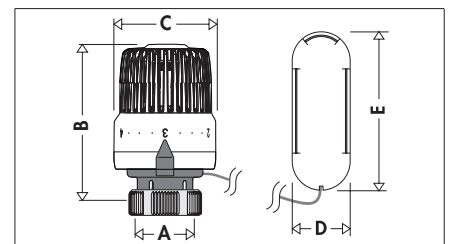
Code	A	B	C	D	E	F
227402 + 200001	1/2"	23 p.1,5	48	37	51	104



Code	A	B	C	D	E	F
226412 + 200001	23 p.1,5	1/2"	48	57	27,5	104



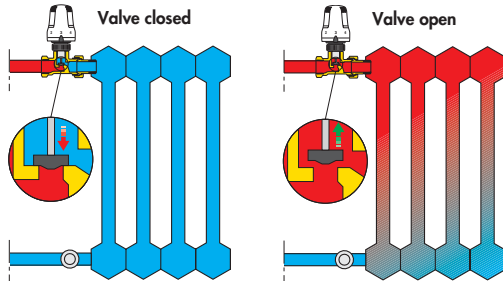
Code	A	B	C	D	E	F
226422 + 200001	23 p.1,5	1/2"	48	57	27,5	104



Code	A	B	C	D	E
204000	30 p.1,5	74	48		
204100	30 p.1,5	74	48	33	95

Operating principle of thermostatic control head

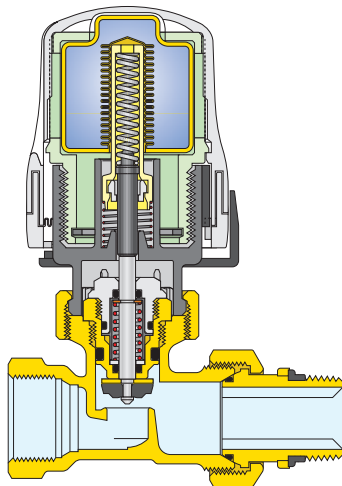
The thermostatic valve control head is a proportional temperature regulator, consisting of bellows containing liquid. When the ambient temperature increases, this causes an expansion in volume in the bellows, which, in turn, dilate. When the temperature falls, the reverse takes place: the bellows contract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



Visibility with sufficient lighting

Pivoting system

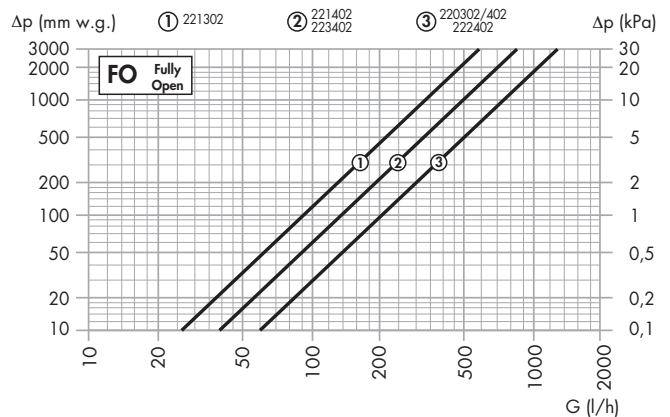
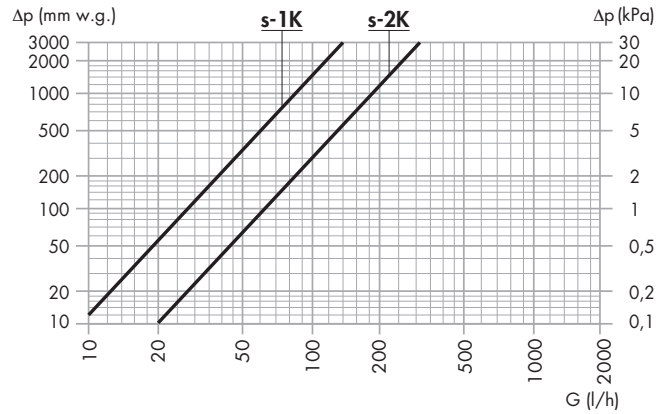
A particular pivoting system keeps the indicator always vertical thus allowing its optimal visualization.



Hydraulic characteristics

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)				Kvs
		1	1,5	2	3	
220302	3/8"	0,32	0,49	0,57	0,85	2,29
220402/222402	1/2"	0,32	0,49	0,57	0,85	2,39

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
220302	3/8"	180	0,92	0,1
220402/222402	1/2"	180 (170*)	0,92	0,1

*With control head 201 series

Valves with straight connections

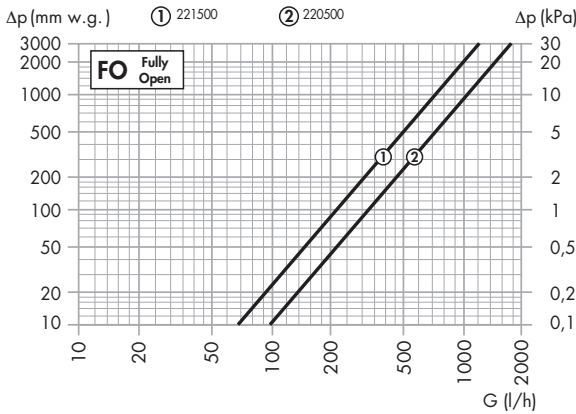
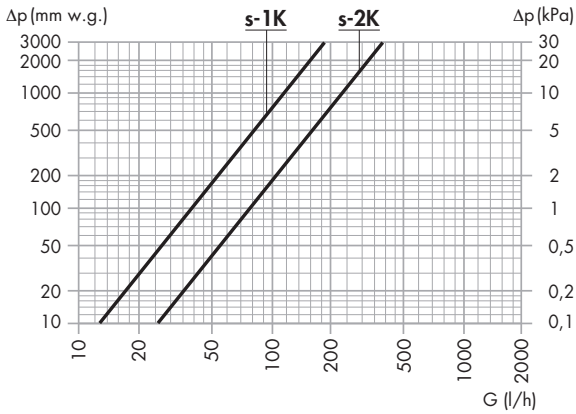
Code	Size	Kv (m³/h) Proportional band (K)				Kvs
		1	1,5	2	3	
221302	3/8"	0,32	0,49	0,57	0,85	1,09
221402/223402	1/2"	0,32	0,49	0,57	0,85	1,52

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
221302	3/8"	180	0,60	0,1
221402/223402	1/2"	180/200	0,60	0,1

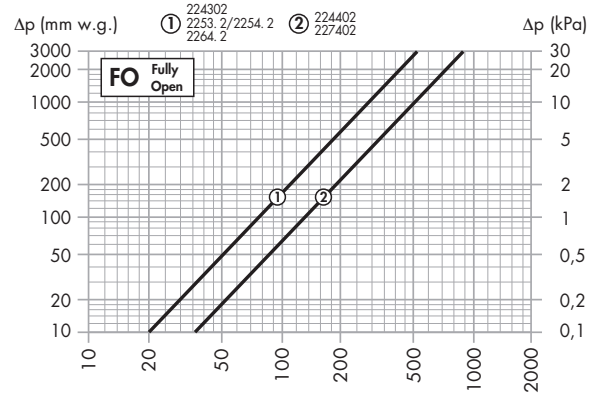
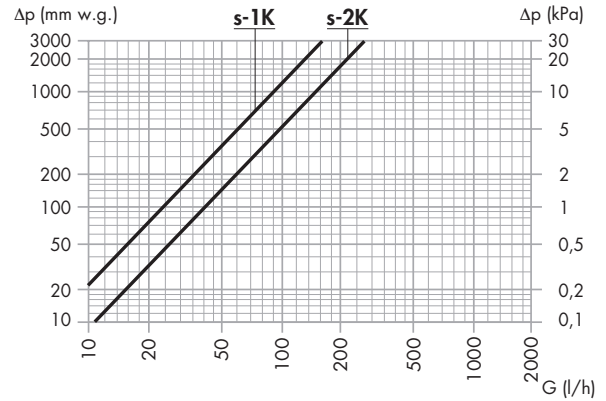
Kv = Flow rate in m³/h producing a pressure drop of 1 bar

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.



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 angled connections

Code	Size	Kv (m³/h) Proportional band (K)				Kvs
		1	1,5	2	3	
220500	3/4"	0,40	0,63	0,76	1,00	3,19

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
220500	3/4"	240	0,93	0,1

Valves with straight connections

Code	Size	Kv (m³/h) Proportional band (K)				Kvs
		1	1,5	2	3	
221500	3/4"	0,40	0,63	0,76	1,00	2,20

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
221500	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]
200000	0,4 K	0,5 K	1 K	18 minutes
201000	0,4 K	0,5 K	0,5 K	18 minutes
204000	0,4 K	0,5 K	1 K	23 minutes
204100	0,4 K	0,5 K	0,5 K	18 minutes

Additional information available on request.

Valves with reverse connections

Code	Size	Kv (m³/h) Proportional band (K)				Kvs
		1	1,5	2	3	
224302	3/8"	0,36	0,49	0,57	0,77	0,93
224402	1/2"	0,36	0,49	0,57	0,77	1,39
227402	1/2"	0,36	0,49	0,57	0,77	1,39

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
224302	3/8"	180	0,65	0,1
224402	1/2"	180	0,93	0,1
227402	1/2"	180	0,93	0,1

Valves with double angled connections

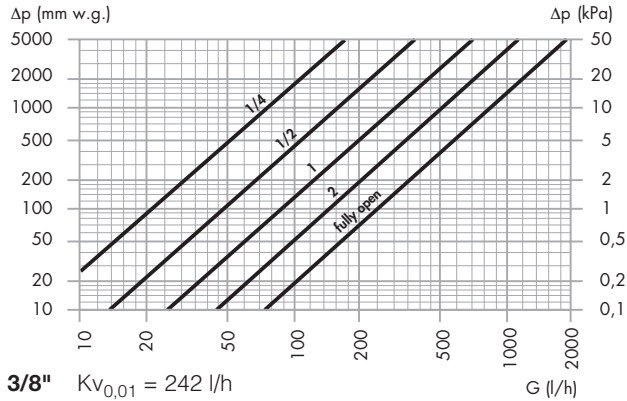
Code	Size	Kv (m³/h) Proportional band (K)				Kvs
		1	1,5	2	3	
2253.2	3/8"	0,36	0,49	0,57	0,77	0,96
2254.2	1/2"	0,36	0,49	0,57	0,77	1,40
2264.2	1/2"	0,36	0,49	0,57	0,77	1,40

Code	Size	Nominal flow rate (l/h)	Obturator authority	Max. diff. press. (bar)
2253.2	3/8"	180	0,60	0,1
2254.2	1/2"	180	0,80	0,1
2264.2	1/2"	180	0,80	0,1

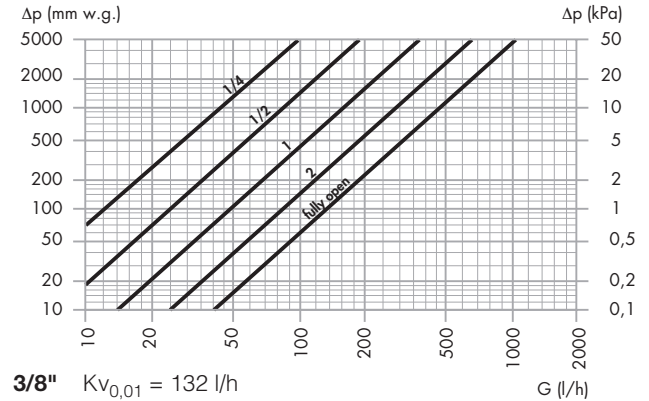
System sizing

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).

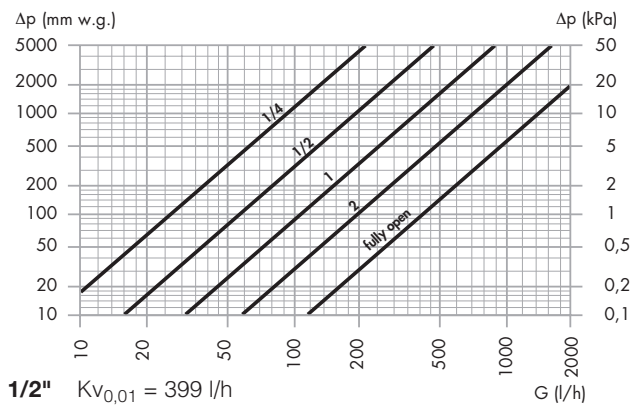
**Lockshield valve
with angled connections 3/8", 342 and 431 series**



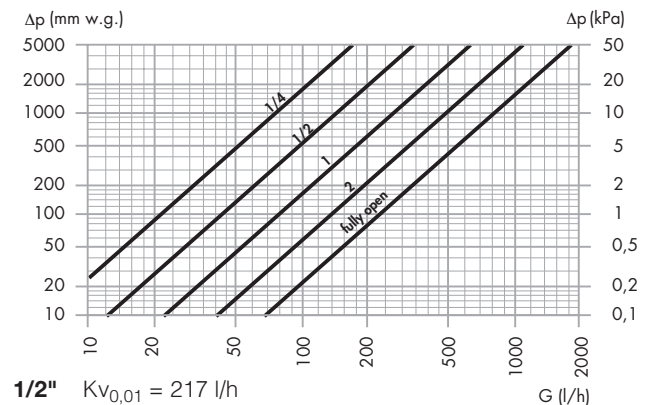
**Lockshield valve
with straight connections 3/8", 343 and 432 series**



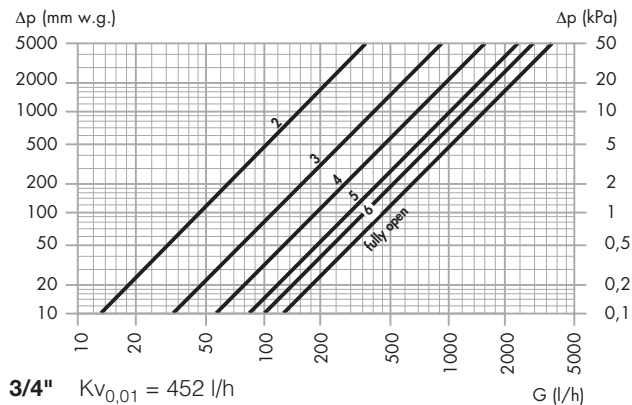
**Lockshield valve
with angled connections 1/2", 342 and 431 series**



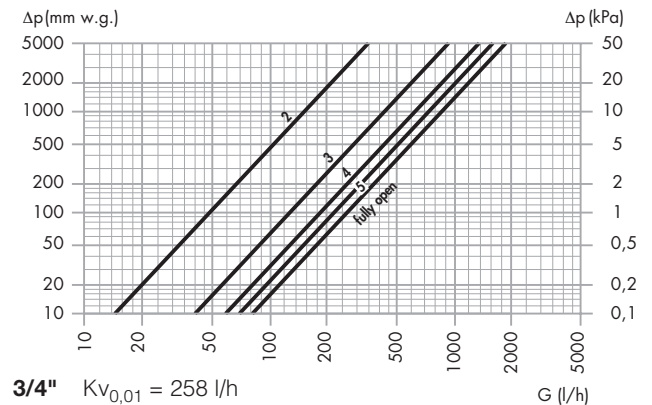
**Lockshield valve
with straight connections 1/2", 343 and 432 series**



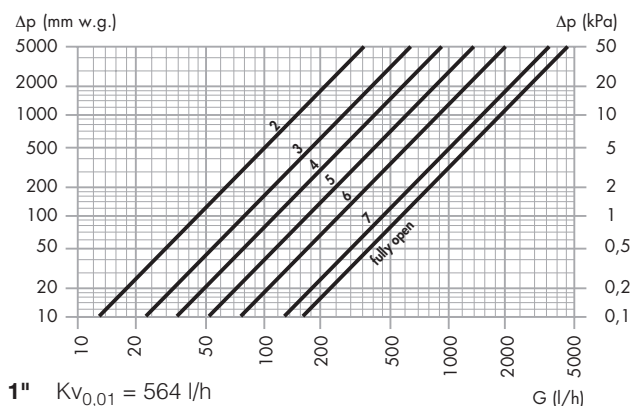
**Lockshield valve
with angled connections 3/4", 431 series**



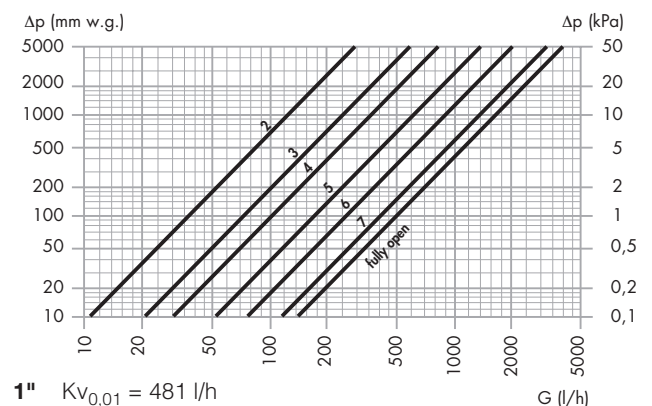
**Lockshield valve
with straight connections 3/4", 432 series**



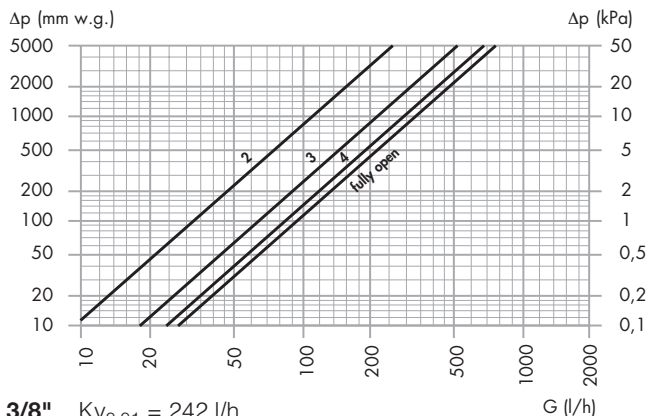
**Lockshield valve
with angled connections 1", 431 series**



**Lockshield valve
with straight connections 1", 432 series**

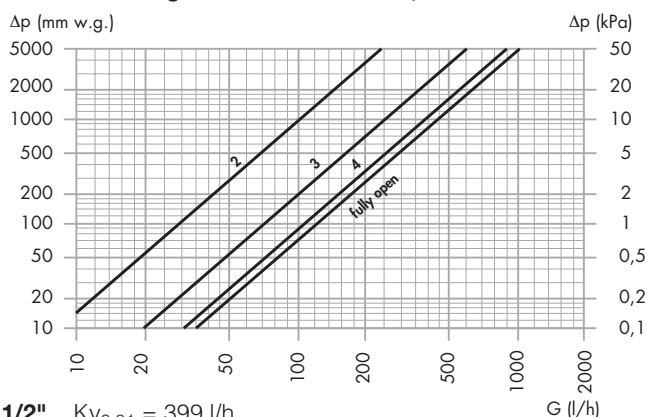


**Lockshield valve
with double angled connections 3/8", 225 series**



3/8" $K_{V_{0,01}} = 242$ l/h

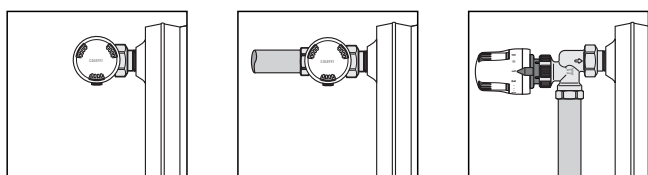
**Lockshield valve
with double angled connections 1/2", 225 and 226 series**



1/2" $K_{V_{0,01}} = 399$ l/h

Installation

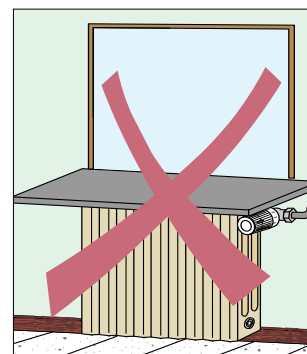
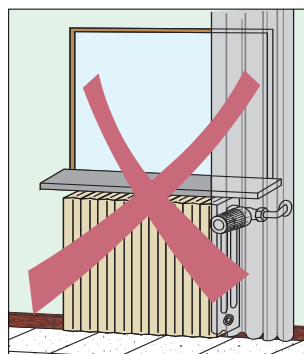
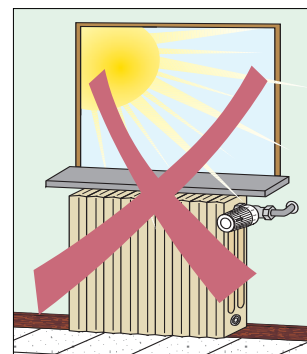
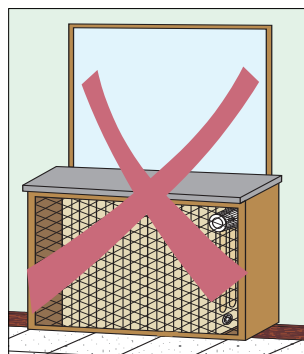
Thermostatic control heads should be installed in horizontal position, by respecting the flow direction as indicated by the arrow on the valve body.



Warnings: in case of uncorrect installation of the valve complete with thermostatic control head, two possible problems can arise in the system:

- 1) 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 excessive 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.



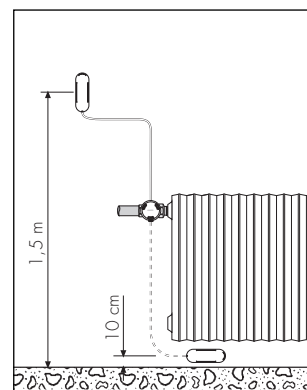
Before fitting the thermostatic control head, turn the control knob to the number 5 position.

Control head with remote sensor

In some situations, the 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.

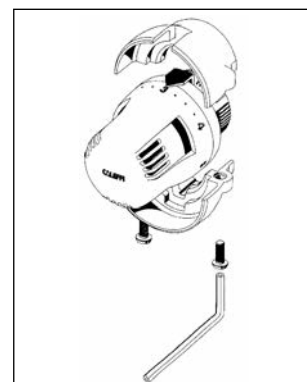


The remote sensor of this type of thermostatic control head must be installed at a height range between 10 cm and 1,5 m.



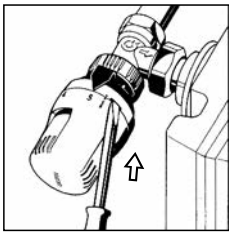
Tamper-proof and antitheft cap

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

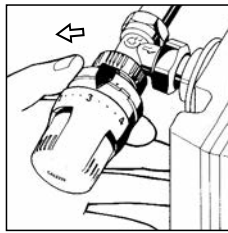


Locking and restricting the thermostat control temperature

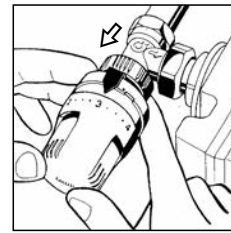
Temperature restriction



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.

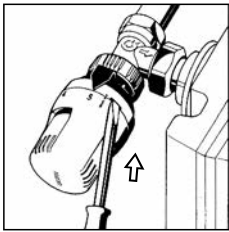


2. Turn the knob to the new maximum open position required (e.g. Pos.3). Turn the ring **anti-clockwise** up to the stop.

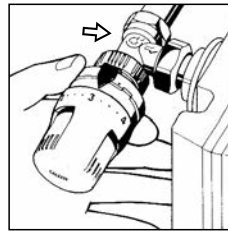


3. Re-lock the ring. The valve will now have a temperature range restriction from 0 to the set value.

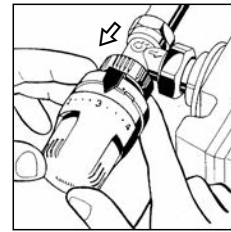
Locking the temperature



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.

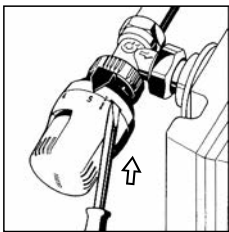


2. Position the valve at the required temperature and turn the ring **clockwise** up to the stop.

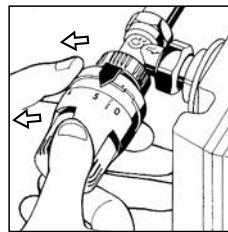


3. Re-lock the ring. The valve will now be locked at the set temperature.

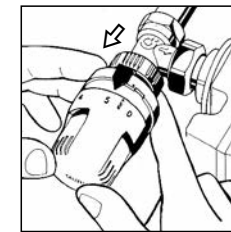
Resetting the temperature restriction and temperature lock



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. Length 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.