Technical
Catalogue

WATTS®
INDUSTRIES
Technology by nature

Safety valves for solar energy systems Series SVE-SOL

Main features

Membrane safety valves for solar energy systems built accordingly to DIN4757 part 1, certified from TÜV as a result of tests according to sheets VdTÜV-SV100, TRD721 and TRD421.

- Certified TÜV SOLAR.
- Conform Directive PED 97/23/CEE
- Identification Number CE1115

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Description

The membrane safety valve is part of the safety device for solar energy systems installations feed with water or water mixture as vector, according to DIN4757part 1. The valve discharge pressure is factory-set and cannot be modified without manumission of the seal, placed on the cap, which indicates setting pressure and approval mark.

Maintenance

In order to assure a correct functioning, the safety valves must be checked periodically. In an installation, normally, the safety valve remains closed. During the time, impurities may settle near the shutter, it is necessary to proceed with a periodical washing of the valve seat, turning the knob in the direction shown by the arrow on the disk. Almost the total of problems (droppings, uncompleted closings) are caused from the presence of dirt between valve seat and shutter, periodical washings and verifications will prevent problems.

SVE-SOL

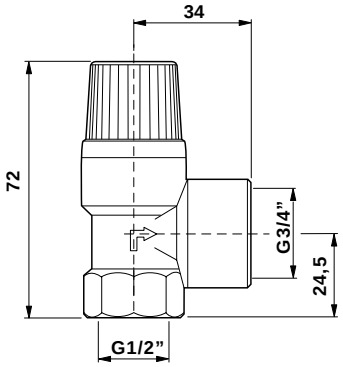
Diaphragm safety valve for solar systems.
TÜV SOLAR certified.
According to Directive PED 97/23/CEE. Identification number CE1115.

Type	Part No.	Dn	bar
SVE-SOL	0215835	1/2" x 3/4"	3.5
SVE-SOL	0215840	1/2" x 3/4"	4
SVE-SOL	0215860	1/2" x 3/4"	6
SVE-SOL	0215880	1/2" x 3/4"	8
SVE-SOL	0215899	1/2" x 3/4"	10

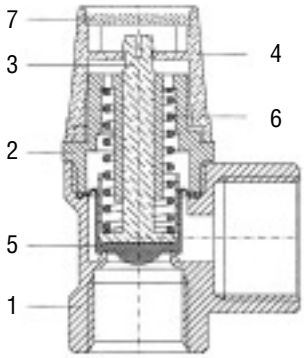
Design Features	
Body and cage	EN12165-99 CW617N, hot pressed and sand blasted
Long	Lasting diaphragm resistant to 180 °C
Green discharge knob	UV-resistant shockproof resin
Spring	Galvanised steel heat stabilised
Stem	Reinforced resin
Disc	Resin with characteristic
Maximum operating temperature	160°C (320°F)
Parts in contact with fluid	suitable for use with 50% glycol mixture

Technical Features	3.5 bar	4 bar	6 bar	8 bar	10 bar
Inlet connection		1/2" female DIN-ISO228/1			
Outlet connection		3/4" female DIN-ISO228/1			
Set pressure (bar)	3.5	4	6	8	10
Discharge pressure (bar)	3.85	4.4	6.6	8.8	11
Closing pressure (bar)	2.8	3.2	4.8	6.4	8
Discharge flow (l/h) (measured with cold water, at discharge pressure +10%)	4300	4420	5400	6100	7800

Overall dimensions (mm)



1. Body
2. Cage
3. Stem
4. Knob
5. Diaphragm
6. Spring
7. Disc



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Re-order no. 54-0006-UK-IT/1-05-11-Rev.0

Thermal drain valves
Series VTFN

Main features

The thermal drain valves have been approved and factory calibrated in the Watts Industries Workshops in accordance with the technical specification of Body R.

WATTS®
INDUSTRIES
Technology by nature

VTFN

THERMOFLUX
Positive action thermal drain valve, with manual resetting and optical signal.
Protection class : IP40. Set temperature : 95°C. Drain capacity without filling :
VTF 1.1/4" - 176.775 kcal/h equal to 7070 l/h
VTF 1.1/2" - 318.200 kcal/h equal to 12728 l/h.

ISPESL approved. According to EEC 89/336, EEC 73/23, PED 97/23/CE. Identification number CE1115.

Tipo	Codice	Dn	Weight (g)
VTFN	0230232	1.1/4" x 1.1/4"	1300
VTFN	0230240	1.1/2" x 1.1/2"	1350

Dimensioning

A) Partial or zero filling
It should be pointed out that Body R (Dossier R.2.A.) specifies that, in the case of partial or zero filling, the valve should have a drain capacity not less than :

$$G = \frac{P}{25}$$

where :

G = flow rate of water to be drained in kg/h
P = thermal capacity of the boiler in kcal/h, assuming the hydrostatic pressure to be 0,5 kg/cm^2.
The value of drain capacity G depends on the value of the water head hydrostatic pressure (pressure difference acting on the valve) by the relation :

$$G = K_v \cdot \sqrt{\Delta p}$$

where :

Kv = flow coefficient
Δp = hydrostatic pressure acting on the valve in kg/cm^2.
By inserting known numeric values we obtain :

1. for VTF/N32: $G = K_V \cdot \sqrt{\Delta p} = 10.000 \cdot \sqrt{0,5} = 7.071$ kg/h
$P = 25 \cdot G = 25 \cdot 7.071 = 176.775$ kcal/h

2. for VTF/N40: $G = K_V \cdot \sqrt{\Delta p} = 18.000 \cdot \sqrt{0,5} = 12.728$ kg/h
$P = 25 \cdot G = 25 \cdot 12.728 = 318.200$ kcal/h

B) Total filling
In the case of total filling from the water main, the flow to be drained at the effective operating pressure should not be less than:

$$G = \frac{P}{80}$$

where :

G = flow rate of water to be drained
P = thermal capacity of the boiler, being on the other side always : $G = K_v \cdot \sqrt{\Delta p}$

where : Kv = flow rate coefficient.

The flow rate G depends on the hydrostatic pressure Δp acting on the valve.

VTFN32			VTFN40		
Δ (bar)	G (l/h)	P (kcal/h)	Δ (bar)	G (l/h)	P (kcal/h)
0,1	3.162	252.982	0,1	5.692	455.368
0,2	4.472	357.770	0,2	8.050	643.988
0,3	5.477	438.178	0,3	9.859	788.720
0,4	6.324	505.964	0,4	11.384	910.736
0,5	7.071	565.680	0,5	12.728	1.018.234
0,6	7.746	619.677	0,6	13.943	1.115.419
0,7	8.366	669.328	0,7	15.060	1.204.790
0,8	8.944	715.541	0,8	16.100	1.287.975
0,9	9.486	758.946	0,9	17.076	1.366.104
1,0	10.000	800.000	1,0	18.000	1.440.000
1,1	10.488	839.047	1,1	18.879	1.510.285
1,2	10.954	876.356	1,2	19.718	1.577.441
1,3	11.401	912.140	1,3	20.523	1.641.853
1,4	11.832	946.572	1,4	21.298	1.703.831
1,5	12.247	979.795	1,5	22.045	1.763.633
1,6	12.649	1.011.928	1,6	22.768	1.821.472
1,7	13.038	1.043.072	1,7	23.469	1.877.530
1,8	13.416	1.073.312	1,8	24.150	1.931.963
1,9	13.784	1.102.724	1,9	24.811	1.984.903
2,0	14.142	1.131.370	2,0	25.456	2.036.468
2,1	14.491	1.159.310	2,1	26.084	2.086.758
2,2	14.832	1.186.591	2,2	26.698	2.135.865
2,3	15.165	1.213.260	2,3	27.298	2.183.868
2,4	15.492	1.239.354	2,4	27.885	2.230.838
2,5	15.811	1.264.911	2,5	28.460	2.276.840
2,6	16.124	1.289.961	2,6	29.024	2.321.930
2,7	16.431	1.314.584	2,7	29.577	2.366.161
2,8	16.733	1.338.656	2,8	30.120	2.409.581
2,9	17.029	1.362.350	2,9	30.653	2.452.232
3,0	17.320	1.385.640	3,0	31.177	2.494.153

Technical features		
Valve type	**VTFN32**	**VTFN40**
Connections	1.1/4" x 1.1/4"	1.1/2" x 1.1/2"
Certificate of ISPEL conformity	VST/341/90	VST/342/90
t0 - calibration temperature fluid temperature at which the valve starts to drain continuously	95 °C	95 °C
t1 - drain temperature max. fluid temperature at which, during the temperature rise phase, there is maximum opening allowed by the control device, consequently the nominal flow rate	96 °C	96 °C
t2 - closing temperature fluid temperature at which, during the temperature lowering phase, the valve stops draining continuously.	92 °C	90 °C
tE - emergency operating temperature temperature at which opening of the valve starts in case of damage to the thermostatic element.	90 °C	92 °C
Kv - flow coefficient water flow rate in kg/h at drain temperature t1 with differential pressure Δp = 1 kg/cm^2	11.000	20.000
KVE - emergency flow coefficient water flow rate in kg/h at drain temperature t1 with differential pressure Δp = 1 kg/cm^2	10.000	18.000
P = Drain capacity in kg/h, with partial or zero filling and with Δp = 0,5 kg/cm^2	176.775	318.200

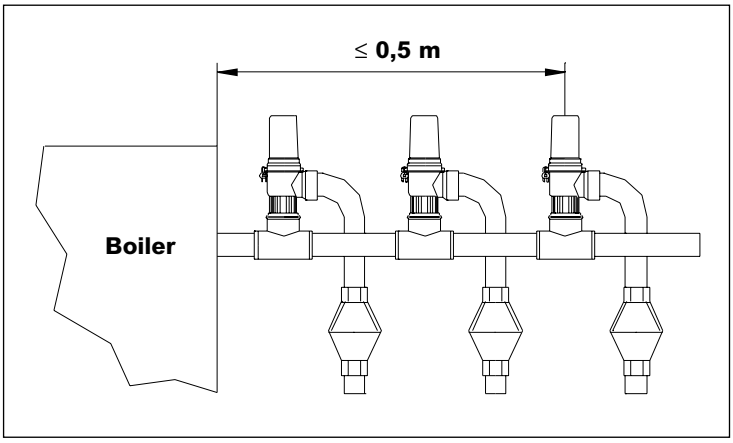
The above values are taken from the I.S.P.E.S.L. reports enclosed with the certificates of conformity N° VST/341/90 and VST/342/90 and represent the average of the values obtained during the inspection tests.

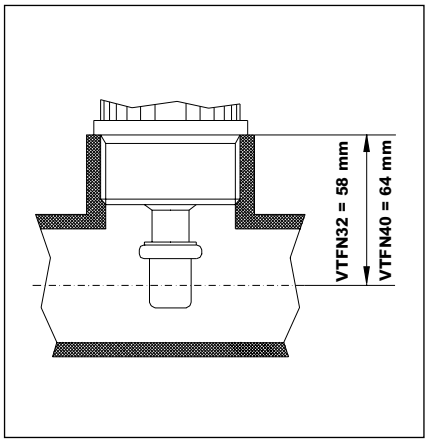
Design features	
Body and cover	Shot-blasted stamped brass
Inlet connection VTF/N32	G 1”1/4 M (ISO 228/1)
Inlet connection VTF/N40	G 1”1/2 M (ISO 228/1)
Outlet connection VTF/N32	G 1”1/4 F (ISO 228/1)
Outlet connection VTF/N40	G 1”1/2 F (ISO 228/1)
Thermal sensitive element	Wax
Springs	Stainless steel
Protective cap	Black polycarbonate
Microswitch	220V-50Hz, with manual resetting button
Optical indicator	red signalling valve opening

Mounting

Technical specification of Body R ed. 82 (R.3B.1.2) required as follow:

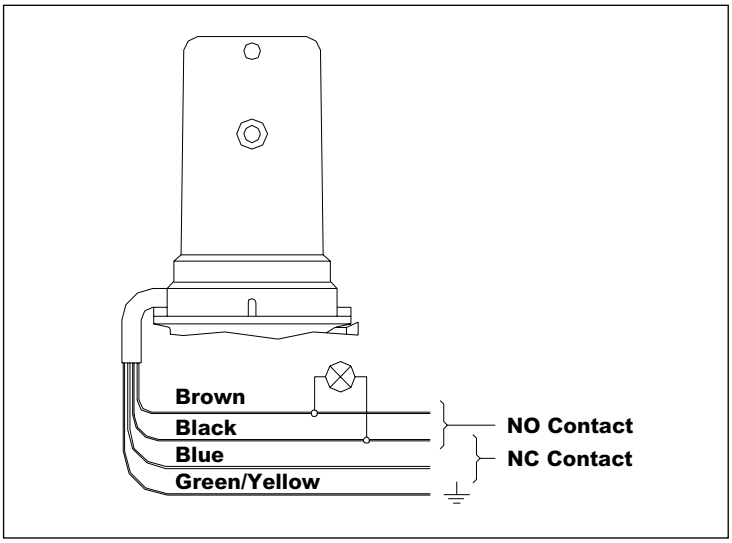
- Thermal drain valve has to be connected to the outlet pipe within 0,5 m from boiler, with the bulb sensing element into the hot water flow rate (see drawing).
- For correct positioning of the bulb sensing element into the hot water flow rate, respect the measure showed between end of the threaded and the axis of the pipe (see drawing).





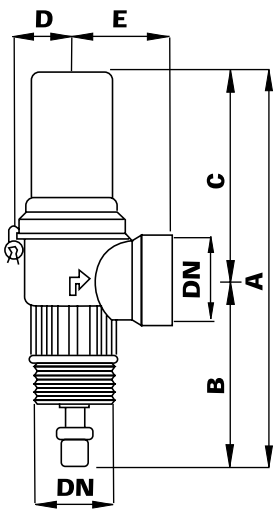
Wiring diagram

For correct connection to the supply (220-50Hz), follow the drawing.



Overall dimensions (mm)

VTFN



Size	A	B	C	D	E
1.1/4”	222	99	123	35	52
1.1/2”	242	114	128	38	60

Maintenance

No maintenance foreseen for VTFN valves; in case of failure please to dismantle the valve and send to Watts Industries Italia.

Safety regulations

The applicable technical specification of Italian Decree DM 1.12.1975 contained in Body R prescribes the use of one or more thermal drain valves in the following cases:

1. **Hot water heating systems, with open expansion vessel**
   when the inner diameter of the safety piping is less than the minimum permissible diameter in relation to the boiler capacity and the virtual length of the safety piping (R.3.A.3.1. tab. 2).

N.B. The minimum permissible inner diameter of the safety piping is equal to 18 mm; under this size, it is not sufficient to install a thermal drain valve, rather the piping must be replaced as well.

2. **Heating systems with closed expansion vessel**

2.1. System with 4-way mixing valve
in the case of a single expansion vessel dimensioned for the entire system and in direct connection with the boiler (Pic. 1)

2.2. System with 3-way mixing valve installed on the delivery line
in the case of a single expansion vessel dimensioned for the entire system and in direct connection with the boiler (Pic. 2)

a) in the case of two or more expansion vessels, of which one is connected directly to the boiler, if no check valve is provided on the return line (Pic. 3);

3. **System with 3-way mixing valve installed on the return line**
   in the case of one or more expansion vessels of which one is in direct connection with the boiler (Pic. 4).

4. **System with overdimensioned expansion vessel**
   when the capacity of the expansion vessel (or vessels) exceeds the theoretical calculated capacity by more than 10% it will always be necessary to install one or more thermal drain valves.

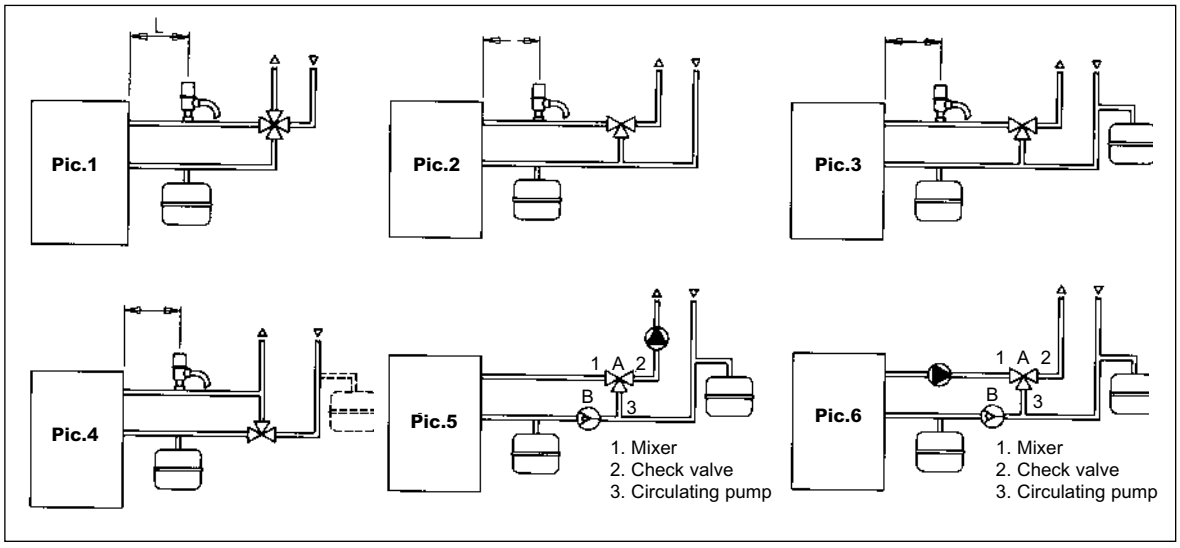
N.B. The distance "L" of the thermal drain valve from the boiler should not exceed 0.5 metres.

NOTE

If a check (non return) valve is to be installed in the return piping, make sure that it is correctly positioned.

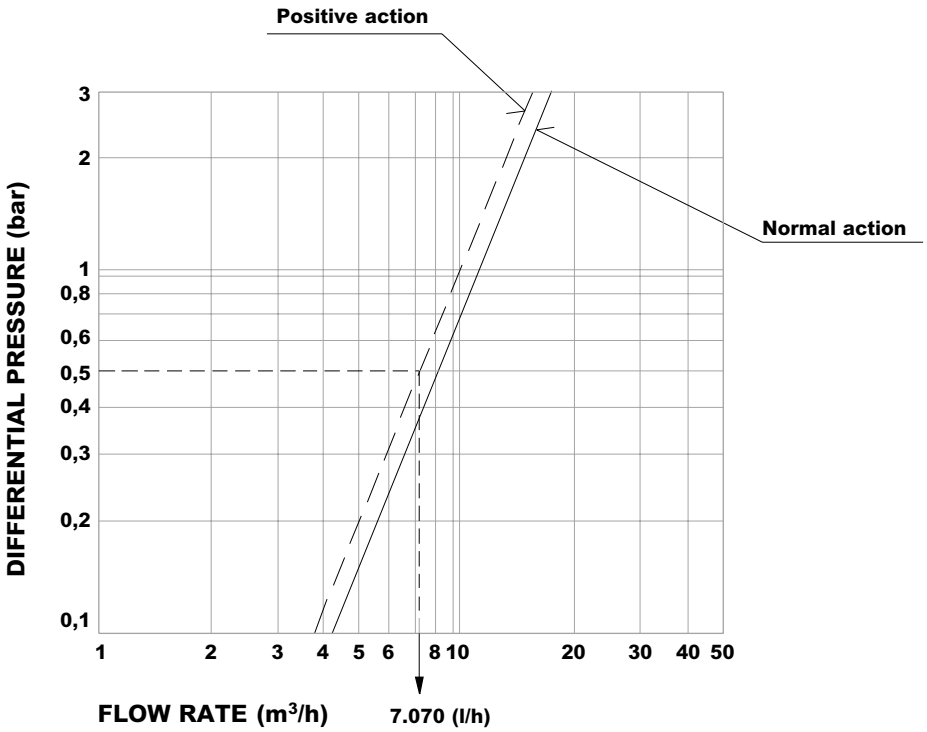
The three-way valve, installed in the delivery line, can act as a mixer or diverter.

1. In the case of the three-way valve acting as a mixer valve, way 2 (Pic. 5) always remains open; the sector shifts from way 1 to way 3. The check valve should be inserted in the boiler circuit (Pic. 5)
2. In the case of the three-way valve acting as a diverter valve (Pic. 6) , way 1 always remains open; the sector shifts from way 2 to way 3. The check valve should be inserted in the user circuit (Pic.6).

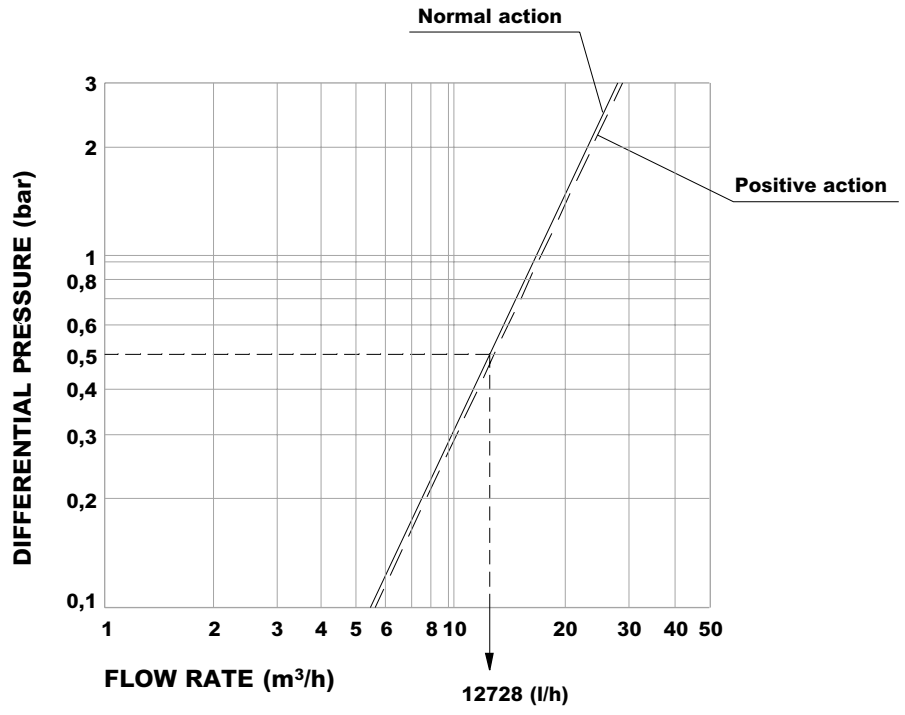


Flow rate against differential pressure

VTFN32



VTFN40



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Re-order no. 54-0025-UK-IT/1-06-01-Rev.1

3-way bronze valve
Series 296

Main features

- Designed to provide shut off for boilers and expansion vassel in closed circuit systems.

- Available with the following connections :
  - Threaded ND 1" to 2"
  - Flanged ND 65 to 200

- Conforms with the following standard : Italian Decree D.M. 1/12/1975 Body R Chap. R.3.A.1.10 - R.3.B.5.1.

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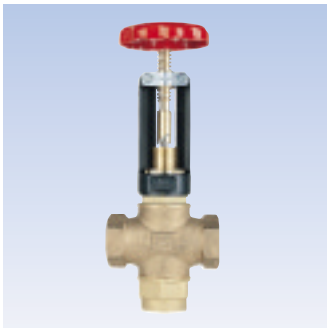
Description

The Valves **Series 296** are 3-way devices for shutting off boilers and expansion vessels in closed-circuit systems. They are made of bronze for the threaded versions and cast iron for the flanged versions, with ports according to I.S.P.E.S.L. standards.



296

Three-way shut-off valve for boiler and expansion vessel.

The internal ports of the valves correspond to those of the piping of same nominal diameter in accordance with I.S.P.S.E.L. standards.

* Flanged model

Type	Part No.	Dn	Np	Weight (g)
296	2961	1"	10	2300
296	296114	1.1/4"	10	2700
296	296112	1.1/2"	10	3500
296	2962	2"	10	4200
296	296212	65 *	16	31100
296	29680	80*	16	37500
296	296100	100 *	16	52700
296	296125	125 *	16	-
296	296150	150 *	16	-
296	296200	200 *	16	-

Design features	
Valve body ND 1" to 2"	Bronze
Valve body ND 65 to 200	Cast iron

Technical features	
Nominal pressure	NP 10 (1" ÷ 2") NP 16 (65 ÷ 200)
Max. operating temperature	100 °C

Application

In a system with two or more boilers, the solutions pre-scribed by the "R" regulations should be adopted, namely:

- a separate safety pipe for each boiler
- a safety pipe in common with two or more boilers in a same system, or the same secondary circuit dimensioned for the overall nominal capacity of the boilers in que-stion.

When the second solution is adopted, a three-way valve should be used for each boiler, designed in order to ensure, in each position, communication of the boiler with the outdoor atmosphere through the safety pipe or through a vent pipe connected to the third way.

As valves of Series 296 have ports corresponding to the piping of the same nominal diameter, they conform with the "R" regulations. In closed-circuit systems the three-way valve is the only permissible device when it is required to shut off the expansion vessel.

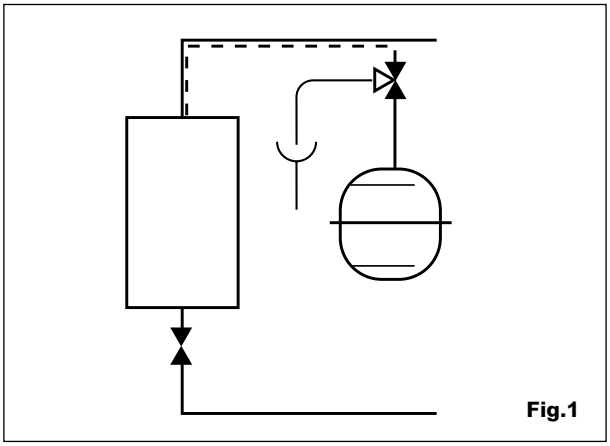


Fig.1

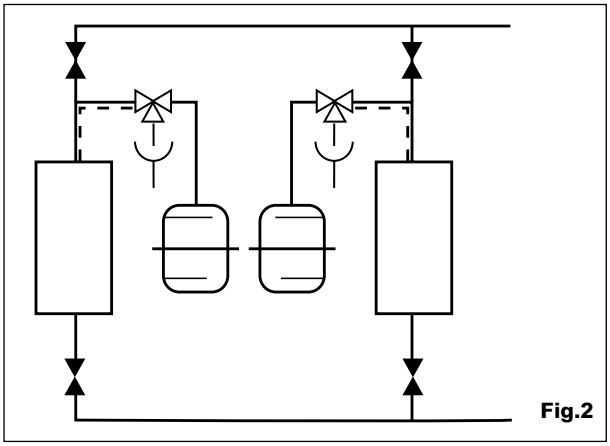


Fig.2

Dimensioning

Dimensioning depends on the boiler capacity and length of the safety circuit. The section of piping from the shut-off valve to the expansion vessel should have an inner diameter less than 18 mm **(fig. 1)**.

If two or more boilers are installed, an individual shut-off device should be installed for each boiler **(fig. 2)**.

When dimensioning the safety pipe, it is necessary to consider the resistance of the three-way valve by increasing the virtual length by hundred times the inner diameter of the pipe itself.

The following values should be summed to the calculated safety pipe:

ø 1”	2.5 m eq.
ø 1 1/4”	3.2 m eq.
ø 1 1/2”	4 m eq.
ø 2”	5 m eq.
ø 2 1/2”	7 m eq.
ø 3”	9 m eq.

Installation

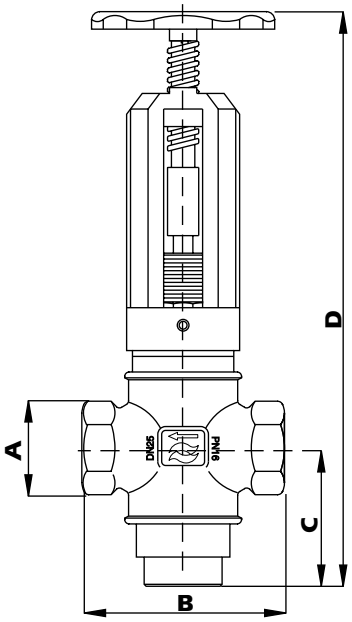
The constant flow port to be connected to the boiler is marked by the letter "C".

The other two ways can be in communication either with the safety pipe (with closed vessel) or the outdoor atmosphere. As prescribed by Body "R", point R3A1.10, our valve always ensures, in each position, the connection of the boiler either to the atmosphere or with the safety pipe.

Hence when one of the ways is closed, the other two ways are completely free and there is absolutely no risk of an incorrect manoeuvre causing a partialization of the flow in one way, without a corresponding increase in the other way.

Overall dimensions (mm)

296



DN	B	C	D
1”F	105	72	320
1.1/4”F	120	75	330
1.1/2”F	145	80	335
2”F	165	90	360
65	290	170	500
80	310	185	490
100	350	200	520
125	400	240	600
150	480	280	680
200	600	360	750

Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

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Re-order no. 58-0020-UK-IT/1-06-01 - Rev.1

Thermal safety drain Series STS and draught regulator Series RT

Main features

- Thermal safety drain Series STS :
  The thermal safety discharge is installed in systems with boilers running on non atomized solid fuel, as protection against over temperature.

- Draught regulator Series RT
  The draught regulator is installed in systems with boilers running on non atomized solid fuel, as a control device.

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Operation

The heat sensitive element, immersed in the boiler water, expands as temperature increases thus causing the valve plug to open when the temperature reaches the set value.

Maintenance

To ensure correct operation of the thermal safety drain over the long-term, periodic drainage of the valve is required (at least once a year); to perform such operation, press the red discharge button located at the top of the valve head. Such operation allows cleaning the seal seat where foreign particles build up. After a certain number of periodic cleaning operations, it is advisable to replace the valve plug which is supplied as spare part.

Approvals

Approved according to DIN3440 standard, issued by TÜV. It meets the requirements of Body R, point R.3.C.1., 1982 edition, ISPSEL.

STS

SECURFLUX
Thermal safety drain for non atomized, solid fuel boilers with double safety. Nickel-plated brass CW617N body. Immersion probe with 145 mm sheath and 1/2" M connection. Max. drain capacity: 6500 litres/h at 8 bar. Max. operating pressure: 10 bar. Set temperature : 97°C.
Max. drain capacity temperature : 107°C

According to TÜV/SVGW.
According to Directive PED 97/23/CE. Identification number CE1115.

Type	Part No.	Size	Capillary
STS	0232120	3/4" F	1300 mm
STS	0232220	3/4" F	2000 mm

STSR

SECURFLUX
Like STS but with just one compact sensitive element.
Immersion probe with 108 mm sheath and 3/8" M connection.
Max. drain capacity : 3000 litres/h.

Type	Part No.	Size	Capillary
STSR	0232520	3/4" F	1300 mm

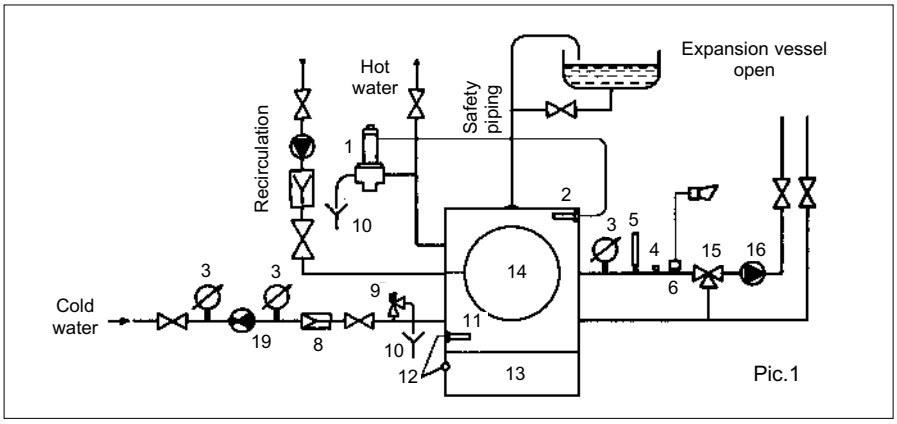
Design features	
Body and head	Nickel-plated brass
Seals and O-rings	EPDM rubber
Spring	Stainless steel
Inlet/outlet connections	UNI-ISO228/1 - G3/4" female
Capillary (model STS20 and STS20R)	Length 1300 mm
Capillary (model STS20/200)	Length 2000 mm
Sheath (model STS20 and STS20/200)	1/2" x 145 mm
Sheath (model STS20R)	3/8" x 108 mm

Technical features	
Set temperature	97° C
Max. operating pressure	10 bar
Drain temperature	107° C
Drain capacity (model STS20 and STS20/200)	6500 litres/h at 8 bar
Drain capacity (model STS20R)	3000 litres/h at 8 bar

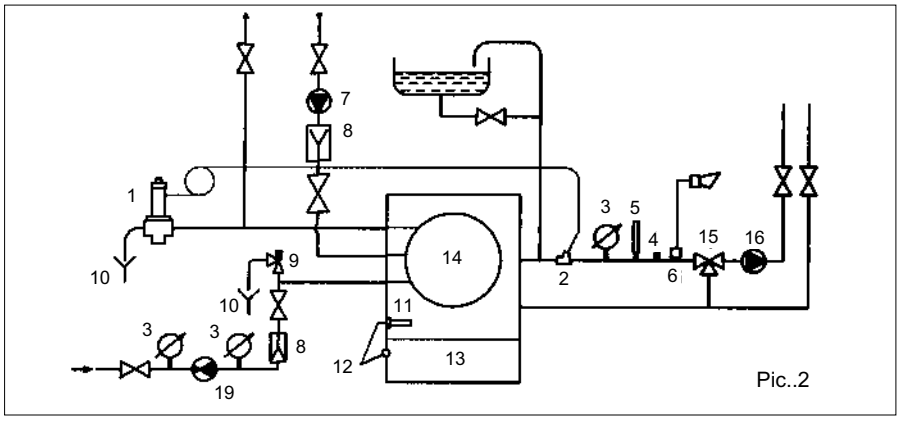
Installation

The various installation possibilities of the thermal safety drain are illustrated in pictures 1,2,3,4 given alongside:

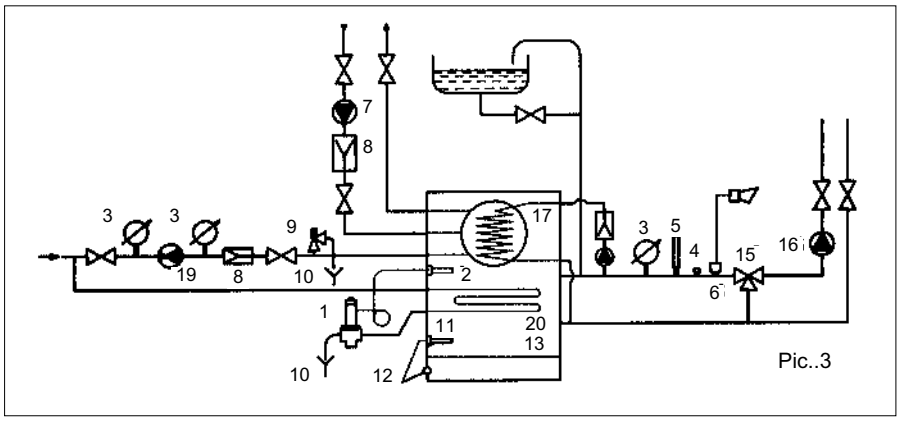
Pic. 1 - Double combustion boiler system combined with a natural circulation water heater. The system is of the open vessel type (solid fuel) with the thermal safety drain STS installed in the domestic hot water piping at the water heater outlet, before any shut-off device. The sensitive element is fitted in the special well provided on the main boiler. The discharge is conveyed into a siphon. During discharge, the valve draws off hot water from the water heater thus acting as an emergency heat exchanger.



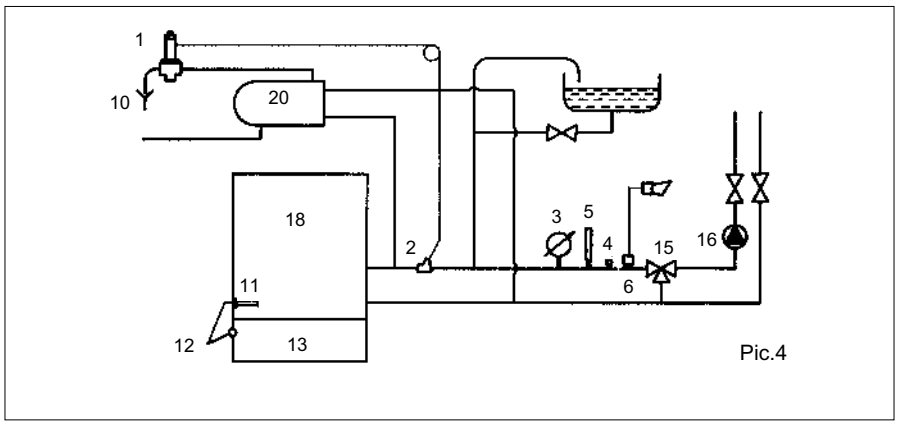
Pic. 2 - System identical to the one in Pic. 1, but without the well for inserting the sensitive element on the boiler. In such case the sensitive element well is installed in the delivery piping, immediately at the boiler outlet, before any shut-off device. Moreover the arrangement features a boiler without expansion connection, hence the safety piping is connected to the delivery line.



Pic. 3 - Double combustion boiler system combined with a water heater running on forced circulation via a pump. In such case, there is no sense in installing the thermal safety drain on the domestic hot water piping because if the pump stops (fault or power supply failure) the water heater is not able to remove the heat from the boiler for dissipation outside. If the boiler is provided with a built-in emergency heat exchanger, the safety drain should be fitted on the outlet of this heat exchanger; if not, see Pic. 4.

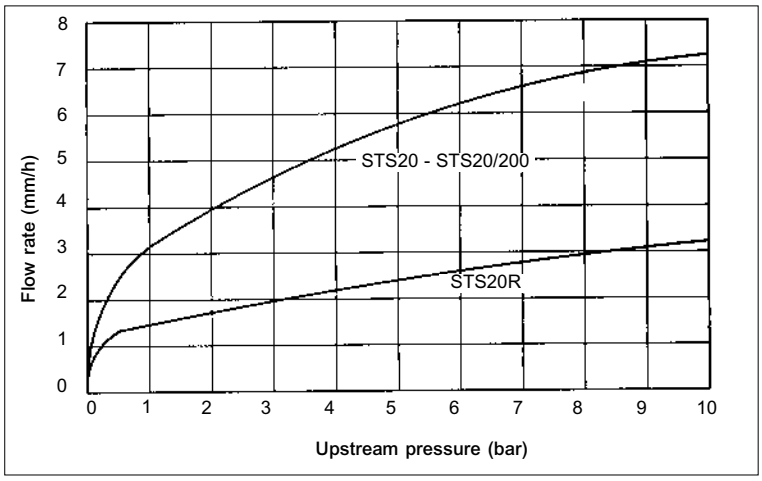


Pic. 4 - Double combustion boiler system without water heater and with emergency heat exchanger connected externally. In such case it is necessary to check whether the entire capacity of the system can be transferred from the boiler to the heat exchanger via natural circulation. As it is difficult to implement such an arrangement, at least in small boilers, it is advisable, in case of doubt, to adopt a thermal drain valve VTF/N installed on the boiler delivery line. In a nutshell, the use of an emergency heater exchanger is only meaningful if it is installed inside the boiler.



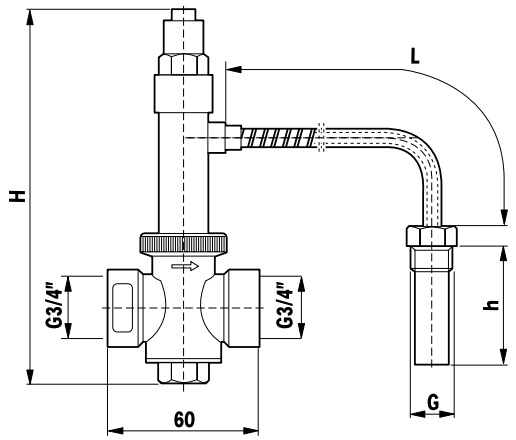
Pic.4

Diagram Upstream pressure – flow rate STS

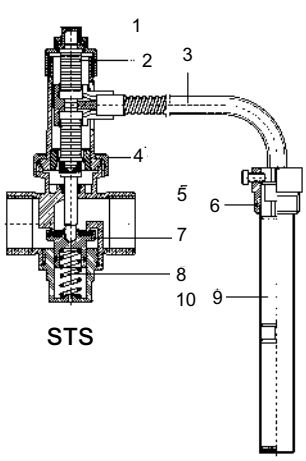


Overall dimensions (mm)

STS/STSR



Type	G	h	H	L
STS	1/2”	145	133	1300
STS	1/2”	145	133	2000
STSR	3/8”	108	131	1300



Legend
1. Manual discharge button
2. Bellows
3. Capillary sheath
4. Head locking ring nut
5. Valve body
6. Sheath connection
7. Valve plug
8. Valve plug spring
9. Sensitive element bulb
10. Valve plug cap

RT

AIRSTOP
Draught regulator for boilers running on non atomized fuels, with single safety (Item 0234200)
or double safety (Item 0234100). Setting range : 40°C to 100°C.
Connection ND 3/4". Wax heat sensitive element.

Type	Part No.	Stroke	Chain lenght
RT	0234100	60 mm	125 cm
RT	0234200	80 mm	125 cm

Operation

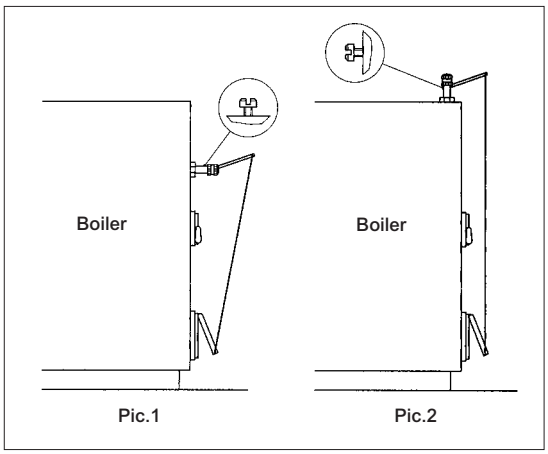
The draught regulator heat sensitive element, immersed in the boiler water within a sheath, acts on the combustion by appropriately varying introduction of the combustion-supporting air in the boiler in relation to the water temperature. Such regulation is by opening or closing the air inlet door in the boiler.

Approvals

Meets the requirements of Body R, point R.3.C.3, 1982 edition, ISPESL.

Installation

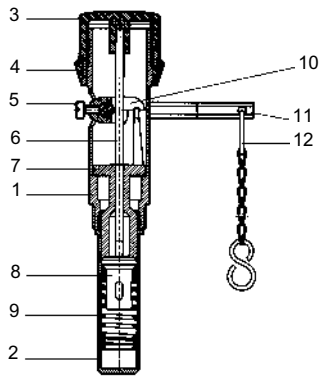
The draught regulator, **Series RT**, can be installed on the boiler either in horizontal position (front) or in vertical position (upper). For horizontal (front) position, the lever locking screw (12) should be in top position with respect to the draught regulator body (**Pic. 1**) while the temperature should be measured with the red digits. In the horizontal (upper) position, the lever locking screw should be in the rear position with respect to the front of the boiler (**Pic. 2**) while the temperature should be measured with the yellow digits.



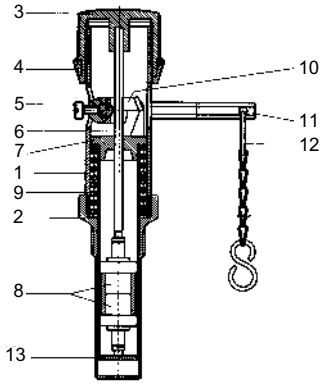
Design features	
Body and sheath	Nickel-plated brass
Adjustment knob	Reinforced plastic
Chain and lever	Tropicalized steel
Connection	UNI-ISO228/1 - G3/4“ M
Sheath (model RT20)	3/4” x 75 mm
Sheath (model RT10)	3/4” x 71.5 mm
Heat sensitive element (model RT20)	Two, with wax expansion
Heat sensitive element (model RT10)	One, with wax expansion

Technical features	
Max. water temperature	120° C
Setting range, temperature	40 to 100° C
Max. lever stroke (RT20)	80 mm
Max. lever stroke (RT10)	60 mm

0234100



0234200

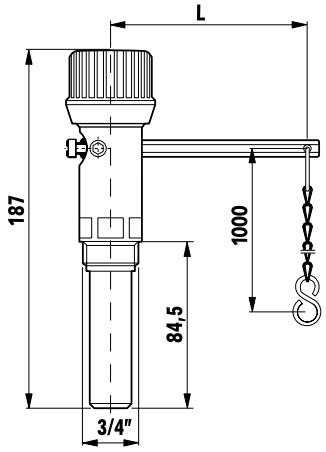


Legend

1. Draught regulator body
2. Sheath
3. Knob
4. Indicator ring
5. Lever locking screw
6. Rod
7. Guide
8. Heat sensitive element
9. Spring
10. Lever support
11. Lever
12. Chain
13. Internal sheath

Overall dimensions (mm)

RT



Stroke	L
60	100
80	187,5

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Re-order no. 54-0026-UK-IT/1-06-01-Rev.0

By-pass valves
Series 466 Thermatic - Series USVR

Main features

- Available in the following version :
  - Female/Female series 466
    DN 1/2”, 3/4”, 1”
  - Female/Male series USVR
    DN 3/4”, 1”, 1.1/4”

- Conforms to standard:
  UNI 9335/61 - D.M. 1/12/1975 Body R
  Cap.R.2.A.2

WATTS INDUSTRIES

Technology by nature

Description

By-pass valves **series 466** Thermatic and **series USVR** are devices for differential pressure control between two points of a circuit, designed in order to overcome the problems of variable flow rate plants and guarantee the by-pass which is proportional to the difference between the nominal pump head and the working conditions.

466

THERMATIC.
Relief valve for systems with automatic or manual shut-off elements on the radiators (thermostatic valves, two-way zone valves). Brass CW617N body and ABS cap. Nominal pressure : NP 10. Overpressure : 10 - 15%.
Max operating temperature : 110°C.

Type	Part number	Size body	bar	Flow rate (l/h)	Weight (g)
466	4660C12	1/2" FF	0,05 - 0,7	1750	630
466	4661C34	3/4" FF	0,05 - 0,7	3500	850
466	4662C1	1" FF	0,05 - 0,7	7000	1180

USVR

Relief valve for systems with automatic or manual shut-off elements on the radiators (thermostatic valves, two-way zone valves). Female inlet connections, Male union outlet. Body and cap of brass CW617N.
Adjustment : Position “0” = Fully open - Position “7” = Close to closing Δp =0.5 bar
Plastic knob. Max operating pressure : 6 bar.
Overpressure : 10 - 15%. Max operating temperature : 110°C

Type	Part number	Size body	bar	Flow rate (l/h)	Weight (g)
USVR	0265216	3/4" FM	0,06 - 0,36	3000	400
USVR	0265220	3/4" FM	0,03 - 0,50	3000	500
USVR	0265225	1" FM	0,03 - 0,55	5700	900
USVR	0265232	1.1/4" FM	0,06 - 0,46	12000	1050

Application

By-pass valves **series 466** and **USVR** are used in all heating systems in which the heating units are provided with thermostatic valves, zone valves or electrothermic valves **series 22C**.
The above mentioned regulation systems, control the room temperature adjusting the flow rate in the heating units. When thermostatic or electrothermic valves close could create noise problems and high differential pressure values on the opened valves of the circuit. This forces the pump to work continually in variable conditions reaching important differences from the initial pump head. The fitting of the by-pass valves between the delivery and the return side of every load line enables resonably costant discharge to be maintained.

Operation

The By-Pass valve will open assuring a constant water flow through the heat generator (very important for gas boiler) and increasing the return temperature to the heat generator (anti corrosion function).

The reliability of the pressure relief valve **series 466** or **USVR** are factory controlled on 100% of the production.

Choice

To choise the valve it usually has to be considering a 25-30% by-pass of the overall flow rate of the circuit to be protected and an overpressure of about 10-15% of the head in that particular point of the circuit.
Whenever no particular datas are available select the most appropiate model considering the overall flow rate :

- up to 1750 l/hour Art 4660C
- up to 3500 l/hour Art 4661C
- up to 7000 l/hour Art 4662C

Set the max working pressure value during the plant testing stage.

Exemple with valve series 466

• Circuit overall flow rate: 2000 l/hour
• Head in the safety valve installation point: 4 m (0.4 bar)
• Max. overpressure 0.5 m (0.05 bar)

Results :
• By-pass flow rate: 600 l/hour
• Max pressure 0.4 bar
• Max pressure with by-pass of 600 l/hour: 0.4 + 0.05 = 0.45 bar

The most appropriate choice is the **4661C model** which by-passes 800 l/hour in correspondence of a pressure variation from 0.4 to 0.45 bar (the **4660C model** by-passes only 500 l/hour).

Setting

By-pass valve **series 466** can be adjusted in two ways :

• Using the pump flow rate and valve diagrams. For example, using a pump with a flow rate of 2000 litres per hour and a head of 0.4 bar, a 3/4" Thermatic would be suitable. Follow the red curve downward from the point on the 3/4" graph where the 2000 l/h line and the 0,4 bar line meet. The left hand end of the red line shows the valve setting recommended, i.e 0,3 bar.
• When installing by-pass valve in a system where the flow rate of the pump is not know, the valve can be adjusted by checking the pump head with pressure gauge. Alternatively, it can be set by gradual adjustment of the valve until silent running and low over-pressure are achieved.
Once the correct setting is established, it can be fixed with the locking screw of the handwheel.

By-pass valve series USVR can be set in this way:

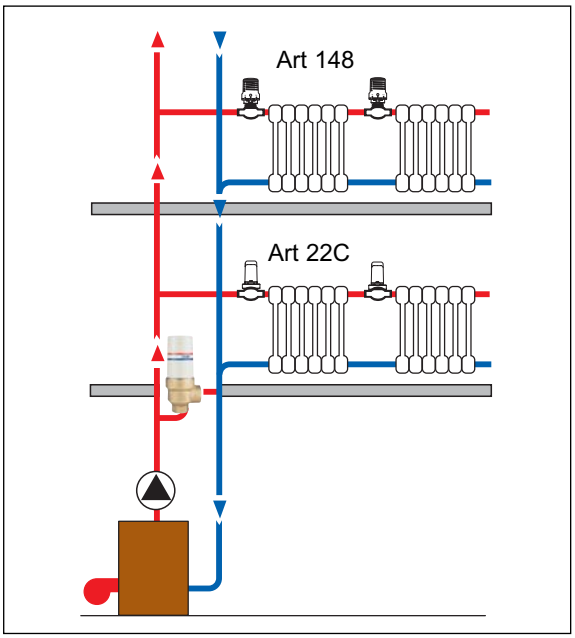
• Thighten blocking screw (1) (see overall dimensions).
• Set the USVR valve at the differential opening pressure ΔP by turning regulation knob (2) (see overall dimensions). The differential opening pressure DP shall exceed the user circuit load loss at rated discharge by approximately 20% in order that avoid valve opening be prevented. When the user circuits is completely closed, the **USVR** valve shall be fully open.

• Turn regulation knob anticlockwise untilscale (3) (see overall dimensions) indicates zero. Then proceed, turning clockwise, to calibration setting at the number required. Each number from 0-7 revers to an USVR16 - USVR20 USVR25 - USVR32.

• Once the correct setting is established, it can be fixed with the locking screw of the handwheel (1).

Installation

By-pass valves **series 466** or **USVR** should be installed after circulating pumps between the supply main and the return main (see scheme). Mounting the by-pass valves do not operate with the spanner on the upper hexagonal part of the valves.

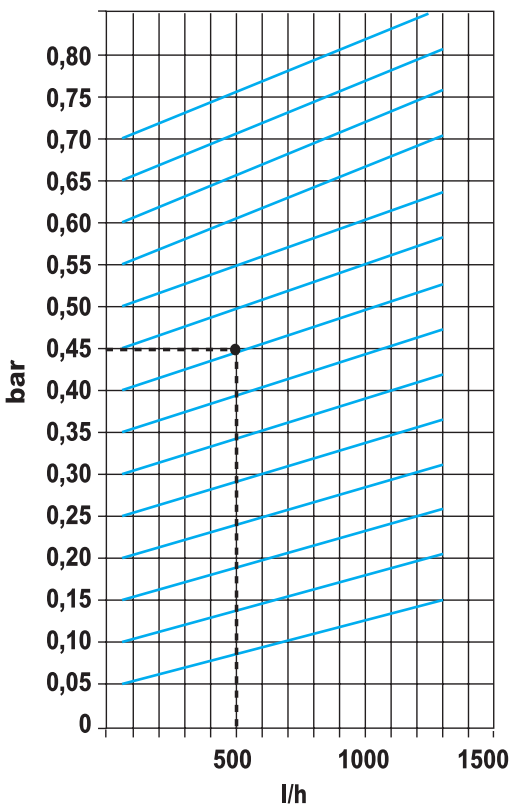


Technical characteristics		
Max operating pressure	466	10 bar
Max operating pressure	USVR	6 bar
Overpressure		10 ÷ 15%
Max operating temperature		110°C

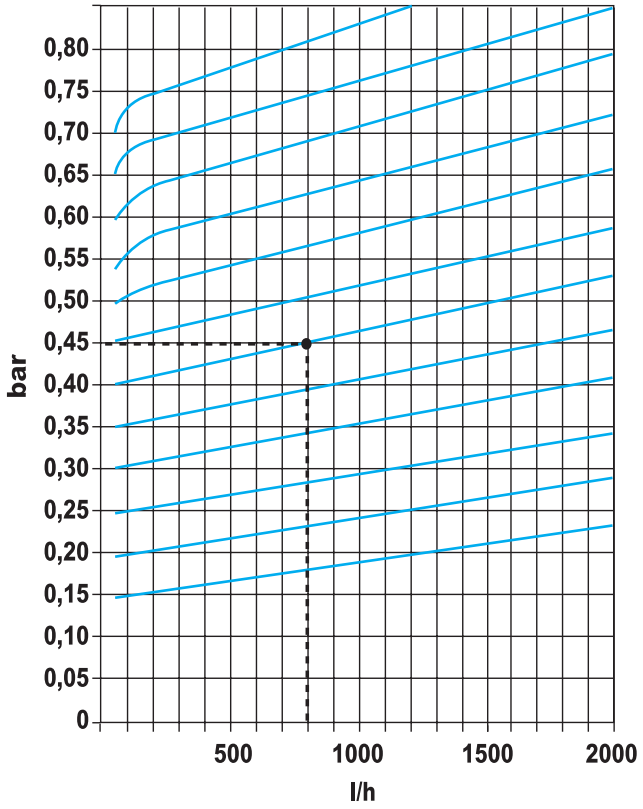
Design features	
Body valves	Brass CW617N
Setting sprins	Stainless UNI 3823
Plug	Alluminium BT3 UNI 6362
O-ring	EPDM
Cap	ABS

Pressure drop charts

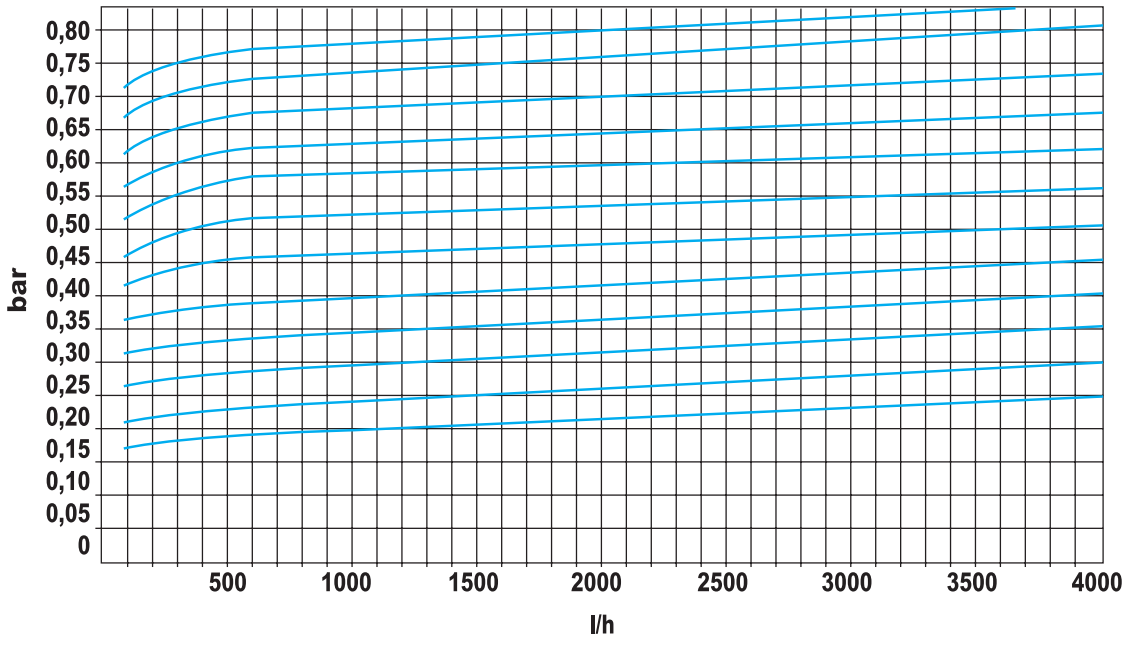
4660 **DN 1/2"**



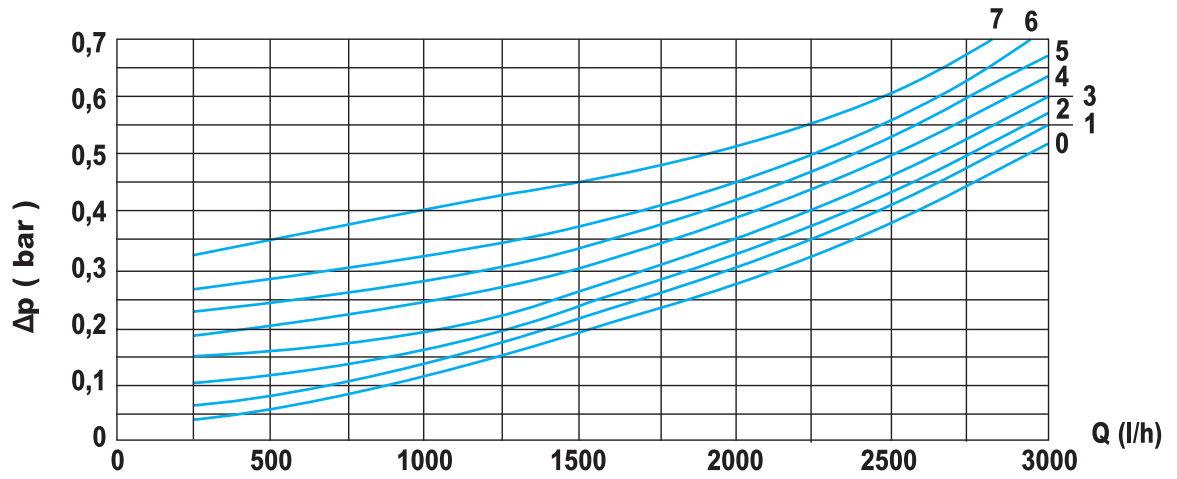
4661 **DN 3/4"**



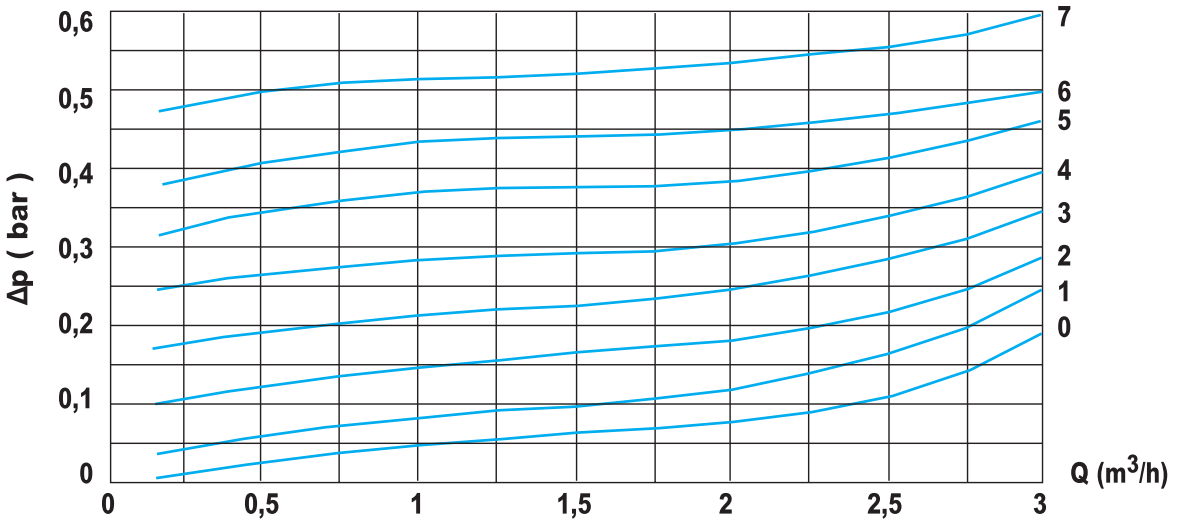
4662 **DN 1"**



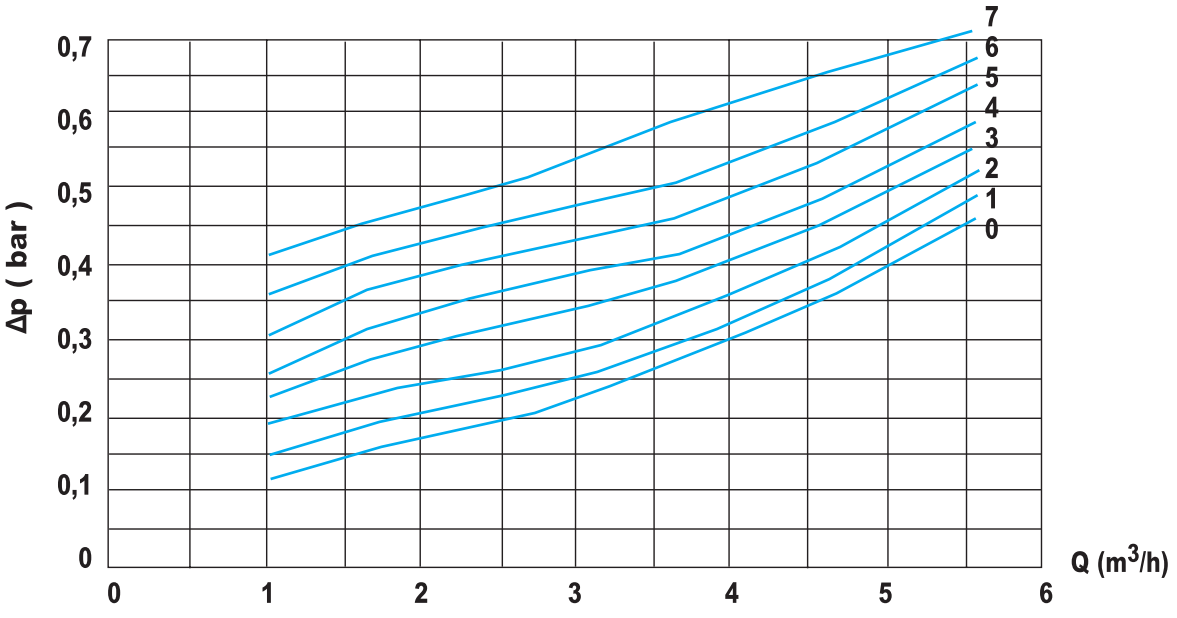
USVR16 **DN 3/4"**

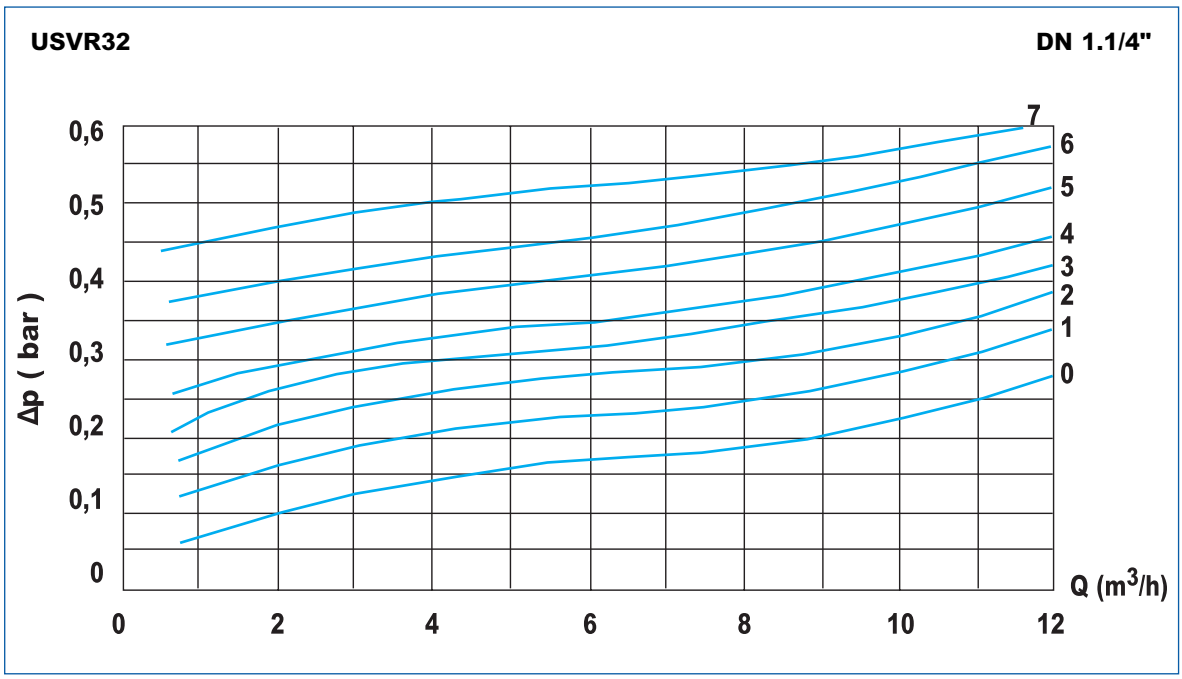


USVR20 **DN 3/4"**



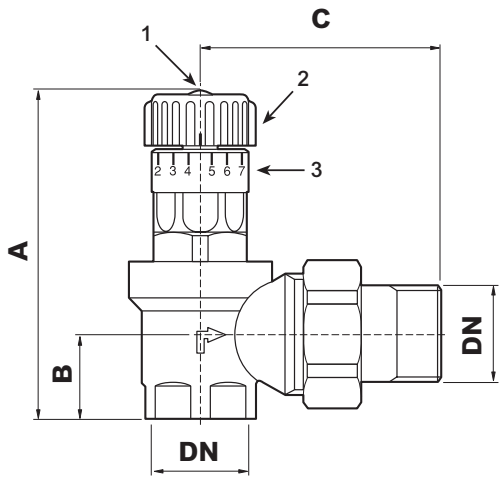
USVR25 **DN 1"**





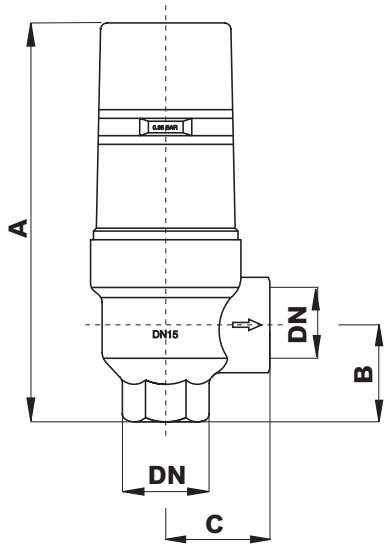
Overall dimensions (mm)

USVR



DN	A	B	C
3/4”	23	88	62.5
3/4”	26	120	70
1”	33	138	83.5
1.1/4”	39	148	100

466



DN	A	B	C
1/2”	135	32	36
3/4”	141	35	41
1”	195	41	46

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Re-order no. 54-0040-UK-IT/1-06-06-Rev.0

Electronic pump control unit WACOPUMP2 Series

Main features

- The electronic unit allows:
- Elimination of pressure switch, 5-way pipe fitting, float, probes, safety flow switch, expansion vessel
- Less installation space
- Easy installation
- Complies with EEC directives 89/336, 73/23.

The great advantage of WACOPUMP: all pump control functions are combined in just the one single unit.

WATTS INDUSTRIES

A Division of Watts Water Technologies Inc.

Description

The electronic unit of the **WACOPUMP2 series** controls start and stop of the pump when any tap or valve of the system is opened or closed.
When the pump is started, it remains running as long as there is demand by the user thus supplying the water main at constant flow rate and pressure.

WACOPUMP2

Electronic pump control unit. It controls start and stop of the pump when any tap or valve of the installation is opened or closed. When the pump is started, it remains running for as long as any connected tap remains open, thus supplying the water main with constant flow rate and pressure.
It is provided with a special check valve (to protect against risk of water hammer) and pressure gauge with scale 0-10 bar.

Type	Part number	Power Supply	Weight (g)
WACOPUMP2	0605226	220/240 Vac	719

Application

The electronic unit **WACOPUMP2 series** is a device designed for controlling and protecting pumps in plumbing installations or systems for the garden, irrigation, sports facilities or water reclaiming for users exceeding 10m and less than 20m (see table).

The electronic unit allows :

- Starting the pump with minimum difference in water pressure (opening of a tap), thus avoiding continuous switching on/stopping of the pump.
- Automatic stopping of the pump after using the water (closing of tap)
- Protecting the electric pump against water supply failure: pump stops after 8 seconds of operation
- Protecting the system against risk of water hammer thanks to the built-in check valve
- Easy reading of water pressure sent to the user thanks to the pressure gauge provided.

Operation

WACOPUMP2 automatically switches on the pump of the system as soon as any user tap is opened. The pump remains running thus supplying a flow of water to the water main as long as any connected tap is left open.

Technical characteristics	
Power supply	220/240 Vac
Max. current drawn	10 (6) A
Frequency	50/60Hz
Degree of protection	IP 65
Max. water temperature	60 °C
Max. flow rate	10,000 litres/h
Starting pressure	1.5 to 2.5 bar
Max. operating pressure	10 bar
Max. pump power rating	1.5 HP (1100 W)

Design features	
Body	Plastic
Diaphragm	Natural rubber
Spring	Tropicalized steel
Seals	Nitrile
Inlet/outlet connections	1” male
Manual start push button	RESET
Power on LED	POWER
Pump on LED	ON
LED, safety system tripped	FAILURE

Adjustment

Starting pressure is set by means of relative screw at the back of **WACOPUMP2** (Pic.1):

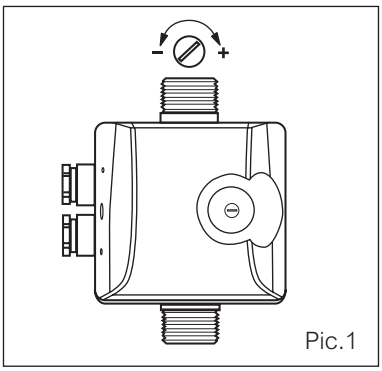
Read the pressure indicated on the pressure gauge when switching on, then turn the screw of the electronic unit in the required direction to increase (+) or decrease (-) the pump starting pressure.

Example		
*** SERVICE HEIGHT**	**STARTING PRESSURE**	**MINIMUM PUMP PRESSURE**
10 m	1,5 bar	2,5 bar
15 m	1,8 bar	3 bar
20 m	2,3 bar	4 bar

This system only adjusts the starting pressure and does not have effect on the operating pressure of the installation; such pressure depends solely on the pump characteristics.

***** These heights refer to the distance between the unit and highest point of use.

For greater heights, install the unit at the required height regardless of the pump



Pic.1

Installation

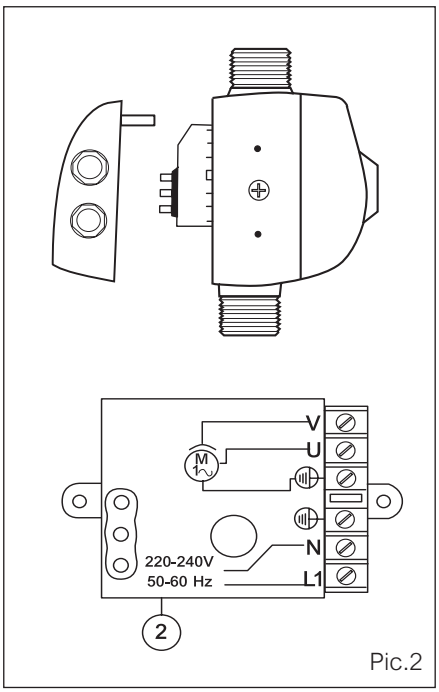
Before proceeding to make the water connections of **WACOPUMP2** make sure that the pump is properly primed. Install the electronic unit in vertical position. Connect the 1" male threaded inlet directly to the pump outlet and the 1" male outlet to the water main.

Do not install check valves at the outlet.

Accessories recommended but not essential :
- Flexible hose with removable fitting for connections to the water main in order to protect the electronic unit from any stress or vibrations
- Ball check valve to shut off the pump from the water main.

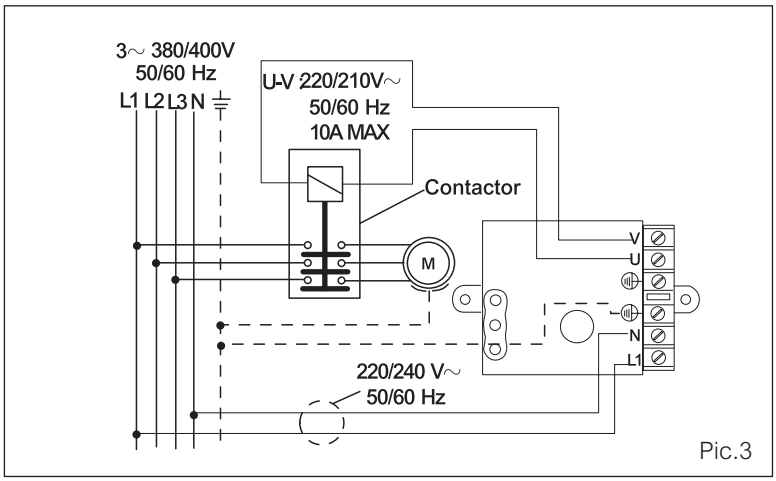
WACOPUMP2 is provided with a pressure gauge which should be installed on the side drilled with 3 holes: The larger central hole is where to insert the pressure gauge stem while the two other smaller holes serve for fastening the pressure gauge with the screws provided.

Electrical connections



Pic.2

To make the electric connections, proceed to remove the cover from **WACOPUMP2** and follow the wiring diagram show in Pic.2.
The electronic unit can be used for single phase or three phase pumps drawing currents greater than 10A by using an auxiliary relay (minimum capacity 4 kW or 5.5 HP coil 220V). See diagram in Pic.3.



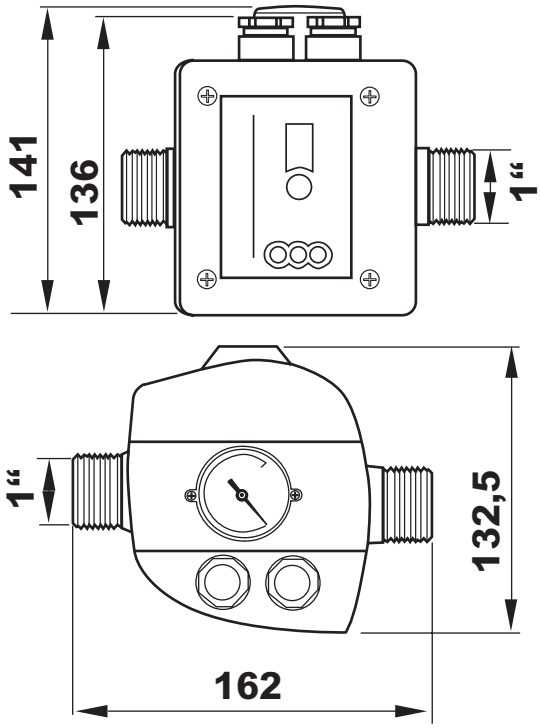
Pic.3

Maintenance

WACOPUMP2 does not require any special maintenance operations.

Overall dimensions (mm)

WACOPUMP2



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Re-order no. 55-0015-UK-IT/1-07-01-Rev.0

Chronothermostat Series Milux RF

Main features

Radio frequency chronothermostat.

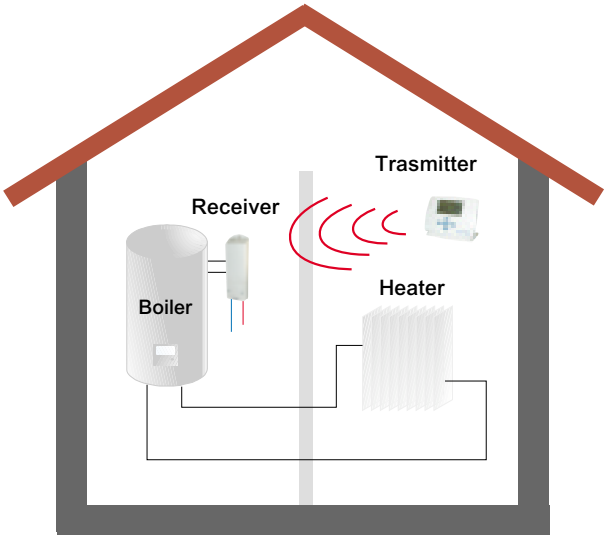
Wireless communication by radio signal to the receiver.

WATTS INDUSTRIES

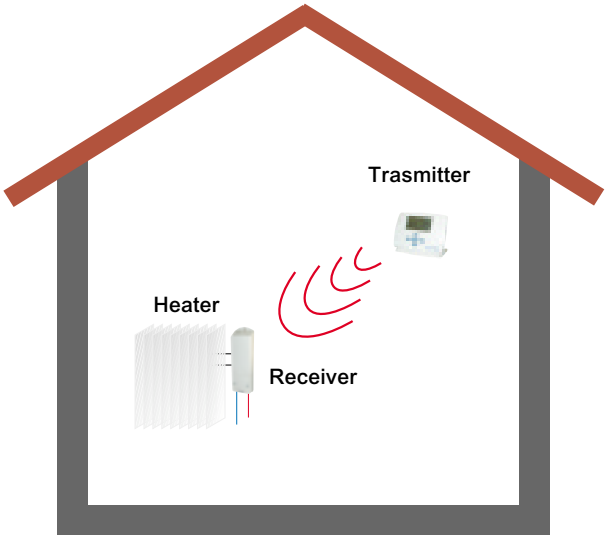
Technology by nature

Description

WATTS INDUSTRIES has developed a range of electronic systems, for reliable and convenient control of panel heating systems, via mechanical and electronic thermostats, in a modern and attractive design.



Exemple of water heating system



Exemple of electrical system

MILUX-RF Digital Chronothermostat

The RF MILUX chronothermostat is able to control and regulate directly the central heating (electric, Gas, Oil) or cooling system as well as electrical panel heating. It is a seven day program/hour which enables power savings in harmony with your every day life. Each trasmitter has a different code in order to avoid interferences problems with the neighbourhood.

Choose this radio solution : radio frequency chronothermostats are devices without any wires. Orders are trasmitted by radio waves. By installing the receiver near of a boiler or other heating sources, they will be controlled throught the intermediary of the trasmitter, in the room you have selected. You can place your trasmitter on a piece of forniture, for instance. Without electrical wires to install, there is no need to undertake any modification in your house.

Characteristics

- It is a wireless communication by radio signal to the receiver, connected to the installation.

- Range of approximately 30 to 50 metres in residential environment (433 Mhz).

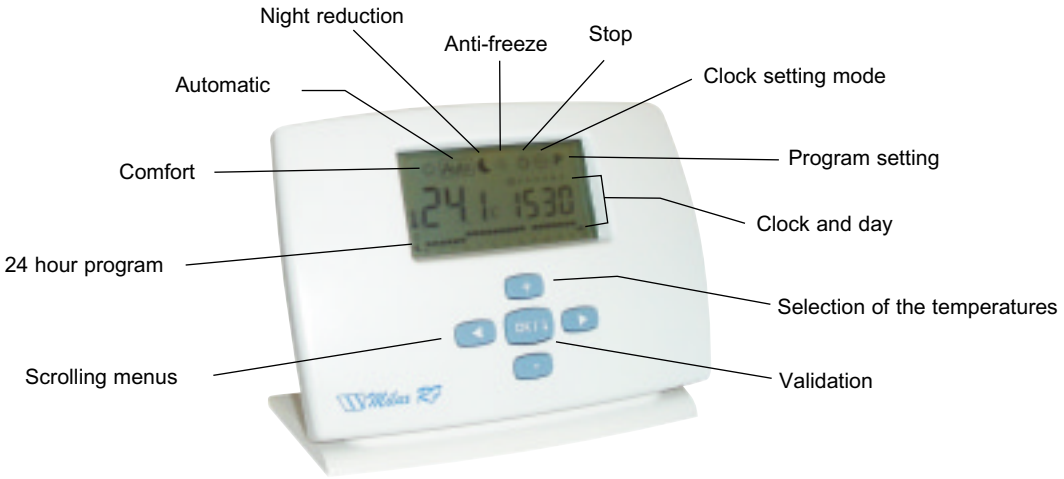
- The communication Radio Frequency is in conformity with the European standards.

- The ITCS (Intelligence Temperature Control System) function is optional. This technology allows you to have precise temperature you want at the time you have selected

Functions :

- 7 days program
- 9 built-in programs and 4 user programs
- Program graphic display
- Room temperature and time display
- Comfort / Reduced / Anti-freeze temperatures
- Temporary temperature override
- Automatic or manual operation
- “Holiday” function
- Keypad lock function (child safety)
- Battery operated supplied, life > 2 years (3 x LR6 batteries, size AA, 1,5 V)
- Battery weakness display
- Battery replacement without loss of the program memory (< 1 minute)
- Reset function

Complete description of the Milux-RF



Display and Keyboard

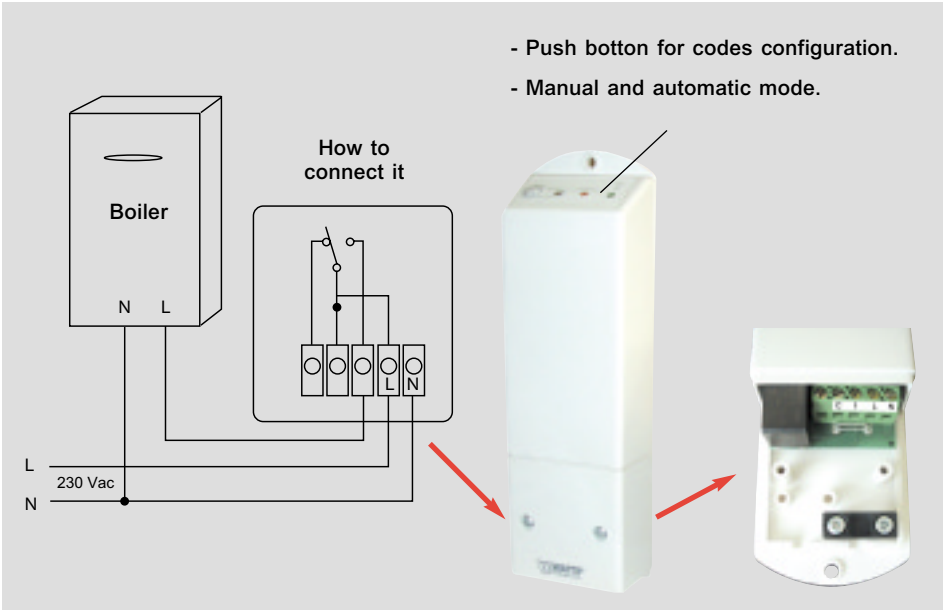
The digital display indicates the temperatures, the time along with different modes (Comfort, Night, Anti-freeze, Stop and program setting). Special functions can be useful such as “Holiday function”, “Keypad lock function” (in order to prevent any modifications of the parameters), “Reset function” (in order to erase all user programs and set the factory parameters by default).
The keyboard is intuitive with an easy cursor type operation. Just press on +/- to set the desired temperature. Slide left or right in the menu to change the current opearating mode.

Easy to install

It is not necessary to fix the thermostat on the wall by using the Milux-RF. However be carefull, the Milux-RF is the unit which senses the room temperature. Therefore, it must be placed approximately at 1.5 metres of the floor and far from any heating sources, sunshine rays and airstream.

Electrical connection of the receiver

The receiver is very easy to install and connect, you just need to fix it on the wall with screw and plugs. Make your own connection operation inside the receiver through screw connectors. Anyway, it can be supplied with a cable already installed.



Packaging

All our products can be customized (logo, leaflets, optional functions, cables...) depending on a minimum quantity.

Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

WATTS INDUSTRIES
Technology by nature

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Re-order no. 60A-0001-UK-IT/1-06-01 - Rev.1

LPG and Natural gas leak detectors
Series GSX - GSW

Main features

- Suitable for domestic applications
- Electronic operation based on microprocessor
- Available in the following versions :
  • wall mounting
  • flush mounting
- Provided with 2 setting/alarm thresholds selectable by the user :
  • 10% of LEL (default)
  • 15% of LEL
- Automatic reset of the normal functioning conditions when the concentration of the gas goes below the threshold alarm.
- Provision for connection to GSM module for sending SMS alarm messages.
- Conforms with European standards, namely :
  • EEC 89/336 EMC, EEC 73/23 LVD, EN50194 Certification pending

WATTS INDUSTRIES
Technology by nature

Description

The new range of gas leak detectors under the name of “Gas Sentinel” for methane and LPG, available for wall and flush mounting, comes with a new design and more compact size as well as with performance characteristics, in terms of reliability and sensitivity in measurement, in accordance with current European standards **(EN50194)**.

The alarm and closing of the solenoid valve are activated by the first or second threshold depending on the programming of gas leak detector, selectable by user.

- Provision for simultaneous monitoring, through serial communication link, up to 11 zones: (1 main detector + 10 secondary detectors)
- Provision for connecting the network of gas leak detectors to a PC for monitoring or programming the detectors using a special software kit.
- Malfunction: the gas leak detector is **provided with circuit for self-diagnostics**, which, in the event of critical fault of the sensor or to one of the main components, trips giving a visual signal (yellow LED).

Conforms with EEC 89/336, EEC 73/23, EN 50194. **Certification pending**.

Technical characteristics	
Power supply	230V - 50Hz
Power consumption	max 3 W
Relay contact load capacity (resistive)	5A - 250V
Gases monitored	(MET version) methane, natural gas (LPG version) propane, butane, LPG
Alarm thresholds	1st threshold = 10% LEL (default) - 2nd threshold = 15% LEL (L.E.L. = Lower Explosion Limit)
Operating temperature	-15 °C ÷ 50 °C
Storage temperature	0 °C ÷ 50 °C
Humidity for using and storage	30 ÷ 95%
Insulating	Class II ⧈
Degree of protection	IP 42
Overall dimensions	GSX - wall mounting 125 x 82 x 47 mm GSW - flush mounting 115 x 66 x 62 mm

GSX

GAS SENTINEL
Gas leak detector, for domestic applications, **for wall mounting**, controlled electronically via microprocessor, with audible and visual alarm, to be connected to one or more solenoid valves, either normally closed (EVNC, EVNCR, EVNCROT) or normally open (EVNA, EVNAOT).

Type	Part. No.	Description	Version	Colour	Weight (g)
GSX	0941010	Methane and natural gas	Wall	White	230
GSX	0941510	LPG, propane, butane	Wall	White	230

GSW

GAS SENTINEL
Characteristics like GSX but **for flush mounting**. Compatible with the more frequent commercially available plates and electrical boxes to DIN standards.

Type	Part. No.	Description	Version	Colour	Weight (g)
GSW	0941020	Methane and natural gas	Flush	White	230
GSW	0941520	LPG, propane, butane	Flush	White	230
GSW	0941021	Methane and natural gas	Flush	Grey	230
GSW	0941521	LPG, propane, butane	Flush	Grey	230

KIT GAS SENTINEL

Gas leak detector kit, for domestic applications, for wall and flush installation, coupled with normally open (EVNAOT) or normally closed (EVNCROT) solenoid valves, with manual reset.

- NO or NC solenoid valves
  - Brass body
  - Power supply:230V
  - Max. operating pressure: 500mbar
  - Operating temperature: -15°C /60°C
  - FF threaded connections: DN15 or 20.
  - Degree of protection: IP65.

Conforms with EEC 89/336, EEC 73/23.

Type	Part. No.	Description	Version	Colour
GSX/15NA	0941550	LPG, propane, butane	Wall	White
GSX/20NA	0941551	LPG, propane, butane	Wall	White
GSX/15NA	0941050	Methane and natural gas	Wall	White
GSX/20NA	0941051	Methane and natural gas	Wall	White
GSX/15NC	0941560	LPG, propane, butane	Wall	White
GSX/20NC	0941561	LPG, propane, butane	Wall	White
GSX/15NC	0941060	Methane and natural gas	Wall	White
GSX/20NC	0941061	Methane and natural gas	Wall	White
GSW/15NA	0941575	LPG, propane, butane	Flush	Grey
GSW/20NA	0941576	LPG, propane, butane	Flush	Grey
GSW/15NA	0941075	Methane and natural gas	Flush	Grey
GSW/20NA	0941076	Methane and natural gas	Flush	Grey
GSW/15NC	0941585	LPG, propane, butane	Flush	Grey
GSW/20NC	0941586	LPG, propane, butane	Flush	Grey
GSW/15NC	0941085	Methane and natural gas	Flush	Grey
GSW/20NC	0941086	Methane and natural gas	Flush	Grey

Application

The “Gas Sentinel” gas leak detectors can be used for domestic application for the purpose of measuring the concentration of the gas, present in the monitored zones; it comes in the:

- **MET** version: methane gas or natural gas
- **LPG** version: butane or propane gas or liquefied petroleum gases

When the concentration of the gas to be monitored exceeds the preset threshold, the gas leak detector is activated with an audible and visual alarm.

The flush version is compatible with the more common commercially available plates and electrical boxes to DIN standards.

AVE System 45 - Banquise
BTicino Light
BTicino Living, Living International
Gewiss Playbus
Gewiss Top System
Vimar Idea
Vimar Plana

Operation

Operation of the “Gas Sentinel” gas leak detector, in both wall and flush installation versions, is through an electronic circuit based on a microprocessor of the latest generation. A transformer and sensor are mounted on the PC board of each gas leak detector. When a threshold is exceeded, the sensor activates an audible/visual alarm and shuts off the gas supply by activating the solenoid valve (normally closed or open), if connected, long before the gas concentration reaches hazardous levels in the domestic environment were the gas leak detector is installed.

The sensor used (“nose”) is a solid-state element, semi-conductor type (non catalytic).

Expected working life of the sensor is 10 years; in this connection, the PC board of the leak detectors is provided with a built-in memory which activates a flashing yellow LED upon reaching 10 years of operation, to indicate that it is advisable to replace the detector (the internal sensitive element is liable to natural aging; its sensitivity is increased accordingly, hence always to the advantage of safety).
Moreover the memory allows checking, if returning the unit to the factory, the serial N°, running hours, the number of times the leak detector has entered alarm condition, etc.

The “Gas Sentinel” gas leak detectors are provided with a programming and silencing button plus a series of LEDs signalling the operating status of the detector :

Programming button:

Service button, located under the adhesive label, can be activated by hand. It allows:

1) Access to the programming menu and setting the gas leak detector operating parameters.

2) Silencing the buzzer for 1 minute in case of alarm.

Red *2° setting alarm threshold (15% LEL)*
Normally switched off, if switched on alarm condition

Red *1° setting alarm threshold (10% LEL)*
Normally switched off, if switched on alarm condition

Yellow *Fault*
If switched on, malfunction or broken signal

Green *Power*
Always switched on normally functioning

Service button
Allowed to programming and silencing alarm (1 min).

LEDs :

Under normal operating conditions, the LEDs are in the following configuration :

1) Green LED: power,
   - if lit up, it indicates that the gas leak detector is switched on.
   - if unlit, it indicates that the gas leak detector is off,
   - if flashing, it indicates that the programming procedure is activated.

2) Yellow LED: malfunction. Unlit under normal operating conditions.

3) Red LED: alarm 10% LEL. Unlit under normal operating conditions.
   Red LED: alarm 15% LEL. Unlit under normal operating conditions.

Self-diagnostics

The electronic circuit of the gas leak detectors is provided with a self-diagnostics program which continuously monitors operation of the gas leak detector: any malfunction, critical fault on the sensor or main components, is indicated via a visual signal (yellow LED). In this case, the gas leak detector should be sent to the factory for checking.

Setting

The gas leak detector is factory-set with 2 different alarm thresholds, namely: 10% and 15% of the LEL and leaves the factory set to 10% of the LEL. If the user has too many false alarms (e.g. generated by products such as bleach, wine, etc.), he can select the 15% alarm mode (however always at a value lower than the max. one prescribed by regulations - 20%).

When the gas leak detector is set for mode of operation based on 10% LEL and the gas concentration exceeds this threshold, a prealarm is displayed (first red LED flashing); if the concentration of gas remains for more than 30 seconds, the leak detector enters the alarm status:

- steady red LED,
- buzzer activated,
- relay switched.

Likewise in the case of the gas leak detector set to 15% LEL, if the gas concentration exceeds this threshold, a first prealarm is displayed (2nd red LED flashing); the leak detector then passes to the alarm status only when the concentration of 15% LEL is exceeded for more than 30 seconds (2nd red LED steady).

Warm-up of the sensor element :

Gas Sentinel has a warm-up time of 2.5 minutes starting from the powering of the gas leak detector, during which the LEDs light up in rotation and the leak detector is not activated. This is the time required for bringing the sensor to its operating temperature which is 140°C.

Normal operation

After the warm-up time, the gas leak detector enters normal operating condition. Under this condition, the leak detector performs self-diagnostics of the electronic circuit. A green LED light indicates “power on” and normal operating condition of the unit.

Malfunction

If a malfunction occurs (e.g. breakage of the sensor element) the leak detector indicates the fault by showing a yellow LED light. A flashing yellow LED indicates reaching the expected working life of the instrument (10 years). After such indication, the leak detector operates normally but its replacement is recommended (the internal sensor element is subject to natural aging).

Alarm

The “Gas Sentinel” gas leak detector is provided with an alarm delay timer to avoid faulty indications due to momentary increases in concentration of the gas. When the alarm threshold is exceeded, the intermittent optical (red LED) and audible (internal buzzer) alarms are given. If the gas concentration exceeds the first alarm threshold 10% LEL, just the first red LED lights up, while if the concentration exceeds the second threshold 15% LEL, both red LEDs light up. If the alarm persists for a time exceeding 30 seconds, the gas leak detector enters the alarm status: the alarm light becomes steady and the buzzer is activated, while the relay causes closing of the solenoid valve. The alarm and closing of the solenoid valve are activated at the first or second gas concentration depending on the gas leak detector. When the concentration of the gas goes below the threshold alarm the gas leak detector stops the alarm automatically and resets the normal functioning conditions. By pushing the “Prog” button it’s possible to stop the alarm for 1 minute.

Performance tests

To check for correct performance of the “Gas Sentinel” gas leak detectors, using a gas bottle test, discharge a small quantity of gas at the opening and wait. If necessary, repeat the operation. The instrument will indicate the presence of gas with a beep and lighting up of one or two intermittent red LEDs. If the gas is detected for more than 30 seconds (internal delay provided in order to avoid spontaneous signalling), the alarm configuration (red LED lit up and buzzer on) is activated. After the set delay time, the pilot relay of the solenoid valve will also be energized. Test functioning by a common lighter is not recommeded, as it makes the gas concentration peak too high, resulting in the sensor giving an incorrect reading for a week.

Networking

The “Gas Sentinel” gas leak detectors have provision for simultaneous monitoring, through a serial communication link, of up to 11 zones. This is done by a programming procedure whereby one detector is set as the main one (Master) and the other 10 detectors as secondary (Slave units).
When the solenoid valve is present, it must be connected to the Master leak detector.
When installing two or more leak detectors in network, the alarm condition produced in a slave detector will also cause the alarm in the master and closing of the solenoid valve to which it is connected. The flashing green LED on the master indicates that the alarm has been transmitted by a slave unit.
On the other hand, the alarm produced in a master will not cause activation of the slaves.

RELIABILITY OF THE SENTINEL GAS LEAK DETECTORS

The “Gas Sentinel” gas leak detectors, with sensors of semi-conductor type, are calibrated individually in cells with the specific gas after an extended stabilizing warm-up of the sensor.
This guarantees maximum security of the gas leak detector for the user because :

- the sensors are calibrated under conditions identical to actual operating conditions;
- the warm-up ensures maximum stability in the level of calibration of the sensor.

The semi-conductor type of sensors used in the gas leak detectors combine the advantage of increased sensitivity over a period of time with good selectivity characteristics and long working life.

Installation

Install the “Gas Sentinel” gas leak detector in a position where the gas to be monitored tends to build up, with reference to figures 1 and 2 :

- **For MET version (for methane or natural gas) at a max distance of 30 cm from the highest point of the ceiling**

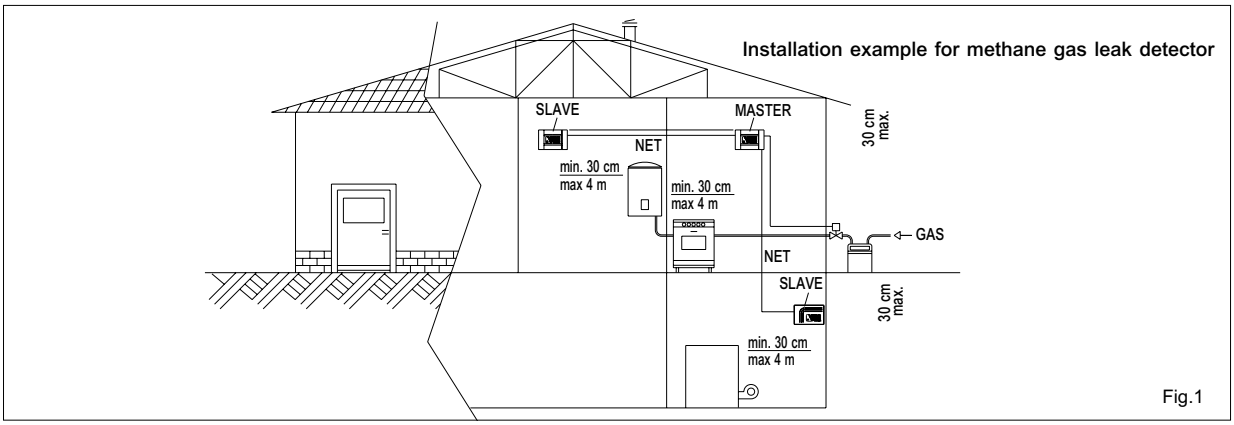


Fig.1

- **For LPG version (butane, propane, LPG) at a max distance of 30 cm from the floor**

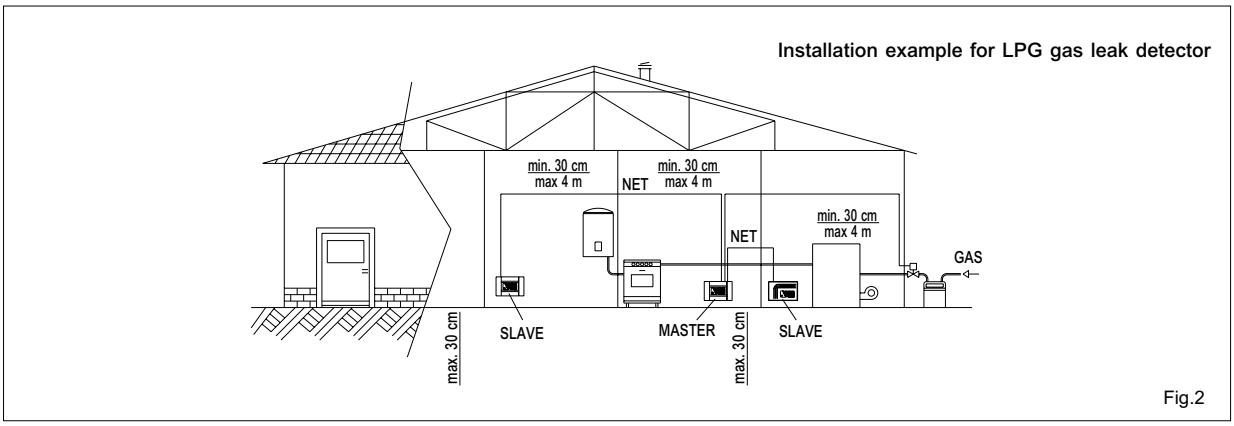
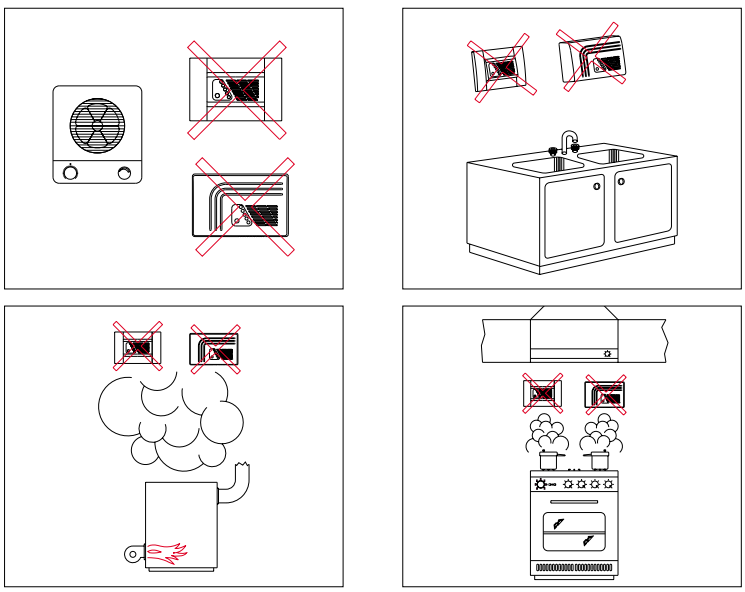
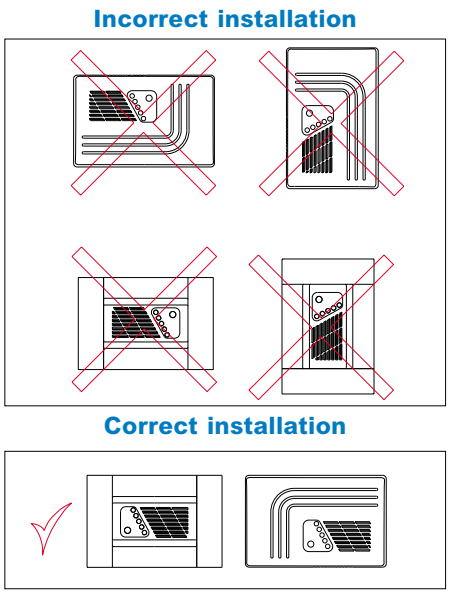


Fig.2

- install the gas leak detector (for wall or flush mounting) at a distance lying between 0.30 and 4 m from gas-fired appliances.
- do NOT install the gas leak detector in the vicinity of sinks, hobs, vents or extractor fans.

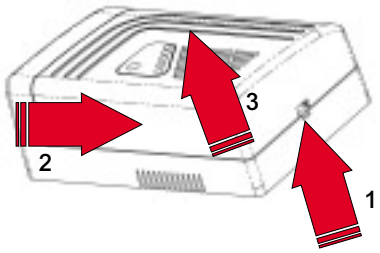
Examples showing incorrect installations





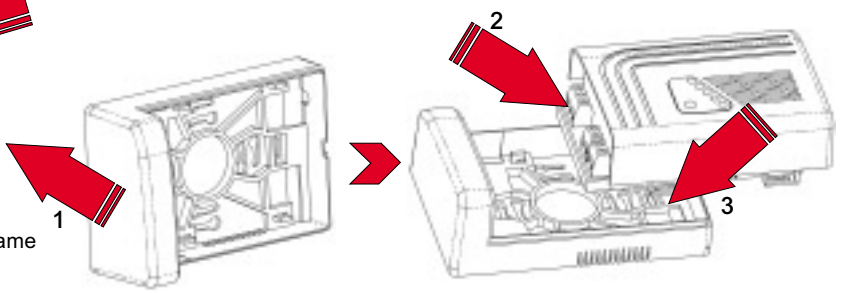
a) Installation of wall-mounting gas leak detector “GSX” :

Installation of wall-mounting version GSX



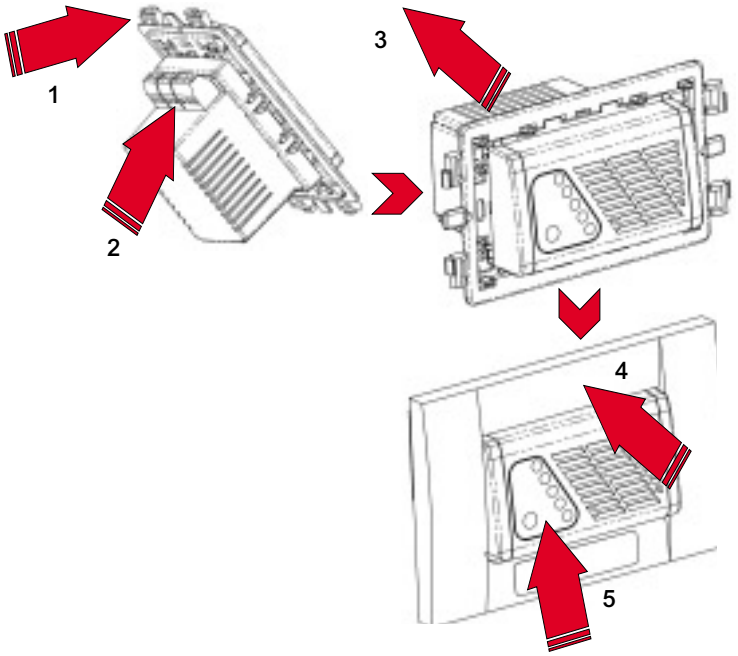
REMOVAL :
1) Prise the spring tab with a screw-driver
2) Pull the leak detector to the right
3) Lift the leak detector from the frame

INSTALLATION :
1) Secure the frame to the wall
2) Make the electrical connections
3) Insert the leak detector in the frame



b) Installation of flush-mounting gas leak detector “GSW” :

Installation of flush mounting version GSW



1) Depending on the type of plate to be installed, either cut or not cut the side tabs, and remove or not remove the side lugs.

2) Connect the power supply, solenoid valve and, if necessary, the serial communication.

3) Insert the gas leak detector in the electric wall box provided and fasten it with the two screws supplied as standard kit.

4) Apply the plate chosen.

5) Affix the adhesive label with the leak detector replacement date.

Maintenance

The “Gas Sentinel” gas leak detector does not require maintenance.

Periodically remove deposits of dust by using a dry rag; do not use alcohol or solvents. It is not possible to vary the gas leak detector calibration; if the fault (yellow) indicator lamp lights up, replace the product and send the non-functioning product to the technical service.

Spare parts

No spare parts are available.

Electrical connections

Connect the “Gas Sentinel” gas leak detector to the 230V - 50Hz power supply using relative terminals (N - L); connect the solenoid valve, if necessary, via relative terminals (Nc - C - No) according to the wiring diagram given in figures 3 and 4.

Use electrical cables with minimum size smaller than 1,5 mm 2 ; use cables provided with suitable insulation.

1 - Connection to solenoid valve 230V-50Hz

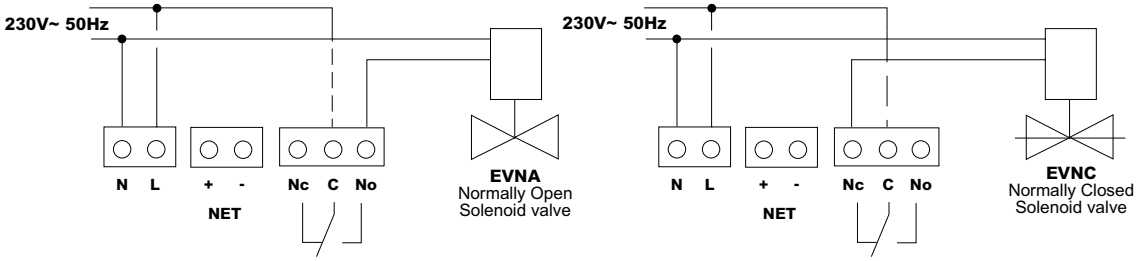


Fig.3

2 - Connection to solenoid valve 12VCC - 12VAC - 24VCC - 24VAC

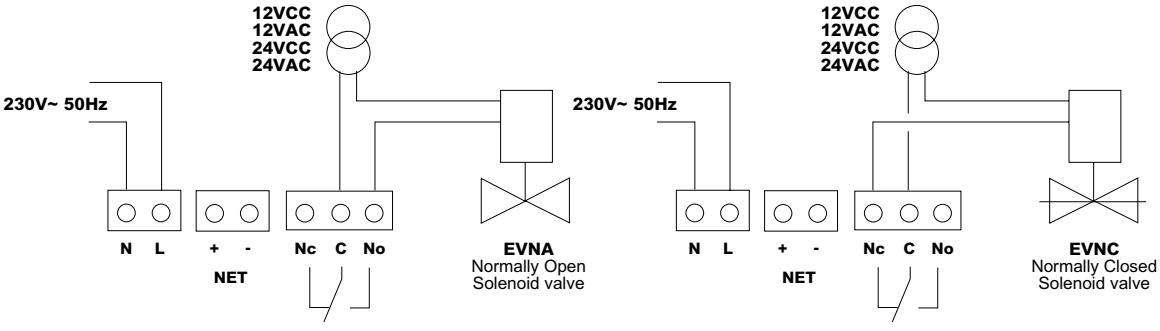


Fig.4

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www.wattsindustries.com

Re-order no. 64-0001-UK-IT/1-06-01-Rev.0

Air vent valves with float
Series MVD,MV, MKV,MKL,2161C, MXV

Main features

Automatic and/or manual devices for discharging air from heating and air-conditioning systems.

- Available with :
• Vertical
• Horizontal

discharge and shut-off valve to enable them to be replaced while the system is running.

High venting capacity version (Series MXV)

WATTS INDUSTRIES

A Division of Watts Water Technologies Inc.

Description

The valves called :

DUOVENT Series MVD, MVDR,
MINIVENT Series MV, MVR,
MICROVENT Series MKV, MKVR, MKL, MKLR,
FLOATVENT Series 2161C.
MAXIVENT Series MXV

are automatic and/or manual devices for discharging air from heating and air-conditioning systems.

MVD

DUOVENT. (*PATENTED*)
Automatic and manual air vent valve with unscrewable cover for inspection.
Body and cover of brass CW617N. Corrosion-resistant polyethylene float.
Nominal pressure: 12 bar. Max. operating pressure: 8 bar.
Max. temperature: 115° C. Automatic venting capacity at 3 bar: 17.9 litres/min.
Manual venting capacity at 3 bar: 139.5 litres/min.
Also suitable for water containing additive (glycol up to 30%).

Type	Part number	Size body	Weight (g.)
MVD	0250608	1/4"	195
MVD	0250610	3/8"	200
MVD	0250615	1/2"	200

MVDR

DUOVENT
Air vent valve like MVD but complete with automatic shut-off valve RIA.

Type	Part number	Size body	Weight (g.)
MVDR	0250708	1/4"	210
MVDR	0250710	3/8"	220
MVDR	0250715	1/2"	250

MV

MINIVENT
Automatic air vent valve with unscrewable cover for inspection.
Body and cover of brass CW617N. Corrosion-resistant polyethylene float.
Max. pressure: 12 bar. Max. temperature: 115° C.
Also suitable for water containing additive (glycol up to 30%).

Type	Part number	Size body	Weight (g.)
MV	0250008	1/4"	195
MV	0250010	3/8"	190
MV	0250215	1/2"	200

MVR

MINIVENT
Automatic air vent valve like MV but complete with automatic shut-off valve RIA.

Type	Part number	Size body	Weight (g.)
MVR	0250108	1/4"	215
MVR	0250110	3/8"	220
MVR	0250115	1/2"	240

MKV

MICROVENT
Automatic vertical air vent valve. Body and cover of brass CW617N.
Sealed with O-Ring. Max. pressure: 10 bar. Max. temperature: 110° C.
Also suitable for water containing additive (glycol up to 30%).

Type	Part number	Size body	Weight (g.)
MKV	0251210	3/8"	140

MKVR

MICROVENT
Automatic vertical air vent valve like MKV but complete with automatic **sealed** shut-off valve.

Type	Part number	Size body	Weight (g.)
MKVR	0251310	3/8"	165

MKL

MICROVENT
Automatic side air vent valve. Body and cover of brass CW617N
Sealed with O-Ring. Max. pressure: 10 bar. Max. temperature: 110° C.
Also suitable for water containing additive (glycol up to 30%).

Type	Part number	Size body	Weight (g.)
MKL	0252210	3/8"	140

MKLR

MICROVENT
Automatic side air vent valve like MKL but complete with automatic **sealed** shut-off valve.

Type	Part number	Size body	Weight (g.)
MKLR	0252310	3/8"	165

2161C

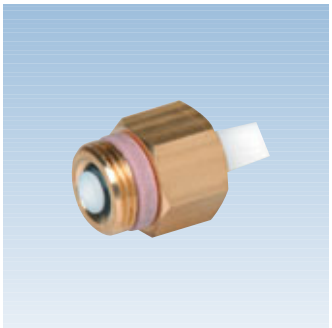
FLOATVENT
Automatic vertical air vent valve. Sealed with O-ring.
Designed for installation on head connections of flush manifolds.
Brass CW617N body. Max. pressure: 10 bar. Max. temperature: 110°C.

Type	Part number	Size body	Weight (g.)
2161C	2161C38	3/8"	135
2161C	2161C12	1/2"	150
2161C	2161C34	3/4"	160
2161C	2161C1	1"	170

2311C

CHECKVENT
Sealed check valve for automatic vertical air vent valve 2161C38.

Type	Part number	Size body	Weight (g.)
2311C	2311C38	3/8"	25



RIA

Automatic shut-off valve for automatic air vent valves series MVD, MV, MKV, MKL.
Complete with device for quick and total drainage of water from the valve.

Type	Part number	Size body	Weight (g.)
RIA	0259008	1/4"	25
RIA	0259010	3/8"	25
RIA	0259015	1/2"	45

MXV

MAXIVENT.
Automatic large capacity deaerator provided with manual air vent valve.
Cast iron body and cover with epoxy finish. Max. operating pressure : 12 bar.
Max. operating temperature : 115° C. Female air outlet connection 3/8".

Type	Part number	Size body	Weight (g.)
MXV	0253020	3/4"	4380
MXV	0253025	1"	4440
MXV	0253032	1.1/4"	4400

Application

These devices are used in all traditional heating systems (independent, central, radiant panel, etc) for discharging air during the filling phase and the air released into the water during the heating phase, which obstructs the normal circulation of the heat carrier fluid above all at the points where it circulates at a low speed (heat emitters), thus reducing their thermal efficiency. The air vent valves allow the air to be discharged at the points of the system where it accumulates (distribution manifolds, tops of the risers or directly in the boiler).

Operation

The automatic operation of the air vent valves is based on a float system ensuring tight seal: valve opening and closing is determined by the float movement (up-down).
When there is air in the valve, the force of the float weight acts on the lever which is integral with the plug, thus causing it to move down. In such situation the seat is free and allows the air to be vented outside.
When filling the system with water, the air entrapped in the water circuit is pushed towards the outside via the valves. As soon as all the entrapped air is discharged, the water, entering the tank, pushes the float up. Consequently the lever moves the plug to press against the seat thus ensuring tight sealing of the system, thus preventing the heat carrier fluid from flowing out.
The design feature of this device is that it enables air to be discharged from the system automatically while it is being emptied. The **Series 2311C or Series RIA** check valves may be used to carry out maintenance work while the system is pressurized.
The operation of the check valve is based on a spring-activated device, sensitive to the pressure of the system, which ensures a seal by means of O-Rings made of EPDM when there is no air vent valve.

The reliability of the air vent valves is ensured by a series of tests carried out on 100% of products to check that the body and its components are watertight.

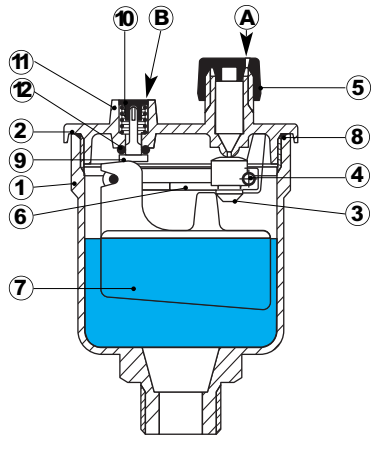
DUOVENT

In addition to its automatic air venting feature, the DUOVENT **MVD, MVR Series** valve is provided with a device allowing manual air venting.

The manual air vent device offers the following advantages :

a) it allows checking the valve for correct operation
b) it allows reducing times for discharging air from the system by increasing the discharge flow rate
c) easier cleaning of the orifice by forcing water to flow through it.

Manual venting is actuated by pushing down button (10); this can be done by exerting a pressure on the surface, for example with a screw driver. Such operation shifts head (9) integral with O-ring (12) to a position lower than the seat, thus allowing air and/or water to flow along stem (10). When water flows both from orifice (A) and (B), this indicates that all the air has been discharged from the system.



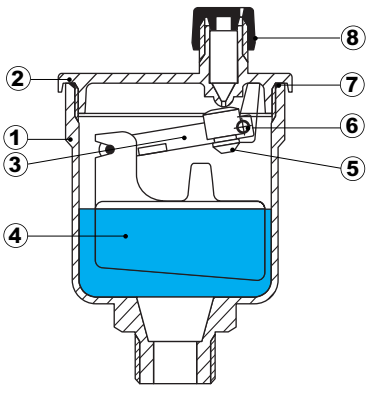
Details

A) Automatic vent
B) Manual vent
1) Body
2) Cover
3) Plug
4) Spring
5) Cap
6) Lever
7) Float
8) Seals
9) Plug head
10) Plug button
11) Spring
12) Seals

Design features	
Body	Brass OT 58
Cover	Brass OT 58
Plug	EPDM rubber
Spring	Stainless steel
Cap	Polyamide
Lever	Polyacetal
Float	High density expanded polyethylene
Seals	NBR rubber
Plug head	Polyacetal
Plug button	Polyacetal
Spring	Stainless steel
Connections	M 1/4" - 3/8" - 1/2" DIN - ISO 228/1

Technical features	
Nominal pressure	12 bar
Max. pressure	8 bar
Max. operating temperature	115°C

MINIVENT



Details

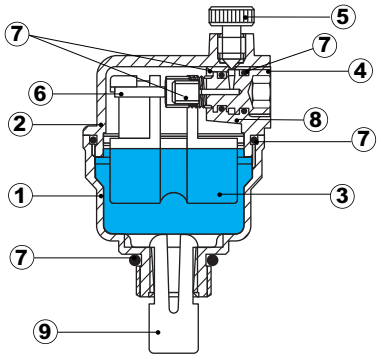
1) Body
2) Cover
3) Lever
4) Float
5) Plug
6) Spring
7) Seals
8) Cap

Design features	
Body	Brass OT 58
Cover	Brass OT 58
Lever	Polyacetal
Float	High density expanded polyethylene
Plug	EPDM rubber
Spring	Stainless steel
Seals	NBR rubber
Cap	Polyamide
Connections	M 1/4" - 3/8" - 1/2" DIN-ISO 228/1

Technical features	
Max. operating pressure	12 bar
Max. operating temperature	115°C

MICROVENT

The **MICROVENT Series MKV, MKVR, MKL, MKLR** valve is provided with a vacuum breaker tongue (close to the threaded connection) designed for improving the air venting characteristics. However such vacuum breaker tongue is not fitted when the **MICROVENT** valve is supplied with shut-off valve **Series RIA** which already incorporates the tongue.



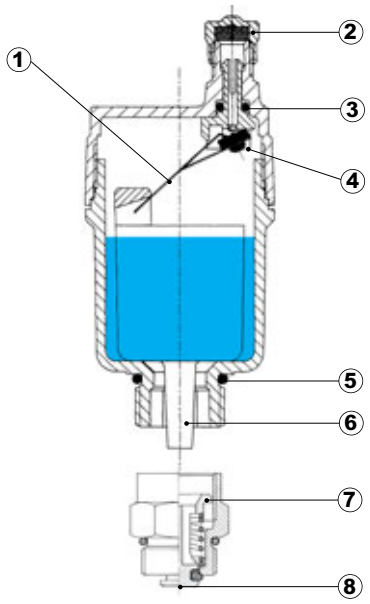
Details

1) Body
2) Cover
3) Float
4) Plug
5) End cap
6) Lever
7) Seals
8) Spring
9) Vacuum breaker

Design features	
Body	Brass OT 58
Cover	Brass OT 58
Float	High density expanded polyethylene
Plug	Polyphenylene oxide
End cap	Polyphenylene oxide, glass fibre reinforced
Lever	Polyphenylene oxide, glass fibre reinforced
Seals	NBR rubber
Spring	Stainless steel
Vacuum breaker	Polyacetal
Connections	M 3/8" DIN - ISO 228/1

Technical features	
Max. operating pressure	10 bar
Max. operating temperature	110°C

2161C



Details

1) Air venting control mechanism
2) Safety cap
3) Vent O-ring
4) Plug
5) Sealed with O-ring
6) Jet breaker
7) Retaining device
8) Retaining plug

Design features	
Valve body	CW617N
Float	Stabilized polypropylene
O-Ring	EPDM
Plug	Silicone rubber
Control mechanism	Stainless steel
O-Ring sealing	EPDM
Retaining spring	Stainless steel
Retaining plug	Glass fiber reinforced polyamide

Technical features	
Max. operating temperature	115°C
Min. pressure	0.1 bar
Max. pressure	10 bar
Usable liquids	Water also with glycol ⩽ 50%

MAXIVENT

Due to its considerable size, the **MAXIVENT Series MXV**, deaerator is used for automatically venting air from large-sized water distribution pipes (e.g. distribution manifolds in the central system, on risers) and in all cases where large quantities of air have to be removed from the system. The **MAXIVENT** deaerator is provided with manual air vent.

Design features	
Body	Cast iron G25 entirely coated with epoxy resin
Cover	Cast iron G25 entirely coated with epoxy resin
Manual vent valve	Chrome-plated brass OT 58
Lever	Stainless steel
Plug	NBR rubber
Float	High density expanded polyethylene
Seals	NBR rubber
Cap	Brass OT 58
Inlet connection	F 3/4" - 1" - 1.1/4" DIN-ISO 228/1
Outlet connection	F 3/8" DIN-ISO 228/1, brass

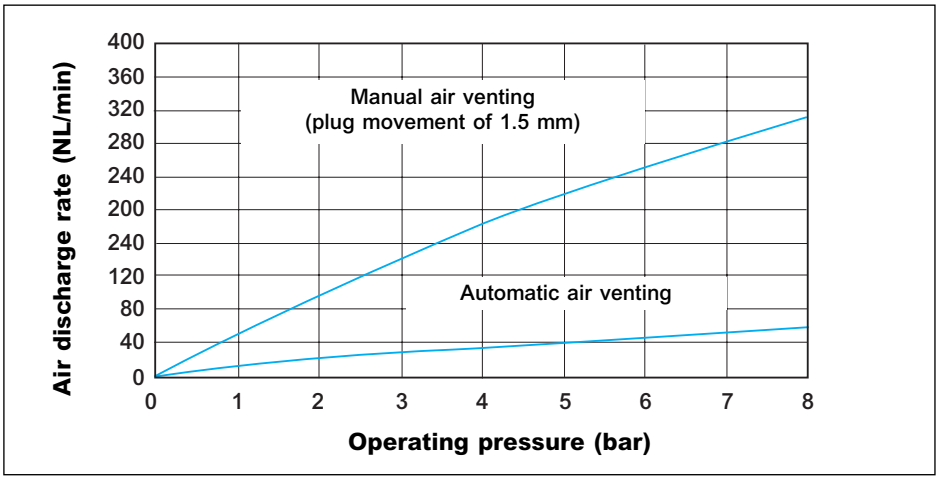
Technical features	
Max discharge pressure	6 bar
Max. operating pressure	12 bar
Min. seal pressure	0.1 bar
Max operating temperature	115°C

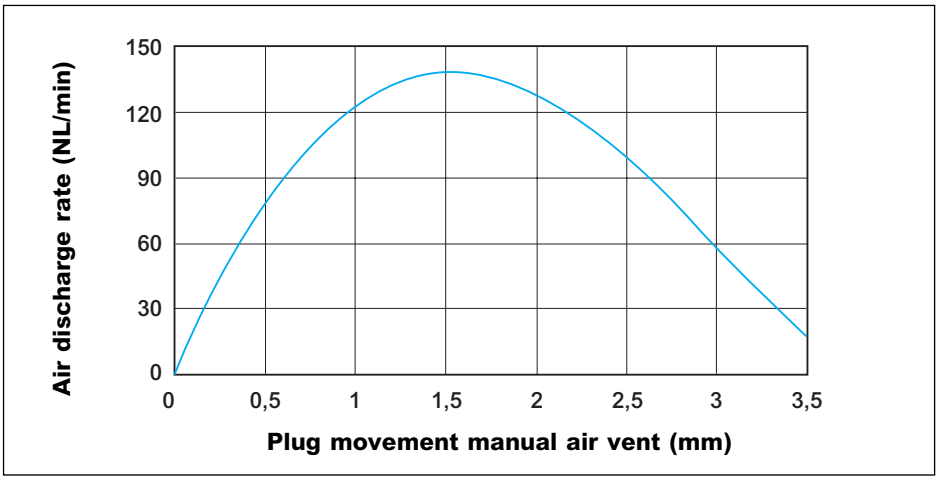
Flow rate-Operating pressure Charts

DUOVENT

Air discharge rate - Operating pressure
(comparison between manual and automatic venting)

The following diagram shows the automatic and manual venting curves in relation to pressure, assuming a manual plug movement of 1.5 mm. It is clear that the manual venting allows an appreciable increasing in the discharge rate of **DUOVENT**.

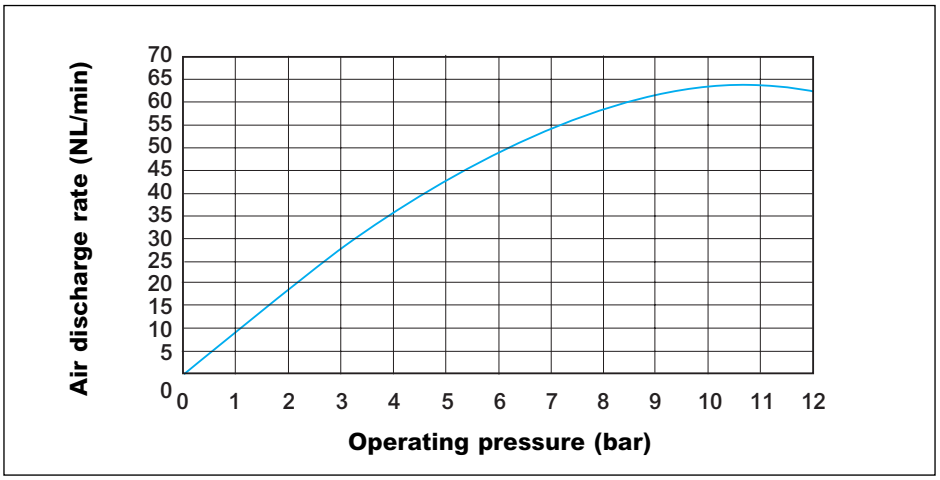




Flow rate-Operating pressure Charts

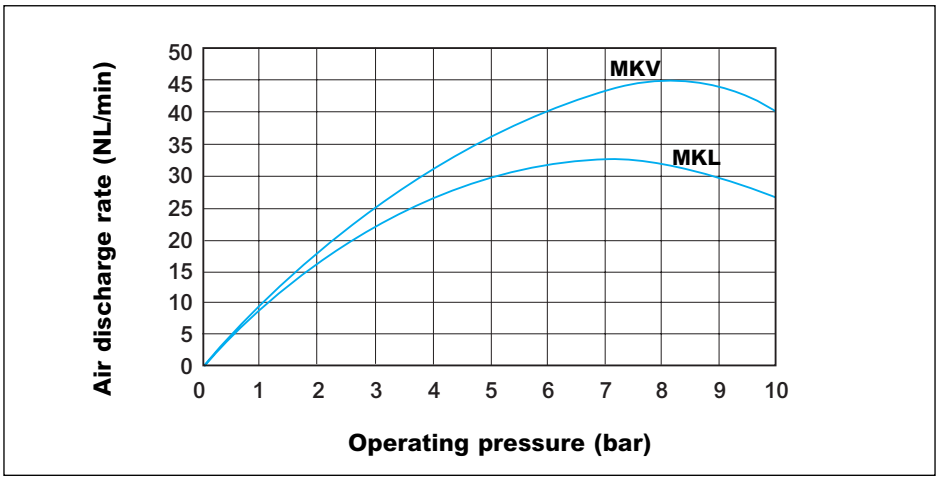
MINIVENT

Air discharge rate - Operating pressure



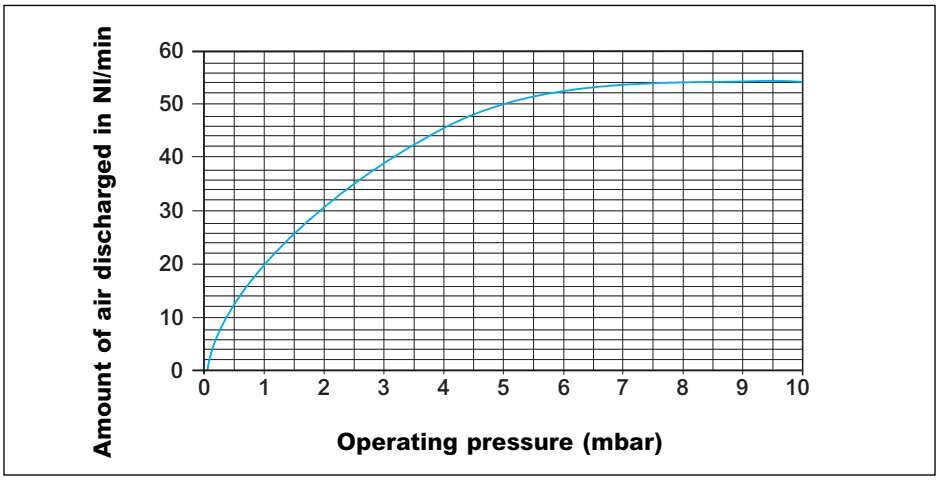
MICROVENT

Air discharge rate - Operating pressure



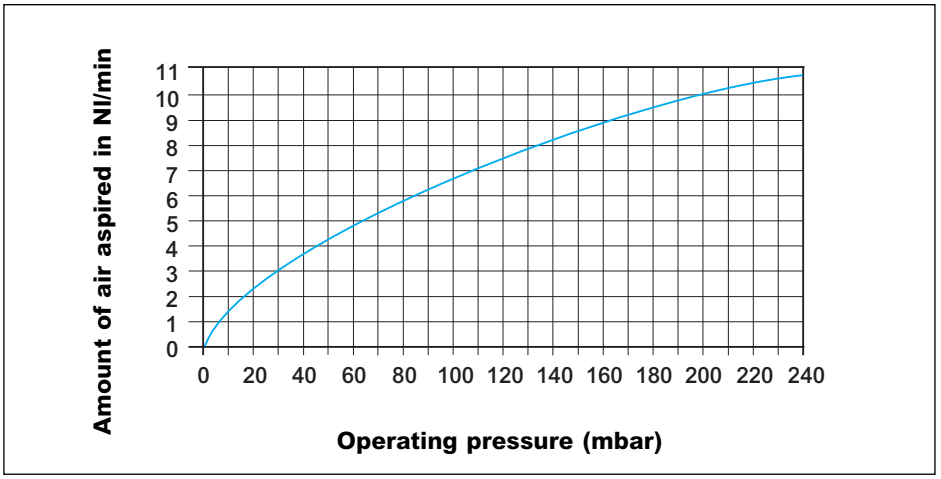
2161C

Discharge capacity



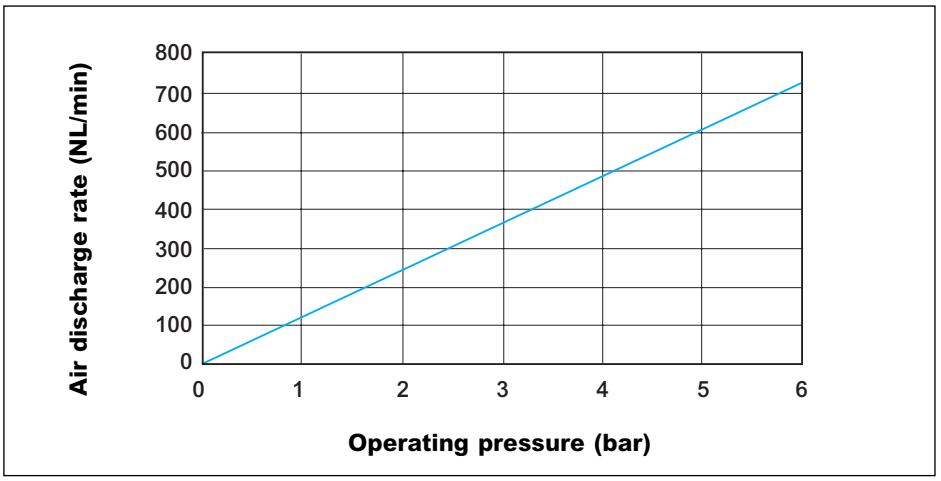
2161C

Aspired capacity



MAXIVENT

Air discharge rate - Operating pressure



Installation

The **DUOVENT, MINIVENT, MICROVENT, FLOATVENT, MAXIVENT** air vent valves are normally installed :

- at the top of risers in heating systems with a closed expansion vessel
- on distribution manifolds
- directly in the boiler (on the S**eries SAF** air separator)

In order to ensure maximum air venting efficiency, it is advisable to install the valves in those points where water speed is relatively low.

After installation, in order to allow perfect air venting, unscrew the protective cap by at least two turns (such condition ensures the vent characteristics as given in the previous diagram).

When it is necessary to mount a MICROVENT valve provided with vacuum breaker tongue on a RIA shut-off valve, merely lift out the tongue with two fingers.

Maintenance

Normally the **DUOVENT, MINIVENT, MICROVENT, FLOATVENT, MAXIVENT** valves do not require maintenance.

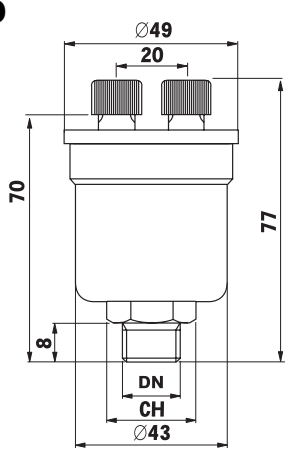
The valves may be inspected by unscrewing the cover from the tank or, with the **MAXIVENT** valve, by unscrewing the screws that secure it to the body. A tight seal between the tank and cover is ensured by the presence of an O-ring; therefore it is also possible to clean the internal parts (float and lever) in case of ingress of foreign matter in the valve.

Long-term efficiency and performance of the vent movement is ensured by the valve design features. The seal system is designed to withstand vibrations, therefore it is unaffected by any external vibrations.

If the **Series MVD, MV, MKV, MKL 2161C** have to be replaced, the use of the **Series RIA or Series 2311C** check valves allows this operation to be performed without the system having to be emptied.

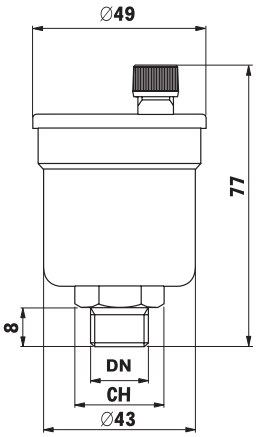
Overall dimensions (mm)

MVD



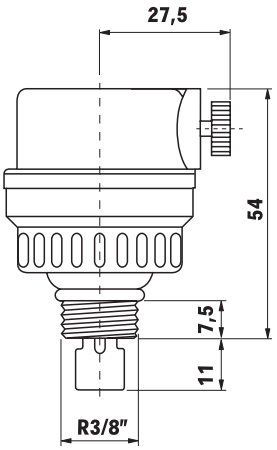
DN	CH
1/4”	19
3/8”	19
1/2”	22

MV

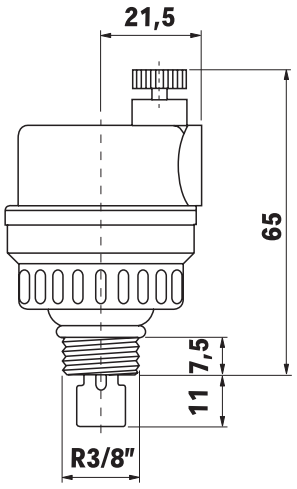


DN	CH
1/4”	19
3/8”	19
1/2”	22

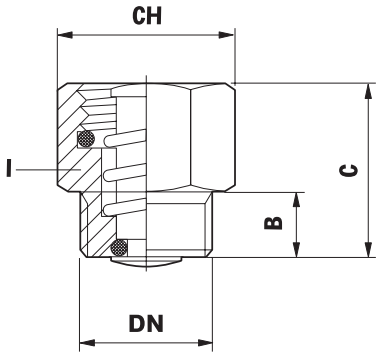
MKL



MKV

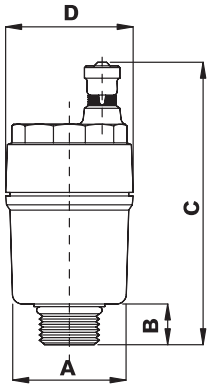


RIA

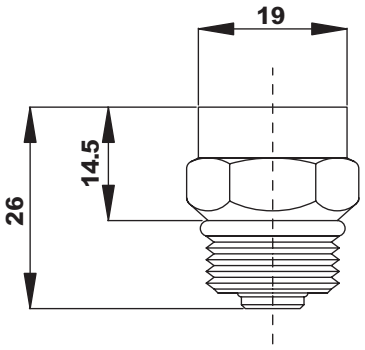


DN	B	C	CH
1/4”	8	11	19
3/8”	8	11	19
1/2”	8	11	24

2161C

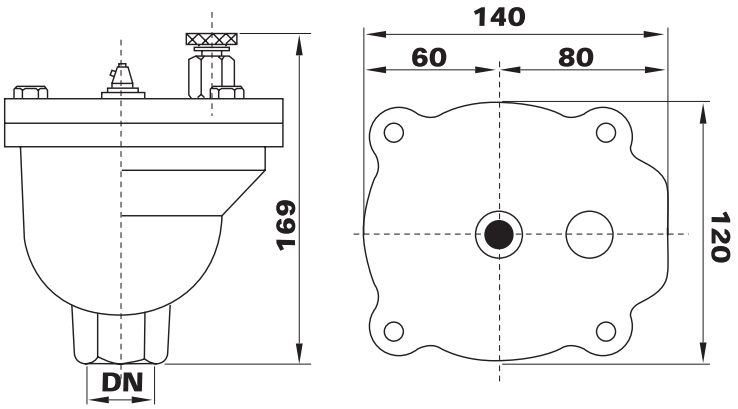


2311C



DN	A	B	C	D
3/8”	30	10	77	36
1/2”	30	10	77	36
3/4”	32	12	79	36
1”	37	12	79	36

MXV - 3/4" - 1" - 1.1/4"



Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

WATTS INDUSTRIES
A Division of Watts Water Technologies Inc.

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e-mail : info@wattsindustries.it - www.wattsindustries.com

Re-order no. 66-0010-IT/1-UK-03/07-Rev.0

Automatic air vents valves for solar energy systems Series MV-SOL

Main features

Automatic air vent for solar energy systems with special float in Polymer high resistance.

- Size available :
• 3/8” - 1/2” threaded.

WATTS® INDUSTRIES

Technology by nature

Description

MINIVENT valves **Series MV-SOL** are automatic air vent valves for solar systems. Valves are inspectionable, by unscrewing the cap from the valve tank (body). The seal between cap and valve tank is guaranteed from the presence of an O-ring, therefore it is possible to inspect and eventually clean the internal parts of the valve, in case of presence of foreign matters. Efficiency and functionality of the discharge mechanism during the time are guaranteed from the design characteristics of the valve.

Sealing system is suitable to support vibration.

MV-SOL

MINIVENT
Automatic air vent valve for solar energy systems with unscrewable cover for inspection. Body and cover of brass CW617N, 1265-99. Polyethylene float.
Seal between reservoir and cover with O-ring.
Connection ND 3/8” - 1/2” DIN - ISO 228/1.
Stainless steel (AISI 304) vacuum breaker (only for ND 3/8”).
Max. operating pressure : 12 bar. Max. operating temperature : 160 °C.

Type	Part No.	Size
MV-SOL	0249110	3/8”
MV-SOL	0249115	1/2”

Technical features	
Couplings	3/8” male DIN-ISO228/1, 1/2” available on demand (without vacuum breaker)
Maximum operating pressure	12 bar (175 psi)
Maximum operating temperature	160°C (320°F)

Design features	
Body and cover	EN12165-99 CW617N brass, hot pressed and sand blasted
Float	Polymer high resistance
Plug	Elastomer high resistance
Spring	AISI302 stainless steel
Cap	EN12164-01 CW614N brass, nickel plated
Vacuum breaker (only for 3/8”)	AISI304 stainless steel

Operation

Opening and closing of the valve is caused by the vertical movement (ascent and descent) of the float.

- With the occurrence of air inside the valve, the level of the water falls down, the float weigh acts on the lever, pulling down lever and shutter (which are united). In this configuration the horifice is open, the air may vent outside the installation.
- During the filling with water of the plant, the air which is contained in the hydraulic circuit is pushed outside through the **MINIVENT** valve. When all the air is discharged, the water that moves into the valve body pushes upward the float, as a result the lever pushes upward the shutter which closes the horifice and ensures the hermetic seal of the valve.

Installation

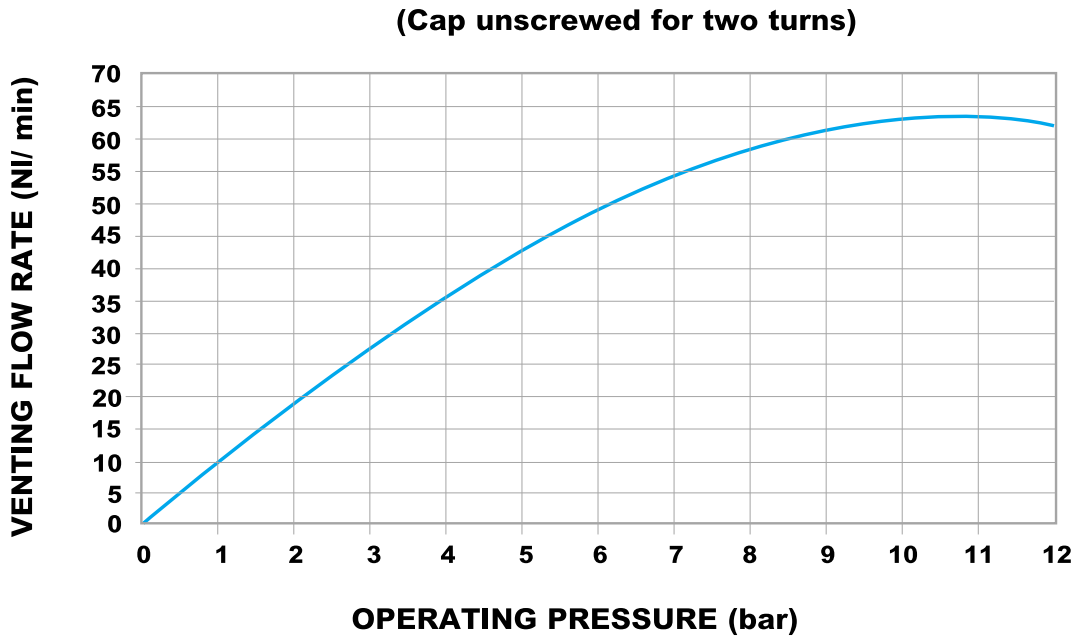
In order to ensure the maximum venting efficiency, the **MINIVENT** valve must be installed in the summit of the hydraulic circuit, in a place where the speed of the water is low.

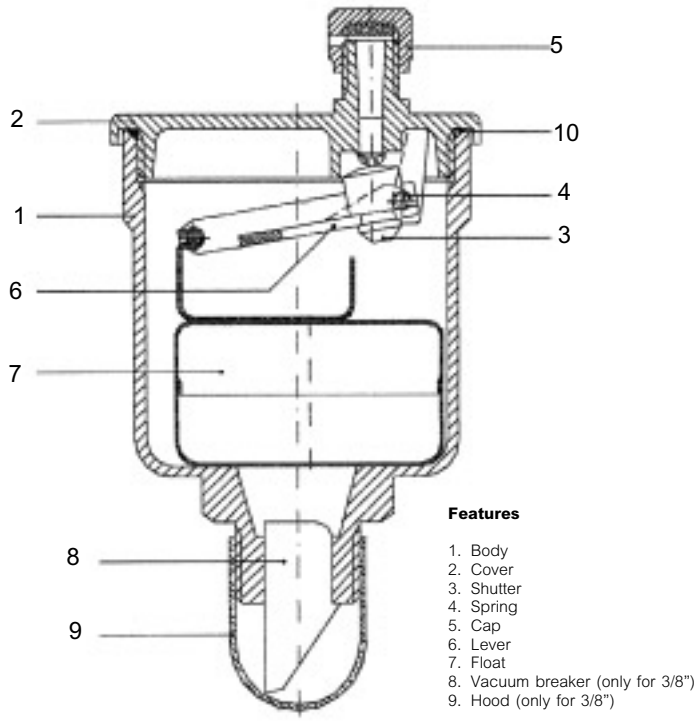
After the installation, in order to maximise the venting capacity, unscrew the protection cap for at least two turns (with this configuration the venting characteristics are shown in the above diagram).

Maintenance

MINIVENT air vent valve normally does not need maintenance. Anyhow, if the valve must be disassembled, the presence of the automatic shut-off valve **RIA** allows the operation without emptying the hydraulic circuit.

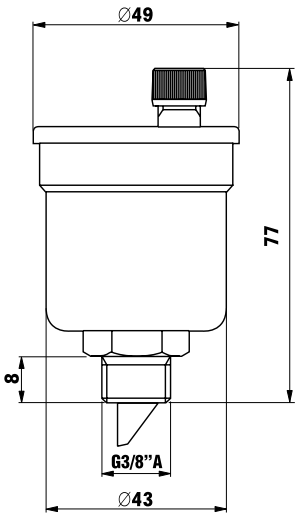
Venting Flow rate - Operating Pressure

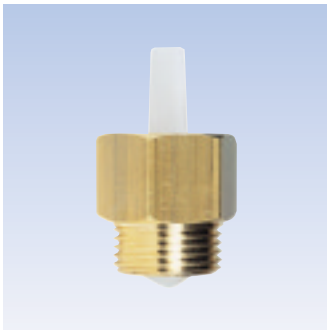




Overall Dimensions (mm)

MV-SOL





RIA/MV-SOL

Automatic shut-off valve.

Type	Part No.	Size
RIA/MV-SOL	0259410	3/8” x 3/8”

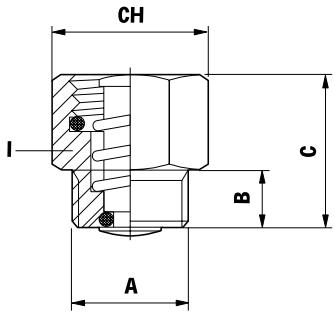
Operation

Automatic shut-off valve **RIA** allows the air vent valves (**MV-SOL**) to be removed without having to empty the system. The **RIA** shut-off valve is fitted with a device for quick total emptying of the water from the valve.

Design features	
Body	Brass EN12164-01 CW614N
Plug	Polymer high resistance
Spring	Stainless steel
Connections	MF 3/8” DIN - ISO 228/1
Sealing	Elastomer high resistance

Overall Dimensions (mm)

RIA



DN	B	C	CH
3/8”	8	11	19

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www.wattsindustries.com

Re-order no. 66-0011-UK-IT/1-06-01-Rev.1

Deaerators Series ERD and Air separators Series SA - SAF

Main features

Air separators and deaerators allow the automatic venting of air in air conditioning and heating systems.

- Presence of air conditioning and heating systems causes various problems such as :
  - Increased deposit of scaling with consequent narrowing of the pipe sections
  - Higher noise level in the systems
  - Lower heat exchange capacities
  - Increase in the rate of corrosion of the pipework

WATTS INDUSTRIES

Technology by nature

Description

The standard automatic air vent valves allow venting of air only when the latter is separated from the water and accumulated in the topmost zones of the system. The **ERD** deaerator allows reduction in speed with consequent aggregation of the air in maxi bubbles and the automatic venting of such air.

ERD

EUROVENT.
Air separator with expansion vessel and double automatic/manual deaerator.

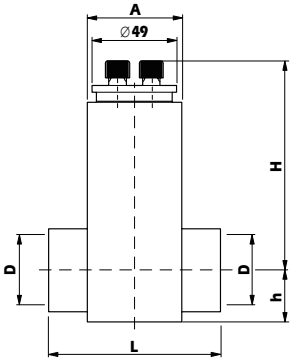
Type	Part No.	Size
ERD	0253625	1”
ERD	0253640	1.1/2”

Technical characteristics	
Max. operating pressure	8 bar
Max. operating temperature	115°C
Test pressure	12 bar

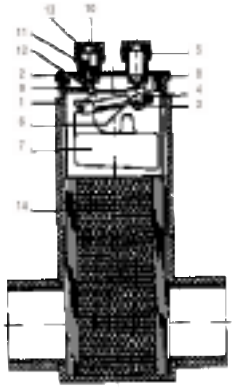
Design features	
Body	Tropicalized sheet steel
Cover	Shot blasted stamped brass OT58
Seals	EPDM rubber
Springs	Stainless steel AISI302
Float	High density PE
Spiral mesh	Stainless steel AISI304
Connections	G 1" F DIN-ISO 228/1 (ERD25) G 1.1/2" F DIN-ISO 228/1 (ERD40)

Overall dimensions (mm)

ERD



DN	A	L	H	h
1”	60x50	94	153	26
1.1/2”	60x60	104	191	32



Features

1. Tank
2. Cover
3. Plug
4. Torque spring
5. Automatic vent plug
6. Lever
7. Float
8. Cover seal ring
9. Manual vent plug
10. Manual vent bushing
11. Manual vent spring
12. Seal ring, manual vent
13. Manual vent plug
14. Spiral mesh

Application

The **EDR** is used for discharging air :

- In circuits with circulator, at the highest point of the pipework to reduce noise and to increase efficiency
- In radiant panel systems because the presence of air would reduce the efficiency of the panels
- In air conditioning system to avoid entrapping of air in the heat exchangers.

Selection criteria

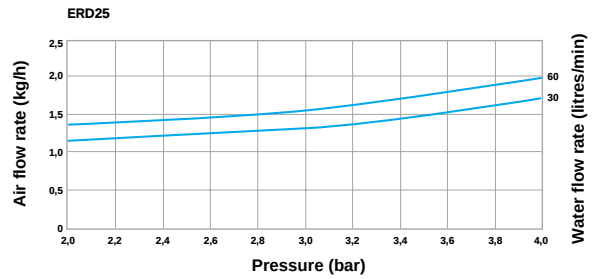
Acceptable speed of water in heating-water-plumbing systems is between 1 and 2 m/s, therefore **ERD25** is used for flow rates up to 60 litres/min, while **ERD40** is used for flow rates up to 150 litres/min. Higher flow rates determine higher speeds with consequent less air venting capacity.

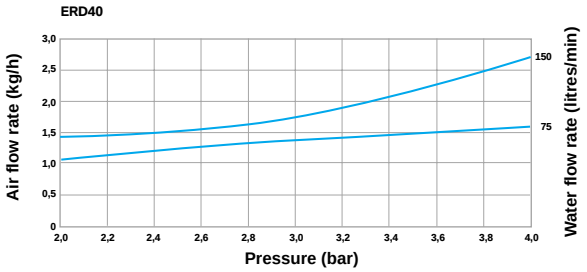
Operation

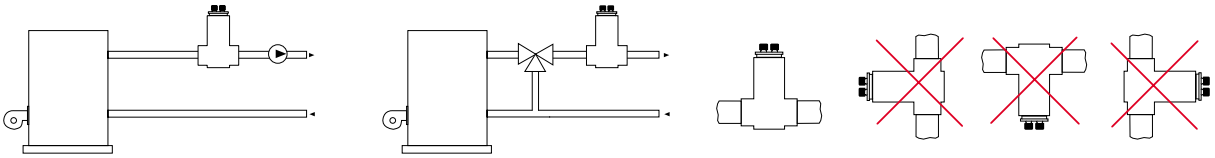
Principle of operation of the **ERD** air separator is as follows:

- The speed of the fluid is reduced inside the device
- The reduction in speed and the presence of the internal spiral mesh leads to separation of the micro air bubbles dispersed in the water
- The micro bubbles, on coming into contact with the mesh, aggregate and tend to be conveyed to the top of the body, from where they are discharged by the automatic valve.

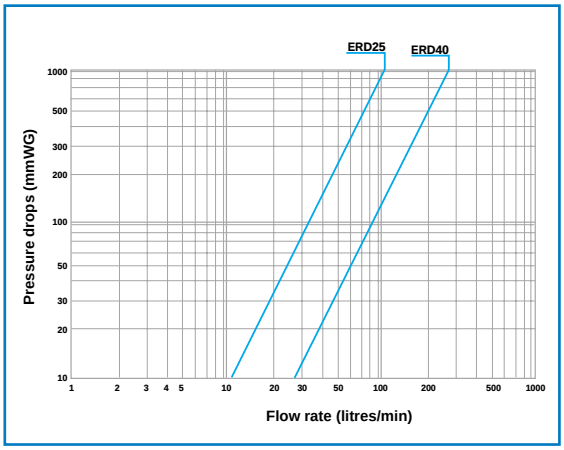
Vent capacity



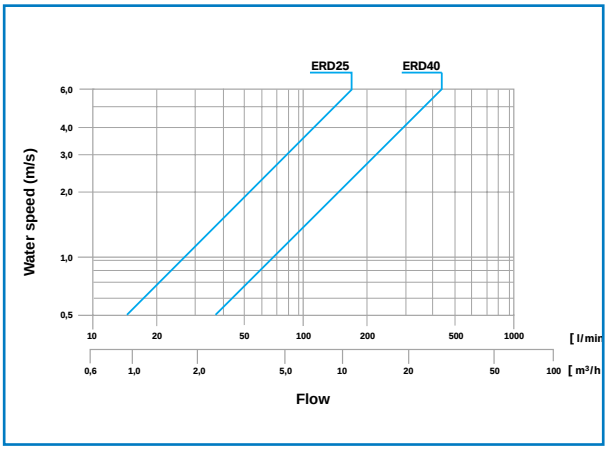




Flow rate - Pressure drop chart



Flow rate - Water speed chart



SA

Air separators with 5 threaded instrument connections.

Type	Part No.	Size
SA	0260125	1”
SA	0260132	1.1/4”
SA	0260140	1.1/2”
SA	0260150	2”
SA	0260165	2.1/2”
SA	0260180	3”

SAF

Flanged air separators with automatic deaerator connection, complete with counter-flange, bolts and seals.

Type	Part No.	Size
SAF	0260200	100
SAF	0260225	125
SAF	0260300	200

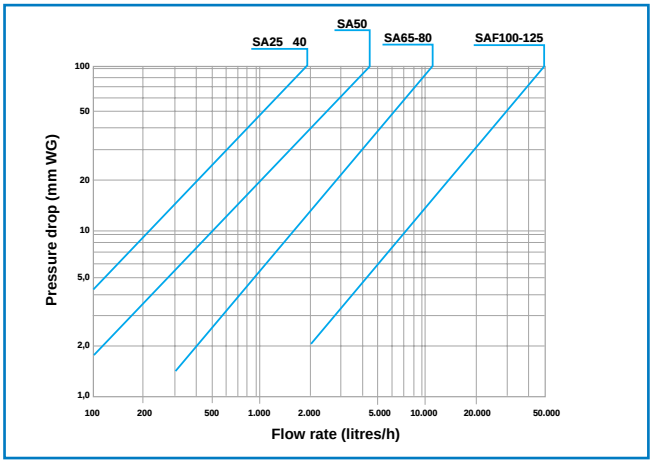
Application

From the critical water speed diagram, it can be deduced that separation of air from water can only take place when the speed of the water lies below the critical speed value. Such value depends on the pipe diameter, on the slope of the latter referred to the horizontal plane (counter slope) and the water temperature.
Air separators **Series SA and SAF** provide the most suitable conditions as regards the characteristics of the above mentioned points:
- Increase in full flow (reduction in speed)
- Zero counter slope (horizontal flow) with partial deviation towards the top owing to the internal fins
- High temperature (determined by the positioning in the vicinity of the boiler).

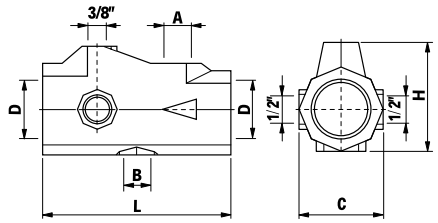
Hence the air collects at the highest point of the separator where an automatic air vent valve is installed (Minivent, Intervent, Microvent or Maxivent). For increased efficiency of the separator, the latter should be preceded by a straight length of piping.

Design features	
Body, separator SA	Painted malleable cast iron
Body, separator SAF	Painted steel
Connections, SA	Threaded DIN-ISO 228/1
Connections, SAF100	Flanged NP6-UNI 2276 with counter flange, bolts and seals
Connections, SAF125	Flanged NP10-UNI 2276 with counter flange, bolts and seals

Flow rate - Pressure drop chart



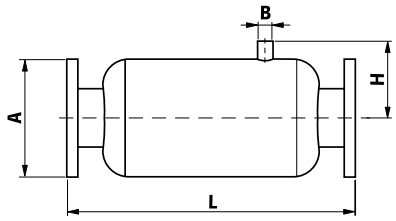
SA



DN	A	B	C	L	H
1”	1/2”	3/4”	70	152	87
1.1/4”	1/2”	3/4”	70	152	87
1.1/2”	1/2”	3/4”	70	152	87
2”	3/4”	1”	87	189	115
1.1/2”	1”	1”	128	300	203
3”	1”	1”	128	300	203

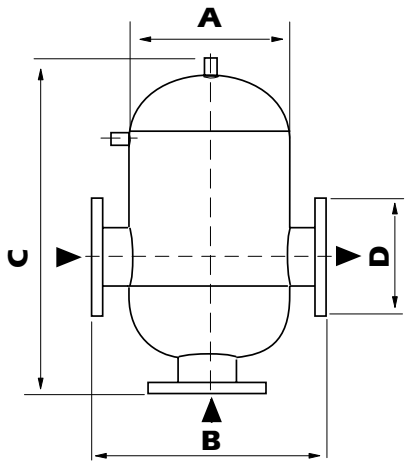
Overall dimensions (mm)

SAF



DN	A	B	L	H
100	PN6	3/4”	600	156
125	PN10	1”	700	168

SAF



DN	A	B	C	D
200	550	800	1100	PN10

Key:

A. safety valve connection (VST, MSL, SV)
B. expansion vessel connection
3/8" automatic air vent valve connection (MV, MKV, MKL, INT)
1/2" thermometer- gauge connection (TMAX)

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Re-order no. 66-0020-UK-IT/1-05-11-Rev.0

"Y" Strainers
F21NOR - F21N Series

Main features

Available in the following versions :

- FF Threaded with brass body
- Flanged with cast iron body

- High filtration capacity
- Easy access to the filter cartdrige
- Compact dimensions
- Manufactured according to the PED 97/23/CEE, No needs to be CE marked according to art. 3 par. 3

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Technology by nature

Description

"Y" strainers **series F21N** are impurity collectors because they contain a stainless steel mesh collecting all filtered material. It is always a good rule to install strainers in domestic or industrial air conditioning or heating system plants in order to avoid that sand or big impurities present into the fluid (welding waste, metal shavings, gasket residues) could occlude or damage the installed devices (sanitary taps, water treatment devices, back flow preventers, pressure reducers, etc.).

F21NOR

Brass "Y" strainer with stainless steel replaceable mesh .
FF threaded connections.

Type	Part. No.	DN	Kvs	Filtration efficiency	Weight (Kg)
F21NOR	F21NOR15	1/2”	4,48	500 µm	0,13
F21NOR	F21NOR20	3/4”	7,86	500 µm	0,23
F21NOR	F21NOR25	1”	11	500 µm	0,39
F21NOR	F21NOR32	1.1/4”	16	500 µm	0,55
F21NOR	F21NOR40	1.1/2”	22	500 µm	0,73
F21NOR	F21NOR50	2”	35	500 µm	1,13
F21NOR	F21NOR65F	2.1/2”	60	800 µm	2,16
F21NOR	F21NOR80F	3”	83	800 µm	3,21
F21NOR	F21NOR100F	4”	100	800 µm	6,92

F21N

Cast Iron "Y" strainer with stainless steel replaceable mesh .
Flanged connections PN16.

Type	Part. No.	DN	Kvs	Filtration efficiency	Weight (Kg)
F21N	F21N-65	65	180	800 µm	16
F21N	F21N-80	80	258	800 µm	18
F21N	F21N-100	100	365	1000 µm	27
F21N	F21N-125	125	567	1000 µm	35
F21N	F21N-150	150	788	1000 µm	47
F21N	F21N-200	200	1258	1000 µm	85
F21N	F21N-250	250	1432	1600 µm	145

Technical features	
Nominal Pressure	20 bar (1/2”- 2”) - 16 bar (2.1/2”- 4”)
Working Temperature	-20 °C ÷ 100 °C
N° holes cartdrige flanged strainers	Dn 65 = 4 Dn 80 = 8 Dn 100 = 8 Dn 125 = 8 Dn 150 = 8 Dn 200 = 12 Dn 250 = 12

Design features	
Threaded Body DN 1/2" ÷ 2"	Brass
Flanged body DN 65 ÷ 250	Cast iron GG25
Filter cartdrige	SS AISI 304
Drilled flanges	UNI 2222/67 PN16

Operation

The flow is obliged to go through the filter cartridge from inside part to the external side and during this crossing all suspended impurities are captured by the strainer mesh. In case of filter saturation the collected impurities do not allow the flow circulation any more, and the particular reinforced support doesn’t allow the filter breaking and consequently the release of impurities into the system.

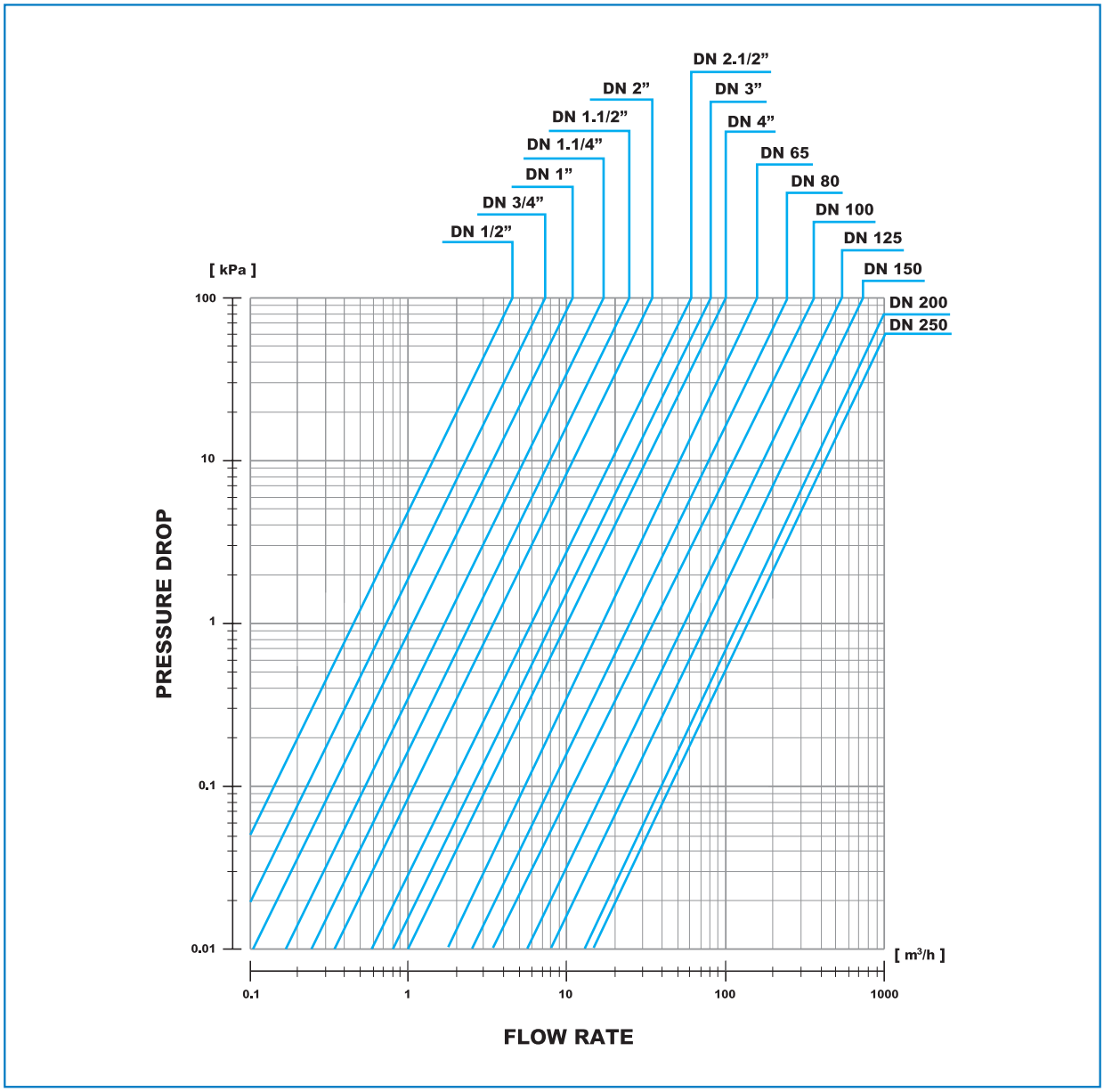
Installation

"Y" strainer **series F21N** can be installed on vertical or horizontal pipes.
Install the filter in the direction indicated by the arrow and with the cap towards the bottom so that, when opening it, all impurities collected will be taken out together with the fluid down flow and will not go back into the pipe. During installation, be careful to have enough space for maintenance.

Maintenance

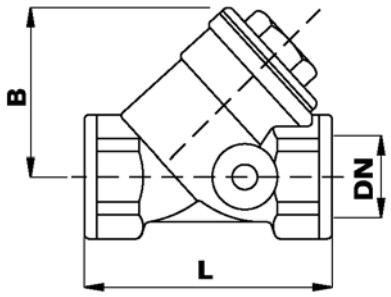
Plan a periodical cleaning of "Y" strainers **series F21N** in order to check the obstruction level of the inner filter cartridge. Cleaning is extremely easy by removing the cap placed on the bottom side of the body. In case of installation near the floor, it is recommended a distance between the pipe and floor equal to two times the distance H in order to allow the extraction of the filter mesh.
When starting a new plant, after few working hours, it is recommended to open all strainers installed to clean them from typical impurities caused by new pipes installation. After having cleaned the strainer, check the cap gasket seal carefully and in case of doubts do not hesitate to replace it. For particular use, it is recommended to install, before and after the strainer, two pressure gauges in order to evaluate the obstruction level of the filter.
Before starting maintenance be sure that the fluid flow has been stopped.

Flow rate/pressure drop charts



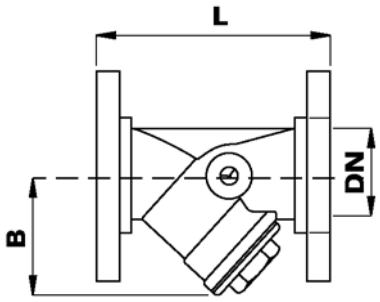
Overall dimensions (mm)

F21NOR



DN	L	B
1/2”	58	40
3/4”	70	48
1”	87	56
1.1/4”	96	64
1.1/2”	106	73
2”	126	89
2.1/2”	150	107
3”	169	120
4”	219	161

F21N



DN	L	B
2.1/2”- 65	290	193
3”- 80	310	205
4”- 100	350	245
5”- 125	400	295
6”- 150	480	325
8”- 200	600	390
10”- 250	730	460

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Thermostatic valves Series 178UM-179UM-1178UM-1179UM 188UM-189UM-1188UM-1189UM

Main features

- Available in the following versions:
  - Angle body, straight body
  - For iron, copper and polyethylene piping
  - With 3/8” radiator connection and 1/2” connection on pipe side.
- Plug stroke pre-setting device for series 188UM-189UM-1188UM-1189UM.
- Compact size and reduced weight.
- Conforms with UNI 8464/90 standard.

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Technology by nature

Description

Thermostatic valves with simple setting **series 178UM-179UM-1178UM-1179UM** and those with pre-setting **series 188UM-189UM-1188UM-1189UM** are used as shut-off and control devices for heat emitters (radiators, fan coils, radiant panels, etc.) in heating and air-conditioning systems. The valves are available in the configuration with straight or angle body, with male or female thread, and should be installed on the delivery pipe of the heat emitter. Connection to the heat emitter is through an O-RING sealed straight tailpiece with use of a socket head wrench.

178UM

Nickel-plated thermostat adaptable valve. Angle body. Connection for iron pipe, size 1/2"M. **Cilinder tailpiece with sealed O-ring**. ABS handwheel with movable stem. Compatible with thermostatic actuators series 148 and electrothermic actuator 22C.

Type	Part number	Dn	Kvs	Weight (g)
178UM	178UMSN38	3/8"	2,1	210
178UM	178UMSN12	1/2"	2,6	260
178UM	178UMSN34	3/4"	3,3	370

179UM

Nickel-plated thermostat adaptable valve. Straight body. Connection for iron pipe, size 1/2"M. **Cilinder tailpiece with sealed O-ring**. ABS handwheel with movable stem. Compatible with thermostatic actuators series 148 and electrothermic actuator 22C.

Type	Part number	Dn	Kvs	Weight (g)
179UM	179UMSN38	3/8"	1,1	230
179UM	179UMSN12	1/2"	1,8	280
179UM	179UMSN34	3/4"	2,6	370

1178UM

Nickel-plated thermostat adaptable valve. Straight body. Connection for copper or plastic pipe, size 1/2"M. **Cilinder tailpiece with sealed O-ring**. ABS handwheel with movable stem. Compatible with thermostatic actuators series 148 and electrothermic actuator 22C.

Type	Part number	Dn body	Dn pipe	Kvs	Weight (g)
1178UM	1178UMSN38X	3/8"	1/2"	2,6	200
1178UM	1178UMSN12	1/2"	1/2"	2,6	230

1179UM

Nickel-plated thermostat adaptable valve. Straight body. Connection for copper or plastic pipe, size 1/2"M. **Cilinder tailpiece with sealed O-ring**. ABS handwheel with movable stem. Compatible with thermostatic actuators series 148 and electrothermic actuator 22C.

Type	Part number	Dn body	Dn pipe	Kvs	Weight (g)
1179UM	1179UMSN38X	3/8"	1/2"	1,8	220
1179UM	1179UMSN12	1/2"	1/2"	1,8	260

188UM

Nickel-plated thermostat adaptable valve like 178UM **with pre-setting** and ABS handwheel with fixed stem

Type	Part number	Dn	Kvs	Weight (g).
188UM	188UMSN38	3/8"	2,1	230
188UM	188UMSN12	1/2"	2,6	280
188UM	188UMSN34	3/4"	3,3	350

189UM

Nickel-plated thermostat adaptable valve like 179UM **with pre-setting** and ABS handwheel with fixed stem

Type	Part number	Dn	Kvs	Weight (g)
189UM	189UMSN38	3/8"	1,1	250
189UM	189UMSN12	1/2"	1,8	350
189UM	189UMSN34	3/4"	2,6	390

1188UM

Nickel-plated thermostat adaptable valve like 1178UM **with pre-setting** and ABS handwheel with fixed stem

Type	Part number	Dn body	Dn pipe	Kvs	Weight (g)
1188UM	1188UMSN38X	3/8"	1/2"	2,6	220
1188UM	1188UMSN12	1/2"	1/2"	2,6	250

1189UM

Nickel-plated thermostat adaptable valve like 1179UM **with pre-setting** and ABS handwheel with fixed stem

Type	Part number	Dn body	Dn pipe	Kvs	Weight (g)
1189UM	1189UMSN38X	3/8"	1/2"	1,8	240
1189UM	1189UMSN12	1/2"	1/2"	1,8	280

Application

These valves are designed for room temperature control in manual or automatic mode when coupled with thermostatic actuators (series 148, 148SD, 148CD) or else electrothermic actuators (Art. 22C). The use of thermostatic valves allows installation of metering systems (see Sections on Measuring and metering systems) as required by Italian legislation (Act 10/94 Art. 28).

Operation

Valve operation is controlled by manual or automatic movement of the plug which shuts off the heat carrier fluid. The hydraulic flow rate and pressure drop characteristics for the valves can be deduced from appropriate charts; in the thermostatic function, they assume the characteristics of such device.

Pre-setting for series 188UM-189UM-1188UM-1189UM:

These valves are provided with active memory presetting which, when using thermostatic or thermoelectric actuators, enables exact balancing of the system.

Such balancing is obtained by turning a ring nut located under the handwheel in order to limit the plug stroke. Above all, the active memory presetting allows, in case of removing the handwheel used in thermostatting the system, permanent retention of the balancing made.

The reliability of the thermostatic valves **series 178UM-179UM-1178UM-1179UM** and **series 188UM-189UM-1188UM-1189UM** is guaranteed by the 100% testing of the production that checks for water tightness of the valve body and its components towards the outside and tight seal of the plug in its flow shut-off function.

Pre-setting

	Pre-setting									
	Qms (l/h)									
	Dn	1	2	3	4	5	6	7	Max	Qmn
	3/8"	80	175	215	215	215	215	215	215	215
	1/2"	80	175	215	215	215	215	215	215	215
	3/4"	80	180	230	230	230	230	230	230	230
	3/8"	75	160	200	200	200	200	200	200	200
	1/2"	75	175	225	225	225	225	225	225	225
	3/4"	80	180	240	240	240	240	240	240	240
	±%	60	30	20	10	10	10	10	10	10

Where : $Kv = \frac{qms}{316}$

How to adjust series 188UM-189UM-1188UM-1189UM

1 - Unscrew handwheel **(Fig.1)**
2 - Remove the ring nut by turning it anti-clockwise
3 - Fully close the pre-setting ring nut **(Fig.2)**
4 - Open to required position by making the number to coincide with the reference notch **(Fig.3)**

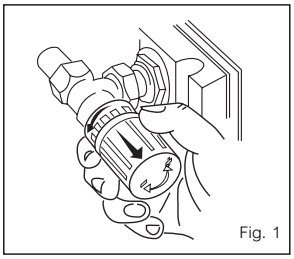


Fig. 1

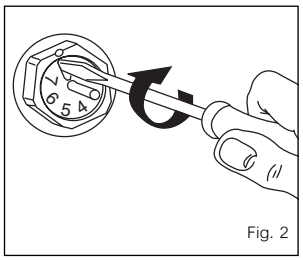


Fig. 2

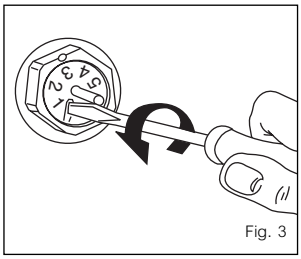


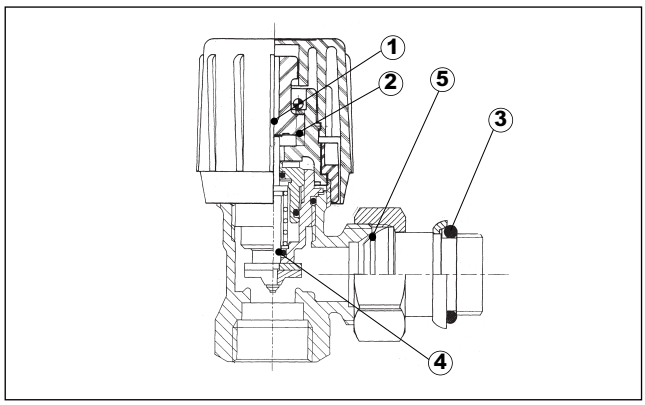
Fig. 3

Installation

The choice of valves and lockshields depends on the size of connection to the radiator and the connecting piping. Manual thermostatic valve with simple setting **series 178UM-179UM-1178UM-1179UM** and those with pre-setting **series 188UM-189UM-1188UM-1189UM** can be installed on heat emitters supplied by iron, copper and plastic piping, in combination with lockshields **series 195UM, 196UM, 1195UM, 1196UM**. When the system requires thermostatting, merely unscrew the handwheel and replace it with a thermostatic or thermoelectric actuator by tightening the ring nut. All this can be done without plumbing work and with the system running. When it is required to build a thermostatted system immediately, use can be made of thermostatic valve bodies **series 130UM, 131UM, 1130UM, 1131MU**, identical in configuration, but without the handwheel for manual control.

Hydraulic characteristics

Kv values in the various pre-setting positions						
Setting position	188UM 3/8" 1188UM 3/8"	188UM 1/2" 1188UM 1/2"	188UM 3/4"	189UM 3/8" 1189UM 3/8"	189UM 1/2" 1189UM 1/2"	189UM 3/4"
1	0.27	0.27	0.27	0.27	0.27	0.27
2	0.60	0.62	0.67	0.57	0.64	0.64
3	0.88	0.90	1.00	0.78	0.90	0.95
4	1.12	1.13	1.30	0.91	1.12	1.23
5	1.31	1.32	1.56	0.97	1.30	1.51
6	1.46	1.47	1.80	1.00	1.44	1.74
7	1.60	1.60	2.00	1.02	1.55	1.96
A	2.05	2.60	3.30	1.10	1.80	2.60



Design features	
Valve body	Brass CW617N
Handwheel	Polypropylene
O-ring	EPDM
Tailpiece	Brass CW614N

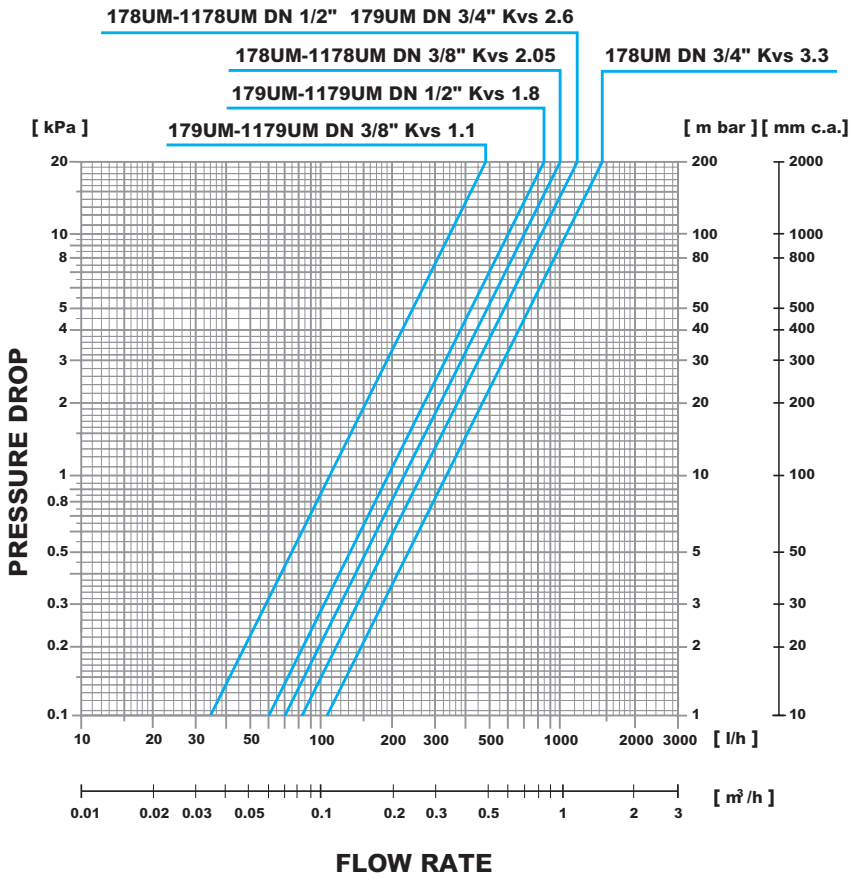
Technical features	
Nominal pressure	10 bar
Max. temperature	110 °C
Usable liquids	Water also with glycol ≤50%

Features

1) Pre-setting stuffing box nut, can also be replaced with system under pressure
2) Complete plug replaceable without emptying the system by using Art. 225.
3) O-RING sealed straight tailpiece
4) Elastomeric plug seal (vulcanised EPDM : Ethylene-Polypropylene Diene Monomer)
5) O-ring

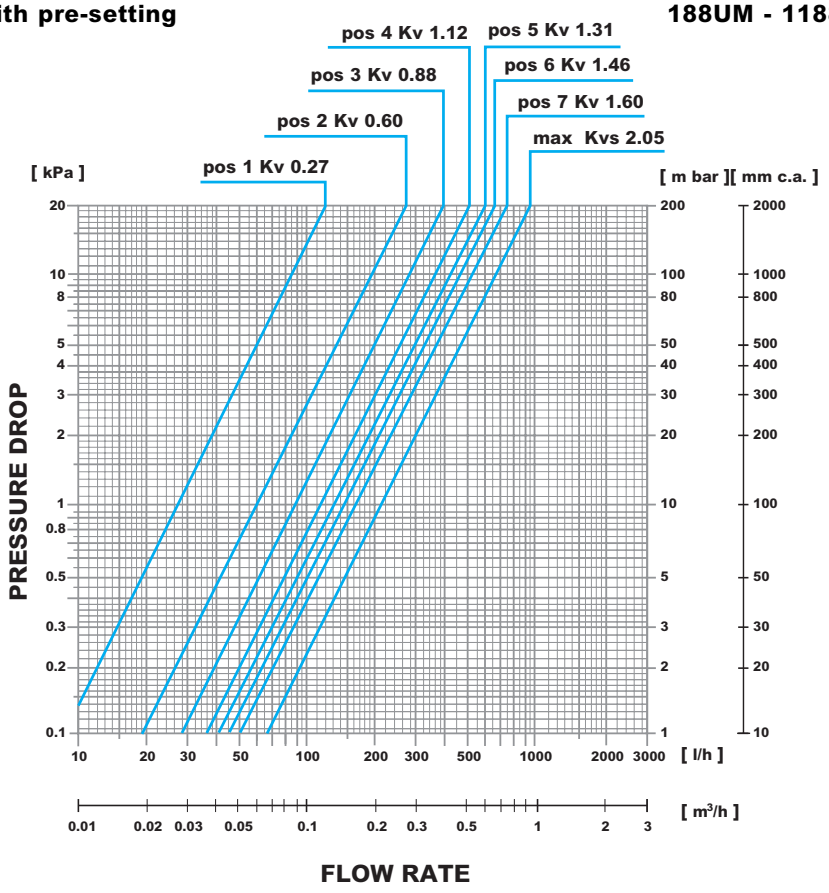
Flow rate/pressure drop charts

Max. opening **178UM - 1178UM - 179UM - 1179UM**



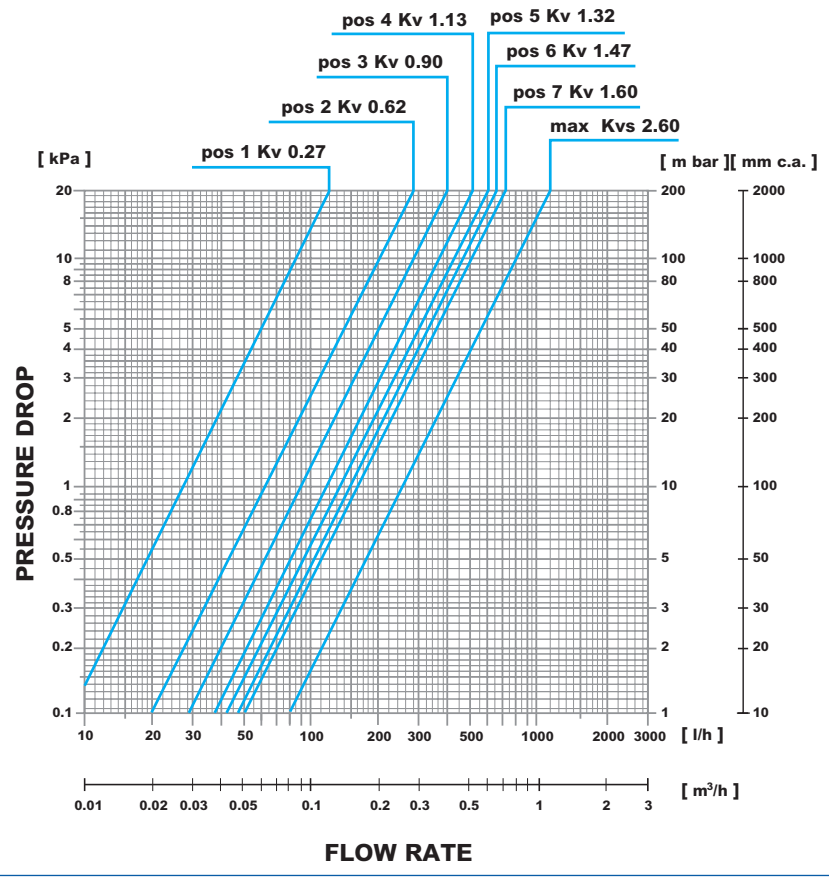
Angle body with pre-setting

188UM - 1188UM - DN 3/8"



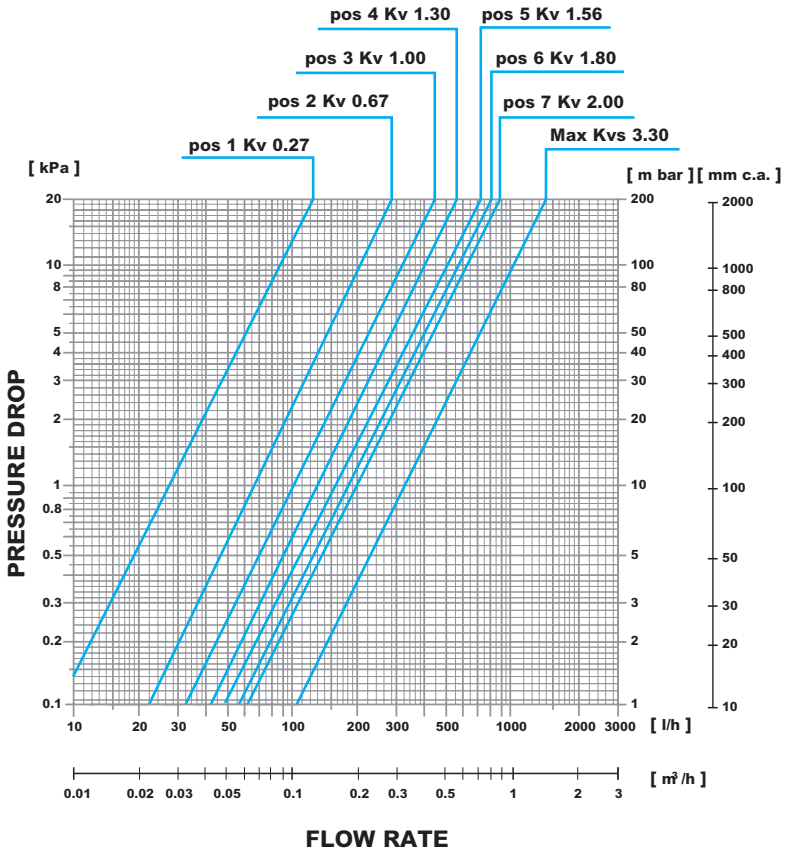
Angle body with pre-setting

188UM - 1188UM - DN 1/2"



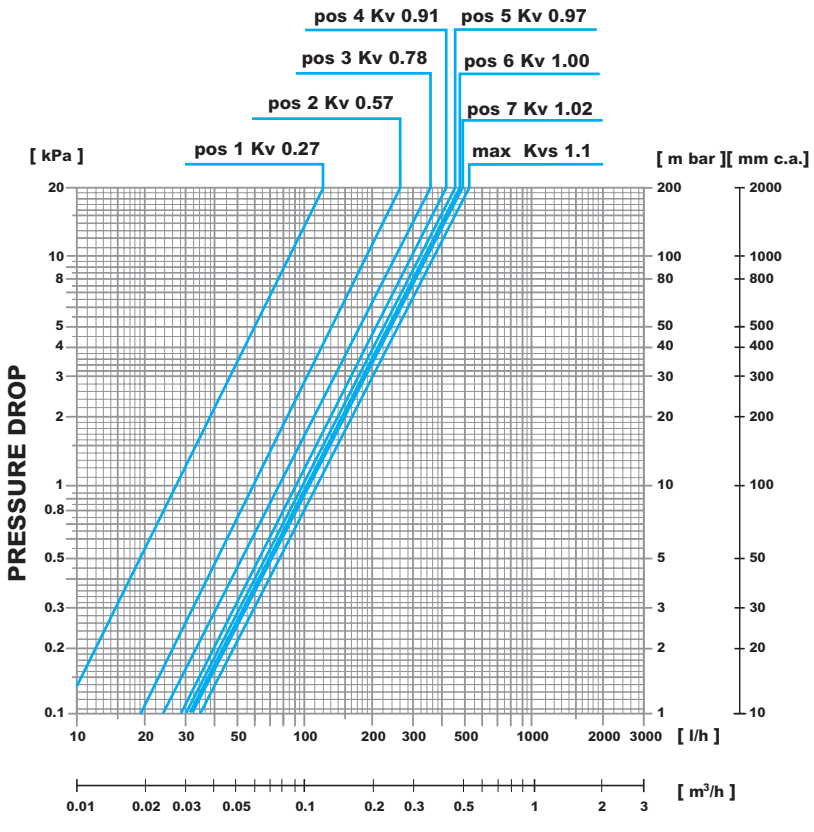
Angle body with pre-setting

188UM - DN 3/4"



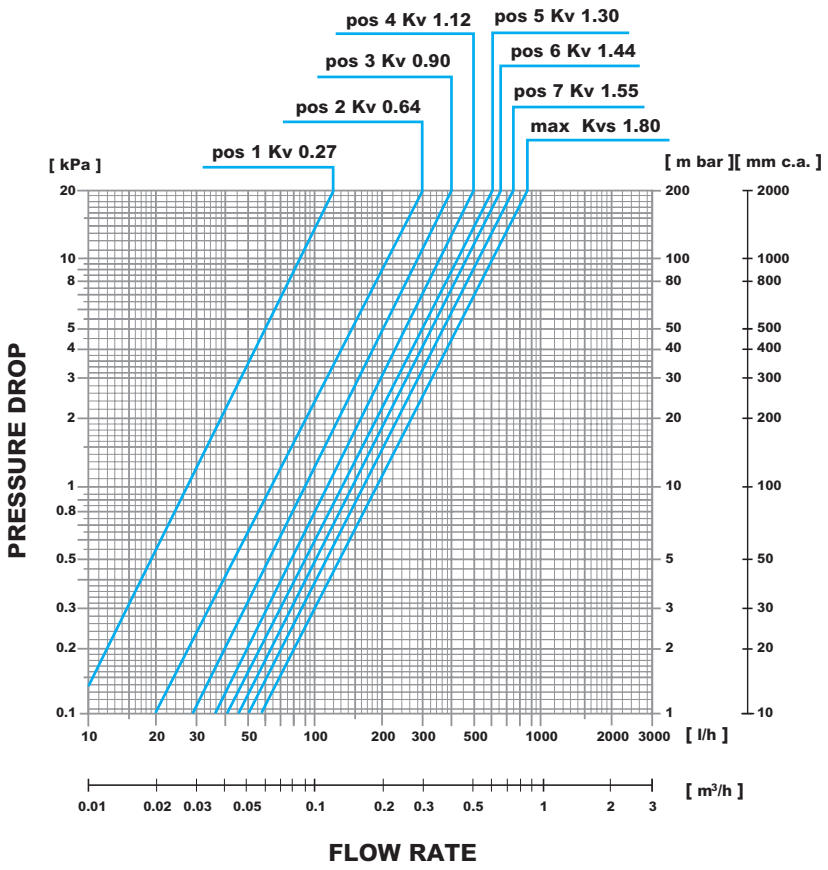
Straight body with pre-setting

189UM - 1189UM - DN 3/8"



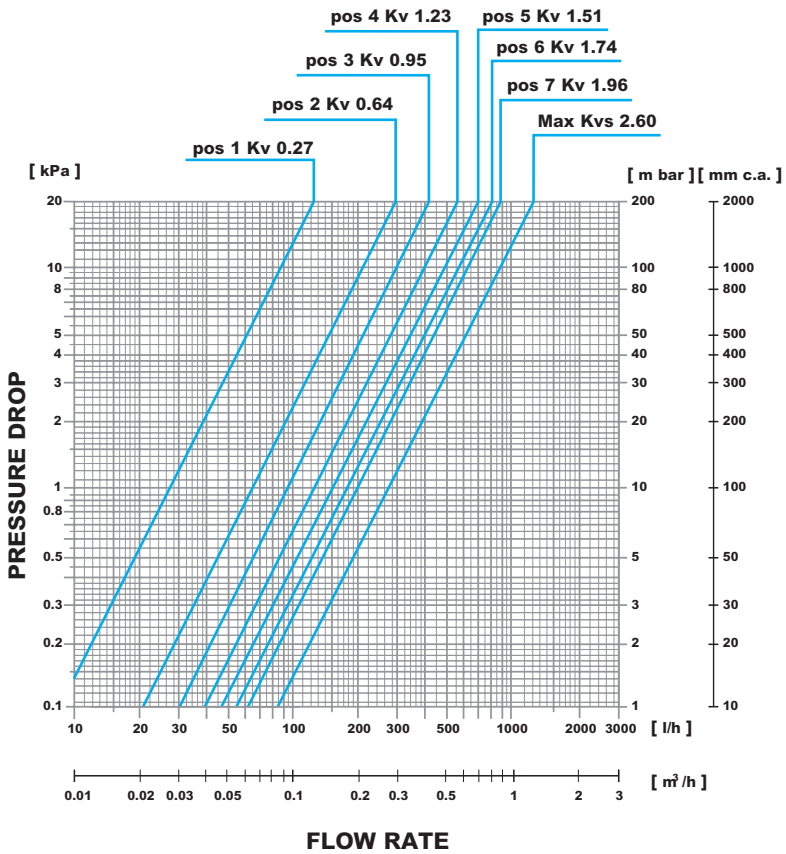
Straight body with pre-setting

189UM - 1189UM - DN 1/2"

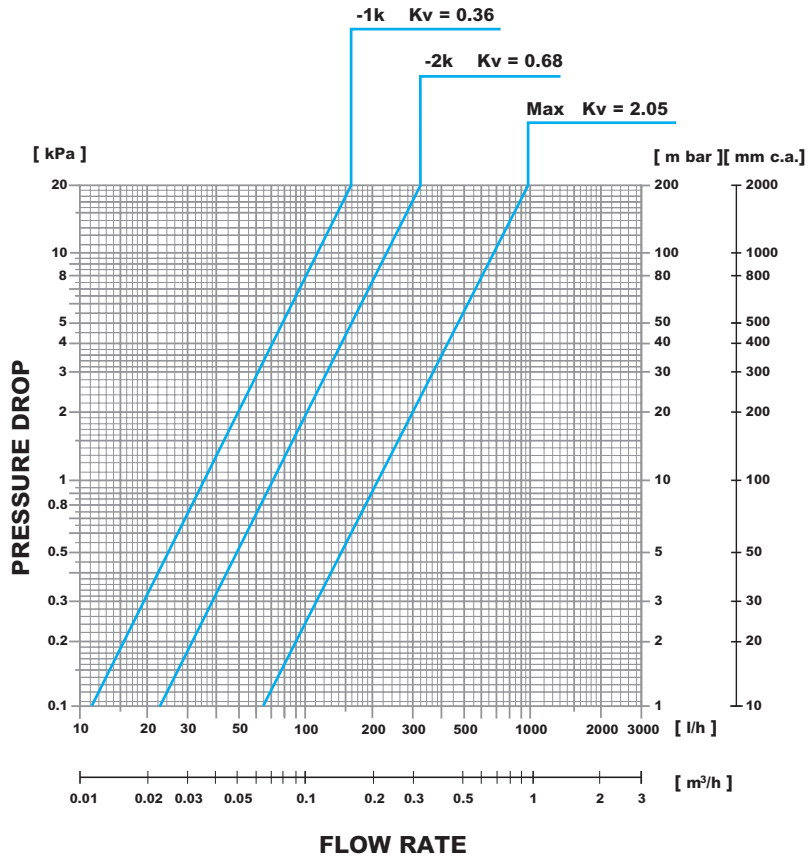


Straight body with pre-setting

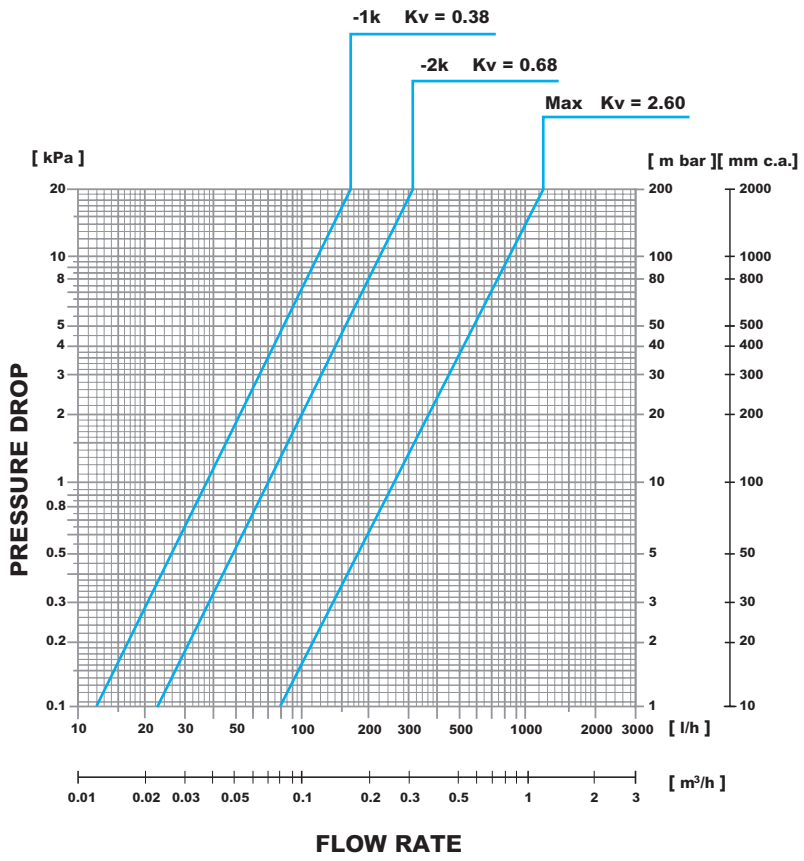
189UM - DN 3/4"



Angle body with actuator 148 **188UM - 1188UM - DN 3/8"**

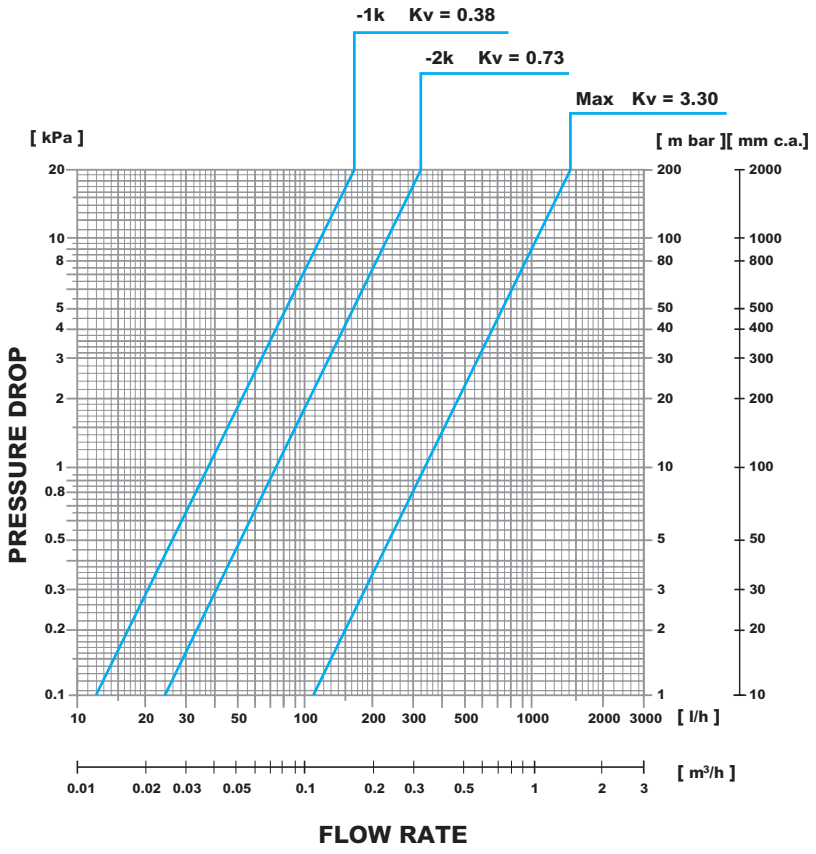


Angle body with actuator 148 **188UM - 1188UM - DN 1/2"**



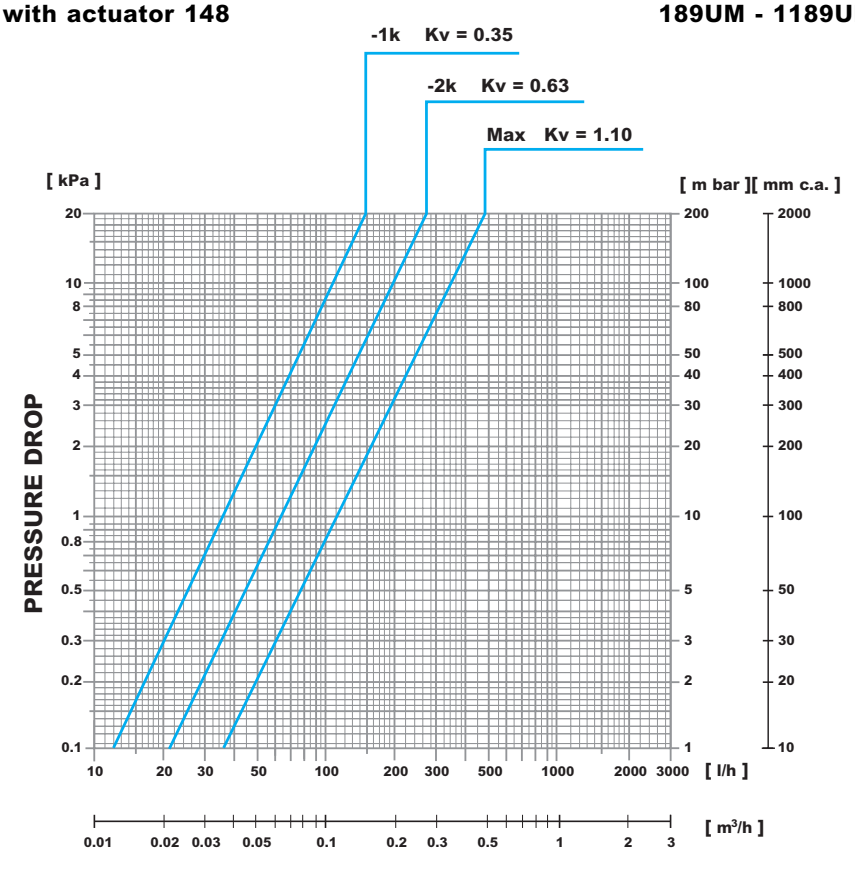
Angle body with actuator 148

188UM - DN 3/4"

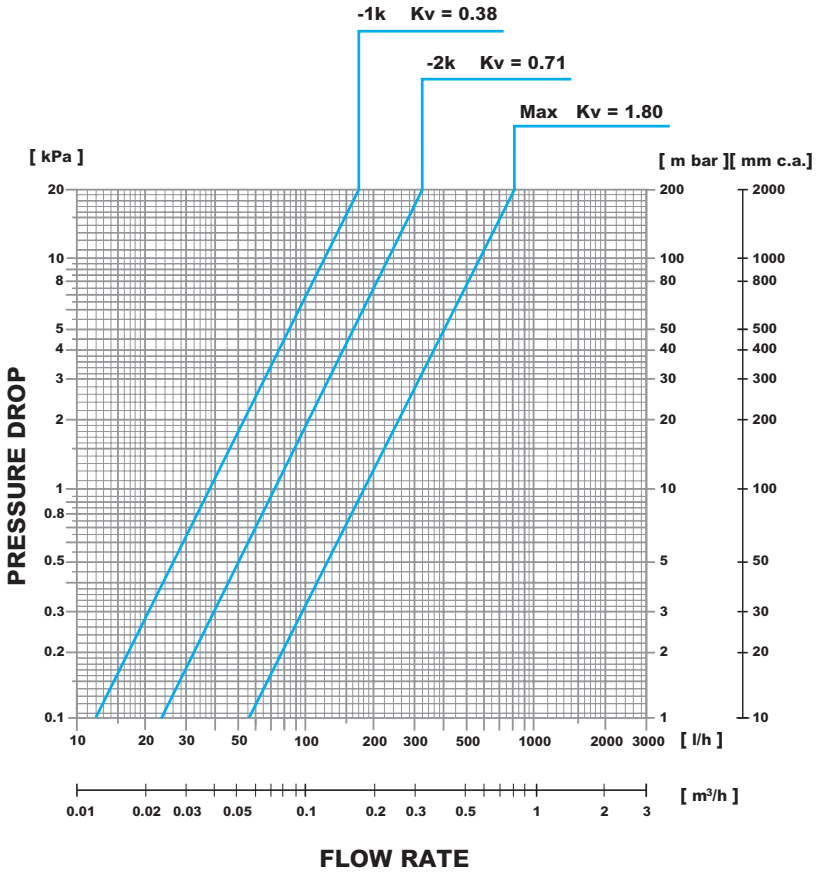


Straight body with actuator 148

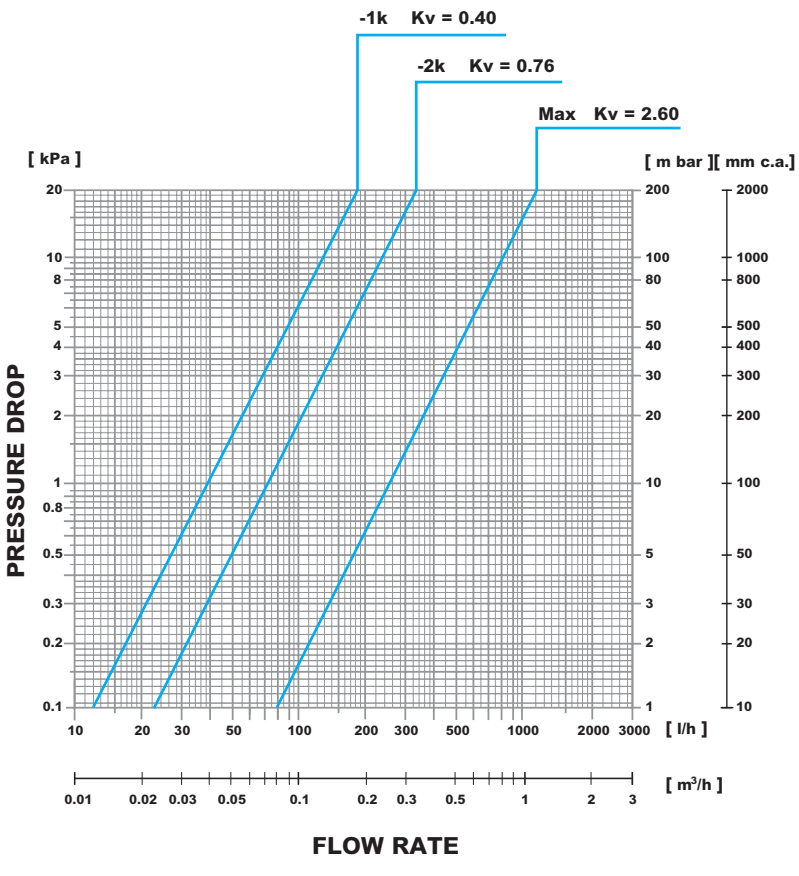
189UM - 1189UM - DN 3/8"



Straight body with actuator 148 **189UM - 1189UM - DN 1/2"**

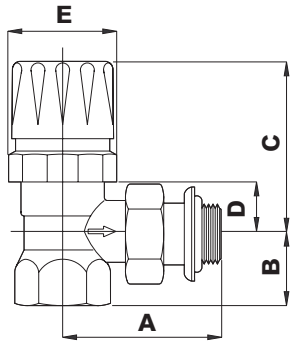


Straight body with actuator 148 **189UM - DN 3/4"**



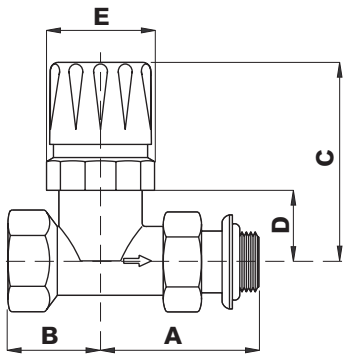
Overall dimensions (mm)

178UM



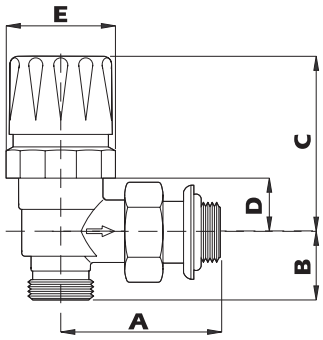
DN	A	B	C	D	E
3/8”	49	20	56	18	35
1/2”	53	23	56	18	35
3/4”	61	28	56	18	35

179UM



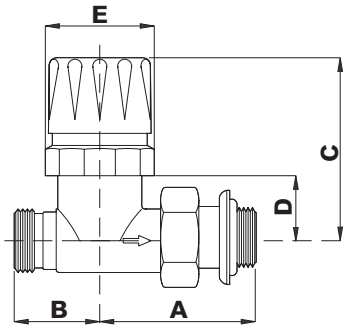
DN	A	B	C	D	E
3/8”	49	26	62	24.5	35
1/2”	53	29	62	24.5	35
3/4”	61	34	62	24.5	35

1178UM



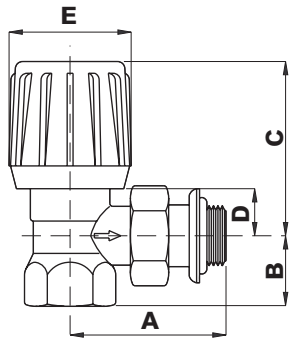
DN	A	B	C	D	E
1/2” x 3/8”	49	20,5	56	18	35
1/2” x 1/2”	53	20,5	56	18	35

1179UM



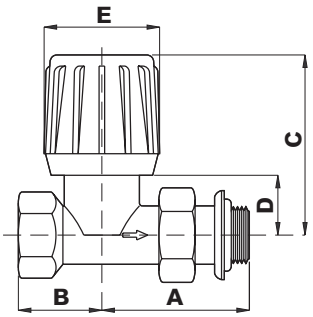
DN	A	B	C	D	E
3/8”	49	26	62	24,5	35
1/2”	53	26	62	24,5	35

188UM



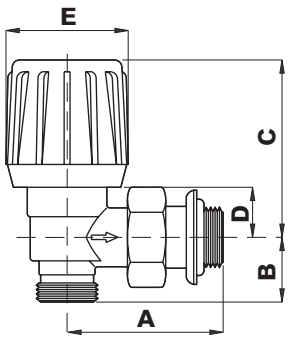
DN	A	B	C	D	E
3/8”	49	20	62	18	40
1/2”	53	23	62	18	40
3/4”	61	28	62	18	40

189UM



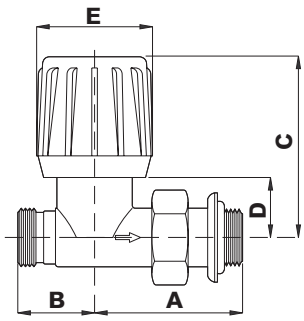
DN	A	B	C	D	E
3/8”	49	26	68	24.5	40
1/2”	53	29	68	24.5	40
3/4”	61	34	68	24.5	40

1188UM



DN	A	B	C	D	E
3/8”	49	20,5	62	18	40
1/2”	53	20,5	62	18	40

1189UM



DN	A	B	C	D	E
3/8”	49	26	68	24,5	40
1/2”	53	26	68	24,5	40

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www.wattsindustries.com

Re-order no. 67-0005-UK-IT/1-06-06-Rev.1

Thermostatic valve bodies with pre-setting Series 130UM 131UM-1130UM-1131UM

CEN EN 215/1 CERTIFIED

Main features

Available in the following versions:
- Angle body, straight body
- For iron, copper and polyethylene piping
- With 3/8" radiator connection and 1/2" connection on pipe side
- Plug stroke presetting device
- Compact size
- Conforms with UNI 8464/90

• The 130UM and 131UM series are CEN certified in accordance with EN215/1 and HD1215.2 (Type 130F) when coupled with actuators Series 138 and its derived products (Series 148).

N.B. Watts Industries Italia manufacturers others CEN Certified thermostat adaptable valves whose specifications are available on request.

WATTS INDUSTRIES

Technology by nature

Description

Thermostatic valve bodies **Series 130UM, 131UM, 1130UM, 1131UM** are used as shut-off and control devices for heat emitters (radiators, fan-coils, radiant panels, etc.) in heating and air-conditioning systems, coupled with thermostatic actuators Series 138 and its derived products Series 148. The valves are supplied in the angle and straight body configuration, with male and female thread. They require installation on the radiator. Connection is through an O-ring sealed straight tailpiece using an Allen wrench. Characteristic of the O-ring is that it ensures perfect external sealing each time the valves are installed on radiators instead of others (manual) which involve the risk of the internal threading on the radiator plug no longer conforming.

130UM

Nickel-plated thermostatic valve. Angle body. Connection for iron pipe.
O-ring sealed straight tailpiece. With easily removable protective cap to allow installation of thermal commands series 148 and electrothermic actuators 22C.

Type	Part number	Size body	Kvs	Weight (g)
130UM	130UMSN38	3/8"	2,1	190
130UM	130UMSN12	1/2"	2,6	240
130UM	130UMSN34	3/4"	3,3	370

131UM

Nickel-plated thermostatic valve. Straight body. Connection for iron pipe.
O-ring sealed straight tailpiece. With easily removable protective cap to allow installation of thermal commands series 148 and electrothermic actuators 22C.

Type	Part number	Size body	Kvs	Weight (g)
131UM	131UMSN38	3/8"	1,1	210
131UM	131UMSN12	1/2"	1,8	270
131UM	131UMSN34	3/4"	2,6	360

1130UM

Nickel-plated thermostatic valve. Angle body.
Connection for copper or plastic pipe.
O-ring sealed straight tailpiece. With easily removable protective cap to allow installation of thermal commands series 148 and electrothermic actuators 22C.

Type	Part number	Size body	Size Tube	Kvs	Weight (g)
1130UM	1130UMSN38X	3/8"	1/2"	2,6	180
1130UM	1130UMSN12	1/2"	1/2"	2,6	220

1131UM

Nickel-plated thermostatic valve. Straight body.
Connection for copper or plastic pipe.
O-ring sealed straight tailpiece. With easily removable protective cap to allow installation of thermal commands series 148 and electrothermic actuators 22C.

Type	Part number	Size body	Size Tube	Kvs	Weight (g)
1131UM	1131UMSN38X	3/8"	1/2"	1,8	200
1131UM	1131UMSN12	1/2"	1/2"	1,8	240

Application

Thermostat adaptable valves are designed for room temperature control in manual or automatic mode when coupled with thermostatic actuators (**Series 148, 148SD, 148CD**) or electrothermic actuators (**Art. 22C**).
The use of thermostat adaptable valves allows installation of metering systems (see Sections on Measuring and metering systems) as required by Italian legislation Act 10/91 art. 26. The valves are provided with active memory presetting which, when using thermostatic or thermoelectric actuators, enables exact balancing of the heating system. Such balancing is obtained by turning the ring nut located under the handwheel in order to limit the plug stroke. Above all when removing the handwheel for thermostatting the system, the active memory presetting holds the balancing made permanently.

Operation

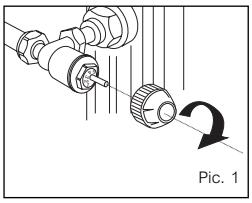
Valve operation is by manual movement (through the protective cap) or automatic movement (combined with thermostatic or electrothermic actuators) of the plug which shuts off the heat carrier fluid. The hydraulic flow rate and pressure drop characteristics for the valves can be deduced from appropriate charts: in the thermostatic function they assume the characteristics of such device. The reliability of the thermostatic valve bodies **Series 130UM, 131UM, 1130UM, 1131UM**, is guaranteed by the 100% testing of the production which tests for water tightness of the valve body and its components towards the outside and the tight seal of the plug in its flow shut-off function.

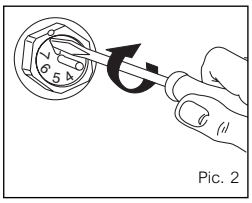
Pre-setting

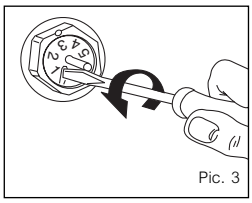
1 - Pull out the handwheel by turning it anti-clockwise **(Pic.1)**

2 - fully close the presetting ring nut **(Pic.2)**

3 - Open the ring nut until the required position by making the number to coincide with the reference notch **(Pic.3)**


Pic. 1


Pic. 2


Pic. 3

	Pre-setting									
	Qms (l/h)									
	Dn	1	2	3	4	5	6	7	Max	Qmn
	3/8"	80	175	215	215	215	215	215	215	215
	1/2"	80	175	215	215	215	215	215	215	215
	3/4"	80	180	230	230	230	230	230	230	230
	3/8"	75	160	200	200	200	200	200	200	200
	1/2"	75	175	225	225	225	225	225	225	225
	3/4"	80	180	240	240	240	240	240	240	240
	±%	60	30	20	10	10	10	10	10	10

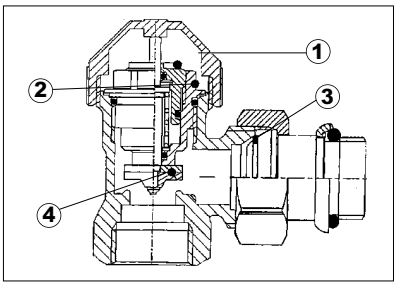
Where : $Kv = \frac{qms}{316}$

Installation

Valve selection is based on the size of the connection to the radiator and the connecting piping. Thermostatic valve bodies **Series 130UM, 131UM, 1130UM, 1131UM** can be installed on radiators supplied by iron, copper and plastic pipes, coupled with the balancing lockshield valves of **Series 195UM, 196UM, 1195UM, 1196UM**. When the system requires thermostatting, merely remove the protective cap from the cap and replace it with a thermostatic or electrothermic actuators by tightening the ring nut. All this can be done without plumbing work and with the system running.

Hydraulic characteristics

Kv values in the various pre-setting positions						
Setting positions	130UM 3/8" 1130UM 3/8"	130UM 1/2" 1130UM 1/2"	130UM 3/4"	131UM 3/8" 1131UM 3/8"	131UM 1/2" 1131UM 1/2"	131UM 3/4"
1	0.27	0.27	0.27	0.27	0.27	0.27
2	0.60	0.62	0.67	0.57	0.64	0.64
3	0.88	0.90	1.00	0.78	0.90	0.95
4	1.12	1.13	1.30	0.91	1.12	1.23
5	1.31	1.32	1.56	0.97	1.30	1.51
6	1.46	1.47	1.80	1.00	1.44	1.74
7	1.60	1.60	2.00	1.02	1.55	1.96
A	2.05	2.60	3.30	1.10	1.80	2.60



Features

1) Presetting stuffing nut can be replaced also with the system under pressure.
2) Complete plug can be replaced without emptying the system by using Art. 225.
3) O-ring sealed tailpiece.
4) Plug seal of elastomeric material, vulcanized ethylene-propylene terpolymer (EDPM).

Technical characteristics	
Nominal pressure	10 bar
Max. differential pressure	1.5 bar
Max. temperature	110° C
Usable liquids	Water also with glycol ≤ 50%

Design features	
Valve body	Brass CW617N
Handwheel	Polypropylene
O-ring	EPDM
Tailpiece	Brass CW617N

Flow rate/pressure drop charts

The charts show the hydraulic flow rate and pressure drop characteristics for the valve body-actuator combination: in the thermostatic function they assume their own particular characteristics represented by straight lines -1K, -2K.
The nominal flow rate qmN is the one corresponding to -2K when the presetting device is not operative.
The straight line marked max represents the flow rate when the valve is fully opened.
The diagrams are valid when a presetting is not made on the valve body.

Use of the tamper-proof cover

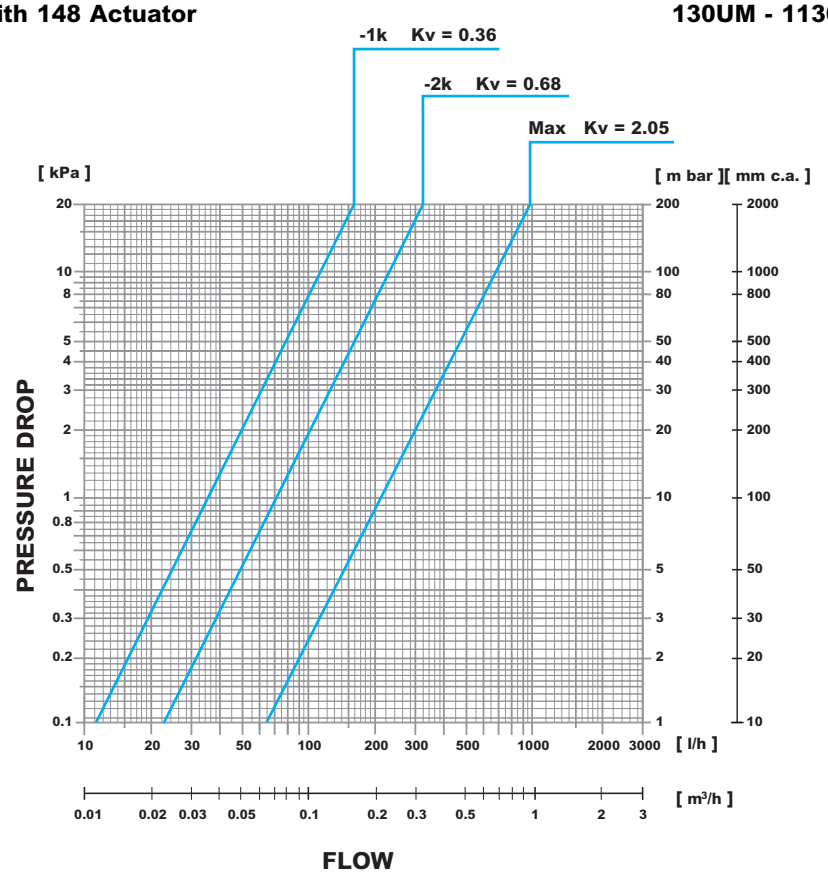
Thermostat adaptable valve bodies **Series 130UM, 131UM**, are fitted with a tamper-proof cover which protects the valve rod and threading before the preliminary mounting on the thermostatic head. It can be used for setting different flow rates by rotating either clockwise (to close valve plug) or anti-clockwise (to open valve plug), passing from full shut-off to full opening according to the indications stamped on the handwheel .

Thermostatic valve certified EN215-1

Coupled with thermostatic actuator Series 138 and derived products Series 148.

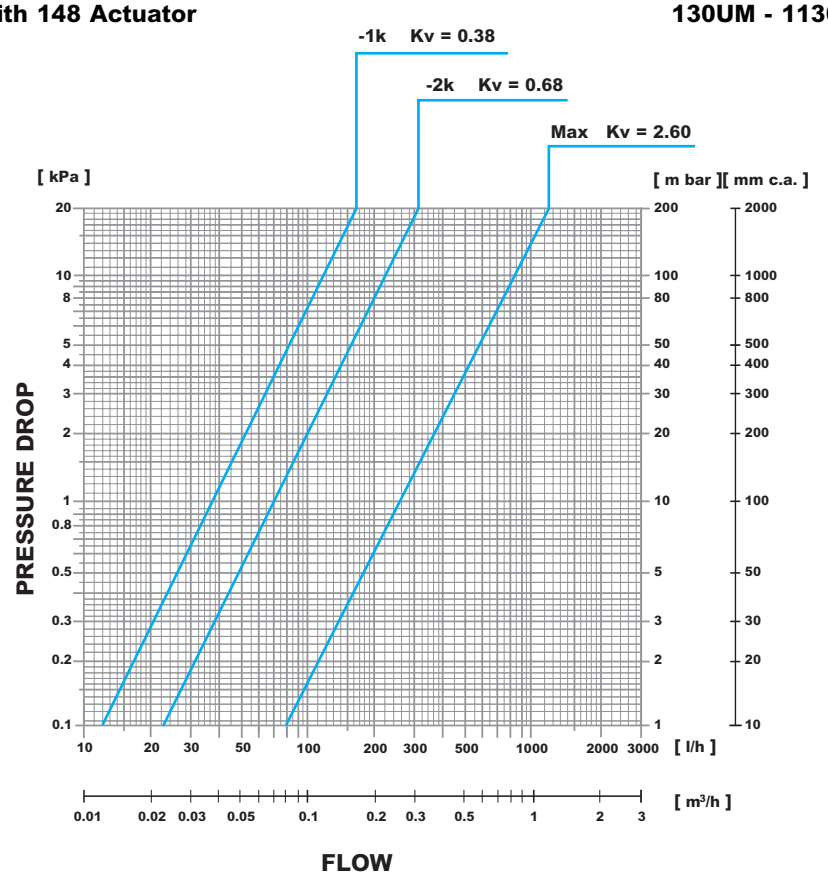
Type	DN	Kvn	qmN (l/h)
130UM + 148	3/8"	0,68	215
130UM + 148	1/2"	0,68	215
130UM + 148	3/4"	0,73	230

Angle body with 148 Actuator **130UM - 1130UM - DN 3/8"**



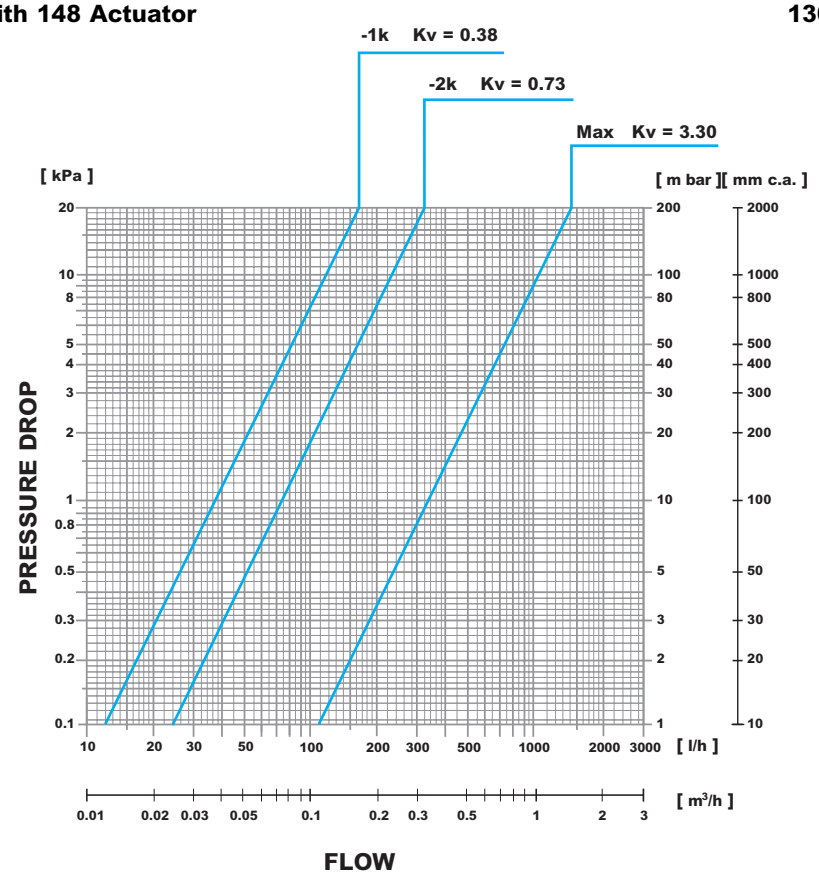
Angle body with 148 Actuator

130UM - 1130UM - DN 1/2"



Angle body with 148 Actuator

130UM - DN 3/4"



Example

When it is preferred to use an analytical method to know the pressure drop Dp (kPa), given the flow rate (litres/h) and the Kvn, adopt the following relation:

$$Dp = \left(\frac{0.01 * q}{Kvn} \right)^2 =$$

Determine the pressure drop of the thermostat adaptable valve Art. 131UM + 148 Nd 3/8" with a flow rate of 80 litres

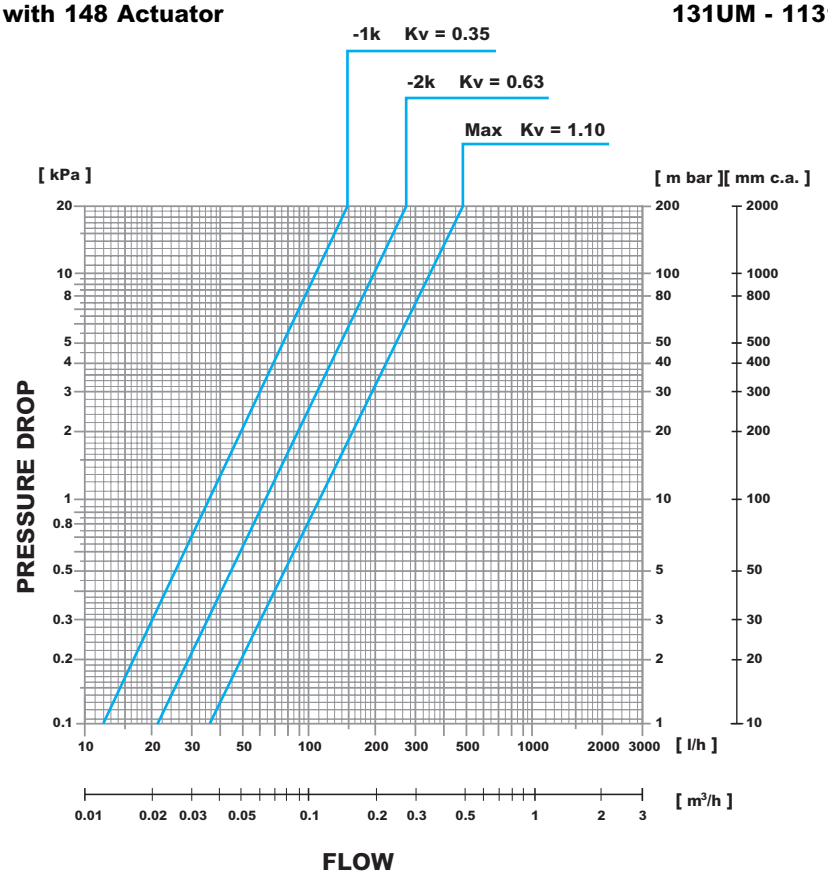
$$Dp = \left(\frac{0.01 * 80}{0,63} \right)^2 = 1,61 \text{ kPa}$$

Thermostatic valve certified EN215-1

Coupled with thermostatic actuator Series 138 and derived products Series 148.

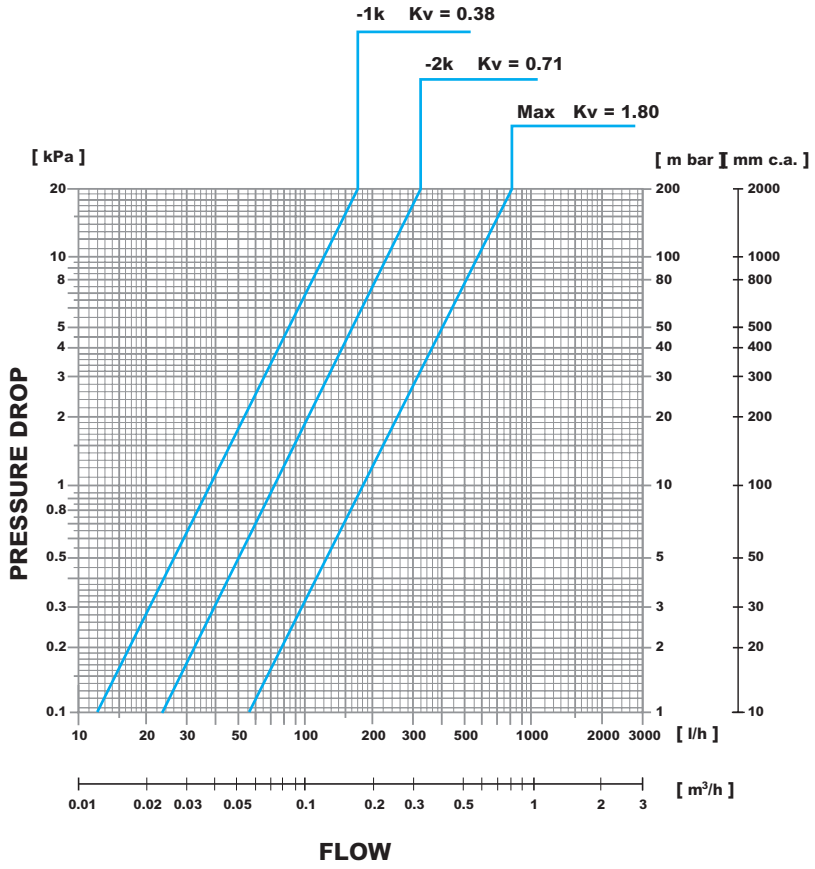
Type	DN	Kvn	qmN (l/h)
131UM + 148	3/8"	0,63	200
131UM + 148	1/2"	0,71	225
131UM + 148	3/4"	0,76	240

Straight body with 148 Actuator — **131UM - 1131UM - DN 3/8"**



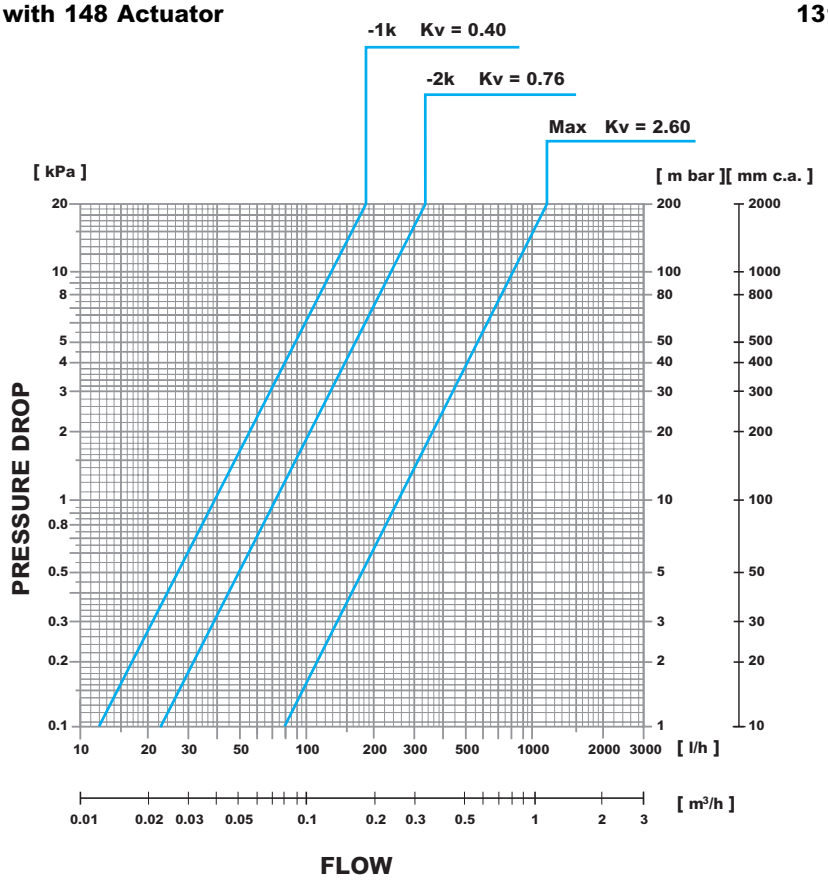
Straight body with 148 Actuator

131UM - 1131UM - DN 1/2"



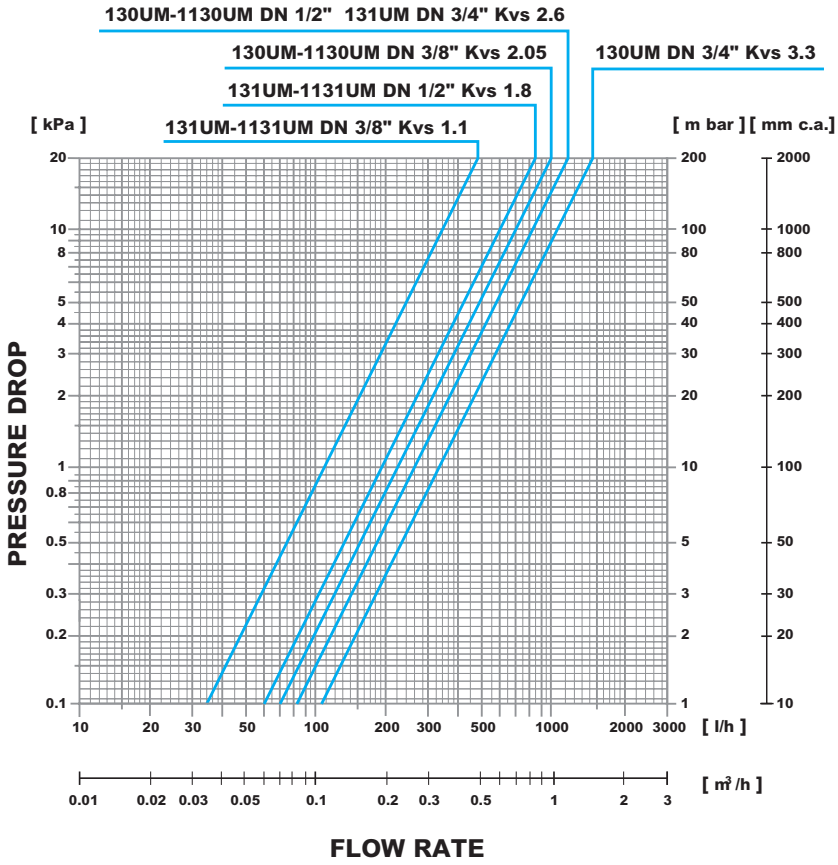
Straight body with 148 Actuator

131UM - DN 3/4"



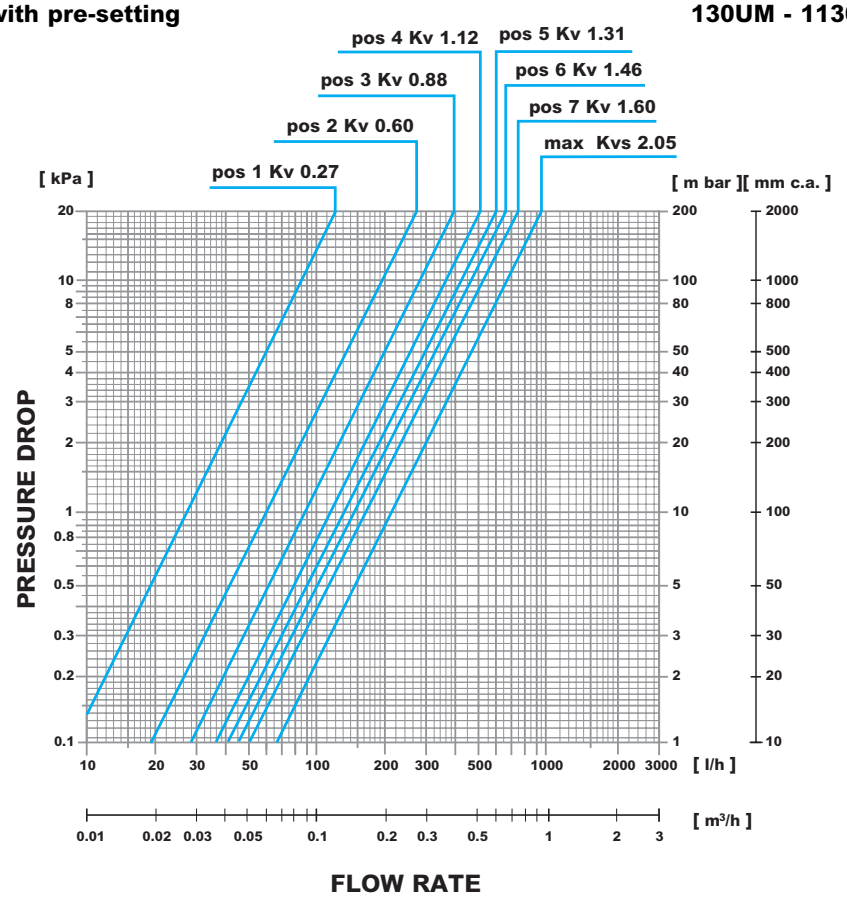
Max Opening

130UM - 1130UM - 131UM - 1131UM



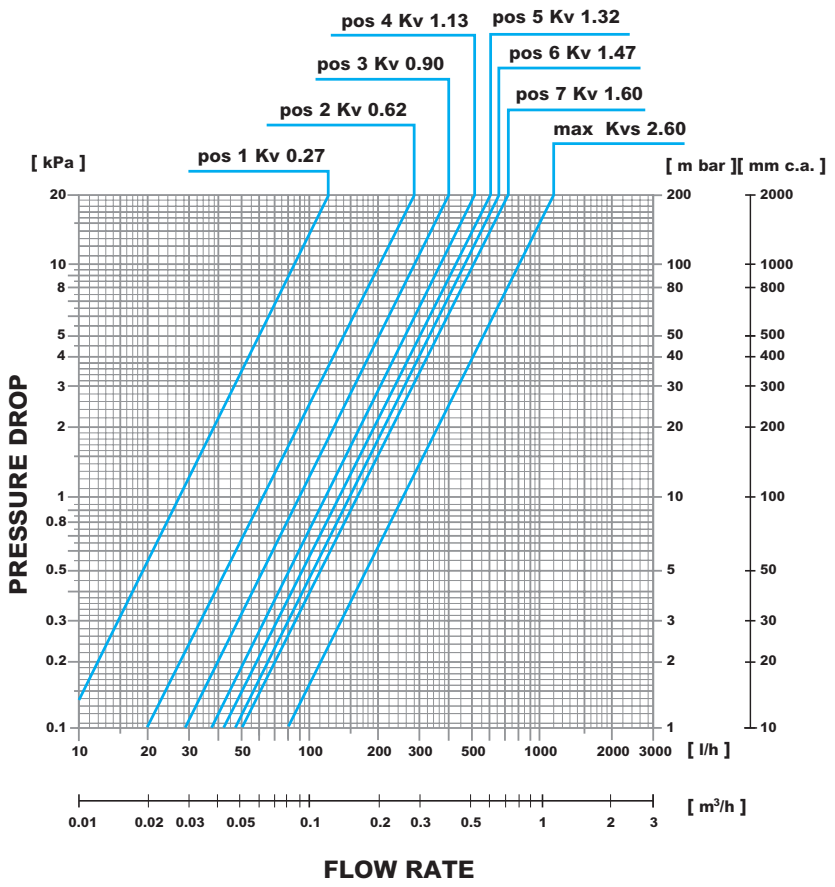
Angle body with pre-setting

130UM - 1130UM - DN 3/8"



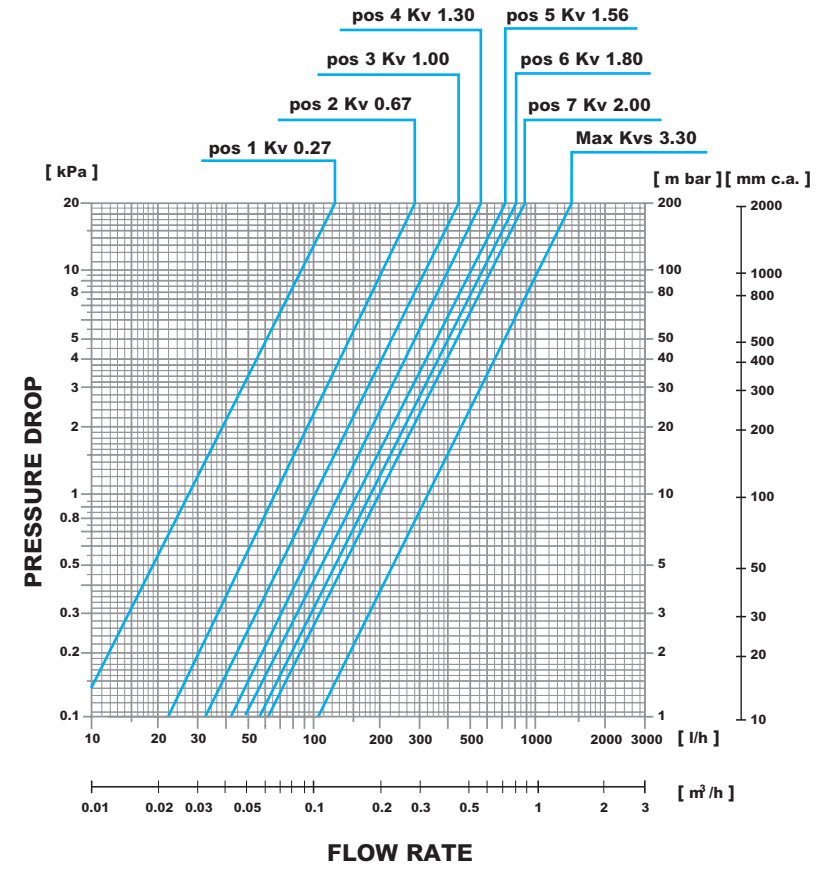
Angle body with pre-setting

130UM - 1130UM - DN 1/2"



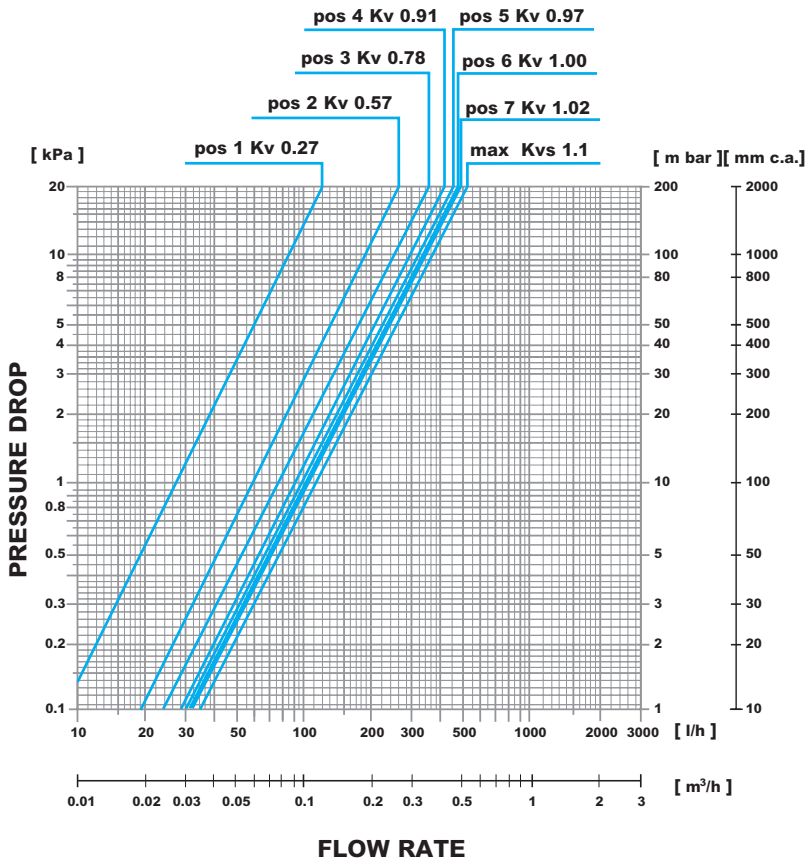
Angle body with pre-setting

130UM - DN 3/4"



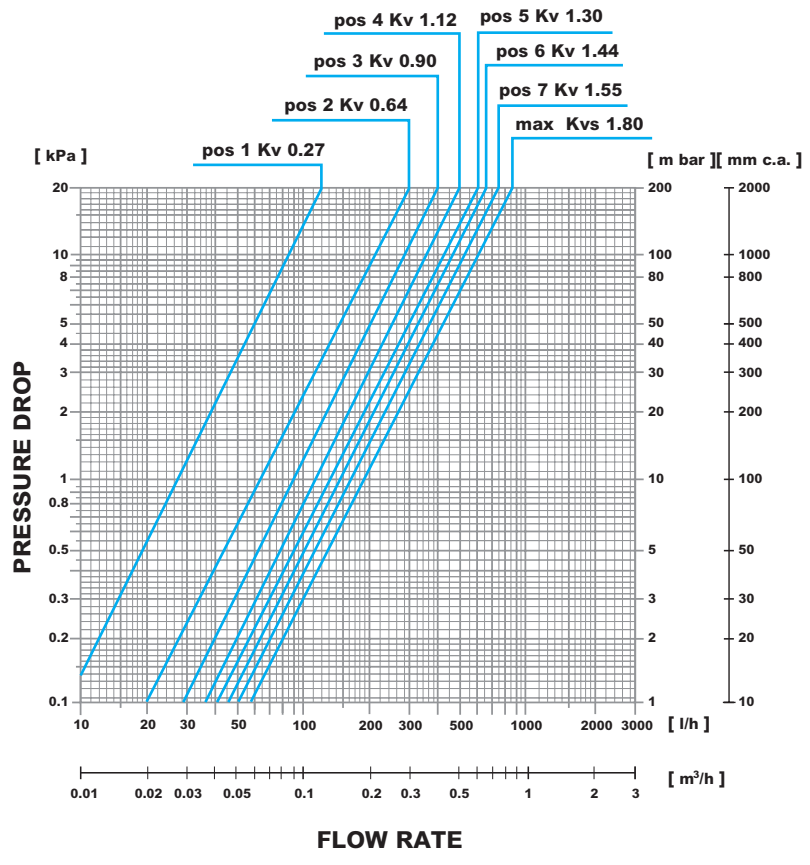
Straight body with pre-setting

131UM - 1131UM - DN 3/8"

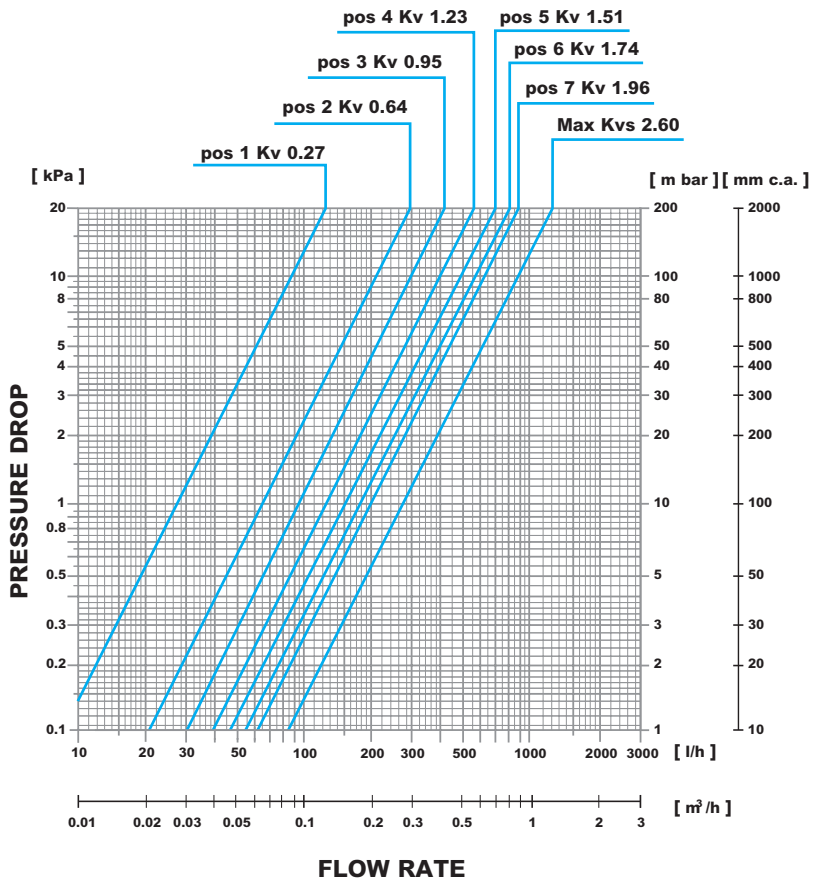


Straight body with pre-setting

131UM - 1131UM - DN 1/2"

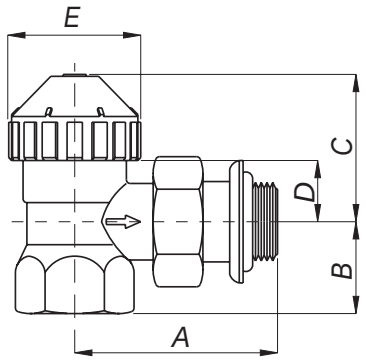


Straight body with pre-setting **131UM - DN 3/4"**



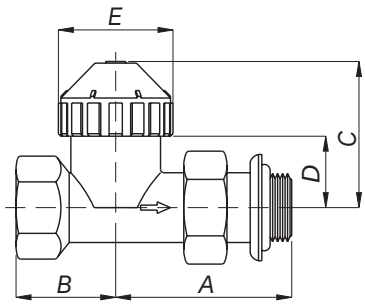
Overall dimensions (mm)

130UM



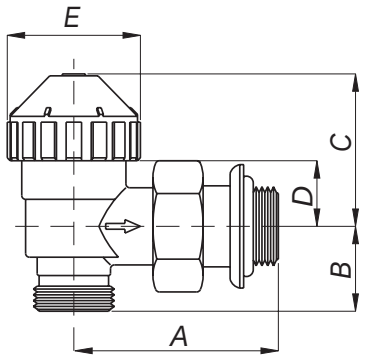
DN	A	B	C	D	E
3/8”	49	20	40	18	35
1/2”	53	23	40	18	35
3/4”	61	28	40	18	35

131UM



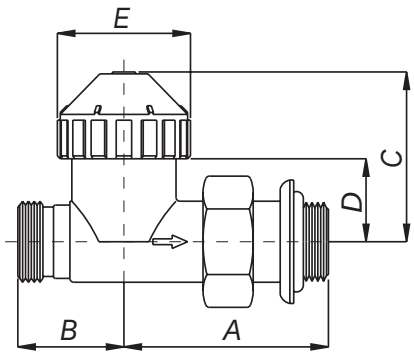
DN	A	B	C	D	E
3/8”	49	26	46.5	24.5	35
1/2”	53	29	46.5	24.5	35
3/4”	61	34	46.5	24.5	35

1130UM



DN	A	B	C	D	E
3/8”	49	20,5	40	18	35
1/2”	53	20,5	40	18	35

1131UM



DN	A	B	C	D	E
3/8”	49	26	46,5	24,5	35
1/2”	53	26	46,5	24,5	35

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Re-order no. 67-0010-UK-IT/1-06-06-Rev.1

Thermostatic actuators
Series 148 - 148SD - 148CD - 148GA

Main features

With liquid-filled sensitive elements and temperature locking

- Available in the versions:
  • Standard
  • With Remote Sensor
  • With Remote Control
- Provision for using them with tamper-proof cover.
- Compact size and reduced weights
- Derived from actuator model 138 which, when associated with valves of Series 130UM and 131UM, it is CEN certified in accordance with EN215/1 and HD1215.2.

WATTS INDUSTRIES

Technology by nature

Description

Thermostatic actuators **Series 148, 148SD, 148CD** are devices for automatic room temperature control, by acting directly on the radiator of radiator-type heating systems. The actuators, which are installed on the thermostat adaptable radiator valves, automate the valve plug movement through the presence of an element, inside the knob, which is sensitive to variations in room temperature.

Application

These devices (whose use is compulsory through Italian Act 10/91), when coupled with thermostat adaptable valves, adapt the amount of heat emitted by the radiators to the required temperature and ensure high comfort levels with consistent energy saving thanks to naturally occurring heat sources in the room.

148

Thermostatic actuator with oil-filled sensitive element. Temperature limiting and locking device. ABS handwheel. Graduated scale from 0 to 5.
Setting range : 0°C - 28°C. Anti-freeze position : 8°C.
Max. differential pressure: 1.5 bar.

Available in chrome-plated version.

Type	Part number	Weight (g)
148	148	150
148 Chrome-plated version	148CR	150

148SD

Thermostatic actuator with remote sensor. 2 m capillary tube.
Other characteristics as per Item 148.

Type	Part number	Weight (g)
148SD	148SD	250

148CD

Thermostatic actuator with remote sensor. 2 m capillary tube.
Max. pressure differential : 1.0 bar. Other characteristics as per Item 148.

Type	Part number	Weight (g)
148CD	148CD	450

148GA

Tamper-proof cover for thermostatic actuators series 148.
Provision for limiting and locking temperature range on rivettable closing position.
Complete with standard mounting screws and break-stem rivets.

Type	Part number	Weight (g)
148GA	148GA	30

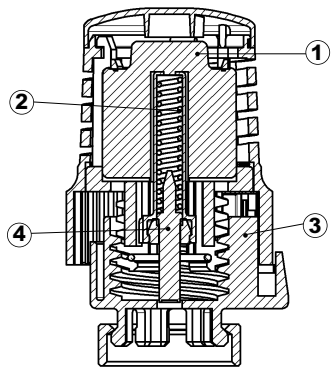
Operation

The device is operated by a liquid-filled sensitive element incorporated in the knob, which, upon expanding or contracting, acts on the valve plug rod in relation to the deviation between set-point and actual room temperature.

When the room temperature exceeds the required level, the sensitive element determines the gradual closing of the valve plug and therefore it appropriately reduces the hot water flow feeding the radiator; when, instead, the room temperature drops, the actuator causes the valve plug to open thus producing an increase in the circulation of hot water in the radiator, so that the temperature set in each single room is held at a constant level.

Technical Characteristics	
Thermostatic actuator 148 (derived from CEN certified model 138 coupled to valves Series 130 D and F, Series 131 D and F)	UNI EN215-1/90
Range of adjustment	8 ÷ 28° C
Range of inalterability of thermostatic element	-15 ÷ 60° C
Hysteresis max	0.6 K and 1,0 K (series 148SD)
Proportional band	2 K
Time constant	34 min
Effect of fluid temperature	1.5 K
Max effect of differential pressure	0.5 K and 0,75 K (series 148SD)
Length of capillary (Art. 148SD - 148CD)	2 m

Design features	
Sensitive element capsule	Bronze
Springs	Stainless steel
Thrust rod	Polyammide + 30% FV
Handwheel	ABS



Features

1) Liquid-filled sensitive element
2) Compensation mechanism
3) Adjustment range locking/limiting system
4) Valve plug thrust rod

Setting

The required temperature is set by turning the handwheel until the indicator coincides with the chosen value:
The numbers and symbols given are associated with the temperatures indicated in picture A.

The interval between the numbers corresponds to about 4°C.

⓪	❄	1	2	③	4	5
Closed	8 °C Antifreeze	12 °C	16 °C	20 °C	24 °C	28 °C

Pic. A

Example :

Pos. 0 Fully closed
Pos. ❄ Anti-freeze 8 °C
Pos. 2 Reduced night-time setting 16 °C
Pos. 3 Day-time setting 20 °C

The anti-freeze position ensures minimum temperature conditions (8 °C) thus protecting the intactness of the system, if regularly in operation, against intense cold.

Temperature locking

For quick setting and finding the ideal adjustment for each single room, the actuator is provided with temperature locks, degree-by-degree, which allow above all:

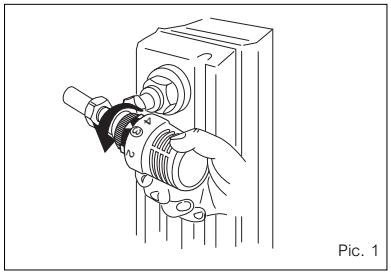
- Limiting the temperature adjustment range
- Selecting a set value
- Limiting the valve closing set-point

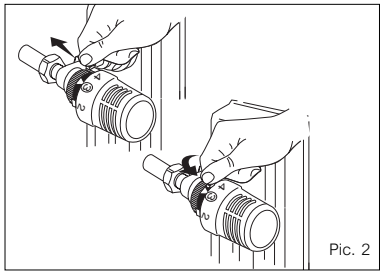
To fix a range of adjustment 16 to 20 °C proceed as follows:

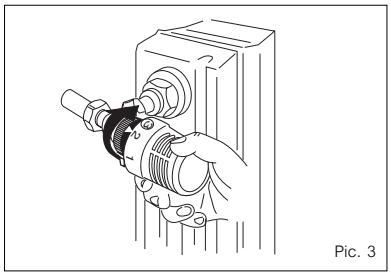
Pic. 1 - Turn the actuator knob so that the indicator corresponds to the required max. value. See Pic. 1: Pos. 3 = 20°C.

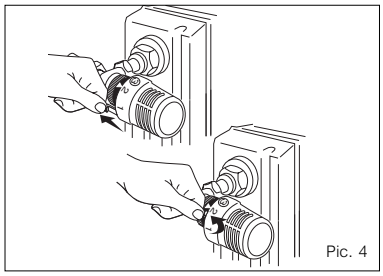
Pic. 2 - Lift out the first lock on the right and place it immediately alongside the indicator. Hence the **upper** limit of the adjustment range is fixed (Pos. 3).

Pic. 3 - Turn the actuator knob until the indicator points to the required minimum value. See Pic. 3: Pos. 2 = 16°C.


Pic. 1


Pic. 2


Pic. 3


Pic. 4

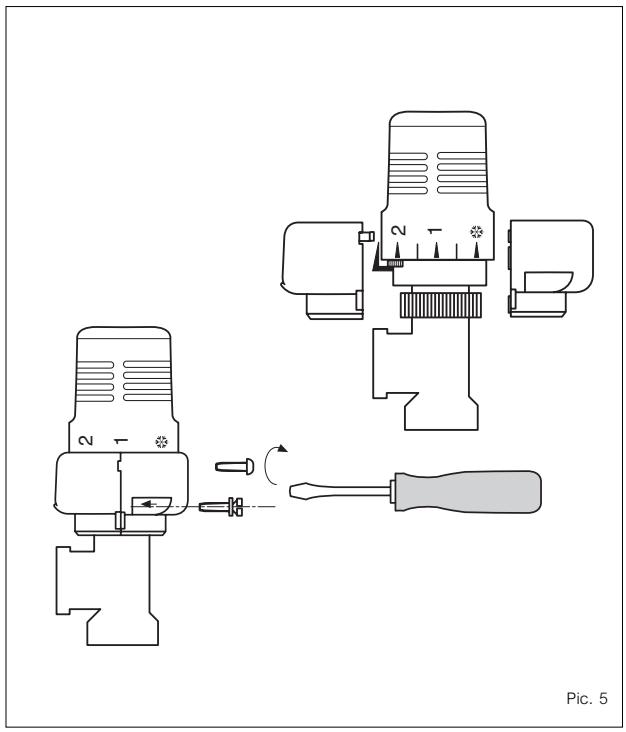
Pic. 4 - Lift out the lock on the left and place it immediately alongside the indicator. Hence the lower limit of the adjustment range is fixed (Pos. 2).

Therefore the setting can easily be readjusted in relation to the various daily requirements thanks to this "memory" system.

Installation

Never allow the actuator to be affected by factors which could falsify measurement of room temperature (e.g. behind curtains, direct exposure to the sun's rays, radiator placed in a recess, etc...) and allow access to the adjustment handwheel (e.g. shielding of the radiator). When this is not possible, it is advisable to adopt versions with remote sensor **Pic. 10 (Art. 148SD)** or with remote control **Pic. 11 (Art. 148CD)**.

These models differ in that the sensor, detached from the transducer element through a liquid-filled capillary, may be placed in the most suitable point and hence measure the exact temperature existing in the room.
Above all, **model 148CD** allows having both remote sensor and remote control; it is used when the valve position is such as to make manual adjustment difficult. The use of tamper-proof cover **Art. 148GA** is highly recommended to protect the actuator against accidental tampering and/or vandalism in public places (schools, hospitals, etc). Its installation is shown in **Pic.5**.



Pic. 5

The installation, which does not require any plumbing work, may **also be carried out with the systems running** and involves the following steps:

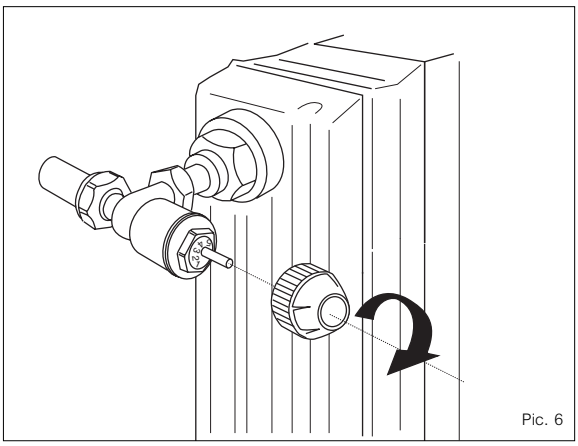
1) Remove the cap or handwheel from the valve body **(Pic. 6)**.

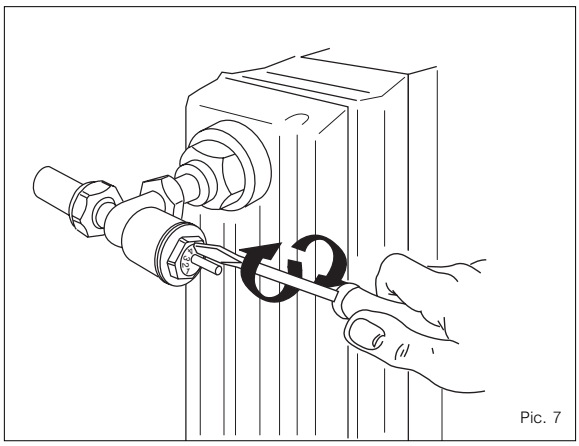
2) Make the presetting if necessary by following the design instructions or selecting the position from the appropriate charts **(Pic. 7)**.

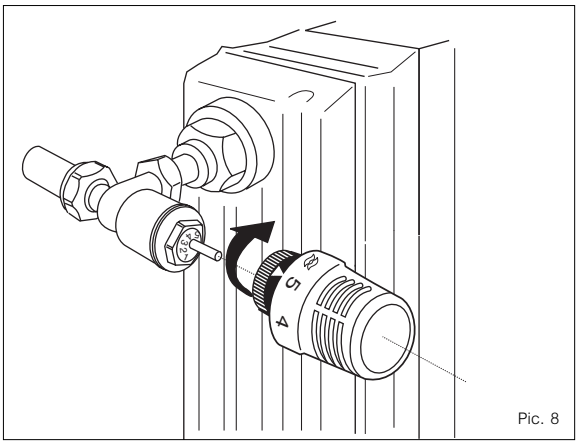
3) Approach the thermostatic actuator in fully open position (Pos. 5) to the valve body, with the reference indicator clearly visible **(Pic. 8)**.

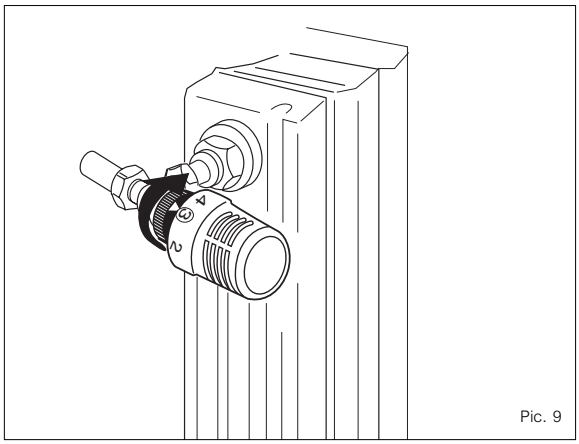
4) Tighten the nickel-plated ring nut by hand until fully home **(Pic. 9)**.

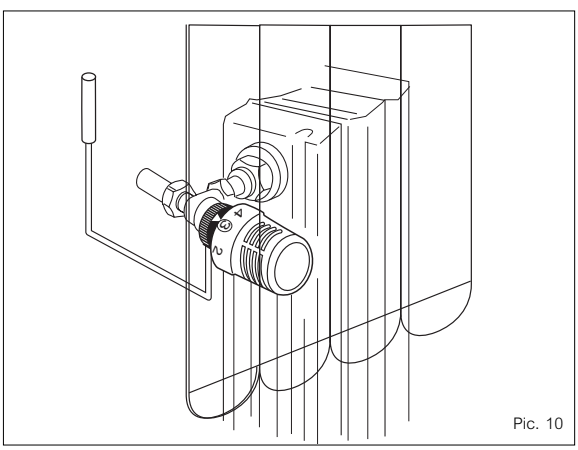
It is recommended to avoid vertical positions of the actuator during installation.

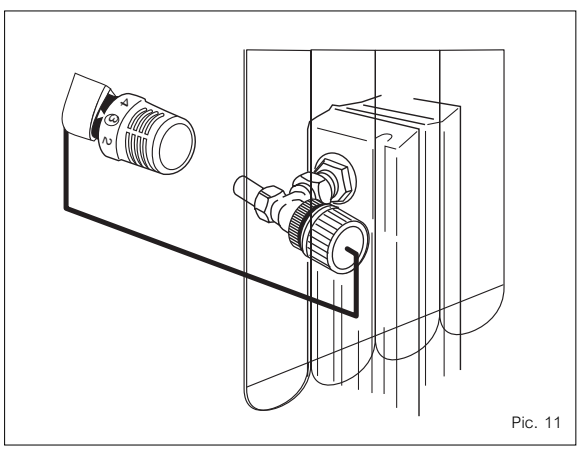

Pic. 6


Pic. 7


Pic. 8


Pic. 9


Pic. 10

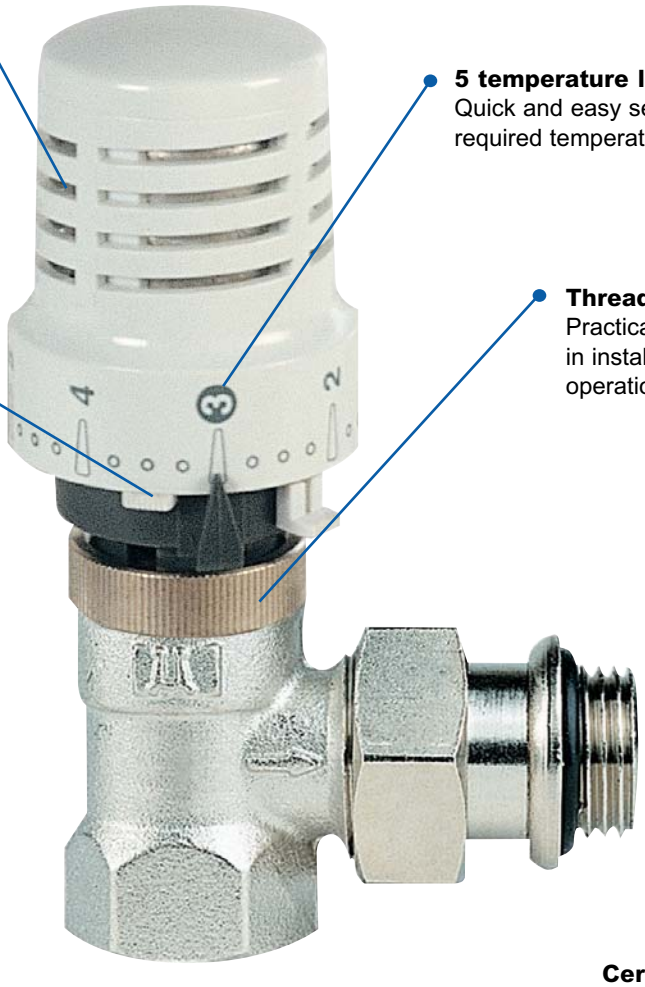

Pic. 11

Radial slots
high sensitivity in ambient temperature measurement

5 temperature levels
Quick and easy setting of the required temperature

Threaded ring nut
Practical and quick in installation operations

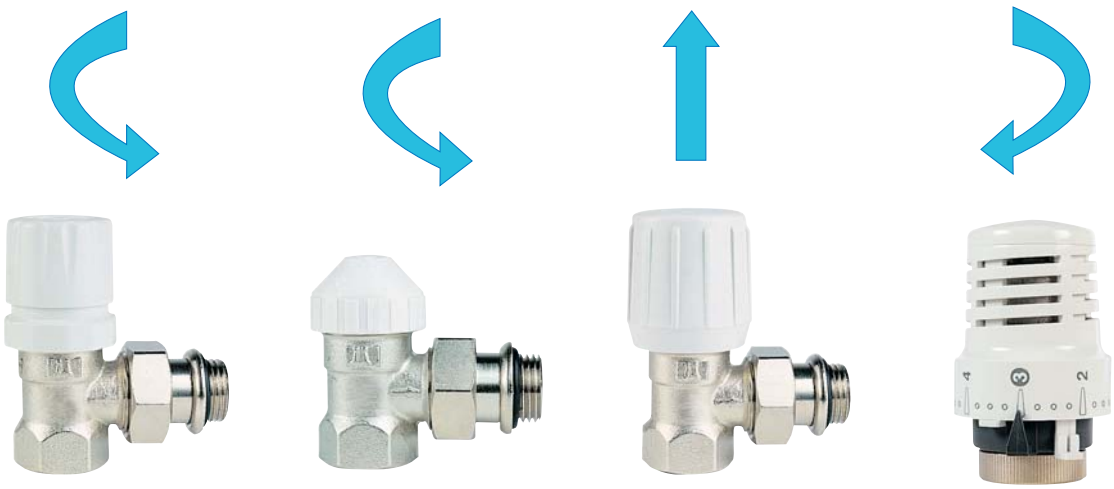
Adjustment riders
Provision for adjusting or blocking the preset temperature range



Modern design
adaptable to any type of furnishing

Certificd EN215-1

UNSCREW **LIFT OUT** **SCREW-IN THE RING NUT OF THE THERMOSTATIC ACTUATOR**



Flow rate/pressure drop charts

The charts show the hydraulic flow rate and pressure drop characteristics for the valve body-actuator combination: in the thermostatic function they assume their own particular characteristics represented by straight lines -1K, -2K.
The nominal flow rate qmN is the one corresponding to -2K when the presetting device is not operative.
The straight line marked max represents the flow rate when the valve is fully opened.
The diagrams are valid when a presetting is not made on the valve body.

Use of the tamper-proof cover

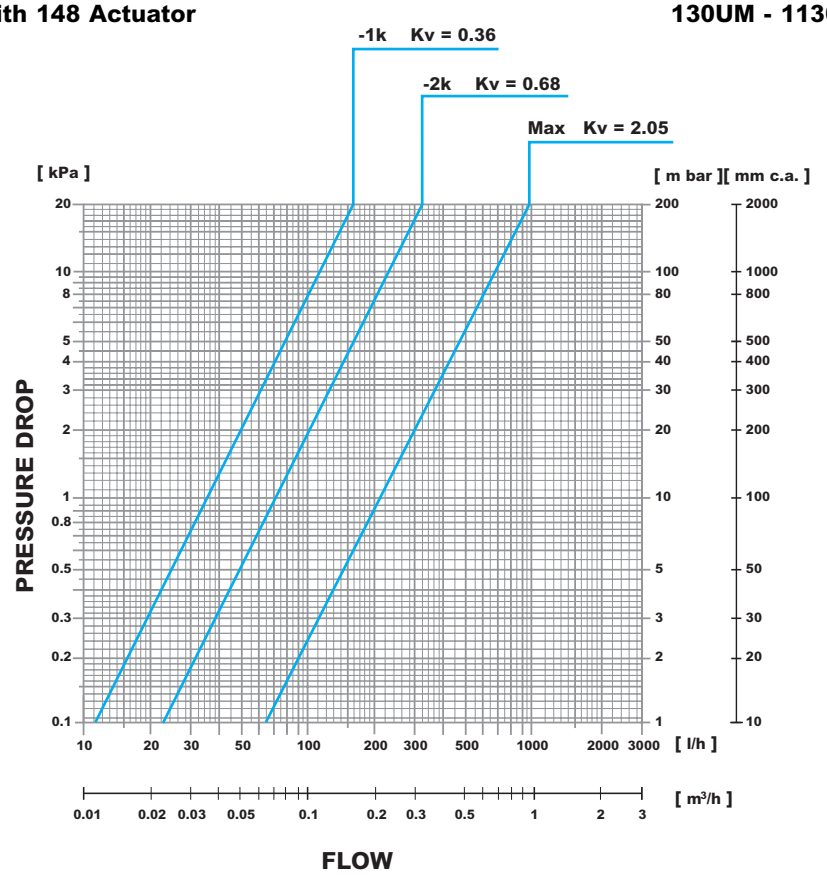
Thermostat adaptable valve bodies **Series 130UM, 131UM**, are fitted with a tamper-proof cover which protects the valve rod and threading before the preliminary mounting on the thermostatic head. It can be used for setting different flow rates by rotating either clockwise (to close valve plug) or anti-clockwise (to open valve plug), passing from full shut-off to full opening according to the indications stamped on the handwheel .

Thermostatic valve certified EN215-1

Coupled with thermostatic actuator Series 138 and derived products Series 148.

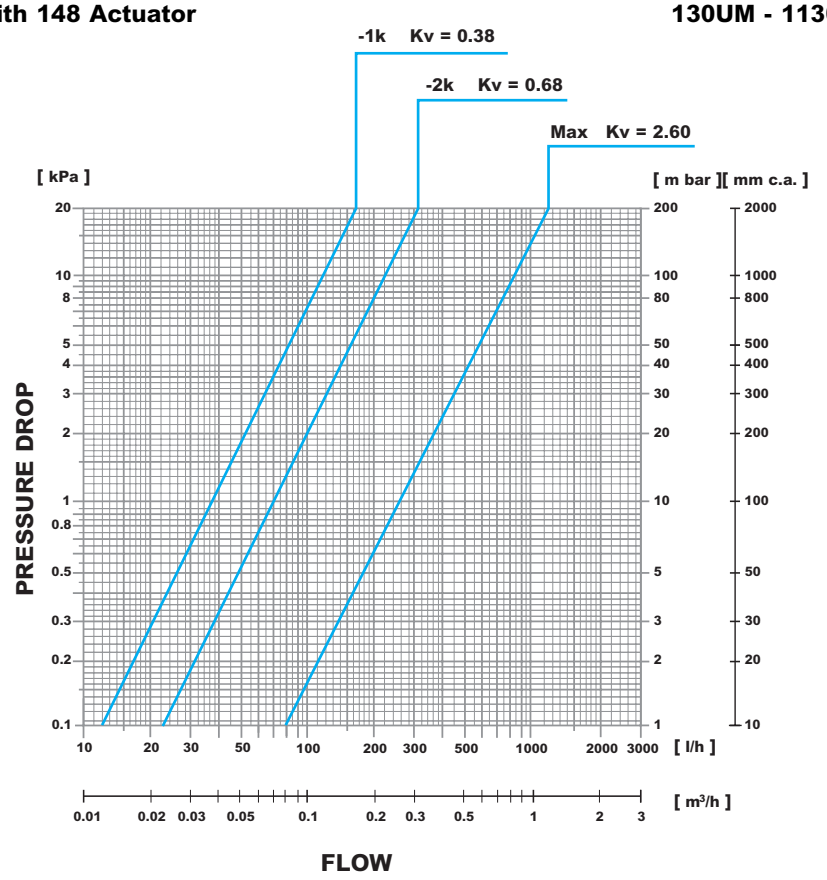
Type	DN	Kvn	qmN (l/h)
130UM + 148	3/8"	0,68	215
130UM + 148	1/2"	0,68	215
130UM + 148	3/4"	0,73	230

Angle body with 148 Actuator — **130UM - 1130UM - DN 3/8"**



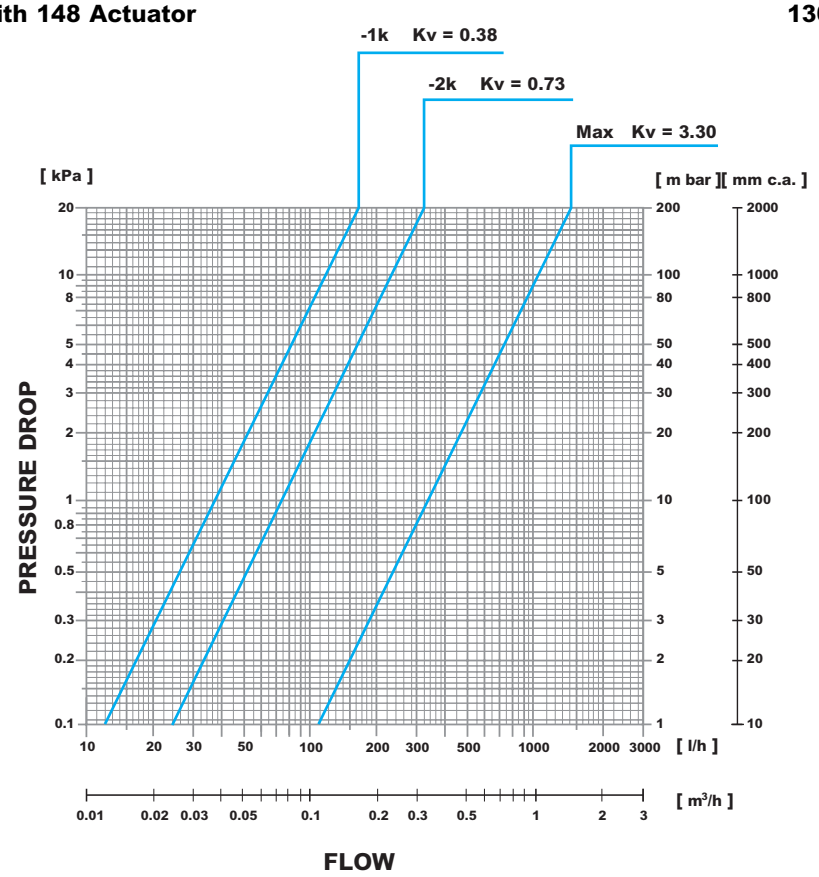
Angle body with 148 Actuator

130UM - 1130UM - DN 1/2"



Angle body with 148 Actuator

130UM - DN 3/4"



Example

When it is preferred to use an analytical method to know the pressure drop Dp (kPa), given the flow rate (litres/h) and the Kvn, adopt the following relation:

$$Dp = \left(\frac{0.01 * q}{Kvn} \right)^2 =$$

Determine the pressure drop of the thermostat adaptable valve Art. 131UM + 148 Nd 3/8" with a flow rate of 80 litres

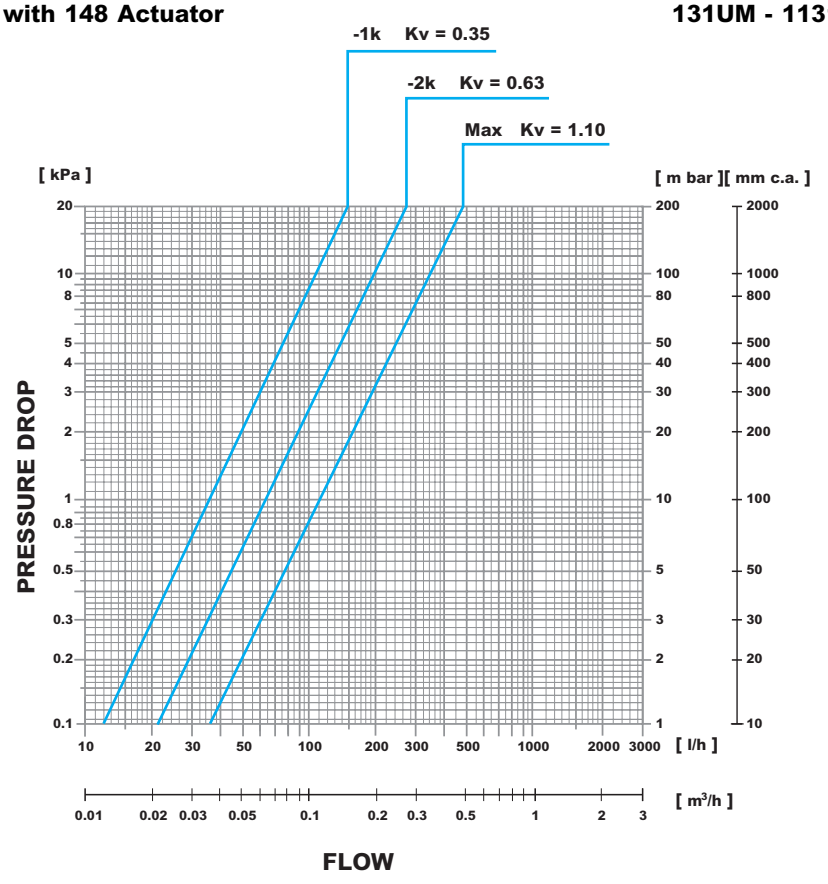
$$Dp = \left(\frac{0.01 * 80}{0,63} \right)^2 = 1,61 \text{ kPa}$$

Thermostatic valve certified EN215-1

Coupled with thermostatic actuator Series 138 and derived products Series 148.

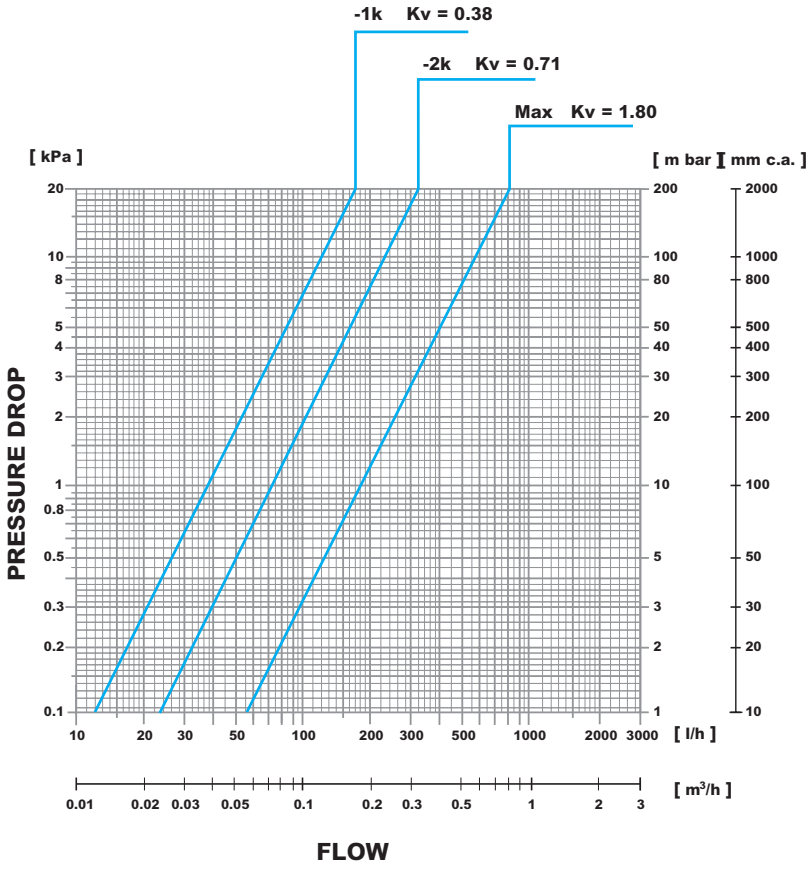
Type	DN	Kvn	qmN (l/h)
131UM + 148	3/8"	0,63	200
131UM + 148	1/2"	0,71	225
131UM + 148	3/4"	0,76	240

Straight body with 148 Actuator — **131UM - 1131UM - DN 3/8"**



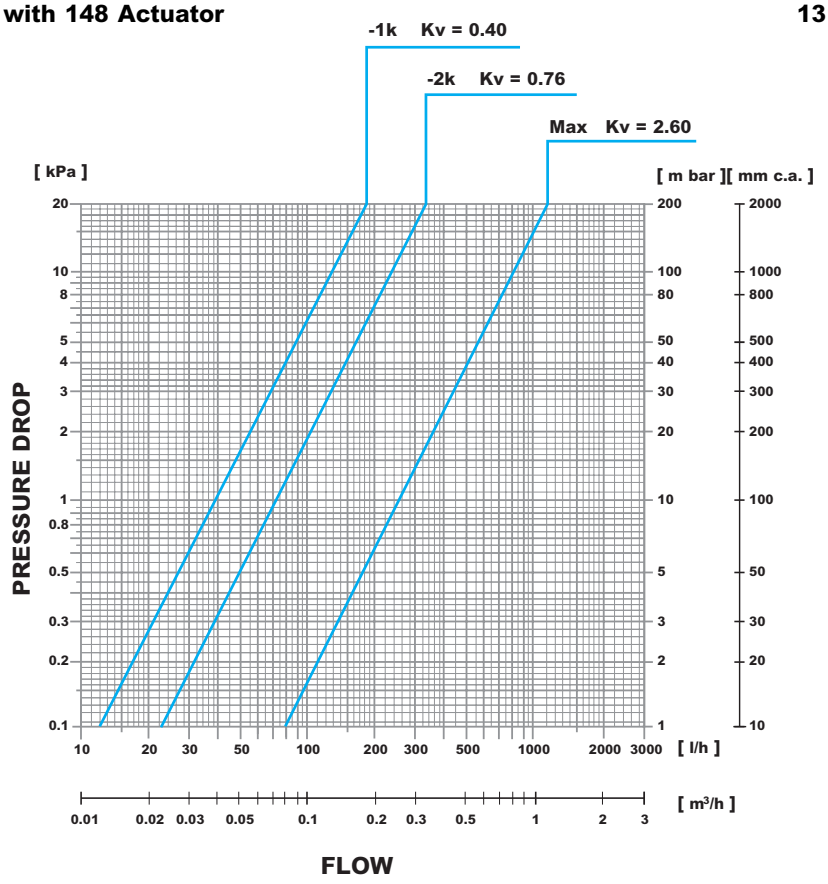
Straight body with 148 Actuator

131UM - 1131UM - DN 1/2"



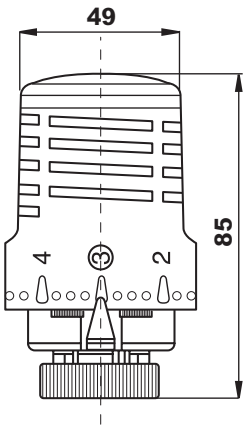
Straight body with 148 Actuator

131UM - DN 3/4"

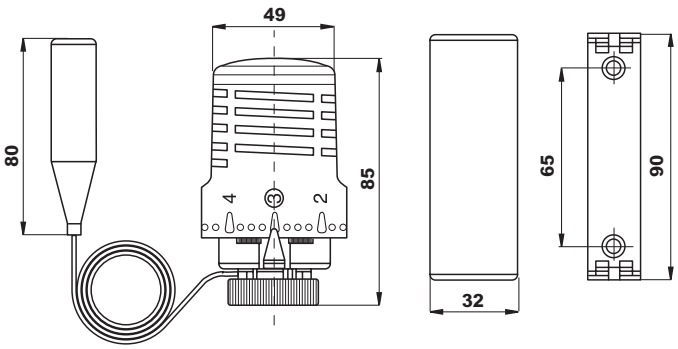


Overall dimensions (mm)

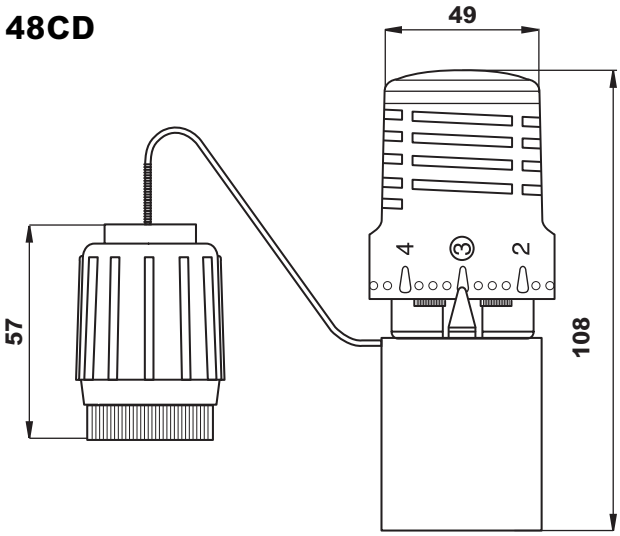
148



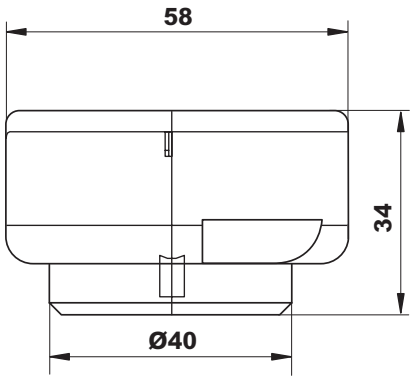
148SD



148CD



148GA



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- Measuring gauges
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- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

WATTS INDUSTRIES
Technology by nature

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Re-order no. 67-0015-UK-IT/1-06-06-Rev.1

Thermostatic actuator with remote probe Series 148SD2

Main features

- Used for:
  - Radiant panel heating systems
  - Heat exchangers

- Temperature setting ranges available :
  - 20 / 50 °C
  - 20 / 70 °C

- Reduced overall dimensions and weights

WATTS® INDUSTRIES

A Division of Watts Water Technologies Inc.

Description

The thermostatic actuator with remote copper probe, **series 148SD2**,is a device serving for controlling the flow rate of the heat-carrier fluid in relation to the operating temperature of the system.

148SD2

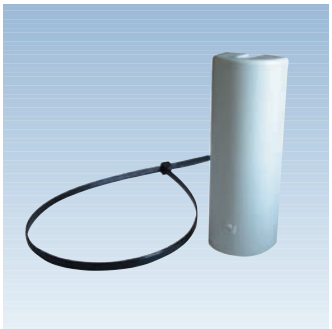
Thermostatic actuator with immersion remote sensor for adjust flow of heat carrier in relation to the temperature in radiant panel heating systems, with presence of a storage tank and for water-air heat exchangers.
Setting range : 20°C ÷ 50°C and 20°C ÷ 70°C.
Bulb length : 97 mm (20°C ÷ 50 °C) - 66 mm (20°C ÷ 70 °C).
Bulb thickness : 12 mm. 2,5 m capillary tube.

Type	Part number	Bulb	Setting	Weight (g)
148SD2	148SD2050	97mm	20-50°C	250
148SD2	148SD2070	66mm	20-70°C	250

148SD12

Sensor pocket for actuator series 148SD2.
Threaded : 1/2"M.
Sealing with o-ring.

Type	Part number	Weight (g)
148SD12	148SD122050	100
148SD12	148SD122070	50



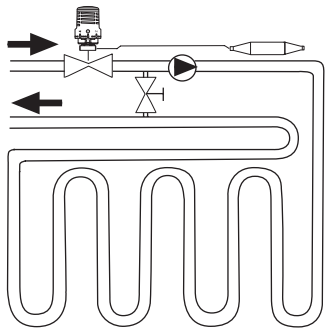
148SDCOP

Insulating cover and string fixing on each manifolds 20-50 and 20-70.

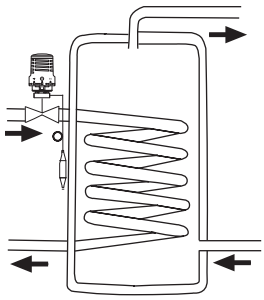
Type	Part number	Weight (g)
148SDCOP	148SDCOP	10

Application

The Series 148SD2 thermostatic actuator can be used for the following plant engineering applications :



1 Control of supply temperature in radial panel heating systems



2 Control of the flow rate in the primary circuit for maintaining a constant temperature in the secondary circuit in a small heat exchanger.

Operation

Operation of the **series 148SD2** thermostatic actuator is based on a sensitive element seated under the control handwheel and connected to the remote probe via a liquid-filled capillary, which detects the operating temperature. The temperature is set by rotating the handwheel which is marked with the following setting range:

Setting range							
148SD2050	20°C	25°C	30°C	35°C	40°C	45°C	50°C
148SD2070	20°C	28°C	37°C	45°C	53°C	62°C	70°C

Depending on the deviation from the preset temperature (set-point), the actuator adjusts the flow rate of the heat-carrier fluid through the plug movement of the valve on which it is mounted, thus controlling the temperature of the work fluid.

Hydraulic characteristics

The Kv values for the thermostatic / fan-coil valves and for each DN are listed in the following table

Series 148SD2 with thermostatic actuator and fan-coil valves	DN	PN bar	DP max bar	kv Proportional band 2k	4k	6k	-8k	kvs A
Series 130UM	3/8”	10	1	0,39	0,75	0,98	1,2	2,2
Series 130UM	1/2”	10	1	0,4	0,78	1,0	1,3	2,6
Series 130UM	3/4”	10	0,8	0,4	0,82	1,15	1,4	3,4
Series 131UM	3/8”	10	1	0,34	0,65	0,85	1,0	1,1
Series 131UM	1/2”	10	1	0,35	0,72	0,95	1,25	1,9
Series 131UM	3/4”	10	0,8	0,38	0,80	1,1	1,36	2,6
Series 2131 - 3131 - 4131	1/2”	16	0,7	0,35	0,65	0,9	1,2	1,7
Series 2131 - 3131 - 4131	3/4”	16	0,5	0,4	0,8	1,1	1,45	2,5 (Mix.) 2,8 (Div.)
Series 2131 - 3131	1”	16	0,4	0,5	0,9	1,5	2,0	4,5

Reliability of the **series 148SD2** is guaranteed by 100% testing of the production.

Design features	
Handwheel	ABS
Sensitive element capsule	Bronze
Probe	Copper
Plug seal	EPDM
Thrust rod	30% polyamide
Springs	Stainless steel

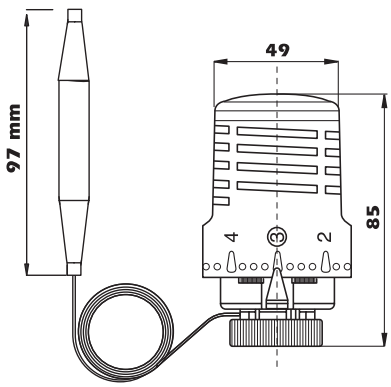
Technical features		
Setting range	20 ÷ 25°C	20 ÷ 70°C
Max. temperature, probe side	55°C	80°C
Nominal lift	0.175 mm/°C	0.105 mm/°C
Probe length	97 mm	66 mm
Probe diameter	12 mm	12 mm
Length of capillary	2 mm	2 mm

Installation

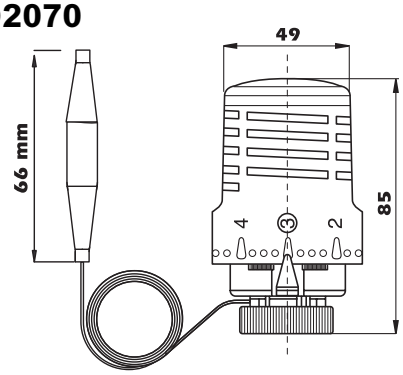
The thermostatic actuator can be installed on thermostatic valves **series 130, 131** and on fan-coil valves **series 2131, 3131, 4131**, with the contact probe in the most suitable position for measuring the operating temperature. For such purpose, it is possible to use the following accessory: sensor pocket **art. 148SD12** or **art. 148SDCOP** for installation on manifolds.

Overall dimensions (mm)

148SD2050

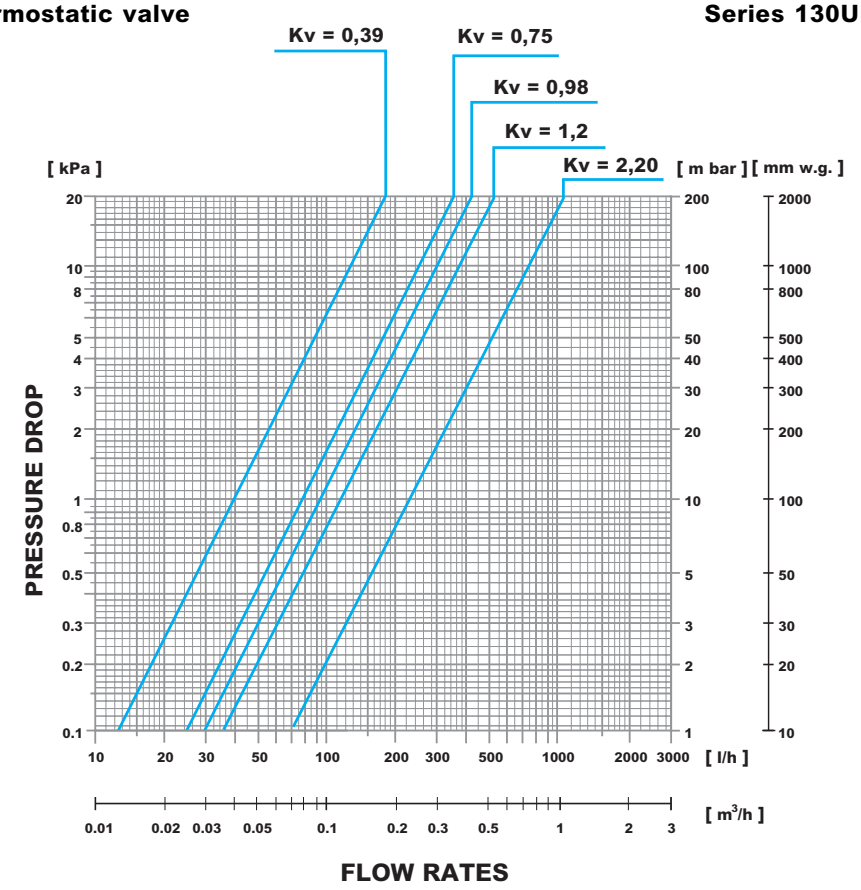


148SD2070

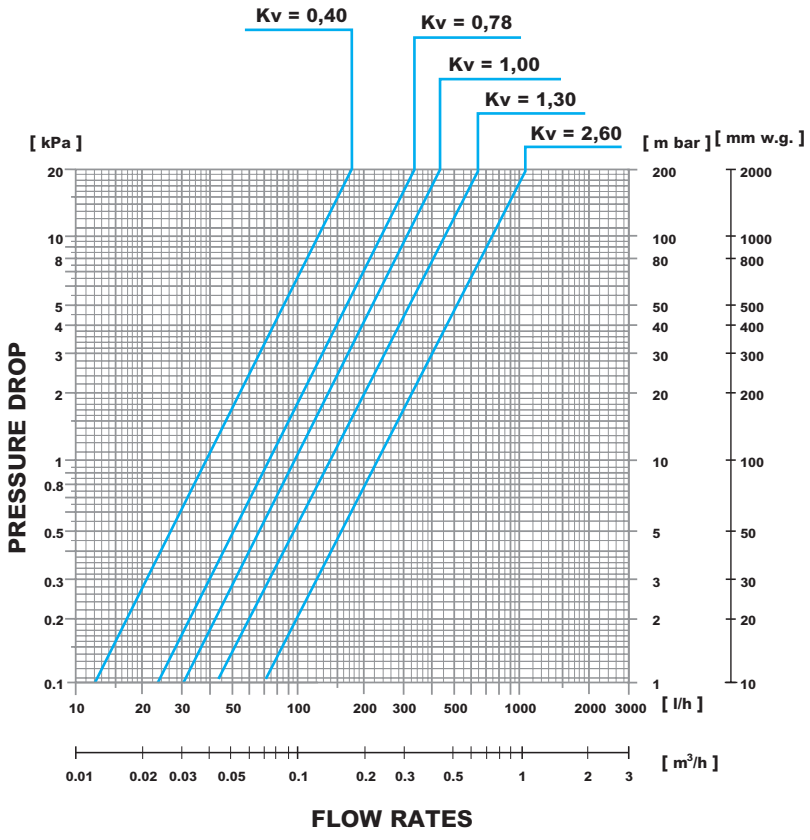


Flow rate/pressure drop charts

148SD2 + Thermostatic valve — **Series 130UM - DN 3/8"**

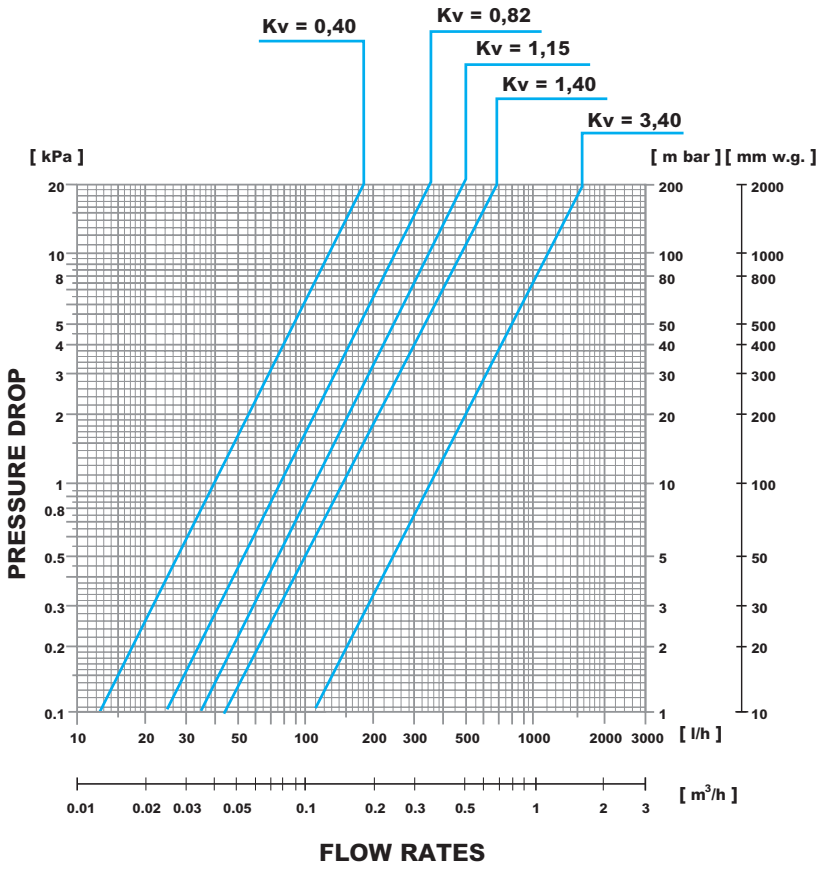


148SD2 + Thermostatic valve — **Series 130UM - DN 1/2"**



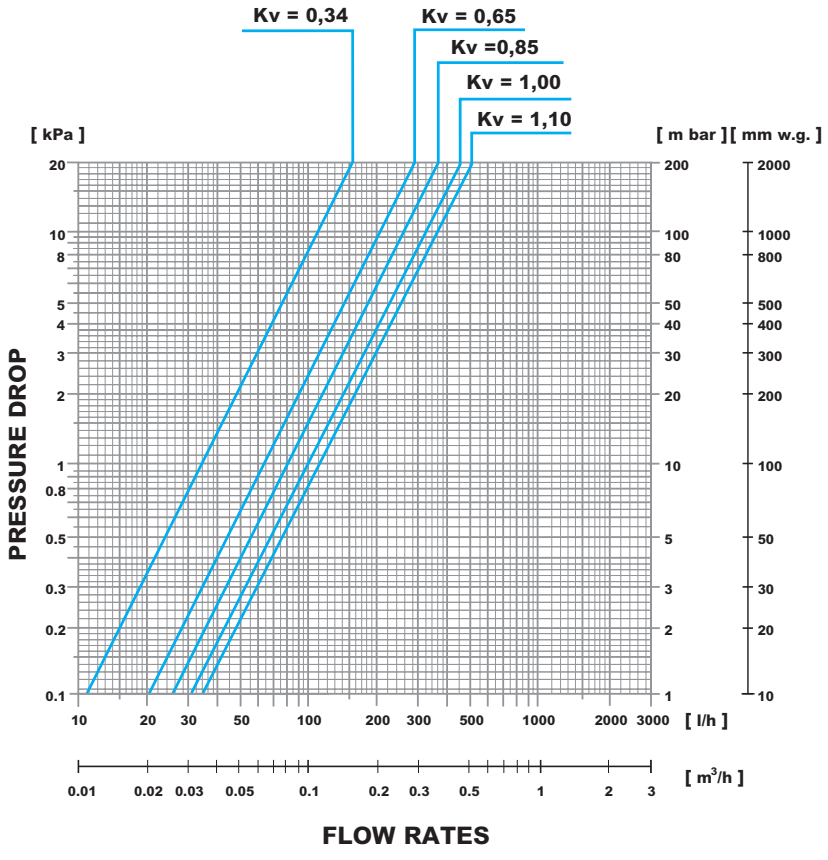
148SD2 + Thermostatic valve

Series 130UM - DN 3/4"

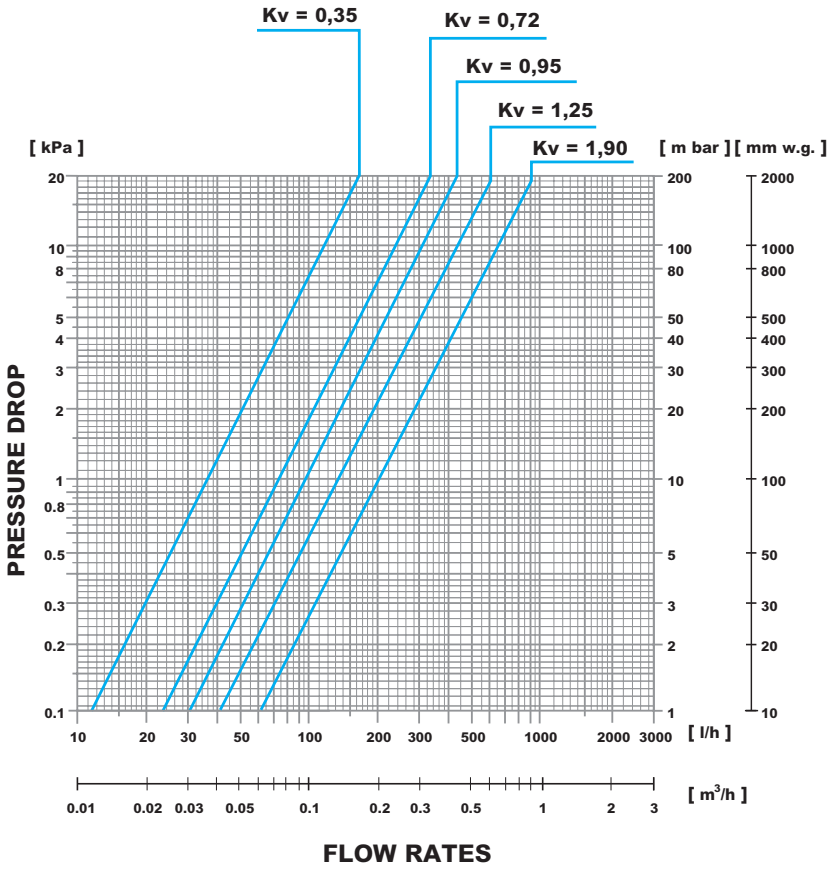


148SD2 + Thermostatic valve

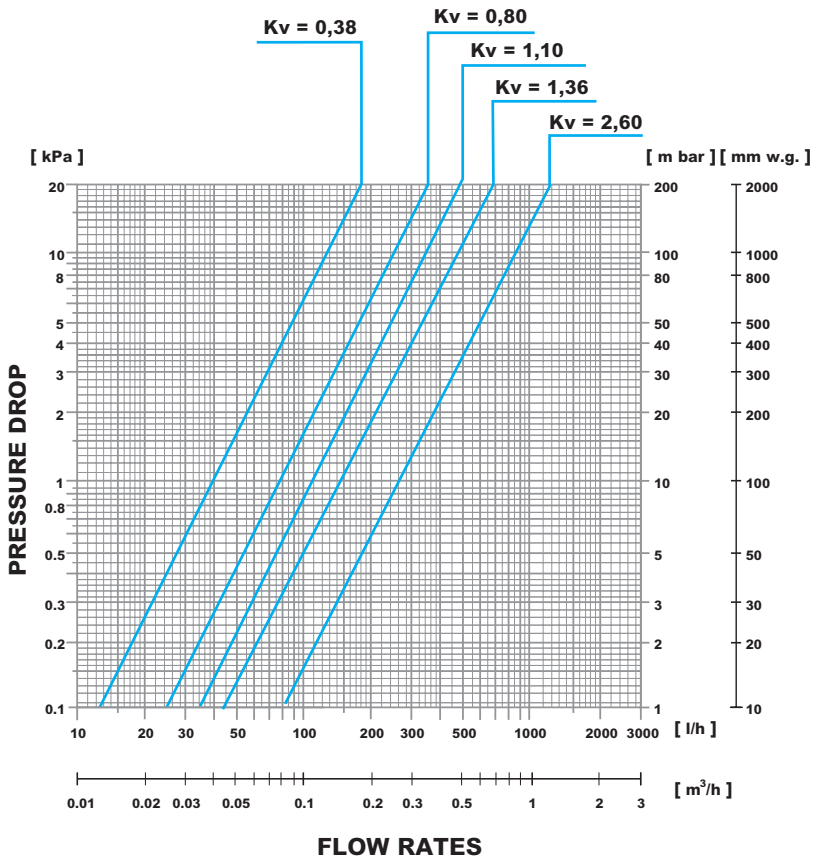
Series 131UM - DN 3/8"



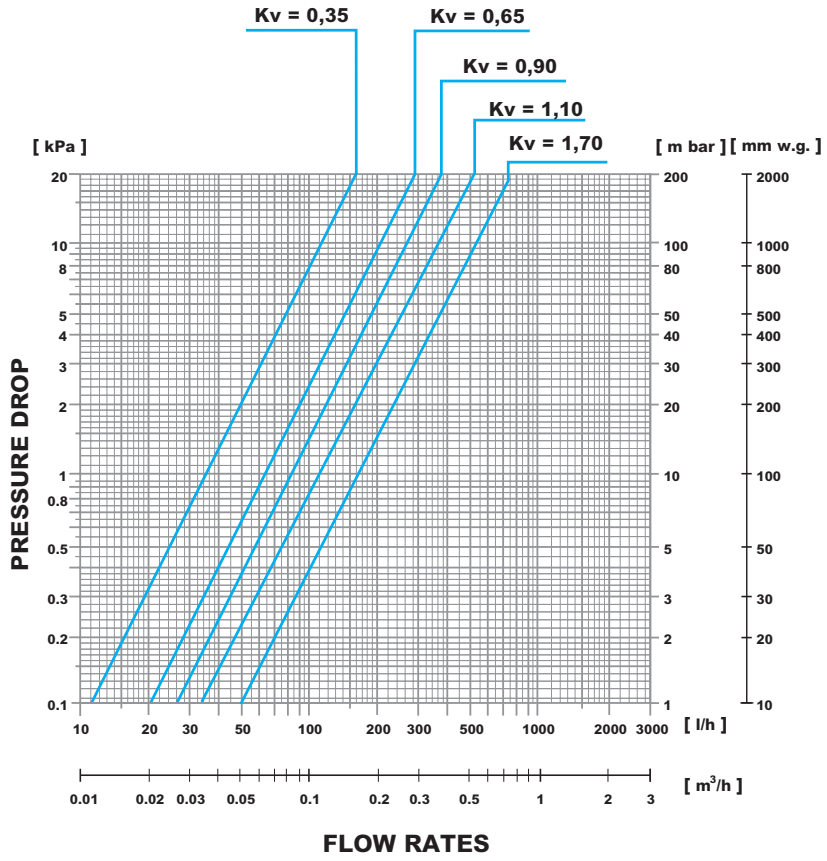
148SD2 + Thermostatic valve **Series 131UM - DN 1/2"**



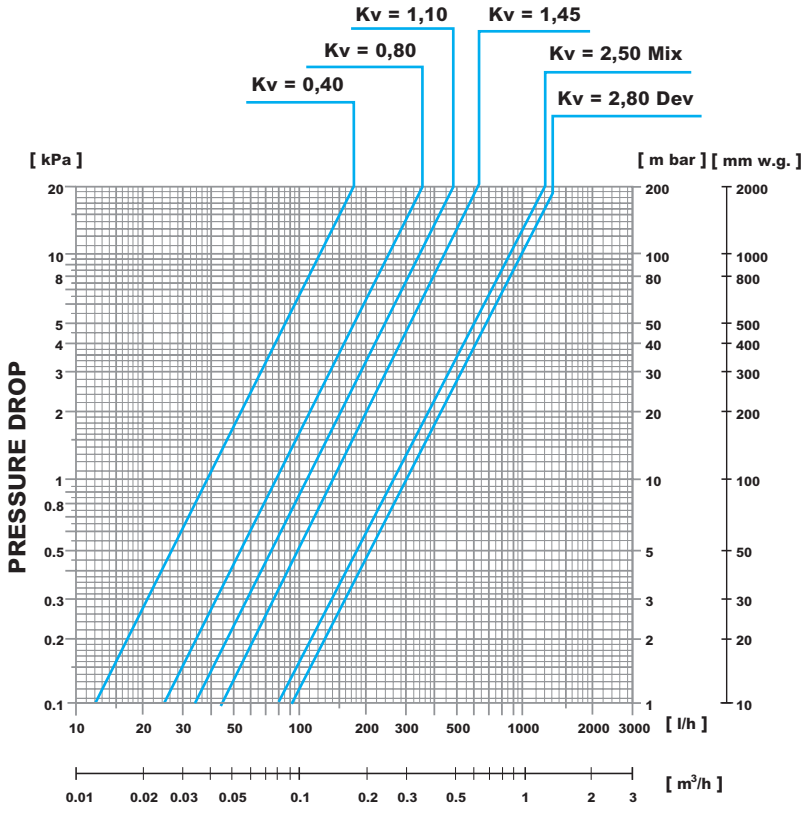
148SD2 + Thermostatic valve **Series 131UM - DN 3/4"**



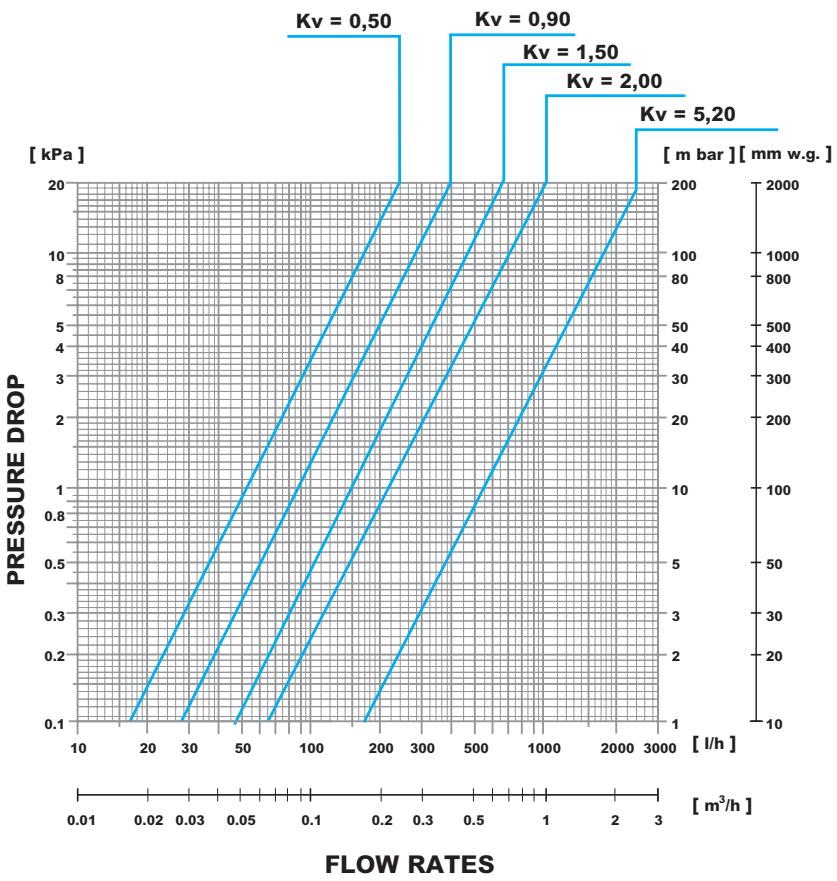
148SD2 + Fan-coil valve **Series 2131 - 3131 - 4131 - DN 1/2"**



148SD2 + Fan-coil valve **Series 2131 - 3131 - 4131 - DN 3/4"**



148SD2 + Fan-coil valve **Series 2131 - 3131 - DN 1"**



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Re-order no. 67-0016-UK-IT/1-01-07-Rev.0

Lockshield valves
Series 195UM - 196UM
1195UM - 1196UM

Main features

- Available in the following versions :
- Angle body, straight body, for iron, copper and polyethylene piping with 3/8” connection to radiator and 1/2” on pipe side
- Conforms with UNI 8464/90 standard

WATTS®
INDUSTRIES
Technology by nature

Description

Lockshields **Series 195UM, 196UM, 1195UM, 1196UM**, are used as shut-off and control devices for heat emitters (radiators, fan coil convectors, radiant panels, etc.) in heating and air-conditioning systems.
The lockshields are available in the configuration with straight or angle body, with male or female thread and should be installed on the return pipe of the heat emitter. They are fitted with an O-RING sealed straight tailpiece.

195UM

Micrometric lockshield with angle body for iron pipes

Type	Code	Size	Kvs	Weight (g)
195UM	195UMSN38	3/8"	1,8	200
195UM	195UMSN12	1/2"	2,3	250
195UM	195UMSN34	3/4"	4,6	500

196UM

Micrometric lockshield with straight body for iron pipes

Type	Code	Size	Kvs	Weight (g)
196UM	196UMSN38	3/8"	1,1	110
196UM	196UMSN12	1/2"	1,5	150
196UM	196UMSN34	3/4"	3,5	350

1195UM

Micrometric lockshield with angle body for copper or polyethylene pipes

Tipo	Codice	Size body	Size Tube	Kvs	Weight (g)
1195UM	1195UMSN38X	3/8"	1/2"	2,3	170
1195UM	1195UMSN12	1/2"	1/2"	2,3	250

1196UM

Micrometric lockshield with straight body for copper or polyethylene pipes

Tipo	Codice	Size body	Size Tube	Kvs	Weight (g)
1196UM	1196UMSN38X	3/8"	1/2"	1,5	110
1196UM	1196UMSN12	1/2"	1/2"	1,5	150

Application

Although the lockshields are not true setting devices, they can also be used for hydraulic balancing of the heat emitters by adjusting the plug stroke.

Operation

Operation is through the manual movement of the plug which shuts off the heat carrier fluid.
For hydraulic flow rate and pressure drop characteristics, see relative charts.

Adjustment

To adjust the lockshield, remove the cap and turn the plug with relative wrench (**Article 223**) or wide-bladed screwdriver. The setting positions are identified by the numbers of turns in opening the lockshield starting from the fully closed position (**See table**).

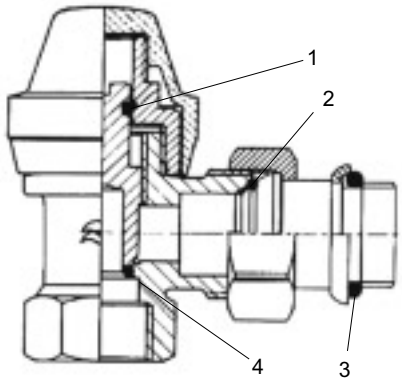
Reliability of the lockshields **series 195UM, 196UM, 1195UM, 1196UM**, is ensured thanks to the 100% testing of the production which checks the hydraulic sealing properties of the valve body and its components towards the outside and that of the plug in its flow shut-off function.

Installation

Selection of the lockshieds depends on the size of the connection to the radiator and the connecting pipe.
Lockshields **Series 195UM, 196UM, 1195UM, 1196UM**, can be installed on heat emitters supplied by iron, copper and plastic piping.

Technical features	
Nominal pressure	10 bar
Max. temperature	110°C
Liquids which can be used	Water also with glycol ≤ 50%

Design features	
Valve body	Brass CW617N
Handwheel	ABS
O-ring	EPDM
Tailpiece	Brass CW614N



Special features

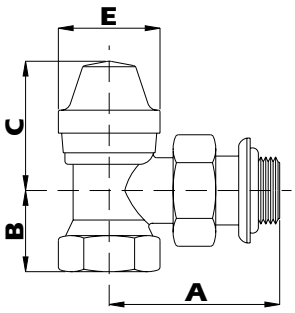
1) O-RING on the outside
2) O-RING sealed straight tailpiece
3) O-RING on radiator side
4) Plug with mechanical seal

Kv values : The setting positions are according to the number of turns in lockshield opening starting from fully closed position.

N° of opening turns	195UM 1195UM		195UM	196UM 1196UM		196UM
	3/8"	1/2"	3/4"	3/8"	1/2"	3/4"
1	0.20	0.26	0.44	0.11	0.19	0.37
1.5	0.32	0.43	0.65	0.18	0.26	0.60
2	0.55	0.65	1.00	0.30	0.42	0.90
2.5	0.75	0.90	1.32	0.42	0.60	1.20
3	100	115	168	060	078	151
4	128	175	260	035	115	220
5	-	-	378	-	-	270
6	-	-	430	-	-	310
A	170	250	500	110	150	350

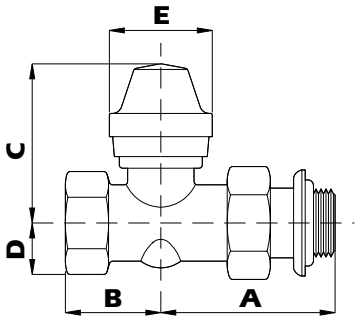
Overall dimensions (mm)

195UM



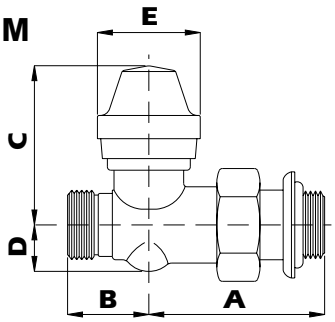
DN	A	B	C	E
3/8”	48	21	36	31
1/2”	52	25	40	31
3/4”	60	29	50	41

196UM



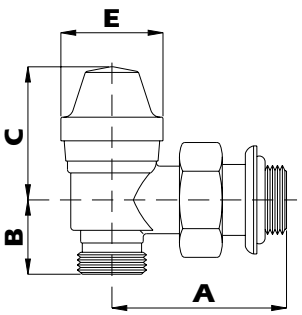
DN	A	B	C	D	E
3/8”	48	25	42	12	31
1/2”	52	28	45	14	31
3/4”	60	33	60	18	41

1195UM



DN	A	B	C	D	E
3/8”	48	23	42	11	31
1/2”	52	23	45	13	31

1196UM

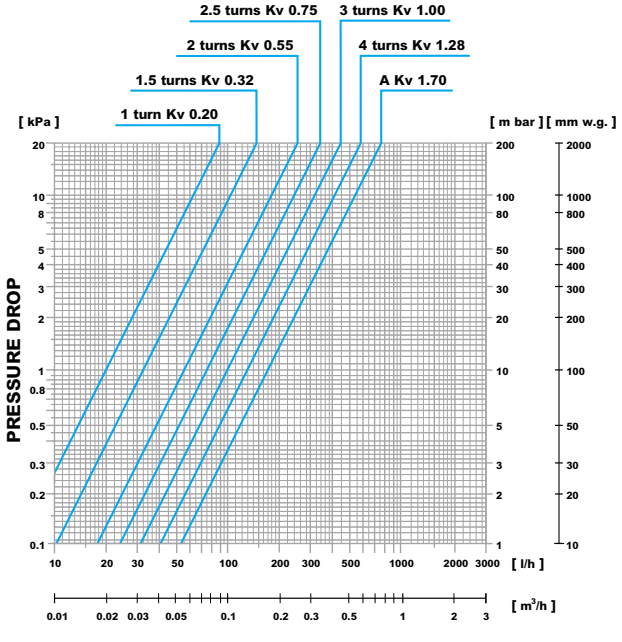


DN	A	B	C	E
3/8”	48	19	36	31
1/2”	52	19	40	31

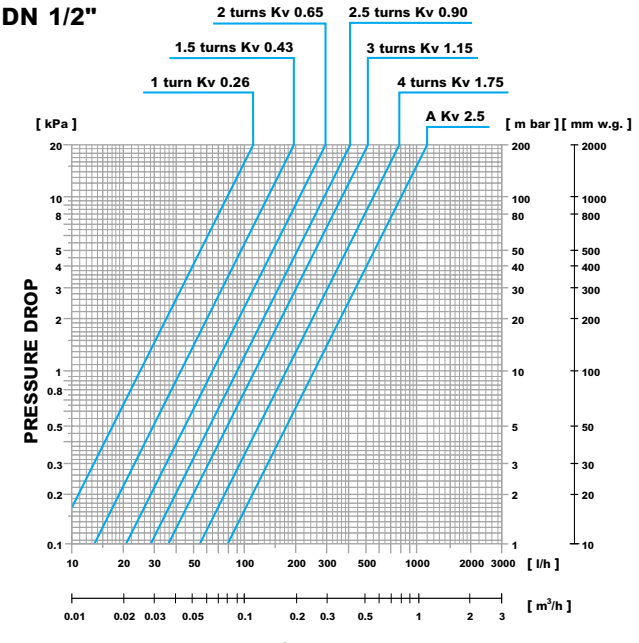
Flow rate/pressure drop charts

Angle body : N° of opening turns

195UM - DN 3/8"



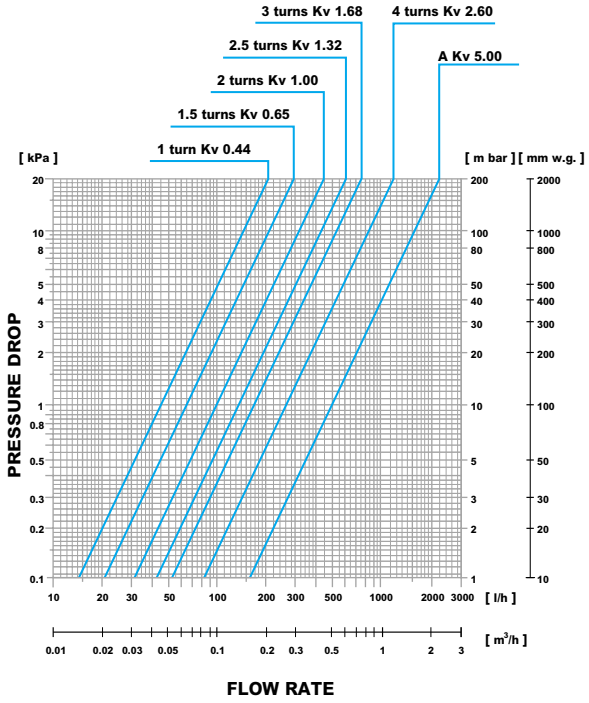
195UM - 1195UM - DN 1/2"



Flow rate/pressure drop charts

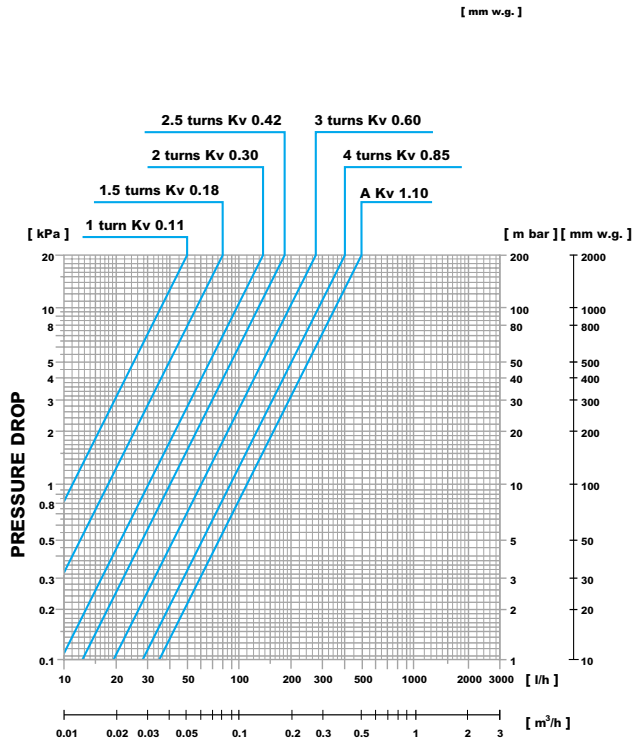
Angle body : N° of opening turns

195UM - DN 3/4"



Straight body: N° of opening turns

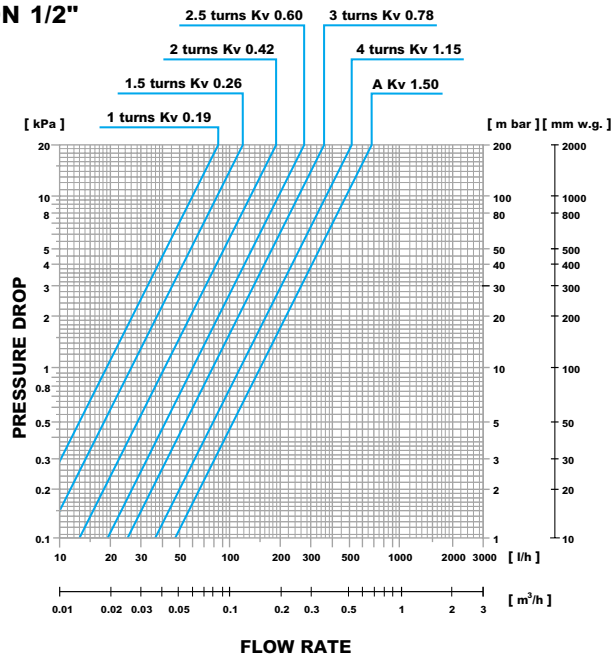
196UM - DN 3/8"



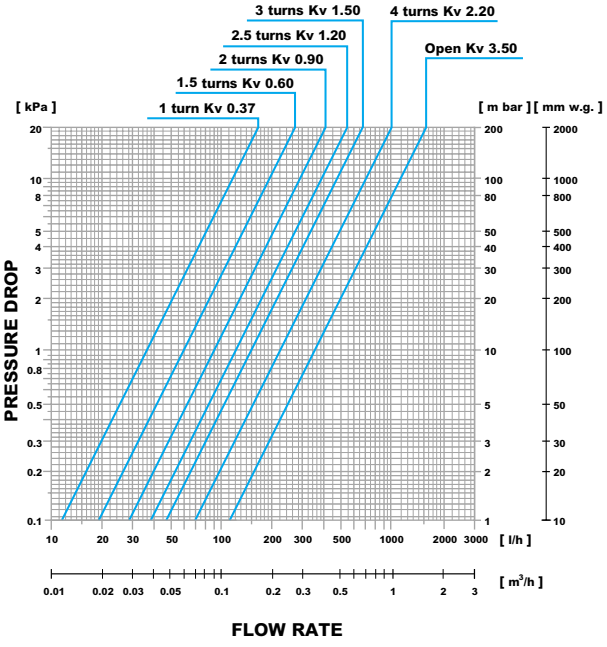
Flow rate/pressure drop charts

Straight body: N° of opening turns

196UM - 1196UM - DN 1/2"



196UM - DN 3/4"



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Re-order no. 67-0025-UK-IT/1-06-01-Rev.0

4-way thermostat adaptable valves for two-pipes and one-pipe heating systems Serie 120B - 102M

Main features

- Available in the following versions with :
  - Connection to heat emitter ND 1/2” - 3/4 “
  - Connection to copper or plastic pipe ND 1/2” - 1/2 “ S
- Plug stroke presetting device
- Conforms with UNI 7942/79 standard

WATTS INDUSTRIES

Technology by nature

Description

The 4-way thermostat adaptable valves, **Series 120B, 102M**, are used as shut-off and control devices for radiators in two-pipe and one-pipe heating systems respectively.

The valves come in the configuration with 1/2" - 3/4" connection to the heat emitter and are provided with probe for separating the delivery flow from the return flow in the radiator.
Connection of the valves to the heat emitter is through an O-ring sealed straight tailpiece and final washer with the aid of a hex. spanner.

120B

4-way nickel-plated thermostat adaptable valve for **two-pipe systems**.
With presetting. Built-in lockshield valve. Connection for copper or plastic pipe. **O-ring sealed** straight tailpiece, complete with flow separation probe. ABS handwheel. Differential pressure (item 148): 1.5 bar.

Compatible with thermostatic actuators series 148 and electrothermic actuators 22C.

Type	Part Number	Size body	Size tube	Kvs	Weight (g)
120B	120B12AM12	1/2"	1/2"	0,82	570
120B	120B12AM34	3/4"	1/2"	0,93	570
120B	120B24AM12	1/2"	1/2"S	0,82	580
120B	120B24AM34	3/4"	1/2"S	0,93	580

102M

4-way nickel-plated thermostat adaptable valve for **one-pipe systems with fixed by-pass**. **With presetting**. Built-in lockshield valve. Connection for copper or plastic pipe. **O-ring sealed** straight tailpiece, complete with flow separation probe. ABS handwheel. Differential pressure (item 148) : 1.5 bar.
Flow rate to radiator: 50%.

Compatible with thermostatic actuators series 148 and electrothermic actuators 22C.

Type	Part Number	Size body	Size tube	Kvs	Weight (g)
102M	102M12AM12	1/2"	1/2"	2	560
102M	102M12AM34	3/4"	1/2"	2,15	560
102M	102M24AM12	1/2"	1/2"S	2	570
102M	102M24AM34	3/4"	1/2"S	2,15	580

Technical feature		
Max. temp.	110°C	
Max. pressure	10 bar	
Max. differential pressure	1.5 bar	
Fluids which can be used	Water also with glycol ≤ 50%	
	120B	102M
Kvn coefficient with proportional band 2K	DN 1/2" = 1.76 DN 1/2" = 0.58	DN 3/4" = 1.84 DN 3/4" = 0.62
Kvn coefficient with proportional band 1K	DN 1/2" = 1.56 DN 1/2" = 0.34	DN 3/4" = 1.61 DN 3/4" = 0.38

Design feature	
Valve body	Brass CW617N
Plug seal	EPDM
Handwheel	ABS
Radiator probe	Modified polyether (PPE + PA)
Panel radiator probe	Copper
O-ring	EPDM
Tailpiece	Brass CW617N

Application

These valves are designed for manual room temperature control using just one connection for water inlet/outlet to/from the heat emitter. They can also be used for automatic temperature control when coupled to thermostatic actuators (**Series 148, 148SD, 148CD**) or else electrothermic actuators (**Art. 22C**). The use of thermostatic valves allows installation of metering systems (see Sections on Measuring and metering systems) as required by Italian legislation (Act 10/91 Art. 26). The valves are provided with active memory presetting which, when using thermostatic or thermoelectric actuators, enables exact balancing of the heating system.

Such balancing is obtained by turning the ring nut located under the handwheel in order to limit the plug stroke. Above all, when removing the handwheel for thermostatting the system, the active memory presetting holds the balancing made permanently.

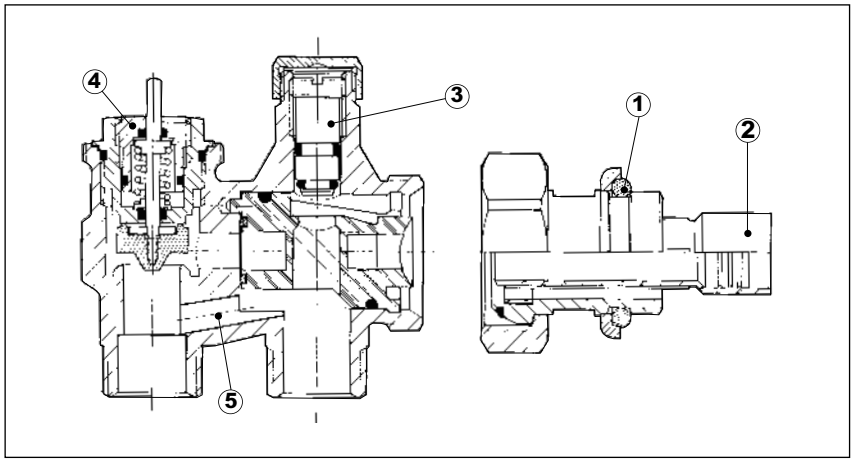
Installation

Valve selection is based on the type of system (one-pipe or two-pipe) as well as size of the connection to the radiator and connecting piping. Valves, **Series 120B, 102M**, can be installed on heat emitters supplied by copper or plastic pipes. When it is required to thermostat the system, merely unscrew the control handwheel from the valve and substitute it with a thermostatic or electrothermic actuator by tightening the ring nut.

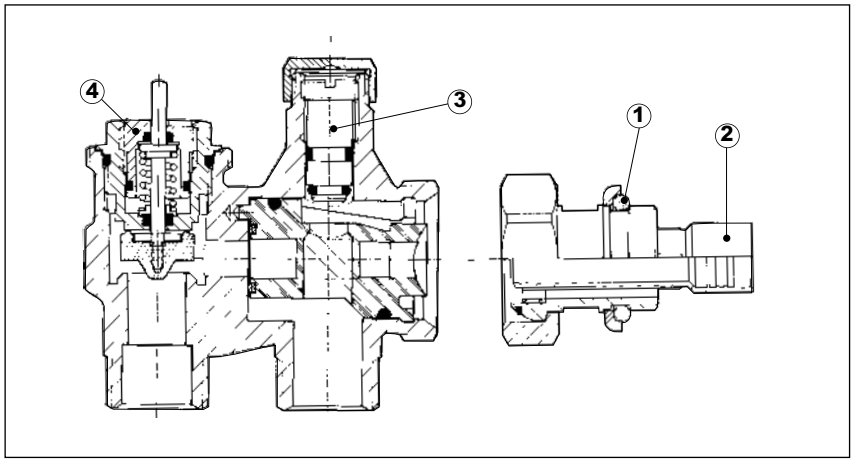
All this can be done without any plumbing work and with the system running. As with all the two-pipe and one-pipe valves, likewise valves **120B, 102M** should be connected in the bottom part of the heat emitter.
In order to ensure correct thermostatic operation (i.e. with thermostatic actuator **Series 148**), the delivery pipe must be connected to the connection under the valve control handwheel which should always be mounted in the horizontal direction. In the case of panel type radiators, use the copper probe (**art. RV141**). When excluding and removing the radiator, it is also necessary to regulate the special built-in lockshield. All this should be done without interrupting circulation of the fluid in the rest of the ring circuit.

Reliability of the thermostat adaptable valves, **Series 120B, 102M**, is guaranteed thanks to the 100% testing of the production which checks pressure tightness of the valve body and its components towards the outside and that of the plug during its flow shut-off function.

102M



120B



Details

1) O-ring sealed straight tailpiece

2) Probe holder insert

3) Lockshield

4) Presetting stuffing box nut, can be replaced with the system under pressure through art. 225.

5) By-pass

Operation

Valve operation is controlled either by manual movement or by automatic movement of the plug which shuts off the heat carrier fluid.

In valves of the **102M series**, known as partial flow types for one-pipe systems, the water flow calculated for the entire ring circuit, is subdivided into one part for heat exchange and one part reaching the next heat emitter directly. This permanently open by-pass allows constant circulation of the heat carrier fluid even when the valve is fully closed with respect to the heat emitter. In valves of the **120B series** for two-pipe systems, the flow of water reaches the heat emitter directly where the heat exchange takes place.

To ensure efficiency of this, in valves **Series 120B, 102M**, the delivery and return flow is separated by a probe inserted in the heat emitter. The hydraulic flow rate and pressure drop cahracteristics for the valves can be deduced from the appropriate charts.

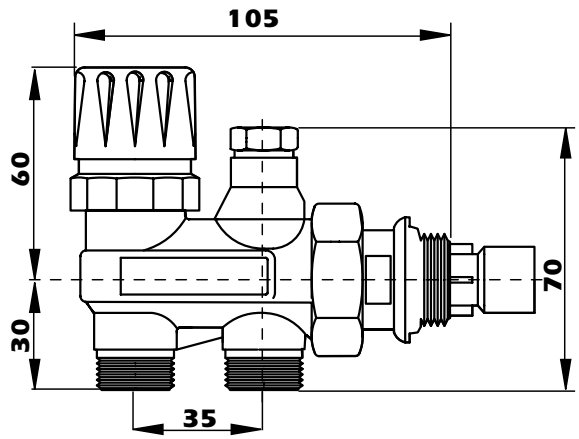
102M								
Total Kv values (flow rate towards radiator + by-pass flow rate) Setting positions								
Setting positions	1	2	3	4	5	6	7	A
DN 1/2"	1.50	1.60	1.75	1.80	1.85	1.90	1.95	2.00
DN 3/4"	1.55	1.75	1.90	1.95	2.00	2.05	2.10	2.15

102M								
"Supply coefficient" of the heating emitter, expressed in percentage of the flow passing through the distribution ring circuit is equal to:								
DN	1	2	3	4	5	6	7	A
DN 1/2" - 3/4"	22%	30%	34%	36%	38%	40%	42%	50%

120B - 102M								
Kv values in the various presetting positions								
Setting positions	1	2	3	4	5	6	7	A
DN 1/2"	0.30	0.53	0.63	0.70	0.74	0.77	0.79	0.82
DN 3/4"	0.30	0.56	0.67	0.75	0.81	0.85	0.88	0.93

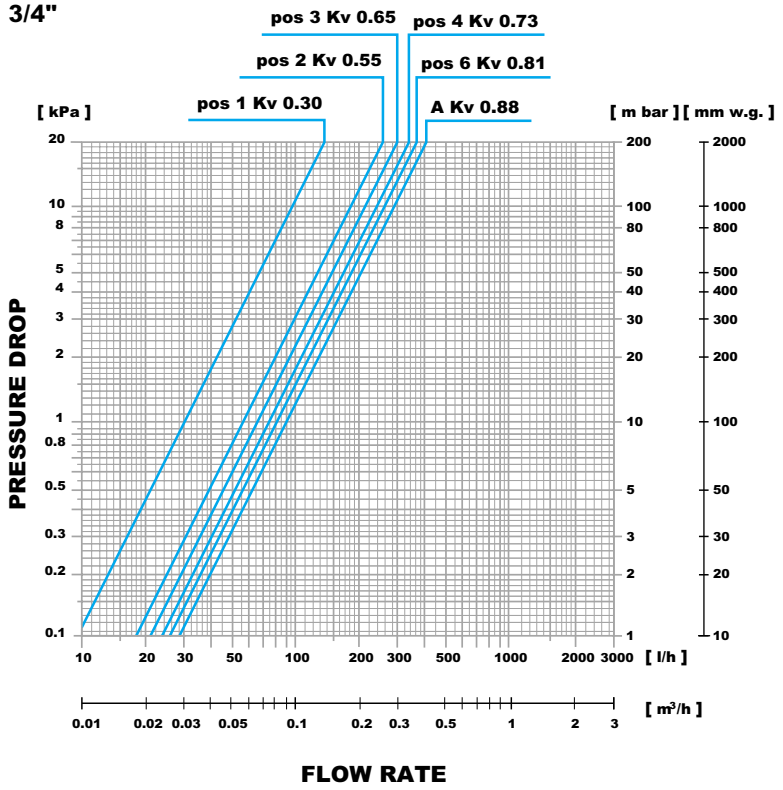
Overall dimension (mm)

120B/102M



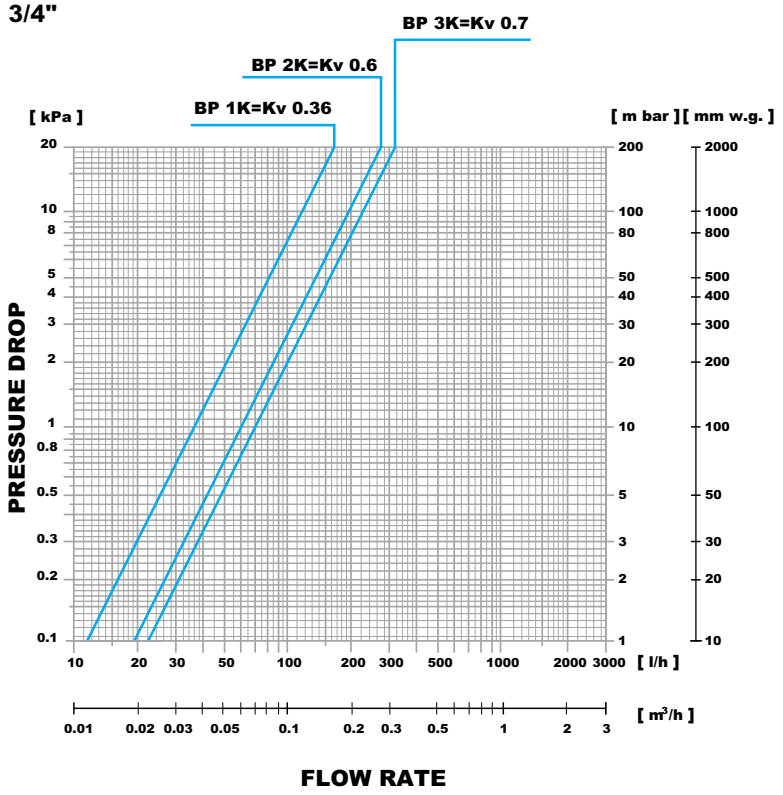
Flow rate/pressure drop charts

120B - DN 1/2" - 3/4"



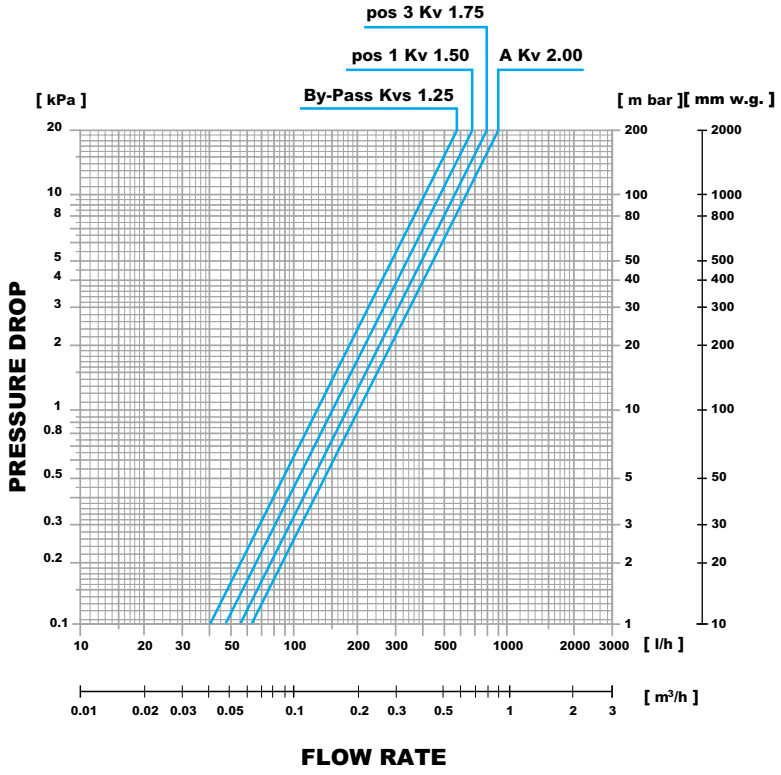
With actuator 148

120B - DN 1/2" - 3/4"



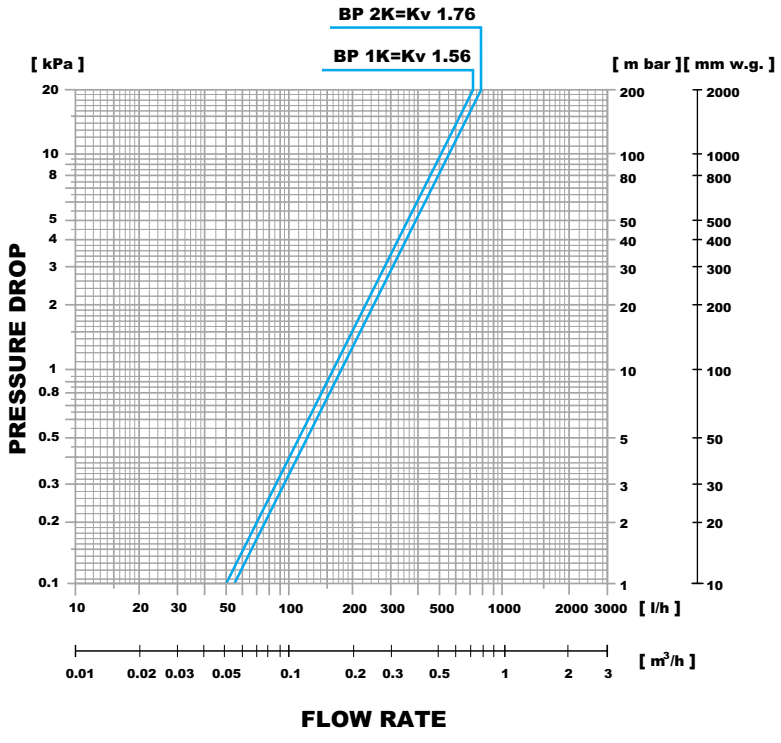
Flow rate/pressure drop charts

102M - DN 1/2"

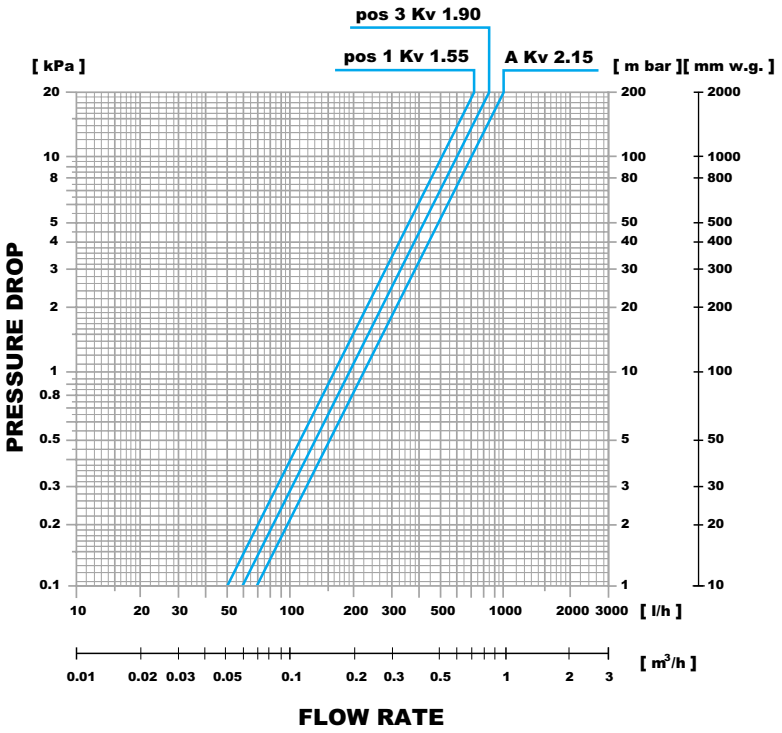


With actuator 148

102M - DN 1/2"

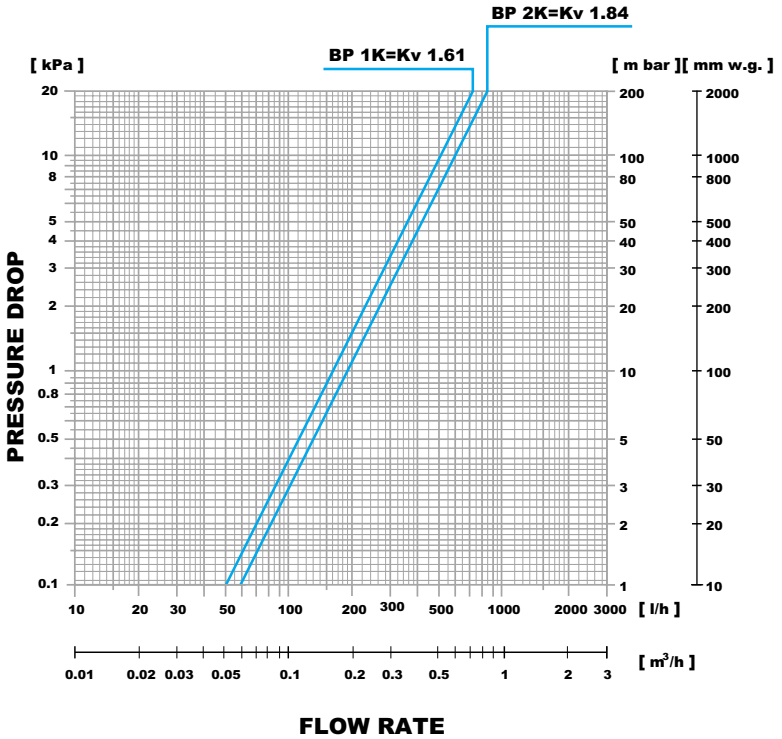


102M - DN 3/4"



With actuator 148

102M - DN 3/4"



Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

WATTS INDUSTRIES
Technology by nature

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Re-order no. 67-0030-UK-IT/1-06-01-Rev.0

On/off electrothermic actuators Series 22C

Main features

- 22C series available in the following versions :
  - NA (Normally open)
  - NC (Normally closed)
- 2-wire (Standard)
- 4-wire (With auxiliary contact)
- New compact design.
- Availability to check status of actuator (On/off) by transparent window on the cover
- CE Marked in accordance with the following standards :
  - EEC EMC (CEI-EN 55104/95 ; CEI-EN55014/93), EMC directive EN 60730-1; EN 60730-2-14, low voltage directive
- ENEC approved .

WATTS INDUSTRIES

Technology by nature

Description

The electrothermic actuators **22C series** are ON/OFF devices used for automatic actuation of the valves on:
- thermostatic adaptable valves **series 178UM, 1178UM, 179UM, 1179UM, 188UM, 1188UM, 189UM, 1189UM, 130UM, 131UM, 102M, 100M, 120B**.
- reverse body valves **series 180M**
- fan coil valves **series 2131, 3131, 4131**
- manifolds **series 822M**

The electrothermic actuators are available in the following versions:
• NA (normally open)
• NC (normally closed)
• 2-wire (Standard) or 4-wire **(with auxiliary contact)**.

Both easy to fix on the valve body with a threaded ring nut.
The electrothermic actuators are designed to run on 24V and 230V.

Application

The electrothermic actuators **series 22C**, are used for ON/OFF control of the heat emission of terminal control units in heating and air conditioning systems, through an electric signal transmitted by a room or timing thermostat.
The use of electrothermic actuators instead of pure thermostatic actuators allows remote control. The room thermostat, timing thermostat, or control component controlling the system can be situated in the most suitable point of each room to provide regulation and wired back to the electrothermic control head.

Operation

Operation of the thermoelectric actuators **series 22C** depends on a wax thermostatic element mounted in the actuators and activated by a PTC thermistor against a signal sent by a room thermostat (or timing thermostat).
When the thermostatic element expands, it supplies the thrust required for automatic movement of the valve. The 4-wire version is provided with an **auxiliary contact** for additional commands (metering, control of pump, fan or other equipment).
The actuator has a mechanical/visual zone that allows for the status of actuator to be seen by virtue of a transparent zone on the actuator cover. **Red** = plug valve closed - **Black** = plug valve open.

22C

Electrothermic actuator with wax thermostat element and auxiliary microswitch (only for versions NC4 and NA4).
Cable Ø = 7,2 mm.

ENEC Marked

Type	Part No.	Power supply	Weight (g)
22C	22C230NC2	230V	150
22C	22C24NC2	24V	150
22C	22C230NC4	230V	200
22C	22C24NC4	24V	200
22C	22C230NA2	230V	150
22C	22C24NA2	24V	150
22C	22C230NA4	230V	200
22C	22C24NA4	24V	200

22C

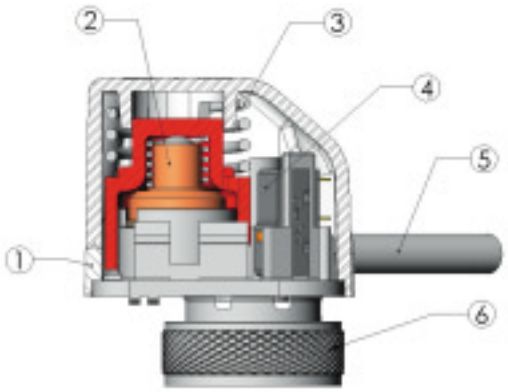
Electrothermic actuator with wax thermostat element.
Cable Ø = 5,5 mm.

CE Marked

Type	Part No.	Power supply	Weight (g)
22C	22C230NC2-5	230V	150
22C	22C24NC2-5	24V	150
22C	22C230NA2-5	230V	150
22C	22C24NA2-5	24V	150

Installation

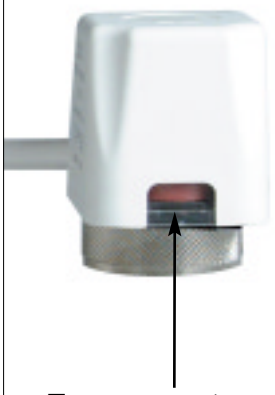
The electrothermic actuators **22C series** can be selected according to the type of system, available space and type of power supply. In systems with 2-way control valves fitted with electrothermic actuators it is advisable to install by-pass valves in (**series 466** or **series USVR**) to ensure a minimum recirculation of the fluid.



Normally Close Section

Features

1) Transparent zone
2) Wax thermostatic element
3) Opposing spring
4) Electrical microswitch (4 wire)
5) Electrical wiring
6) Provision for sealing



Transparent zone

Technical Features	
Action	ON/OFF
Power supply	24 - 230 VAC/DC (+10% / -15%)
Frequency	50 ÷ 60 Hz
Power consumption (normal operation)	2,5 W
Peak starting current	0.20 A x 0.5 sec (230V) 0.25 A x 60 sec (24V)
Initial opening (NC) or closing (NA) time (power ON) 230V	75 s
Final opening (NC) or closing (NA) time (power ON)	3 min
Initial opening (NC) or closing (NA) time (power ON) 24V	3 min
Final opening (NC) or closing (NA) time (power ON)	5 min
Actuator stroke	max 3.5 mm
Valve stroke	2.5 mm
Protection class	IP44 to EN60529
Electrical Protection class	II
Safety (contamination level)	2
Cable length *	1 m 2-pole x 0.75 mm^2 4-pole x 0.75 mm^2
Operation temperature limit	0 to 50°C
Storage temperature limit	-25 to 60°C
Fluid temperature limit	Max 110 °C
Nominal closing force (power OFF) (Closed type)	100 N (±10%)
Nominal closing force (power OFF) (Open type)	80 N (±10%)
Auxiliary microswitch (4-pole model)	max 700 mA - 250 V ~ (a.c)
Cover	Ral 9016 Polyamide +30 F.V. self estinguished
Valve connection	Threaded ring nut M30x1.5

*** Special Cable length on request**

Reliability of the electrothermic actuators **22C series** is guaranteed due to 100% testing of the production.

Mounting

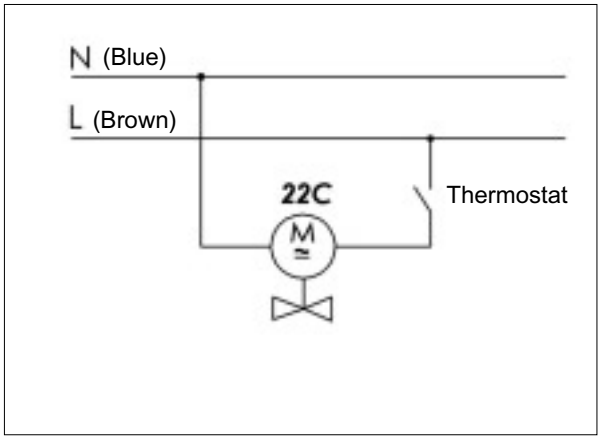
1) Remove handle or cap from the body valve.
2) Position the actuator and tighten manually the ring nut of the actuator onto the body valve.
   DO NOT use pipe wrenches, spanners or similar.
3) Connect electrical wiring.

Important maintenance notes
The connecting cable must never be replaced. Opening the **22C series** actuator will cause irreparable damage to the device. Faulty actuators must be replaced as complete units.

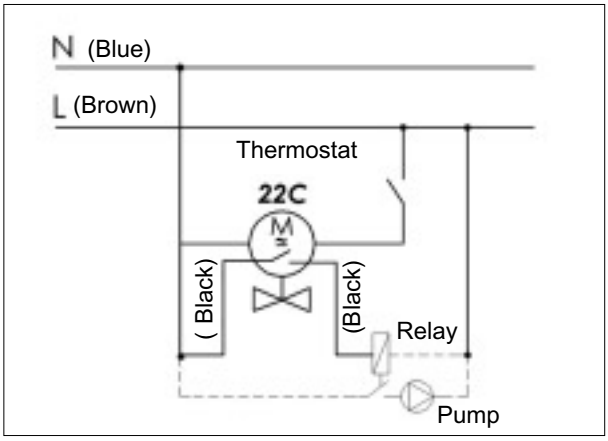
Warning
The actuator must not be installed below the body valve.

Electrical wire connections

22C 2-wires

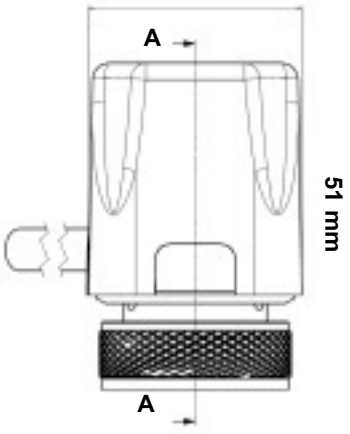


22C 4-wires

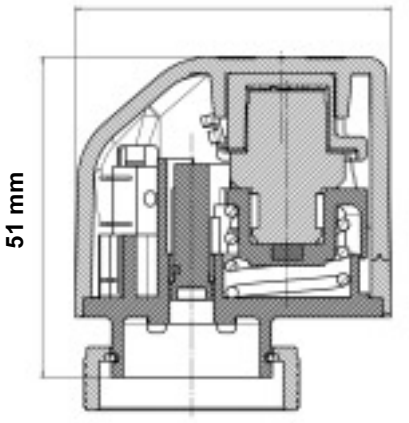


Overall dimensions (mm)

38 mm



50 mm



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Re-order no. 67-0041-UK-IT/1-06-01-Rev.0

Single manifolds
Series 805M - 805ME - 806M
807M - E807M - E810M

Main features

- Available in the versions with :

• Head connections ND 3/4", 1", 1.1/4"
• Side outlet connections ND 1/2"M, 3/4"M and 3/4"M EUROCONO

- Compact size and reduced weight
- Low pressure drops
- Complying with UNI standard 5035/62.

WATTS INDUSTRIES
Technology by nature

Description

The Modul manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M series** allow building up systems for cold and hot water distribution in heating, air-conditioning and plumbing systems.

The manifolds are of brass construction, complying with the following standard:
• UNI 5035/62

They are available with BSP (GAS) threading in the following versions with:
- Head connections 3/4", 1", 1.1/4"
- Side outlet connections 1/2"M, 3/4"M and 3/4"M EUROCONO.

• Above all the manifolds of the **805M** and **805ME Series** are provided with:
- A prefitted O-ring to allow easy assembly of the manifolds by ensuring water-tightness without resorting to conventional means (sealing with hemp);
- Locking nut which also allows correct alignment between the side outlet connections.

805M

Single modular manifold made of brass CW617N. With prefitted O-ring and locking nut.
Side outlet connections: 1/2"M - 3/4"M
Head connections MF: 3/4" - 1" - 1.1/4".

Type	Part. No.	Nd	Side outlet	Centre distance
805M	805M34TMN2	3/4" MF	2-1/2" M	35 mm
805M	805M34TMN3	3/4" MF	3-1/2" M	35 mm
805M	805M34TMN4	3/4" MF	4-1/2" M	35 mm
805M	805M1TMN2X	1" MF	2-1/2" M	35 mm
805M	805M1TMN3X	1" MF	3-1/2" M	35 mm
805M	805M1TMN4X	1" MF	4-1/2" M	35 mm
805M	805M54TMN3	1.1/4" MF	3-1/2" M	50 mm
805M	805M54TMN4	1.1/4" MF	4-1/2" M	50 mm
805M	805M1TN2X	1" MF	2-1/2" M	50 mm
805M	805M1TN3X	1" MF	3-1/2" M	50 mm
805M	805M1TN4X	1" MF	4-1/2" M	50 mm
805M	805M1TM2X	1" MF	2-3/4" M	50 mm
805M	805M1TM3X	1" MF	3-3/4" M	50 mm
805M	805M1TM4X	1" MF	4-3/4" M	50 mm
805M	805M54TM3	1.1/4" MF	3-3/4" M	50 mm
805M	805M54TM4	1.1/4" MF	4-3/4" M	50 mm

805ME

Single modular manifold made of brass CW617N. With prefitted seal and locking nut.
Side outlet connections: 3/4"M EUROCONO.
Head connections MF: 1".

Type	Part. No.	Nd	Side outlet	Centre distance
805ME	805M1TME2X	1" MF	2-3/4" M	50 mm
805ME	805M1TME3X	1" MF	3-3/4" M	50 mm
805ME	805M1TME4X	1" MF	4-3/4" M	50 mm

806M

Single blind modular manifold made of brass CW617N.
Side outlet connections: 1/2"M.
Head connections F: 3/4" - 1".

Type	Part. No.	Nd	Side outlet	Centre distance
806M	806MOT234	3/4" F	2-1/2" M	35 mm
806M	806MOT21	1" F	2-1/2" M	35 mm

807M

Single modular manifold made of brass CW617N.
Side outlet connections: 1/2"M
Head connections FF: 3/4".

Type	Part. No.	Nd	Side outlet	Centre distance
807M	807MT234	3/4" FF	2-1/2" M	35 mm
807M	807MT334	3/4" FF	3-1/2" M	35 mm
807M	807MT434	3/4" FF	4-1/2" M	35 mm

E807M

Single modular manifold made of brass CW617N.
Side outlet connections: 1/2"M
Head connections MF: 3/4".

Type	Part. No.	Nd	Side outlet	Centre distance
E807M	E807M-MF-T2	3/4" MF	2-1/2" M	35 mm
E807M	E807M-MF-T3	3/4" MF	3-1/2" M	35 mm
E807M	E807M-MF-T4	3/4" MF	4-1/2" M	35 mm

E810M

Single modular manifold made of brass CW617N.
Side outlet connections: 1/2"M
Head connections MF: 1".

Type	Part. No.	Nd	Side outlet	Centre distance
E810M	E810MTM2	1" MF	2-1/2" M	35 mm
E807M	E810MTM3	1" MF	3-1/2" M	35 mm
E807M	E810MTM4	1" MF	4-1/2" M	35 mm

Application

The manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M Series**, are used for distributing the heat carrier fluid in air conditioning system by forming “spider” type horizontal networks which feed the individual terminal units via pairs of copper or plastic pipes (supply and return). Thanks to their easy modular arrangement, the manifolds allow many plant engineering solutions and dimensioning of distribution units of all types and with multiple branching. The Modul manifolds are especially recommended for distribution systems with parallel feeding (two-pipe systems). The use of 2,3-way zone valves upstream of the manifolds, with relative heat metering components, form part of the automatic control systems for subdividing running costs.

Installation

Manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M Series**, are inserted in inspection boxes placed in centre of gravity position with respect to the users in order to minimize use of pipe and to ensure improved hydraulic balancing. This is also to allow for the necessary maintenance of all components and accessories (shut-off valves, control valves and air vent valves). The manifolds can be installed horizontally or vertical (axis of the main pipeline) without this impairing their correct operation; furthermore one of the head connections of the manifolds can be used for an extra branch by installing reducer **Type 833M**.

When using manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M Series**, in plumbing systems, the individual circuits can be balanced or excluded by installing adjustment lockshields **Type 209**.

At least two shut-off valves (butterfly valve **Type 3800** or ball valve **Type 210**) and a balancing valve should be installed between the main pipes and the manifolds. The use of special spanners (**Type 829M** or open-ended spanners) is recommended for tightening the fittings on the pipes and the manifold joints.

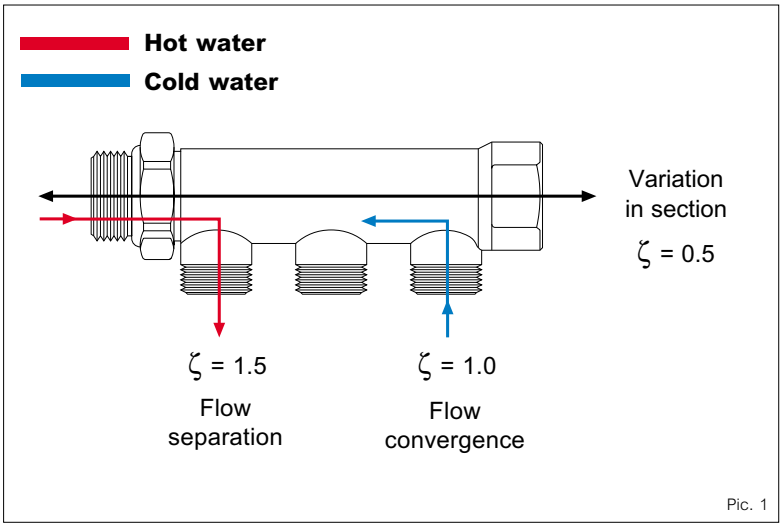
When the number of users is smaller than the number of available connections on the manifolds, use plugs **Series 834M**.

Hydraulic characteristics

The pressure drop which the fluid undergoes between inlet and outlet (caused by the branches) should be considered as equivalent to that of a right-angled “Tee” with separation of flow for the supply manifold and one with convergence of flow for the return manifold (**Tab.1**).

Any circuits installed ahead of the manifold produce pressure drops owing to the reduced port flow (**Tab.2**).

The resistances are expressed in the following tables in ζ (velocity methods) or in eq.m (equivalent length method) according to the configuration of the difference and diameter as well as the type of pipe used for the circuit. The values given are valid regardless of the position of the connections with respect to the manifold heads since that manifold has its own resistance which is so modest as to be negligible.



Pic. 1

In order to simplify the calculation without practical effects on the results, the same pressure drop can be considered for each branch (supply + return): 2 m eq. or ζ = 3.

The quantity of flow passing through the manifold and its side outlets is, as is well known, related to the difference in pressure available between the inlet/outlet and to the physical configuration of the path: port size, state of the surfaces, branching, restrictions. In view of such considerations we have given the max. flow rates valid for manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M Series** and relative piping (**Tab.3**).

Reliability of the manifolds of the **805M, 805ME, 806M, 807M, E807M, E810M Series**, is guaranteed by 100% testing of the production: the test consists of a hydraulic tight seal test of the assembly for detecting any microporosity and a pressure resistance test on the body.

Technical features	
Max. temp.	110°C
Max. pressure	10 bar
Liquids which can be used	Water also with glycol ≤ 50%

Design features	
Manifold body	Brass CW617N
O-ring	EPDM

Tab. 1

Accidental resistances, side outlet in eq. m:							
Outer Diameter	**8**	**10**	**12**	**14**	**15**	**16**	**18**
Copper pipe (wall thickness 1 mm)	0.3	0.3	0.4	0.6	0.6	0.7	0.8
Polyethylene pipe	--	0.3	0.3	--	0.4	--	0.5

Tab. 2

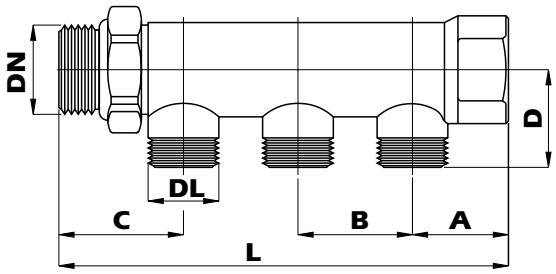
Accidental resistances, head connection in eq. m:								
Outer Diameter	**8**	**10**	**12**	**14**	**15**	**16**	**18**	**22**
Copper pipe (wall thickness 1 mm)	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4
Polyethylene pipe	--	0.1	0.1	--	0.2	--	0.3	0.2

Tab. 3

Max. flow rates Manifolds					
System	**Flow rate main pipe**			**Flow rate side outlets**	
	3/4"	**1"**	**1.1/4"**	**1/2"**	**3/4"**
Heating (l/h)*	1450	2850	3600	700	1400
Plumbing (l/min)	30	60	90	15	30
* For chilled water (**Air conditioning**) values exceeding 30-40% are often used.					

Overall dimensions (mm)

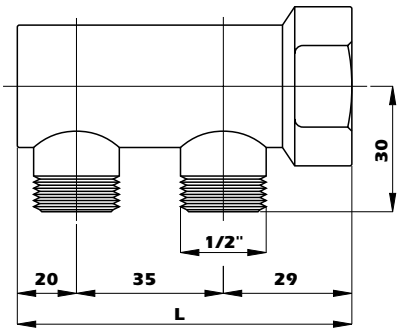
805M - 805ME



ND	DL	L	A	B	C	D
3/4”	2x1/2”	98	28.5	35	34.5	28
3/4”	3x1/2”	133	28.5	35	34.5	28
3/4”	4x1/2”	168	28.5	35	34.5	28
1”	2x1/2”	97	24	35	38	33
1”	3x1/2”	132	24	35	38	33
1”	4x1/2”	167	24	35	38	33
1”	2x1/2”	114.5	24.5	50	41	33
1”	3x1/2”	164.5	24.5	50	41	33
1”	4x1/2”	214.5	24.5	50	41	33
1.1/4”	3x1/2”	168.5	27.5	50	41	36
1.1/4”	4x1/2”	218.5	27.5	50	41	36

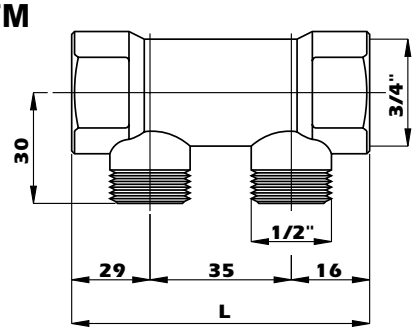
ND	DL	L	A	B	C	D
1”	2x3/4”	114.5	24.5	50	41	33
1”	3x3/4”	164.5	24.5	50	41	33
1”	4x3/4”	214.5	24.5	50	41	33
1.1/4”	3x3/4”	168.5	27.5	50	41	36
1.1/4”	4x3/4”	218.5	27.5	50	41	36

806M



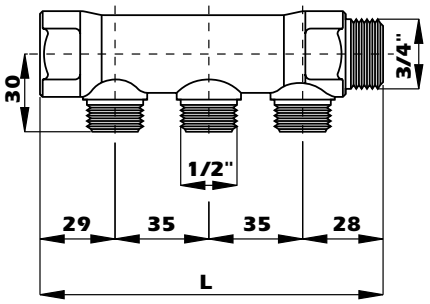
ND	L
3/4”	84
1”	119

807M



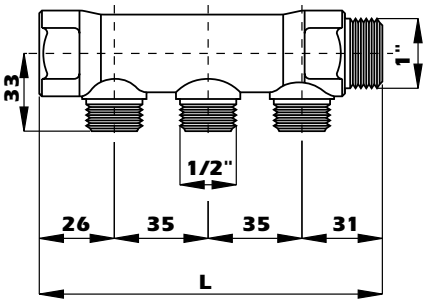
ND	Side outlet connections	L
3/4”	2	80
3/4”	3	115
3/4”	4	150

E807M



ND	Side outlet connections	L
3/4”	2	92
3/4”	3	127
3/4”	4	162

E810M



ND	Side outlet connections	L
1”	2	93
1”	3	129
1”	4	164

Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
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Re-order no. 68-0020-UK-IT/1-06-01-Rev.0

Single brass manifolds for radiant panel heating systems Series 822MM - 822MR - 822MME - 822MRE

Main features

- Available in the versions with :
  - Head connections DN 1" MF and 1.1/4" MF
  - Side outlet connections 2,3,4 with DN 1/2" M, 3/4" M, 3/4" M EUROCONUS
  - Centre distance between the outlet connections 50 mm
- Low pressure drops
- Complying with UNI EN 1982 standard.

WATTS INDUSTRIES

Technology by nature

Description

The Modul manifolds of the **822MM, 822MR, 822MME, 822MRE series** allow building up systems for distributing the heat carrier fluid to heating and air conditioning installations (above all for radiant panel heating systems).

The manifolds are available with NTP threading and in the following versions :

- Head connections 1"MF, 1 1/4"MF
- Side outlet connections 1/2"M, 3/4"M, 3/4"M EUROCONUS.

The manifolds are provided with :

- **Prefitted O-ring** to allow easy assembly of the manifolds by ensuring water tightness without resorting to conventional means (sealing with hemp).
- Locking nut which also allows correct alignment between the side outlet connections.
- **Control devices** in series **822MM, and shut-offs in series 822MR** hence reducing space required for installation and allowing control of each single circuit.

822MM

Single modular brass **return manifold** with prefitted seal and lock nut.
Built in control valves, thermostat adaptable with electrothermic actuators series 22C.
Side outlet connections: 1/2" M - 3/4" M. Male/female head connections: 1" - 1.1/4".
Differential pressure: 1.5 bar. Kvs of outlets: 2.28

Type	Part No.	Size body	Outlets	Center distance	Weight (g)
822MM	822MM1TMN2	1" MF	2-1/2" M	50 mm	570
822MM	822MM1TMN3	1" MF	3-1/2" M	50 mm	750
822MM	822MM1TMN4	1" MF	4-1/2" M	50 mm	980
822MM	822MM1TM2	1" MF	2-3/4" M	50 mm	560
822MM	822MM1TM3	1" MF	3-3/4" M	50 mm	760
822MM	822MM1TM4	1" MF	4-3/4" M	50 mm	1000
822MM	822MM54TMN3	1.1/4" MF	3-1/2" M	50 mm	900
822MM	822MM54TMN4	1.1/4" MF	4-1/2" M	50 mm	1150
822MM	822MM54TM3	1.1/4" MF	3-3/4" M	50 mm	1000
822MM	822MM54TM4	1.1/4" MF	4-3/4" M	50 mm	1300

822MR

Single modular brass **supply manifold** with prefitted seal and lock nut.
Built in balancer register lockshield. Side outlet connections: 1/2" M - 3/4" M.
Male/female head connections: 1" - 1.1/4". Kvs of outlets: 2.61

Type	Part No.	Size body	Outlets	Center distance	Weight (g)
822MR	822MR1TMN2	1" MF	2-1/2" M	50 mm	660
822MR	822MR1TMN3	1" MF	3-1/2" M	50 mm	890
822MR	822MR1TMN4	1" MF	4-1/2" M	50 mm	1180
822MR	822MR1TM2	1" MF	2-3/4" M	50 mm	650
822MR	822MR1TM3	1" MF	3-3/4" M	50 mm	900
822MR	822MR1TM4	1" MF	4-3/4" M	50 mm	1190
822MR	822MR54TMN3	1.1/4" MF	3-1/2" M	50 mm	1100
822MR	822MR54TMN4	1.1/4" MF	4-1/2" M	50 mm	1350
822MR	822MR54TM3	1.1/4" MF	3-3/4" M	50 mm	1150
822MR	822MR54TM4	1.1/4" MF	4-3/4" M	50 mm	1450

822MME

Single modular brass **return manifold** with prefitted seal and lock nut.
Built in control valves, thermostat adaptable with electrothermic actuators series 22C.
Side outlet connections: 3/4" M **EUROCONO**.
Male/female head connections: 1" - 1.1/4". Differential pressure: 1.5 bar.
Kvs of outlets: 2.28

Type	Part No.	Size body	Outlets	Center distance	Weight (g)
822MME	822MM1TME2	1"	2-3/4"	50 mm	560
822MME	822MM1TME3	1"	3-3/4"	50 mm	760
822MME	822MM1TME4	1"	4-3/4"	50 mm	1000
822MME	822MM54TME3	1.1/4"	3-3/4"	50 mm	1000
822MME	822MM54TME4	1.1/4"	4-3/4"	50 mm	1300

822MRE

Single modular brass **supply manifold** with prefitted seal and lock nut, built in brass balancer register lockshield. Side outlet connections: 3/4" M **EUROCONO**.
Male/female head connections: 1" - 1.1/4". Kvs of outlets: 2.61

Type	Part No.	Size body	Outlets	Center distance	Weight (g)
822MRE	822MR1TME2	1"	2-3/4"	50 mm	650
822MRE	822MR1TME3	1"	3-3/4"	50 mm	900
822MRE	822MR1TME4	1"	4-3/4"	50 mm	1190
822MRE	822MR54TME3	1.1/4"	3-3/4"	50 mm	1150
822MRE	822MR54TME4	1.1/4"	4-3/4"	50 mm	1450

Application

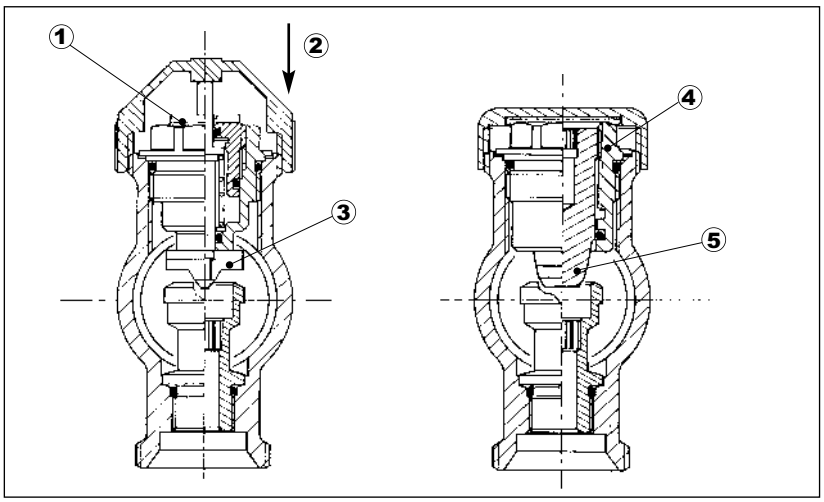
The manifolds of the **822MM, 822MR, 822MME, 822MRE series** are used for distributing the heat carrier fluid in air conditioning systems by forming “spider” type horizontal networks which feed the individual terminal units via pairs of copper or plastic pipes (supply and return). Above all, the Modul manifolds are suitable for engineering the distribution system in radiant panel heating installations. Thanks to their easy modular arrangement, the manifolds, including those of **805M series**, allow many plant engineering solutions and dimensioning of distribution units of all types, with multiple branching. The use of 2,3-way zone valves upstream of the manifolds, with relative heat metering components form part of the automatic control systems for subdividing running costs.

Operation

The operation is based on the automatic movement of the plug shutting off the heat carrier fluid, obtained with electrothermic actuators, **22C series** through an electrical signal transmitted by a room or room timing thermostat. The ON/OFF action of the plug is given by a thermostat wax expansion element inside the actuators **22C series** and activated by a PTC thermistor, against a signal emitted by a room thermostat (or room timing thermostat).
For the hydraulic flow rate and pressure drops characteristics of the manifolds, see relative charts.
The reliability of the manifolds belonging to **822MM, 822MR, 822MME, 822MRE series**, is ensured by 100% testing of the production: testing consists of a hydraulic seal test of the manifold assembly to detect any microporosity and body resistance test at operating pressure.

Design features	
Body and internal parts	Brass CW617N
Plug seals	EPDM
O-ring	EPDM
Packing nut	Poliacetal resin
Cap for 822MR	Polypropylene
Cover for 822MM	Brass CW614N
Adjustment lockshield	Brass CW614N

Technical features	
Max. pressure	10 bar
Max. temperature	110 °C
Kvs coeff. side outlets 822MM	2.28
Kvs coeff. side outlets 822MR	2.61
Liquids which can be used	Water also with glycol ≤ 50%



Details

1) Pre-adjustment packing nut which can be replaced also when the system is under pressure.

2) The manifold can be actuated with electrothermic motors series 22C.

3) Elastomeric plug seal.

4) Threaded plug separate from the flow.

5) Linear preadjustment cone.

Hydraulic characteristics

Kv values in the various preadjustment positions

Setting positions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**A**
822MM 1" - 11/4"	0.26	0.55	0.91	1.23	1.52	1.79	2.0	2.28
N° opening turns	**0.5**	**1**	**1.5**	**2**	**2.5**	**3**	**3.5**	**A**
822MR 1" - 11/4"	0.35	0.68	1.1	1.4	1.78	2.1	2.3	2.61

Installation

Manifolds **822MM, 822MR, 822MME, 822MRE series**, are inserted in inspection boxes placed in the centre of gravity position with respect to the users in order to minimize use of pipe and to ensure improved hydraulic balancing. This arrangement also allows the necessary maintenance of all components and accessories (shut-off, control and air vent valves).

It is recommended :

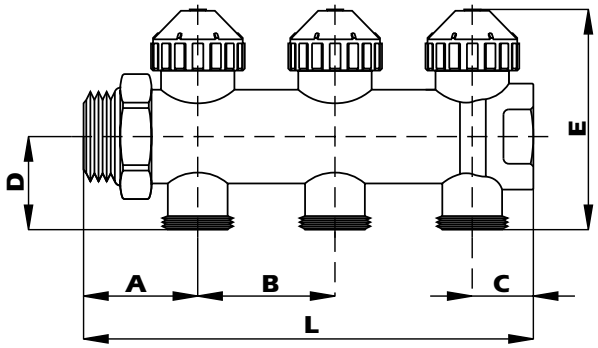
- To keep the manifolds with the centre-line of the main pipe in horizontal position
- To install the manifold with lockshields (**822MR**) on the supply line and the manifold with built-in adjustment devices (**822MM**) on the return circuit, so that the plug movement is opposite to the direction of flow.

The manifolds of **822MM, 822MR, 822MME, 822MRE series** can be provided with an O-ring sealed male end piece complete with locking nut, **series 823MT** including connections for air vent **Part No. 2161C38** and vent valve **series 238, 290** as well as a 1/2" outlet for further branching .

Install at least two shut-offs (butterfly valve **series 3800** or ball valve **series 210**) and a balancing valve between the main pipes and manifolds. The use of special spanners (**series 829M** or open-ended spanners) is recommended for tightening the fittings on the pipes and the manifold joints.
When the number of users is smaller than the number of available connections on the manifolds, use plugs **series 834M**.

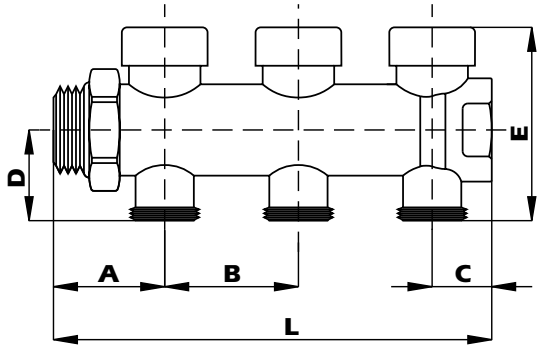
Overall dimensions (mm)

822MM - 822MME



DN	L			A	B	C	D	E
	2 Outlets	3 Outlets	4 Outlets					
1”	114	164	214	40	50	24.5	33	80
1.1/4”	-	168	218	41	50	24.5	33	86

822MR - 822MRE

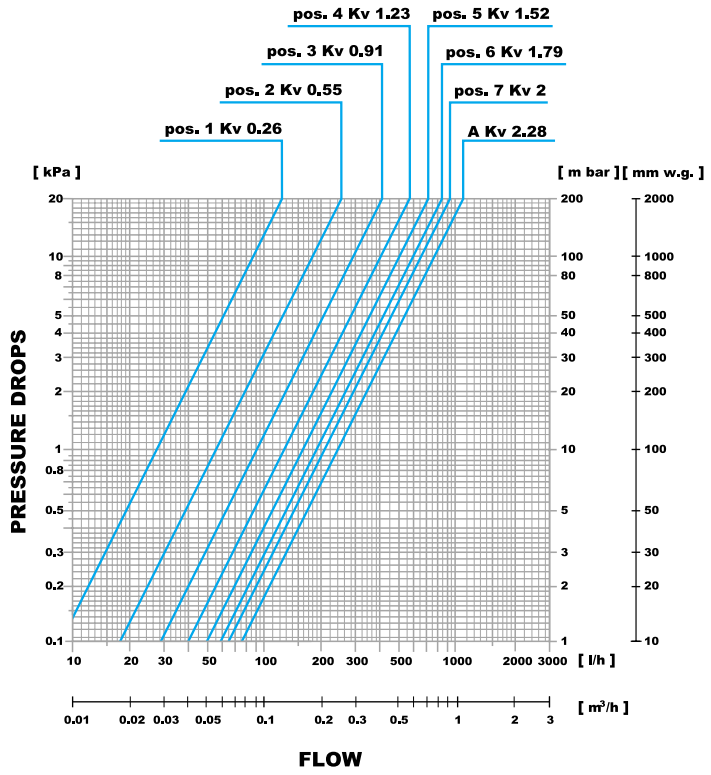


DN	L			A	B	C	D	E
	2 Outlets	3 Outlets	4 Outlets					
1”	114	164	214	40	50	24.5	33	72
1.1/4”	-	168	218	41	50	27.5	36	77

Flow rate/pressure drop charts

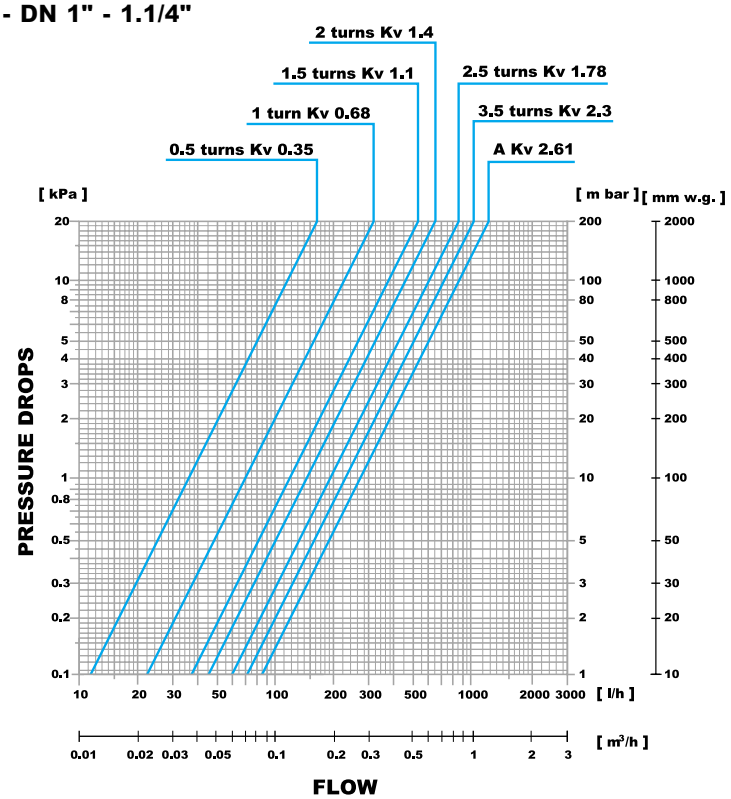
Manifold with control valves. Preadjustments

822MM/822MME - DN 1" - 1.1/4"



Manifold with lockshields. Opening in turns

822MR/822MRE - DN 1" - 1.1/4"



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Technology by nature

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Preassembled manifolds with flow meter, series CPRFL

Main features

- Available in the versions with :

• Head connections DN 1.1/4" F
• Side outlet connections 3/4" M
• Centre distance between the outlet connections 50 mm

- Patented flow meter for control and measurement of the water flow rate.
- Low pressure drops

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Description

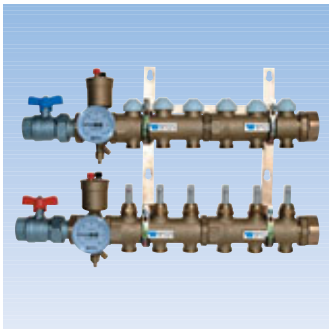
The preassembled manifolds of the **CPRFL series** allow building up systems for distributing the heat carrier fluid to heating and air conditioning installations (above all for heating systems with radiant floor heating panels).

The manifolds are available with NTP threading and in the following versions :

- Head connections 1 1/4" MF
- Side outlet connections 3/4" M
- Centre distance between the outlet connections 50 mm

The manifolds, supplied already preassembled on brackets, are provided with :

- Delivery manifolds complete with flow meters series FLMR
- Return manifolds series 822MM
- Two ball shut-off valves series 210
- Two end-pieces for manifolds series 823MP complete with drain cocks series 238, air vent valves series MVD and immersion thermometers series T



CPRFL

Preassembled manifold consisting of : delivery manifolds complete with flow meters series FLMR. Return manifolds series 822MM. Two ball shut-off valves series 210. Two end-pieces for manifolds series 823MP complete with drain cocks series 238, air vent valves series MVD and immersion thermometers serie TB. Centre distance between side outlet connections: 50 mm.

N.B.: inspection box not included in the supply.

Type	Part number	Size	Outlets	Weight (Kg.)
CPRFL	CPRFL54TM3	1.1/4" F	3-3/4" M	12,8
CPRFL	CPRFL54TM4	1.1/4" F	4-3/4" M	13,3
CPRFL	CPRFL54TM5	1.1/4" F	5-3/4" M	13,9
CPRFL	CPRFL54TM6	1.1/4" F	6-3/4" M	14,5
CPRFL	CPRFL54TM7	1.1/4" F	7-3/4" M	14,9
CPRFL	CPRFL54TM8	1.1/4" F	8-3/4" M	15,6
CPRFL	CPRFL54TM9	1.1/4" F	9-3/4" M	17,4
CPRFL	CPRFL54TM10	1.1/4" F	10-3/4" M	18,6
CPRFL	CPRFL54TM11	1.1/4" F	11-3/4" M	19,8
CPRFL	CPRFL54TM12	1.1/4" F	12-3/4" M	20,3

226

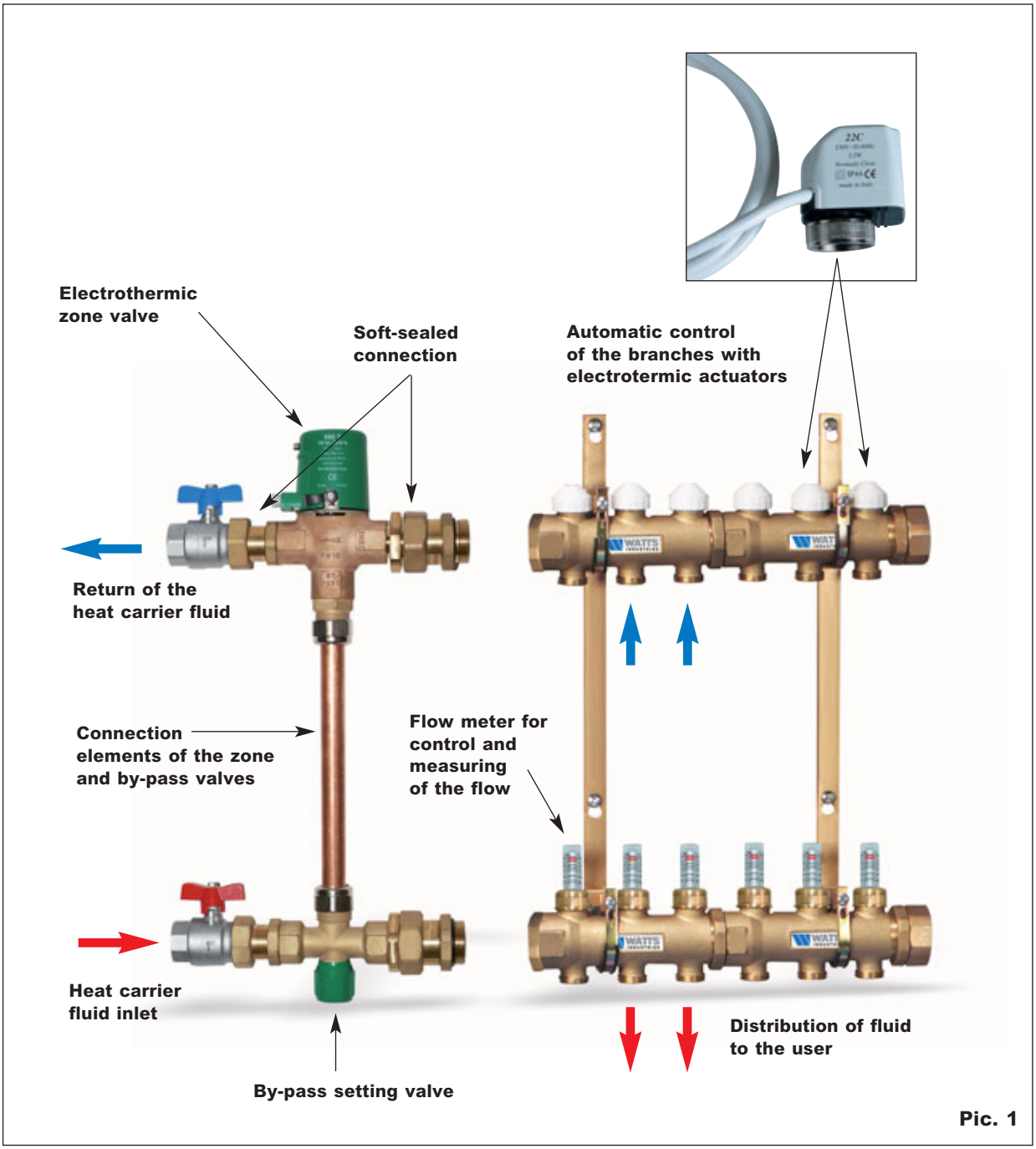
Flow meter control cap

Type	Description
226	Flow meter control cap

Application

The preassembled manifolds of the **CPRFL series** are used for distributing the heat carrier fluid in heating systems, above all in heating systems with radiant floor heating panels.

The use of 2- or 3-way zone valves of the **ZONAKIT series** upstream of the preassembled manifolds (in Pic.1 the 3-way version with by-pass) and relative thermal energy metering components allows providing the manifolds of the **CPRFL series** with zone control and billing of the thermal energy for allocation of the running costs to each individual user.



Pic. 1

Operation

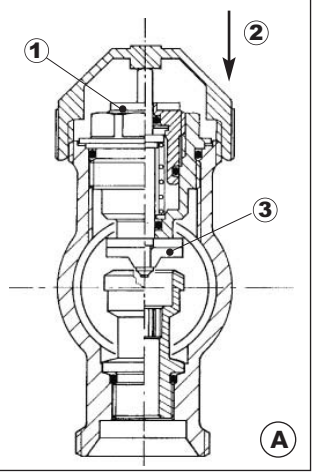
The operation of the **series CPRFL** manifolds is based on the automatic movement of the plug shutting off the heat carrier fluid, obtained by installing electrothermic actuators, **series 22C** on the return manifolds after unscrewing the protective white cap (Pic. 1). The ON/OFF action of the plug is given by a thermostat wax expansion element inside the actuators series 22C against a signal emitted by a room thermostat series BATTERY ELECTRONIC (or room timing chrono-thermostat series MILUX).

For control and measurement of the water flow rate for each branch, use the flow meter with control cap **series 226**: turn clockwise for closing or reducing the flow rate or anti-clockwise for opening or increasing the flow rate.

For the hydraulic flow rate and pressure drops characteristics of the manifolds, see relative tables and charts given in the following pages.

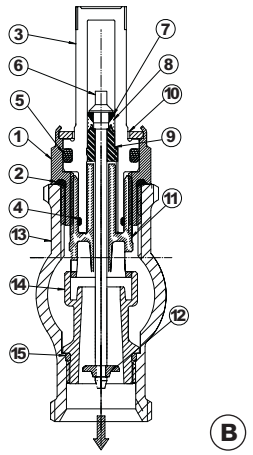
Details

1) Pre-adjustment packing nut which can be replaced also when the system is under pressure.
2) The manifold can be actuated with electrothermic motors series 22C.
3) Elastomeric plug seal.



Details

1) Cover 1/2" NTP
2) O-Ring
3) Level tube
4) O-Ring (FLMR)
5) O-Ring
6) Dipstick
7) Level indicator
8) Precision spring
9) Spring guide bushing
10) Washer
11) Plug (FLMR)
12) O-Ring
13) Modular manifold
14) Seal seat
15) O-Ring



The reliability of the manifolds **series CPRFL** is ensured by 100% testing of the production: testing consists of a hydraulic seal test of the manifold assembly to detect any microporosity and body resistance test at operating pressure.

Technical features	
Kvs coeff. Side outlets 822MM	2.28
Liquids which can be used	Water also with glycol ⩽ 50%
Setting and measuring range	0 ÷ 6 l/min
Max. temperature	90 °C
Operating temperature	80 °C
Max pressure	10 bar
Outlet max. flow coefficent	Kvs = 1.8
Reading error	± 10% f.s. i.e. ± 0.6 l/min. (with DP at the ends between 10 kPa and 50 kPa)
Leakage	Max. permissibile leakage with plug closed ⩽ 0,02% Kvs FLMR
Flow meter tightening torque on replacement manifold	30 Nm

Design features	
Body and internal parts	Brass CW617N
Plug seals	EPDM
O-ring	EPDM
Packing nut	Polyacetal plastic
Cap for 822MM	Polypropylene

Hydraulic characteristics								
Kv values in the various preadjustment positions								
Setting positions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**A**
822MM 1.1/4"	0.26	0.55	0.91	1.23	1.52	1.79	2.0	2.28

Installation

Preassembled manifolds **series CPRFL** are inserted in inspection boxes **series 839M** placed in the centre of gravity position with respect to the users in order to minimize use of pipe and to ensure improved hydraulic balancing. This arrangement also allows the necessary maintenance of all components and accessories (shut-off, control and air vent valves).

It is recommended:

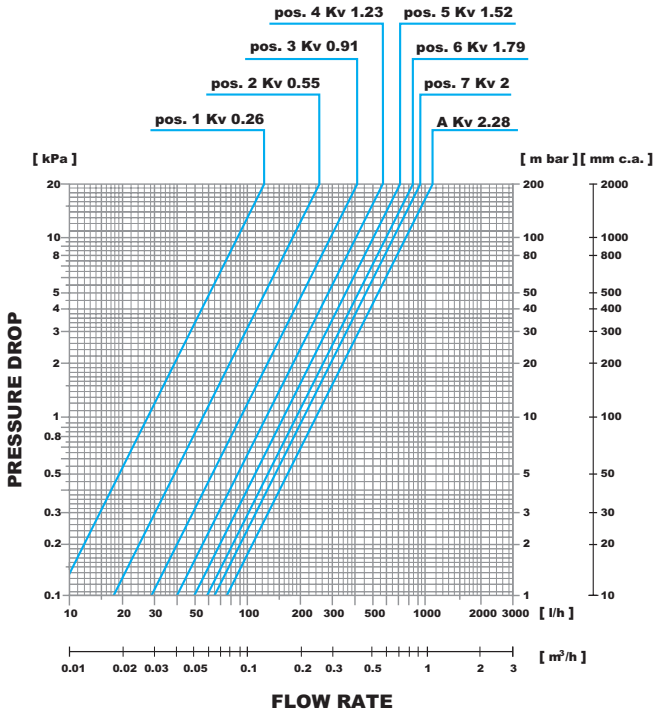
- **To keep the manifolds with the centre-line of the main pipe in horizontal position**
- **To install the manifold with the flow meters on the supply line and the manifold with built-in adjustment devices on the return circuit**, so that the plug movement is opposite to the direction of flow.

It is recommended to use special spanners (**art. 829M** or open-ended spanners) for tightening the fittings on the pipes and manifold joints.
When the number of the user is lower than the connections available on the manifolds, plugs of the **834M series** can be used.

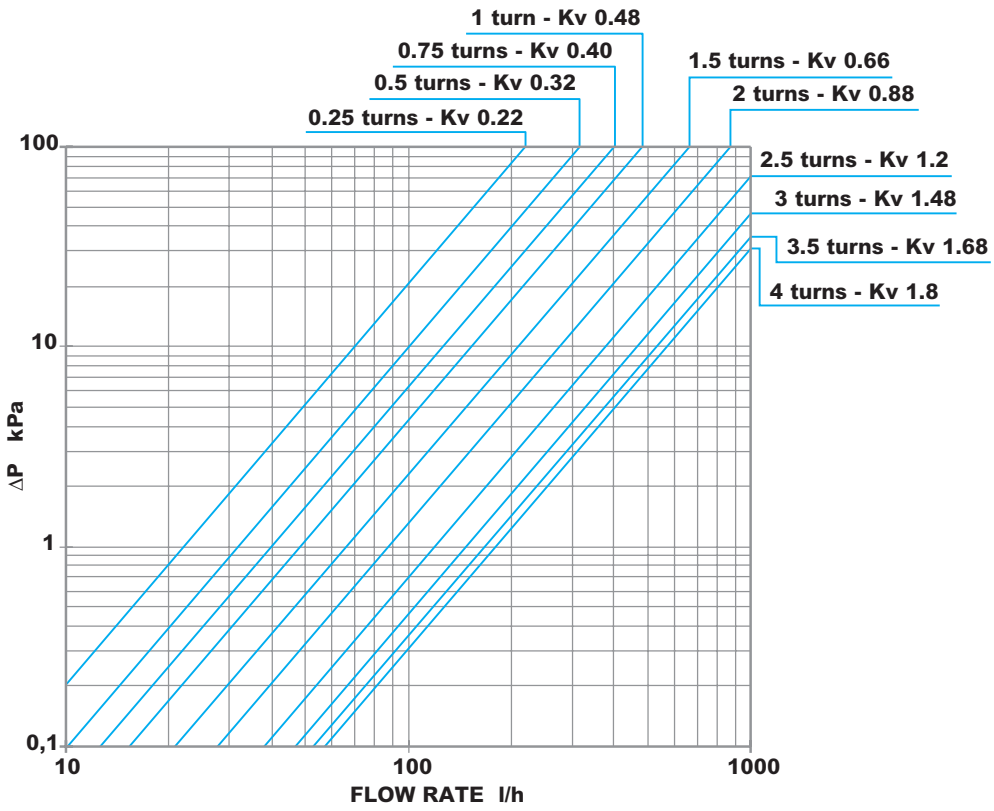
Flow rate / Pressure drop charts

Manifold with control valves. Preadjustments

822MM - DN 1.1/4"

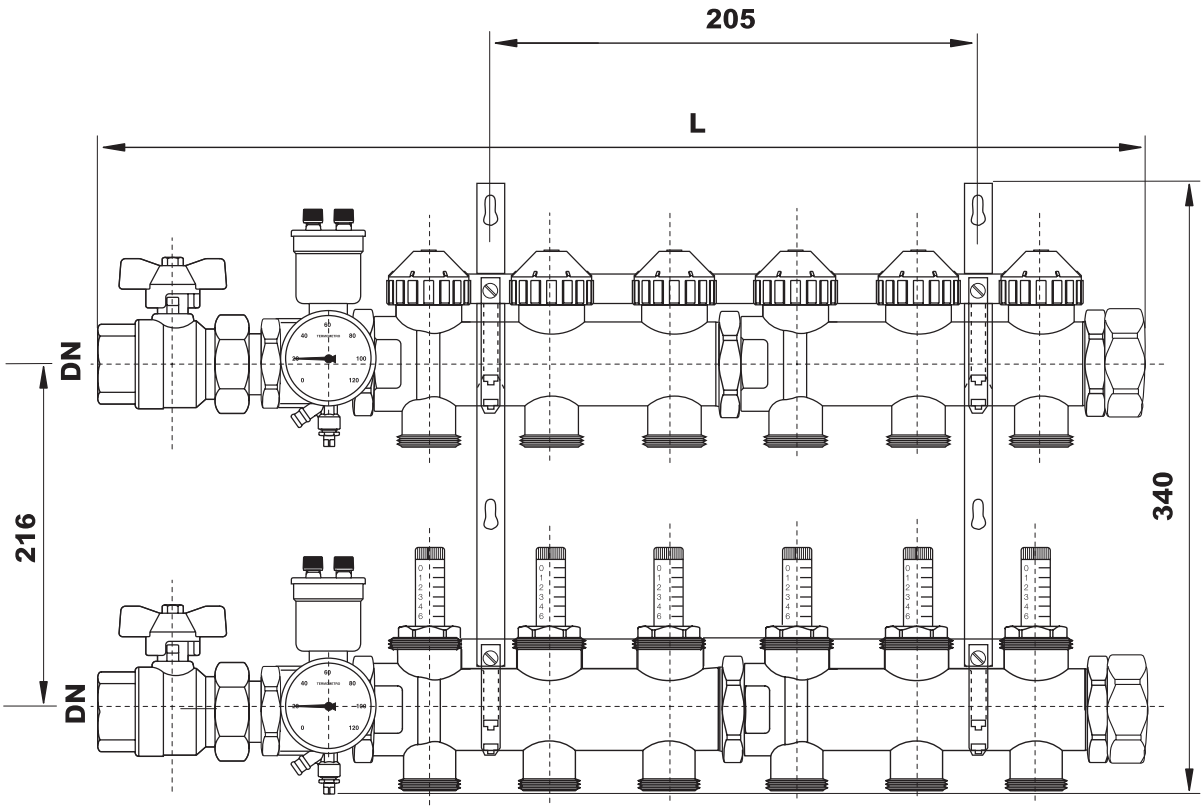


Flow meters 0-6 l/m measurement + control



Overall dimensions (mm)

CPRFL



Number of Outlets	L - 1.1/4“
3	350
4	400
5	500
6	500
7	550
8	600
9	650
10	700
11	750
12	800

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Copper pipe fittings

Main features

- The following versions are available :

• One-piece fittings Series 872M and 873M,
• Unions (3-piece) Series 820R
• Reducer for valve with female connection Series 197.

- All fittings can be tightened with wrench Series 829M.

- The one-piece fittings of the RAFIT and VELOFIT series allow speeding up operations when connecting to copper piping.

- The fittings are provided with a cutting ring capable of withstanding high pipe unthreading forces.

- Overall dimensions reduced.

- The one-piece fittings of the RAFIT and VELOFIT series are PATENTED.

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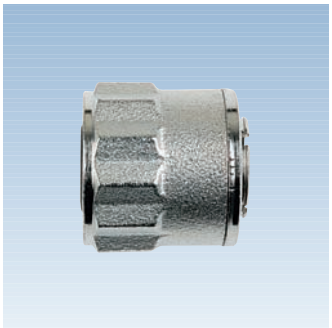
Description

The **Rafit+** fittings **872M Series** are patented one-piece soft-seal fittings, for connecting copper piping and hydraulic components of the system (valves, lockshields, manifold side outlets, etc.).
The **872M Series** fittings are made of a set of parts assembled in an automatic process, namely:

- Tightening body
- Vulcanized EPDM seal on steel insert
- Cutting ring
- Lock ring nut

The characteristic feature of the one-piece fittings, is that of allowing **quicker connection operations** as compared to the conventional unions (three-piece fittings). The **872M Series** fittings use PIPE thread in accordance with UNI ISO 228 standard. The fittings stand out for their stylish design, differing from the hexagonal standard one of normal fittings, therefore they are especially suitable for installations in residential buildings.



872M

RAFIT+.
One-piece soft seal fitting, patented, for quick copper pipe connections.

Tightening torque with good unthreading resistance (tearing resistant).
DN 3/8" = 15 ÷ 18 Nm.
DN 1/2" = 20 ÷ 25 Nm.

Type	Part number	Size	Ø Tube	Spanner Hexagon	Weight (g.)
872M	872M3810	3/8"	10	20	36
872M	872M3812	3/8"	12	20	32
872M	872M1210	1/2"	10	25	56
872M	872M1212	1/2"	12	25	54
872M	872M1214	1/2"	14	25	50
872M	872M1215	1/2"	15	25	48
872M	872M1216	1/2"	16	25	48
872M	872M12S18	1/2"S	18	27	66

1/2"S = thread M24x1.5 ISO/R262 present on Valves of 120B, 102M, 126C, 126P, 119SX Series

Application

Fittings of the **872M Series** find application in air conditioning and heating systems for connection between copper pipes and hydraulic component s in the system (valves, lockshields, manifold side outlets, fancoils, etc).

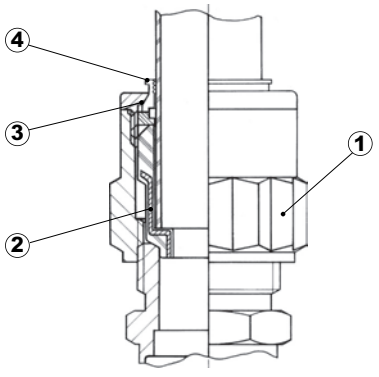
Operation

Operation of the fitting **872M Series** is based on a combined sealing system, between the EPDM seal and cutting ring.

The EPDM seal ensure tightness on both pipe and the threaded end. The cutting ring, which clenches on the pipe during tightening, prevents slipping out of the pipe due to stress caused by thermal expansion to which the pipe can be submitted during operation of the system. Mechanical seal tests against unthreading show a resistance above 2000 N.

The dimensional characteristic and high flow diameter inside the fitting **872M Series** are such that pressure drops are negligible.

Reliability of the fittings series 872M, is ensured thanks to the 100% testing of the production.



Details

1) One-piece body
2) Steel reinforcement insert covered by EPDM moulding
3) Cutting ring
4) Pipe lock ring

Technical features	
Operating temp.	-5°C to 110°C
Max. pressure	10 bar
Tightening torque	DN 3/8" = 15 to 18 Nm DN 1/2" = 20 to 25 Nm
Usable liquids	Water also with glycol max. 50%

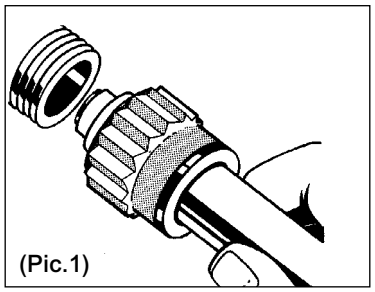
Design features	
Body	Brass CW617N
Cutting ring	Brass CW614N
Ferrule	EPDM
Reinforcing insert	Steel

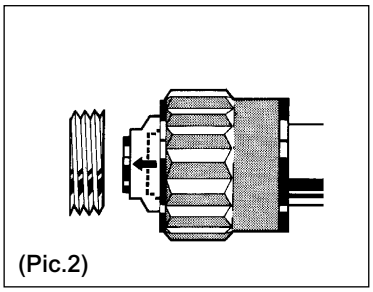
Installation

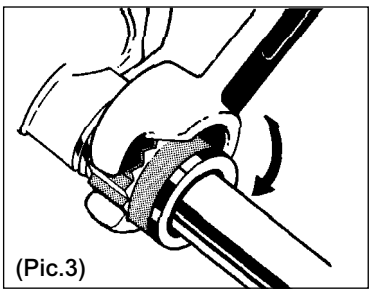
Choice of fittings **Rafit+ Series 872M** depends on the diameter Ø of the connection pipe and the DN of the connection on the hydraulic components to be connected (valves, lockshields, manifold side outlets, fancoils, boiler components).

The fittings **Series 872M** can be installed on the threaded end parts supplied by copper piping following the instructions given below :

1. When cutting the pipe, be careful to clean the pipe ends from any external burrs.
2. Insert the pipe in the fitting pushing it until it butts against the end stop **(Pic.1)**, and hold it still in such position during tightening; hence the seal element will be thrust outwards from the fitting body **(Pic.2)**.
3. Approach Rafit+ fitting to the threaded end piece until the head of the ferrule is engaged inside, then tighten by hand.
4. **Using the special wrench (art. 829M) proceed to tighten in accordance with the recommended torques (Pic.3)**.
5. To remove the fitting from the pipe, unscrew fully and press the cutting ring against the end ring nut.

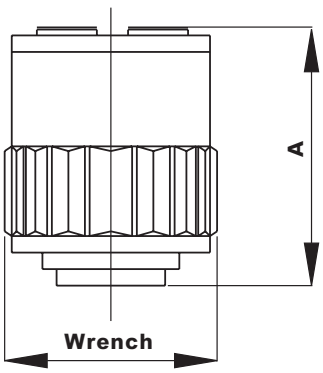

(Pic.1)


(Pic.2)


(Pic.3)

Overall dimensions (mm)

872M



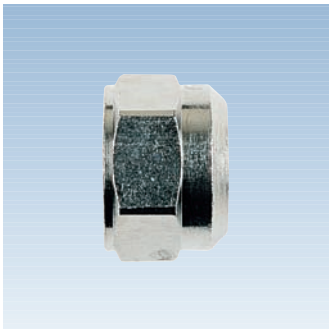
Size	A	Rafit Wrench
3/8"	25	20
1/2"	27	25
1/2"S	29	27

Description

The **Velofit fittings Series 873M** are patented one-piece soft-seal fittings, for connection between copper piping and hydraulic components of the system (valves, lockshields, manifold side outlets, etc.).
The Velofit fittings consists of three preassembled parts :

- Tightening nut
- A mechanical pipe locking element (EPDM)
- A cylindrically shaped seal

The characteristic feature lying behind one-piece fittings, is that of allowing shorter times in connection operations as compared to the conventional unions (three-piece fittings). The Velofit fittings use PIPE thread in accordance with UNI ISO 228 standard.



873M

VELOFIT.
One-piece compact soft seal fitting, patented, for quick copper pipe connections.

Tightening torque :
DN 3/8" = 15 ÷ 20 Nm.
DN 1/2" = 20 ÷ 25 Nm.
DN 3/4" = 30 ÷ 35 Nm.
DN 1" = 35 ÷ 40 Nm.

Type	Part number	Size	Ø Tube	Spanner Hexagon	Weight (g.)
873M	873M3810	3/8"	10	21	26
873M	873M3812	3/8"	12	21	28
873M	873M1210	1/2"	10	25	40
873M	873M1212	1/2"	12	25	36
873M	873M1214	1/2"	14	25	32
873M	873M1215	1/2"	15	27	54
873M	873M1216	1/2"	16	27	52
873M	873M12S18	1/2"S	18	27	30
873M	873M3418	3/4"	18	30	44
873M	873M122	1"	22	36	74

1/2"S = thread M24x1.5 ISO/R262 present only on valves Series 120B, 102M, 126C, 126P, 119SX.

Application

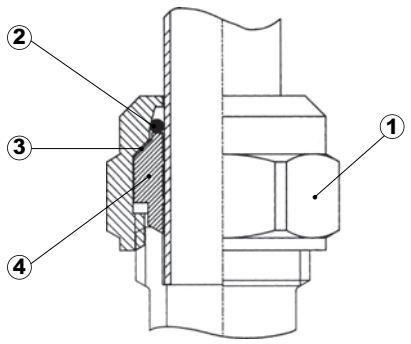
Fittings of the **873M Series** find application in air conditioning and heating systems for connection between copper pipes and hydraulic component s in the system (valves, lockshields, manifold side outlets, fancoils, boiler components).

Operation

Operation of the Velofit fitting is based on a combined sealing system, between the EPDM seal and cutting ring.
During tightening, mating taper surfaces cause the seal to become deformed by reaction: hence raised collars on the inner wall exert a compressive force which ensures tight sealing both between the fitting and threaded end part, and between the fitting and pipe.

A flexible cutting ring, which is retracted during tightening of the fitting on the outer diameter of the pipe, causes slight indentations formed according the turn of the ring; these determine strong resistance of the fitting to axial creep of the pipe caused by thermal expansions to which the pipe could be submitted during operation of the system.

Reliability of the fittings belonging to the 873M series is assured by 100% testing of the production.



Details

1) Tightening nut
2) Cutting ring with overlapping ends and with axial contact
3) Top taper compression surfaces
4) Seals with raised collars on the internal surfaces

Technical features	
Operating temperature	-5°C ÷ 110°C
Max. operating pressure	10 bar
Tightening torque	DN 3/8" = 15 to20 Nm DN 1/2" = 20 to 25 Nm DN 3/4" = 30 to 35 Nm DN 1" = 35 to 40 Nm
Usable liquids	Water also with glycol max. 50%

Design features	
Body	Brass CW614N
Cutting ring	Stainless steel
Seal	EPDM

Installation

Choice of the Velofit fittings **Series 873M** depends on the diameter Ø of the connection pipe and the DN of the connection on the hydraulic components to be connected (valves, lockshields, manifold side outlets, fancoils, boiler components).

The Velofit fittings should be installed on the threaded end parts supplied by copper piping following the instructions given below :

1. When cutting the pipe, be careful to clean the pipe ends from any external burrs.
2. Fully insert the pipe section jutting out from the fitting into the threaded end.
3. Approach the fitting to the shoulder of the threaded part, and then tighten by hand.
4. **Tighten with relative open-ended hex. wrench Series 829M**.

Installation 873M122

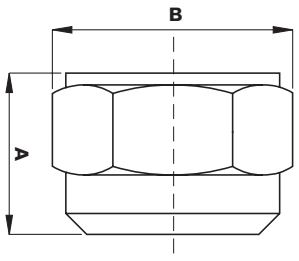
a) instructions for cutting the copper pipe:
- Cut the copper pipe so that it can enter the valve body or nipple by at least 10 mm
- After cutting the pipe, eliminate any external burrs with special deburring tool

b) assembly instructions:
- insert the fitting in the cut pipe with the rubber part facing the valve
- insert the pipe in the valve or nipple
- when assembling, make sure that the pipe is aligned with the center-line of the fitting / valve: the fitting does not work well with the pipes inclined
- tighten the nut of the fitting to the valve or nipple by the prescribed tightening torque

c) disassembly and reassembly:
the fitting can be disassembled, then reassembled after making sure that the rubber part has not been damaged during previous disassemblies/assemblies. After installation of several months, reuse of the fitting after its disassembly it is not advisable.

Overall dimensions (mm)

873M



Size	A	B	Wrench Hexagonal
3/8"x10	17.5	24	21
3/8"x12	20.5	24	21
1/2"x10	18.5	28	25
1/2"x12	18.5	28	25
1/2"x14	18.5	28	25
1/2"x15	22.5	30	27
1/2"x16	22	30	27
1/2"sx18	17.5	30	27
3/4"x18	18	33	30
1"x22	23	36	39

Description

Fittings of the **820R series** are metal seal three-piece fittings (unions) for connection between copper piping and hydraulic components (valves, lockshields, manifold side outlets, etc.) and they use PIPE thread in accordance with UNI ISO 228 standard.

Application

Fittings of the **Series 820R** find application in air conditioning and heating systems for connection between copper pipes and hydraulic component s in the system (valves, lockshields, manifold side outlets, etc.).

820R

Compression union for copper pipe. Metal seal.

Type	Part number	Size	Ø Tube	Spanner Hexagon	Weight (g.)
820R	820R3808	3/8"	8	20	22
820R	820R3810	3/8"	10	20	26
820R	820R3812	3/8"	12	20	24
820R	820R1210	1/2"	10	25	44
820R	820R1212	1/2"	12	25	42
820R	820R1214	1/2"	14	25	44
820R	820R1215	1/2"	15	25	36
820R	820R1216	1/2"	16	25	40
820R	820R12S18	1/2"S	18	25	50
820R	820R3418	3/4"	18	30	74
820R	820R3422	3/4"	22	30	66

1/2"S = thread M24x1.5 ISO/R262 present only on valves Series 120B, 102M, 126C, 126P, 119SX.

Operation

Operation of the fittings belonging to the 820R series is easy and efficient as it is based on the counteracting of the tightening torques between core and ferrule. The core prevents squashing of the pipe during tightening and is suitably knurled to withstand the thermal expansions which could occur during operation of the system.

The taper ferrule allows hydraulic seal on the piping and on the hydraulic component connected to it. Versions with DN 3/4" for pipe dia. Ø18 and Ø22 are provided with O-ring sealed ferrule which improves the tight sealing to the hydraulic components.

Mechanical seal tests against unthreading show a resistance exceeding 1200 Nm. The coupling obtained in this way offers maximum reliability to the extent that its use is recommended also in cases which do not have provision for inspection.

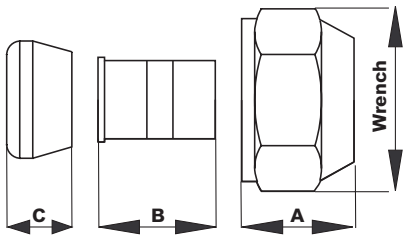
Reliability of the fittings belonging to the 820R series is assured by 100% quality controls of the production lots.

Technical features	
Max. pressure	10 bar
Max. operating temperature	-5°C ÷ 100°C
Tightening torque	DN 3/8" = 20 to 25 Nm DN 1/2"-1/2S = 25 to 30 Nm DN 3/4" = 30 to 35 Nm
Usable liquids	Water also with glycol max. 50%

Design features	
Nut	Brass CW617N
Core ferrule	Brass CW614N

Overall dimensions (mm)

820R



Size	A	B	C	Wrench
3/8"x8	17	17	8	20
3/8"x10	17	17	8	20
3/8"x12	17	17	8	20
1/2"x10	18.5	17	10	25
1/2"x12	18.5	17	10	25
1/2"x14	18.5	18	10	25
1/2"x15	18.5	18	10	25
1/2"x16	18.5	18	10	25
1/2"sx18	18.5	18	10	25
3/4"x18	21.5	18	14.5	30
3/4"x22	21.5	18	14.5	30

Installation

Choice of fittings **Series 820R** depends on the diameter Ø of the connection pipe and the DN of the connection on the hydraulic components to be connected (valves, lockshields, manifold side outlets, fancoils, boiler components).

For correct installation, merely follow a few simple rules :

1. When cutting the pipe, be careful to clean the pipe ends from any external burrs.
2. Insert the nut on the pipe, then the reinforcement core until fully home, then the ferrule **(Pic.1)**.
3. Approach the **820R** fitting to the threaded end and make sure that the pipe, fitting and end part are aligned.
4. Tighten the fitting according to the recommended tightening torque.

Fitting **Art. 820R** is used for connecting copper pipes to valves and lockshields with male connections. Coupling is achieved by compression of an annealed brass ferrule placed between the threaded part and the pipe, determined by tightening of the nut.

The pipe end should be stiffened by a special reinforcement core in order to avoid risk of squashing during tightening.

Use of the ferrule prevents unthreading of the pipe, while it always ensures a very easy removal.

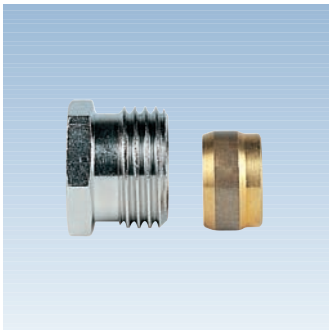
(Pic.1)

Description

Reducers of the **197 Series** are two-piece fittings with mechanical seal for connection between copper piping and hydraulic components with female thread. They use PIPE thread in accordance with UNI ISO 228 standard.

Application

Reducers of **197 Series** find application in air conditioning and heating systems for connection between copper pipes and hydraulic components in the system (valves, manifold side outlets, fancoils, boiler components).



197

Nickel-plated reducer for metal seal for connection of copper pipe (1mm wall thickness) to valves and lockshields with female connections.

Type	Part number	Size	Ø Tube	Spanner Hexagon	Weight (g.)
197	197SN3810	3/8"	10	17	17
197	197SN3812	3/8"	12	17	11
197	197SN1214	1/2"	14	21	27
197	197SN1215	1/2"	15	21	22
197	197SN1216	1/2"	16	21	17
197	197SN3418	3/4"	18	27	55

Operation

Operation of the fittings belonging to the 197 series is easy and effective as it is based on the counteracting of the tightening torques between the double taper ferrule and reducer. During tightening, the double taper ferrule is compressed thus ensuring tight seal on the piping and on the hydraulic component connected to it.

1. Pipe tightening nut
2. Double taper ferrule

Reliability of the fittings belonging to the 197 series is assured by 100% quality controls on the production lots.

Installation

Choice of reducers belonging to the 197 Series depends on the diameter Ø of the connection pipe and the DN of the connection on the hydraulic components to be connected (valves, lockshields, manifold side outlets, fancoils, boiler components). For correct installation, merely follow a few simple rules :

1. When cutting the pipe, be careful to clean the pipe ends from any external burrs.
2. Insert the pipe in the reducer after suitable hemping, then insert the ferrule (**Pic. 2**).
3. Approach the **197** reducer to the threaded end and make sure that the pipe, fitting and end part are aligned.
4. Fully tighten the reducer

Technical features	
Temp. max	-5°C ÷ 100°C
Max. pressure	10 bar
Tightening torque	DN 3/8" = 15 Nm DN 1/2" = 15 to20 Nm DN 3/4" = 20 to25 Nm
Usable liquids	Water also with glycol max. 50%

Design features	
Nut Ferrule	Brass CW614N

The Series 197 reducer allows connecting copper piping to all valves and lockshields with female connections, of the iron series

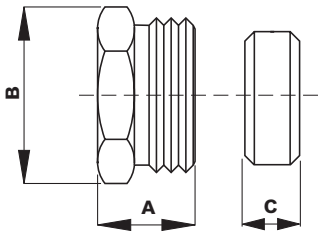
Nicked plated threaded ring nut

Shot-blasted brass double taper ferrule

(Pic.2)

Overall dimensions (mm)

197



Size	A	B	C	Wrench
3/8"x10	12.5	20	9	17
3/8"x12	12.5	20	9	17
1/2"x14	17	24	10	21
1/2"x15	17	24	10	21
1/2"x16	17	24	7	21
3/4"x18	20	31	11	27

829M

Steel wrench for tightening.

Type	Part number	Size	Weight (g.)
829M	829M2025	3/8" - 1/2"	230
829M	829M2527	1/2" - 1/2"S	255

A Division of Watts Water Technologies Inc.

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Fan-coil valves
Series 2131 - 3131 - 4131

Main features

Complete range in the following versions :

- 2-way - DN: 1/2”, 3/4”, 1”
- 3-way - DN: 1/2”, 3/4”, 1”
- 3-way with 4 ports - DN: 1/2”, 3/4”

- The 3-way version and the 3-way versions with 4 ports can be used as diverting or mixing valves of compact size and reduced weights. The valves are motorized with actuators series 22C or actuators with stroke 2.5 mm with ring nut M30x1.5.

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Description

Fan-coil control valves **series 2131, 3131, 4131** are used for controlling the flow of hot or cold water in heating and air conditioning systems. They are operated by electric actuators with max. stroke of 2.5 mm. such as electrothermic actuator **series 22C**.

As standard, the valves are available in the configuration with male thread in the following versions :

• 2-way **series 2131**
• 3-way **series 3131**
• 3-way with 4 ports **series 4131** with built-in by-pass.

Operation of the valve plug is by electrothermic actuator **series 22C**, available in the following versions:

• NO (normally open) 2-wire(Standard) or 4-wire (with auxiliary microswitch contact)
• NC (normally closed) 2-wire (Standard) or 4-wire (with auxiliary microswitch contact)

All actuators of the 22C series can easily be fastened to the valve body with a threaded ring nut. (M30x1.5).

2131

Two-way brass valve for fan-coils.
ON/OFF operation with actuators series 22C.
Max. operating temperature: 100°C. Disc stroke: 2.5 mm.
Nominal pressure: 16 bar.

Type	Part number	Dn	Kvs	Weight (g)
2131	213112	1/2" MM	1,7	200
2131	213134	3/4" MM	2,8	200
2131	21311	1" MM	4,5	500

3131

Three-way brass valve for fan-coils. ON/OFF operation with actuators series 22C. Max. operating temperature: 100°C. Disc stroke: 2.5 mm. Can be used both as mixing and diverting valve, except for version 31311 which can only be used as diverting valve. Nominal pressure: 16 bar.

The Kvs and by-pass Kvs values given in the table alongside refer to the valve used for diverting service.

Type	Part number	Dn	Kvs	Kvs By-bass	Weight (g)
3131	313112	1/2" MM	1,7	1,3	200
3131	313134	3/4" MM	2,8	1,8	250
3131	31311	1" MM	4,5	3,1	550

VU

Tee fitting for creating by-pass in valves series 3131 (Dn 1“).

Type	Part number	Dn	Weight (g)
VU	VU311	1" MM	250

4131

Three-way brass valve with 4 connections for fan-coils. ON/OFF operation with actuators series 22C. Max. operating temperature: 100°C. Disc stroke: 2.5 mm. Can be used both as mixing and diverting valve. Nominal pressure: 16 bar.

The Kvs and by-pass Kvs values given in the table alongside refer to the valve used for diverting service.

Type	Part number	Dn	Kvs	Kvs By-bass	Weight (g)
4131	413112	1/2" MM	1,7	1,3	350
4131	413134	3/4" MM	2,8	1,8	400

840

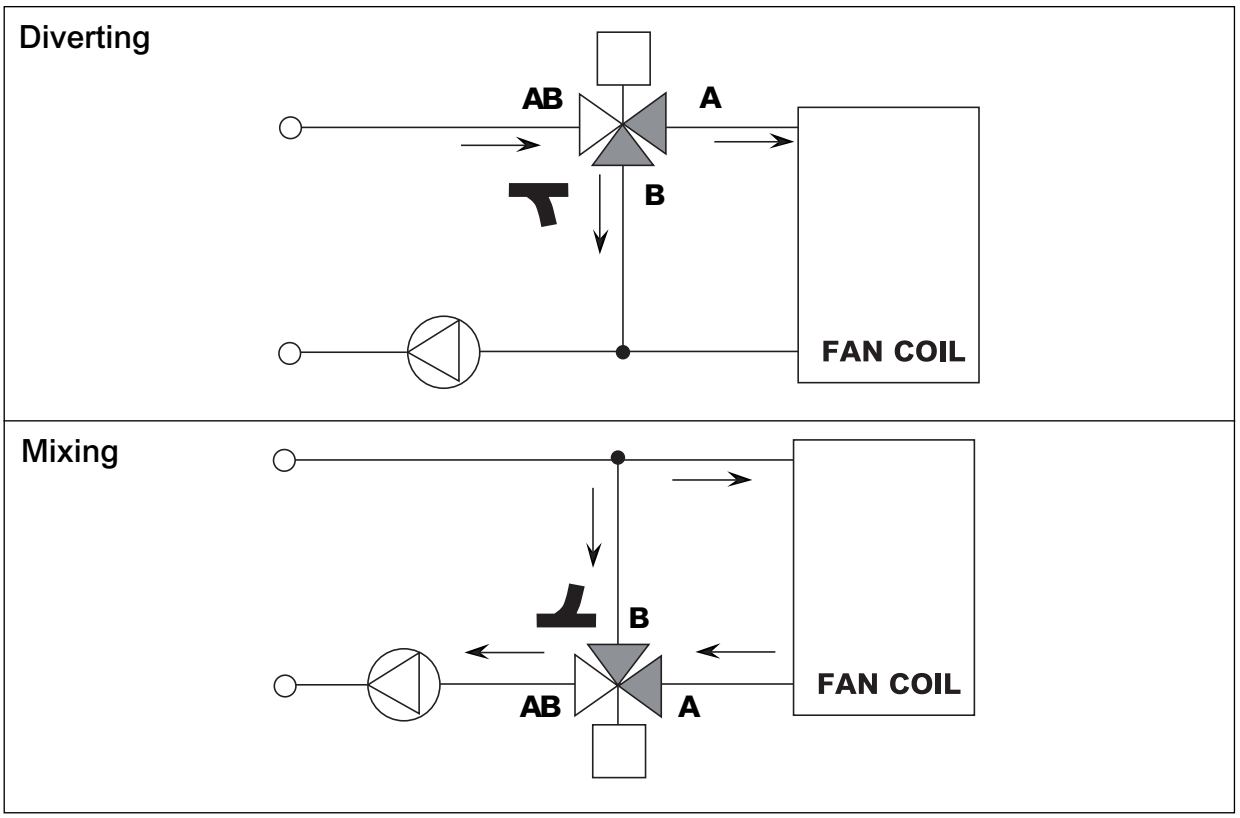
Soft sealed union with nut for zone valves series 2131, 3131, 4131.

Type	Part number	Dn	Weight (g)
840	8401212GAS	1/2" x 1/2"	50
840	8403434GAS	3/4" x 3/4"	50
840	84011GAS	1" x 1"	50

Application

The valves are used for shutting off (**series 2131**, two-way) or diverting/mixing (**series 3131 - 4131**, 3-way and 3-way with 4 ports size 1/2" e 3/4"), the heat transfer fluid to a heating or air conditioning system as required by the room thermostat (or timing thermostat).

The 3-way fan-coil valves **series 3131** or 3-way with 4 ports **series 4131**, thanks to the special configuration of the plug controlling the by-pass flow, can be used equally well as diverting or mixing valves (thus optimizing to the full the various plumbing requirements in assembly).



Operation

Operation of the fan-coil control valves **2131,3131,4131** is through the movement of the plug which shuts off the heat transfer fluid: the ON/OFF action of the plug is controlled by the actuator **series 22C** whose internal motor consists of a wax thermostatic element activated by a PTC thermistor against a signal sent by a room thermostat (or timing thermostat). The electrochemical actuator **series 22C**, in the 4-wire version, is provided with an **auxiliary contact** for additional controls (metering, control of pumps, fans or other equipment). The mechanical characteristic of the valves is of the Normally Open type. It can be adjusted or fully closed by manually turning the threaded plastic cap, provided on the valve. This threaded cap acts directly on the valve stem.

When coupled to the **22C NC** actuator, under rest conditions (actuator not energized), the valve becomes

- normally closed (NC) (straight way closed and by-pass open if 3-way type); when the actuator is energized, the valve is opened.

When coupled to the **22C NA** actuator, under rest conditions (actuator not energized), the valve remains

- normally open (NO) (straight way open and by-pass closed if 3-way type); when the actuator is energized, the valve is closed.

The hydraulic flow rate and pressure drops characteristics of the valves are given in appropriate charts; instead, when coupled with the ON/OFF actuators, they assume the characteristics associated with such device.

The three-way valves (or three-way valves with 4 ports) are designed and built to be used both as diverting valves (one inlet and two outlets) and mixing valves (two inlets and one outlet). It is recommended to observe the operating ΔPmax given in the table in order to avoid risk of malfunctions and/or noise.

The reliability of the fan-coil control valves **2131, 3131, 4131** is guaranteed by the 100% testing on the production, which checks the hydraulic seals of the valve body and its components towards the outside and the seal of the plug in its flow shut-off function.

Design features	
Body	Brass CW617N
Stem	Brass with chemical nickel-plating
Spring	Stainless steel
Plug rubber	EPDM

Technical features common to the entire range	
Max pressure, models w. constant Kv	16 bar
Max pressure, models w. variable Kv	10 bar
Min. fluid temperature	4°C
Max. fluid temperature	110°C
Liquids which can be used	Water (with glycol ≤ 50%)
Plug stroke	2.5 mm
By-pass leakage	< 0,02 % Kvs
Actuator connection	Threaded ring nut M30 x 1.5

Installation

Choice of the fan-coil control valves depends on the type of plumbing systems as well as the required flow rate and pressure drop characteristics.
In systems with 2-way control valves it is advisable to provide by-pass valves **series 466** to ensure a minimum recirculation of the fluid.
Before mounting the valves, make sure that the piping is clean, and free from welding slag or the like.

It is recommended not to install the valve with the 22C actuator facing down.

The valves can be connected by using the soft-sealed tailpieces **series 840** with the range of single-piece or union fittings (3-piece).

The 1” three-way valves can use the TEE fitting (part No. VU311 - DN 1”) for making the by-pass.

Hydraulic characteristics

Valve part number	**DN** Inches	**DN** mm	Pre-setting (Kv adjustable)	Port size	Max. operation pressure **PN** [bar]	**Kvs**	**Kv by-pass**	**ΔPmax** Max. differential operation pressure. (noise < 38 dBA) [bar]	**ΔPs** Close off with actuator **22C** NO/NC [bar]	**Kvs**	**Kv by-pass**	**ΔPmax** Max. differential operation pressure. (noise < 38 dBA) [bar]	**ΔPs** Close off with actuator **22C** NO/NC [bar]
2 WAY VALVES													
213112	1/2"	15		15A2	16	1,7	-	0,8	2,5	-	-	-	-
213112P	1/2"	15		15F2	16	1,7	-	0,8	2,5	-	-	-	-
213112DP	1/2"	15		15A2		1,7	-	0,8	4	-	-	-	-
213134	3/4"	20		20A2	16	2,8	-	0,7	1,5	-	-	-	-
213134P	3/4"	20		20F2	16	2,6	-	0,7	1,5	-	-	-	-
213134DP	3/4"	20		20A2	16	2,8	-	0,7	4	-	-	-	-
21311	1"	25		25A2	16	4,5	-	0,6	0,7	-	-	-	-
21311P	1"	25		25F2	16	4,5	-	0,6	0,7	-	-	-	-
21311DP	1"	25		25A2	16	4,5	-	0,6	4	-	-	-	-

3 WAY VALVES						**Used as DIVERTER VALVE**				**Used as MIXING VALVE**			
313112	1/2"	15		15A3	16	1,7	1,3	0,8	2,5	1,7	1,2	0,7	2
313112P	1/2"	15		15F3	16	1,7	1,3	0,8	2,5	1,7	1,2	0,7	2
313112DP	1/2"	15		15A3	16	1,7	1,3	0,8	4	1,7	1,2	0,7	4
313134	3/4"	20		20A3	16	2,8	1,8	0,7	1,5	2,5	1,6	0,5	1
313134P	3/4"	20		20F3	16	2,8	1,8	0,7	1,5	2,5	1,6	0,5	1
313134DP	3/4"	20		20A3	16	2,8	1,8	0,7	4	2,5	1,6	0,5	1
31311	1"	25		25A3	16	4,5	3,1	0,6	0,7	4,5	3,1	0,4	0,7
31311P	1"	25		25F3	16	4,5	3,1	0,6	0,7	4,5	3,1	0,4	0,7
31311DP	1"	25		25A3	16	4,5	3,1	0,6	4	4,5	3,1	0,4	4

3 WAY VALVES 4 PORT						**Used as DIVERTER VALVE**				**Used as MIXING VALVE**			
413112	1/2"	15		15A4	16	1,7	1,3	0,8	2,5	1,7	1,2	0,7	2
413112P	1/2"	15		15F4	16	1,7	1,3	0,8	2,5	1,7	1,2	0,7	2
41311240P	1/2"	15		15I4	16	1,7	1,3	0,8	2,5	1,7	1,2	0,7	2
413112DP	1/2"	15		15A4	16	1,7	1,3	0,8	4	1,7	1,2	0,7	4
413134	3/4"	20		20A4	16	2,8	1,8	0,7	1,5	2,5	1,6	0,5	1
413134P	3/4"	20		20F4	16	2,6	1,8	0,7	1,5	2,5	1,6	0,5	1
413134DP	3/4"	20		20A4	16	2,8	1,8	0,7	4	2,5	1,6	0,5	4
41313440P	3/4"	20		20I4	16	2,8	1,8	0,7	1,5	2,5	1,6	0,5	1

- Red part numbers are standard versions

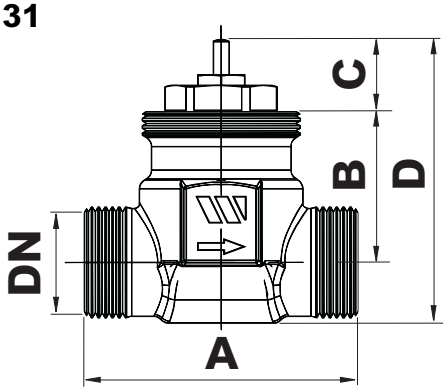
- KVs = nominal value of the flow in the main way of the valve in m3/h with the valve fully open at a pressure of 1 bar and with water temperature at 20 °C

- ΔPmax = maximum dynamic differential pressure at the ends of the fully open valve, without risk of noise (< 38 dBA)

- ΔPs= maximum static differential pressure at the ends of the valve against which the valve is able to be opened (through its internal spring for the three-way versions; through the actuator for the two-way versions)

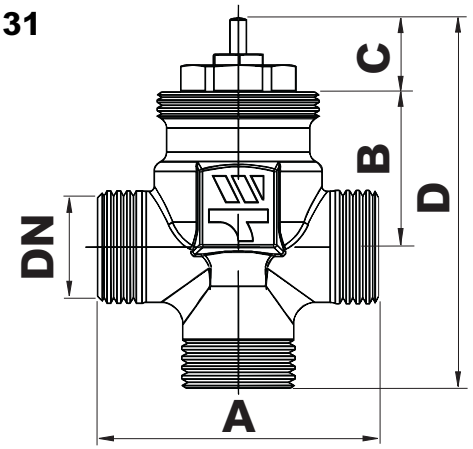
Overall dimensions (mm)

2131



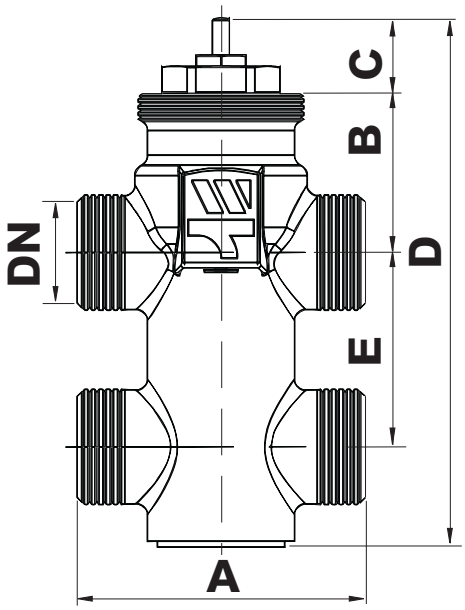
Part number	DN	A	B	C	D
213112	1/2”	52	29	13,5	51
213112P	1/2”	52	29	13,5	51
213112DP	1/2”	52	29	13,5	51
213134	3/4”	56	28	13,5	56
213134P	3/4”	56	28	13,5	56
213134DP	3/4”	56	28	13,5	56
21311	1”	82	30,5	13,5	77,5
21311P	1”	82	30,5	13,5	77,5
21311DP	1”	82	30,5	13,5	77,5

3131



Part number	DN	A	B	C	D
313112	1/2”	52	29	13,5	68,5
313112P	1/2”	52	29	13,5	68,5
313112DP	1/2”	52	29	13,5	68,5
313134	3/4”	56	28	13,5	69,5
313134P	3/4”	56	28	13,5	69,5
313134DP	3/4”	56	28	13,5	69,5
31311	1”	82	38	13,5	92,5
31311P	1”	82	38	13,5	92,5
31311DP	1”	82	38	13,5	92,5

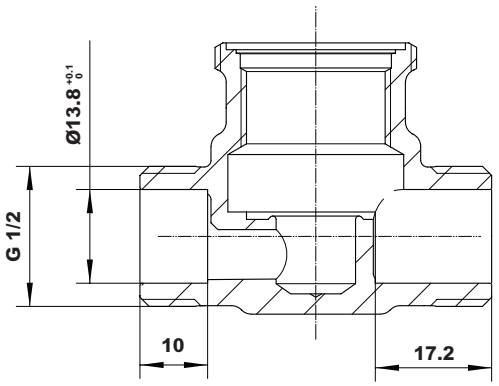
4131



Part number	DN	A	B	C	D	E
413112	1/2”	52	29	13,5	95,5	35
413112P	1/2”	52	29	13,5	95,5	35
413112DP	1/2”	52	29	13,5	95,5	35
41311240P	1/2”	52	29	13,5	100,5	40
41313440P	3/4”	56	28	13,5	102,5	40
413134	3/4”	56	28	13,5	112,5	50
413134P	3/4”	56	28	13,5	112,5	50
413134DP	3/4”	56	28	13,5	112,5	50

Connections dimensions (mm)

15F2



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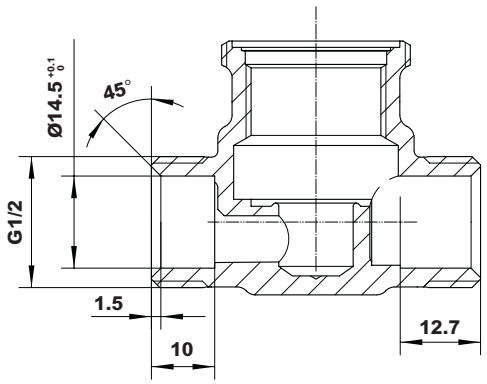

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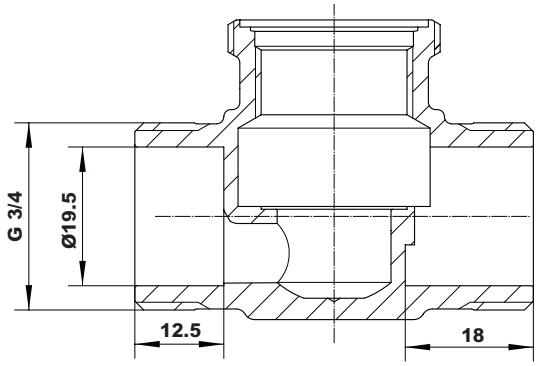

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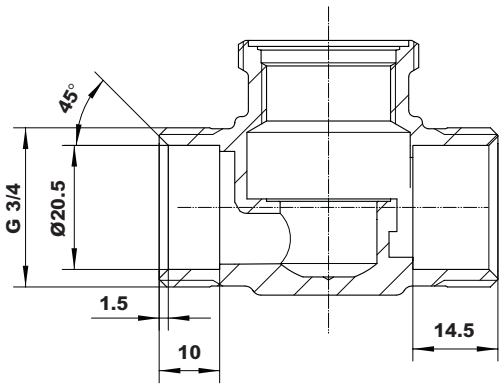

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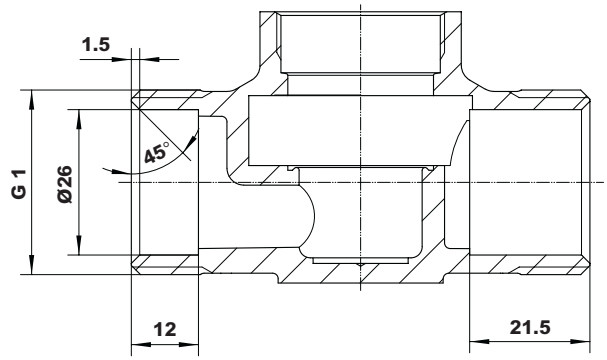

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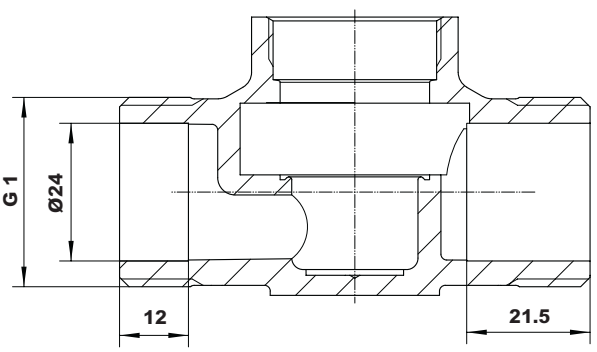

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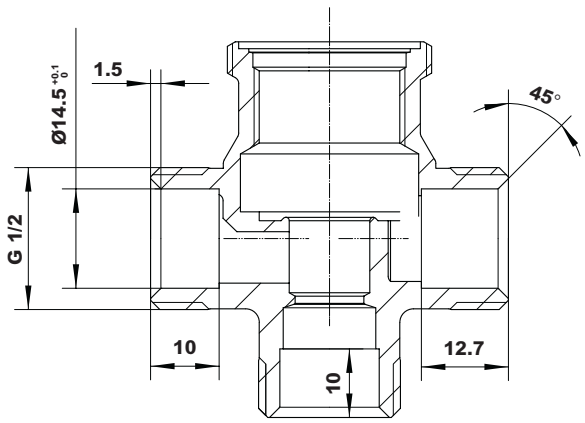

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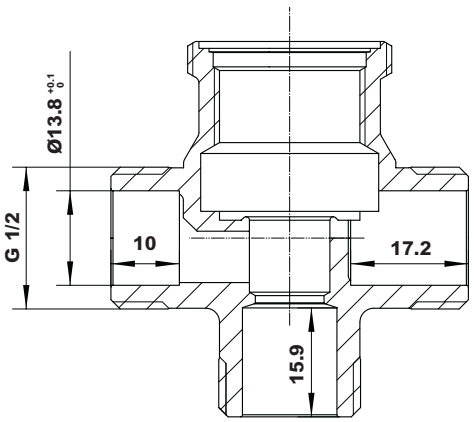

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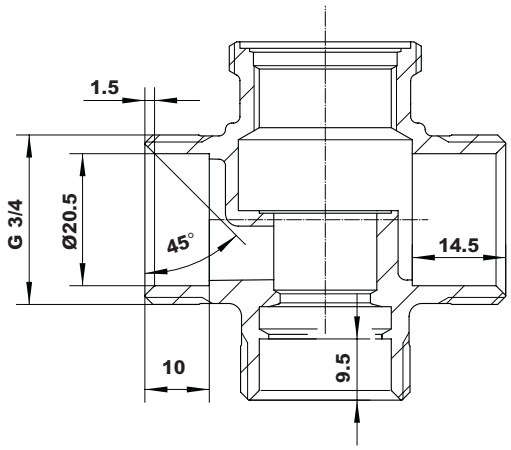

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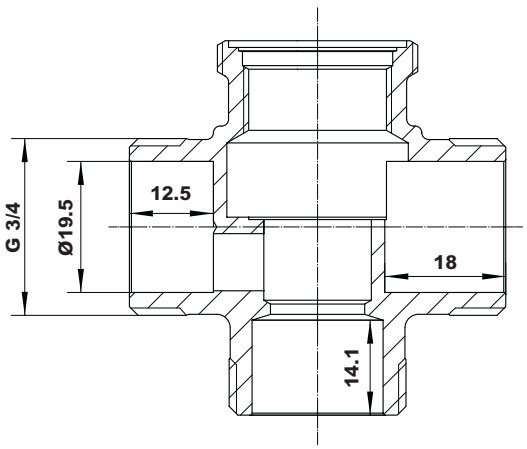

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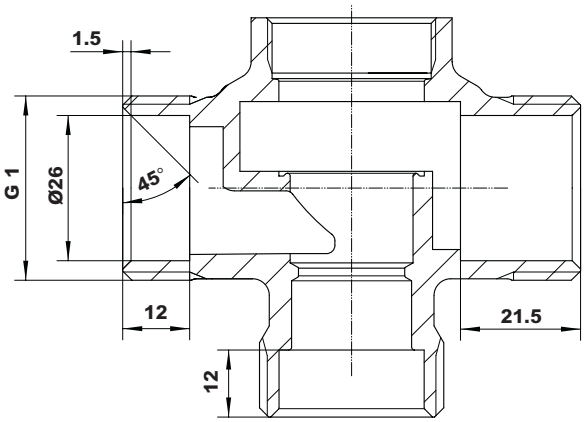

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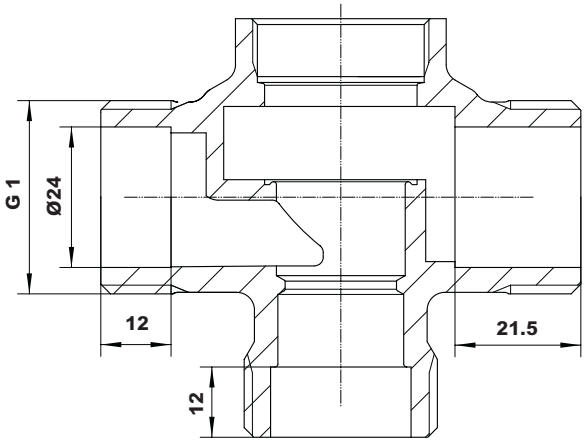

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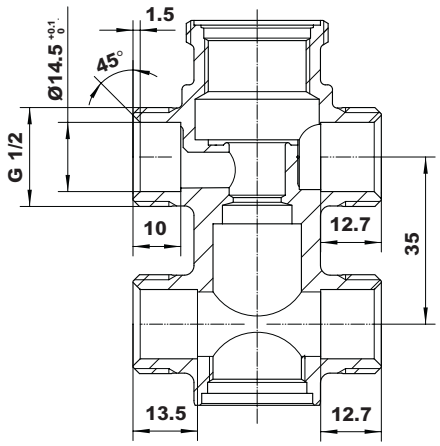

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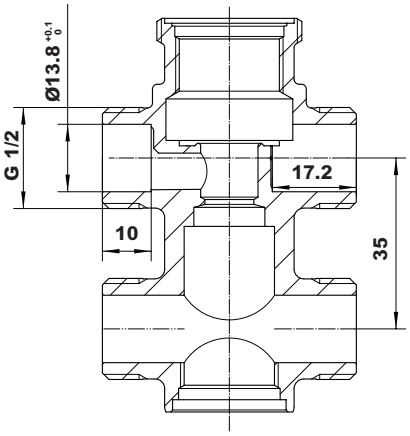

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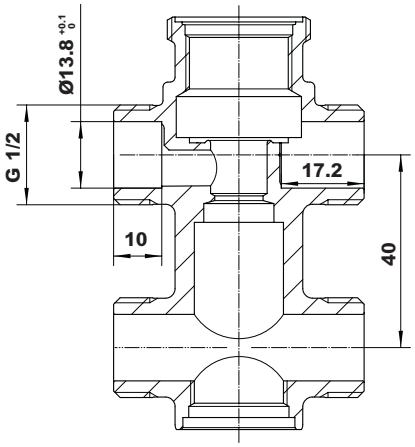

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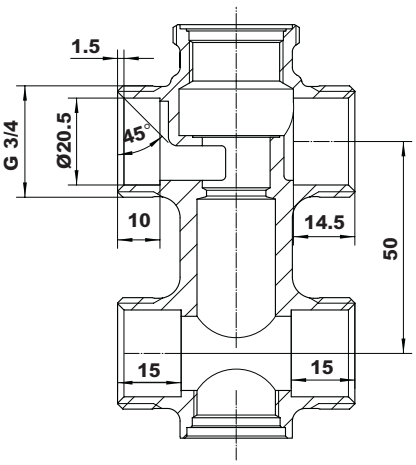

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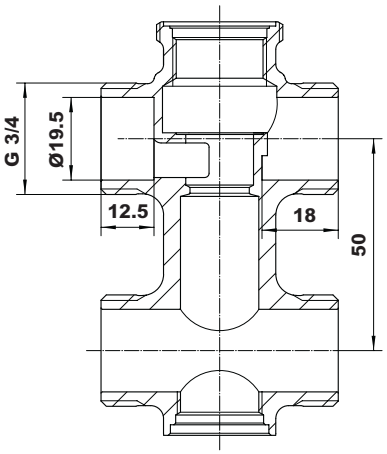

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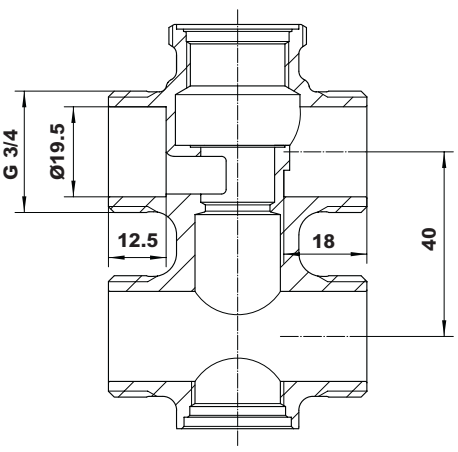
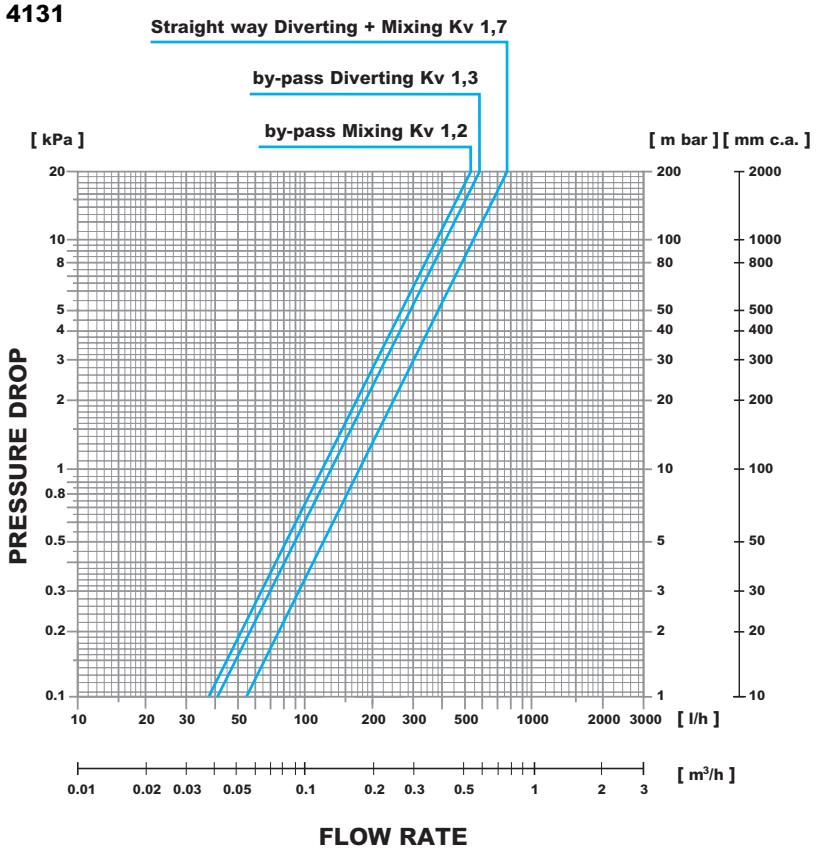
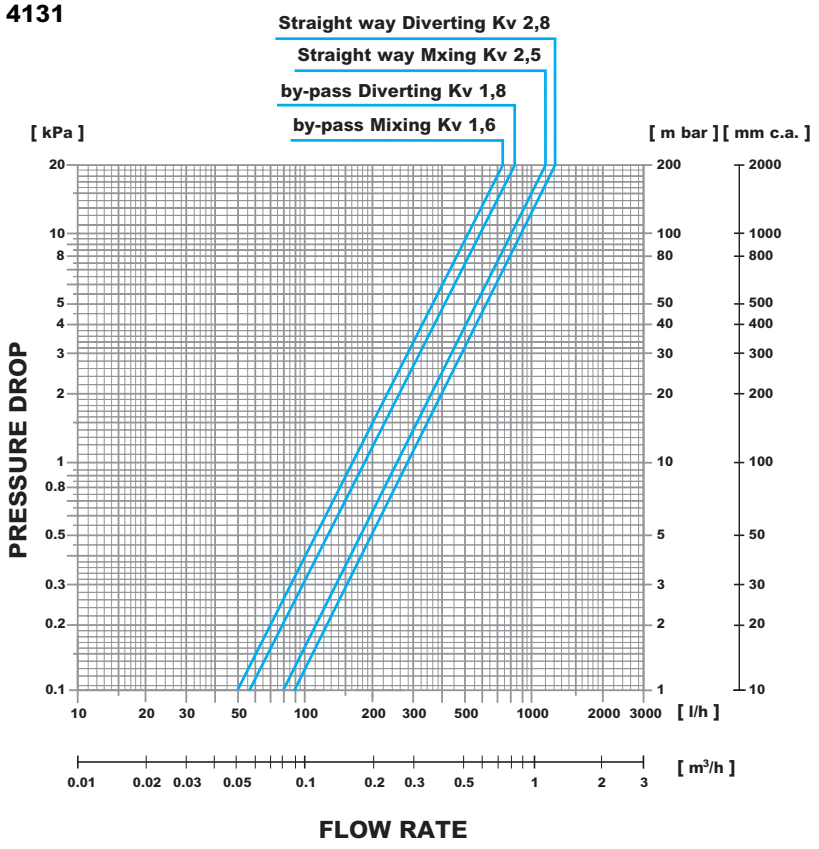


Flow rate/pressure drop charts

2131 - 3131 - 4131 **DN 1/2"**

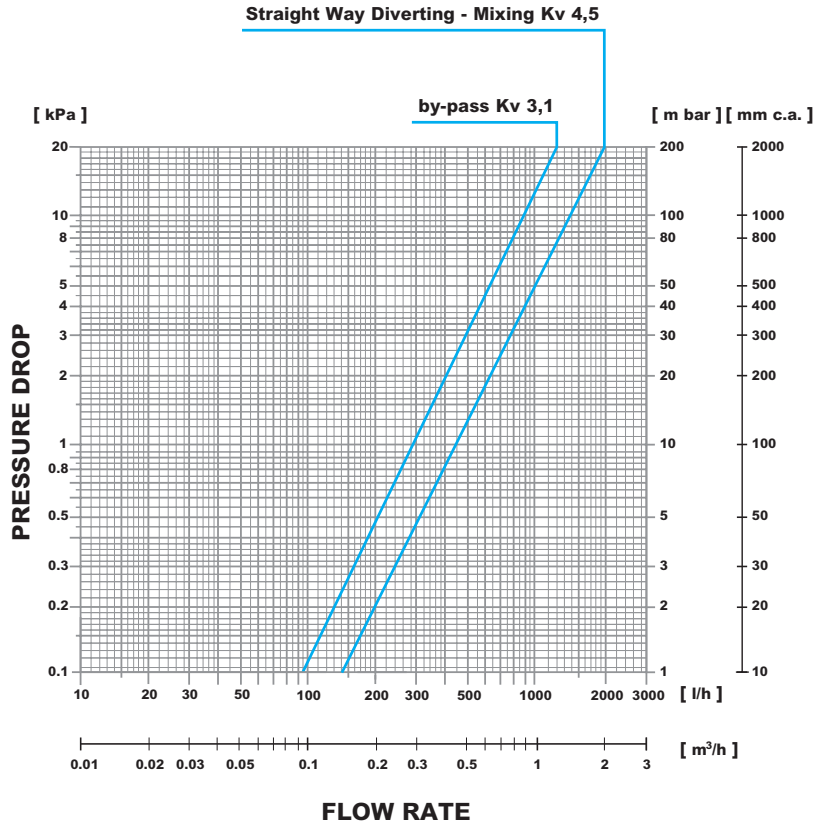


2131 - 3131 - 4131 **DN 3/4"**



Flow rate/pressure drop charts

2131 - 3131 **DN 1"**



Product range Watts Industries

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- Safety units
- Safety relief valves
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- Radiator valves
- System products
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Electro-Mechanical Modulating Actuator EMU Series

Main features

- The EMU Series electro-mechanical modulating actuator is matchable with the WATTS fan Coil valve compact series (2131-3131-4131)

- Nominal Stroke: from 4.4mm up to 8.0 mm.
- Stroke control through torque increment.
- Control Signal: 3 points or 0-10 V (2-10 V)
- Power supply: 24V or 230 V a.c.
- Direct mounting through threaded ring (M30x1.5)
- Easy Manual resetting simply removing the motor from the valve body.
- Power supply cable factory installed.

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INDUSTRIES
Technology by nature

Description

The actuator **EMU Series** are electro-mechanical modulating actuator that can be supplied with 24V or 230V voltage by a modulating signal 3 points or 0-10 V (2-10V). The actuator can be identified thanks to the compact dimensions and easiness of mounting.

The actuator and valve matching does not need any particular tool or to empty the system.

EMU

Electro-mechanical modulating actuator that can be supplied with 24V or 230V voltage by a modulating signal 3 points or 0-10 V (2-10V).

Type	Part No.	Control Signal	Power supply	Wire length
EMU	EMU24	3 points	24V	2000 mm
EMU	EMU230	3 points	230V	2000 mm
EMU	EMU010	0 -10V (2 -10V)	24V	2000 mm

Application

The electro-mechanical modulating actuator **EMU Series** can be matched with the fan coil compact valve (2131-3131-4131). This kit can be used in heating and cooling systems, providing an accurate control of the heating/cooling emission of each terminal unit. This control can be reached using a modulating signal 3 points or 0-10 V (2-10V).

Functioning

The **EMU Series** actuator stem is operated by a threaded stem coupled with gears that provides a coclockwise or counter-clockwise rotation.

The gear system is controlled by a bi-directional syncro-motor that transmits the movement through a magnetic joint which limitates the transmitted torque, consequently the linear power to the stem. The actuator and the valve can be matched using the threaded gear at the bottom of the motor **(Fig 1)**. No tools need !

The actuator movement is transmitted to the valve through axial contact and constantly mainteined thanks to the valve spring.

So, the opening and closure force of the valve are obtained in one direction by the power of the servo-motor (**Fs** open the B exit, **Fig. 2**) and in the opposite direction by the power of the valve spring itself (**Fm** open the A exit, **Fig. 2**).

The **EMU Series** actuators can be easily reset by manually removing the actuator from the valve body.

Valve - Actuator matching

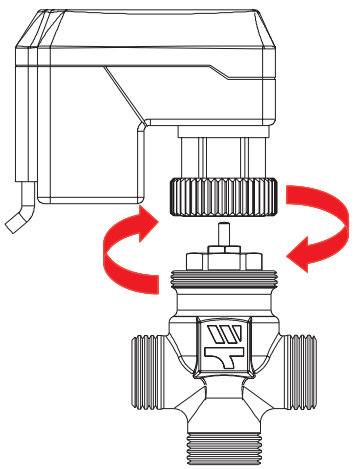


Fig.1

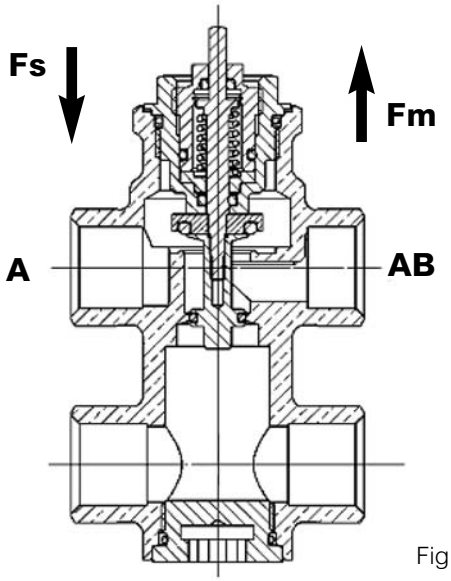


Fig.2

Technical features			
Type	3 points		0-10V (2-10V)
Max linear stroke	8.0 mm		4.4 mm
Max force		180 ± 10% N	
Power supply	24 (avail. 230) V a.c; 50/60 Hz Voltage		24 V a.c; 50/60 Hz
Power consumption	1 W		2,6 W
Impedance inlet	1,2 kOhm (24V) - 10 kOhm (230V)		8 kOhm
Class of Protection EN60529		IP50	
Class of Insulation EN60730		II	
Max. temperature / min. ambient		5 ÷ 60°C	
Cover material		PBL 45 VGF10-V0 CPS/ABS-V0	
Gears material		9 POM	
Speed [mm/s]		0,038	
Control signal	3 points		0-10 V; 2-10 V
Total cable length [mm]		2000	

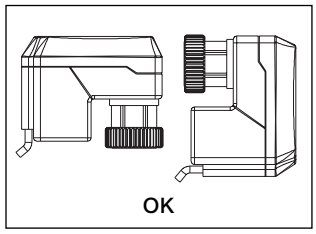
CE Marked	
Direttive LVD 73/23/CEE, 93/68/CEE	Norm : CEI en 60730-1, CEI EN 60730-2-8
Direttive EMC 89/336/CEE	Norm : EN 55014-1, EN 61000-3-2, EN61000-3-3
Norma Costruttiva	UNI 9497/89

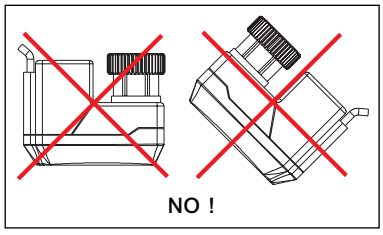
Installation

Actuator maintenance :

- Shutt-off the power supply.
- If possible, remove the electric connection from the electric terminal board.

Before electrically supplying the actuator, be sure of the correct mounting of the actuator on the valve, according to the here below scheme. The actuator should never be mounted with the cover upside down.



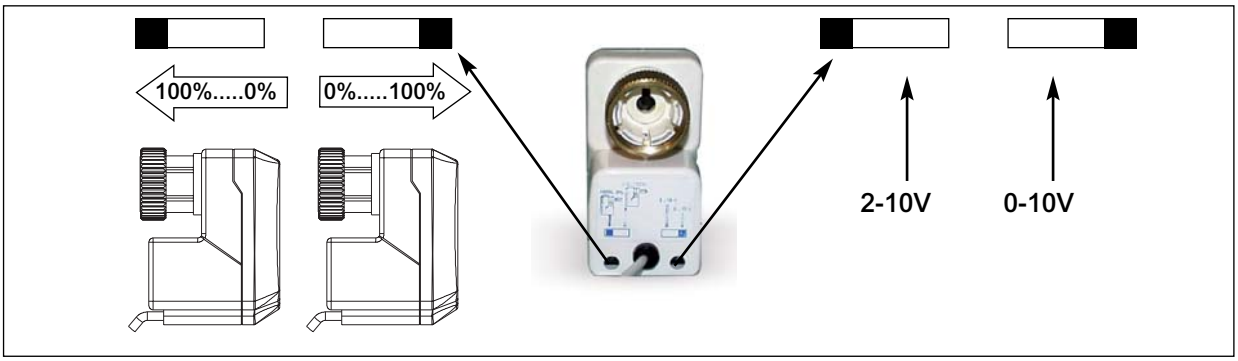


Electrical connection

The wiring diagram is shown on the motor plastic cover. The supplying cable should be connected as shown in Tab. 1. In the modulating version (0….10V) the 0% control signal indication and the signal type can be chosen using the two switches located under the safety plugs.(Fig. 3).

Table1			
3 POINTS VERSION		**0-10 V VERSION**	
Operations	**(*) Wire color**	**Operation**	**(*) Wire color**
Neutral	Blue	Power Supply: Neutral -Ground	White
Direction Fs (Fig. 2)	Red	Power Supply: phase	Blue
Direction Fm (Fig.2)	White	Positive Control Signal (+)	Red
		Negative Control Signal (-)	(**)

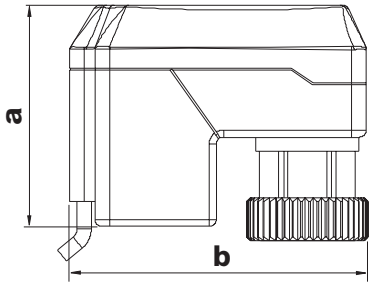
(*) Colors can change: please refer to the wiring diagram or the installation leaflet.
(**) for controls with negative exit signal (-); the same should be connected to the neutral of the power supply.



The actuator will self positioning at 0% every time the electric motor will be powered for the first time.
In addition there are the indication LED that provide an immediate check of the motor functioning.

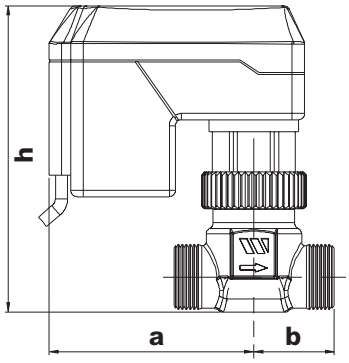
Overall dimensions (mm)

EMU

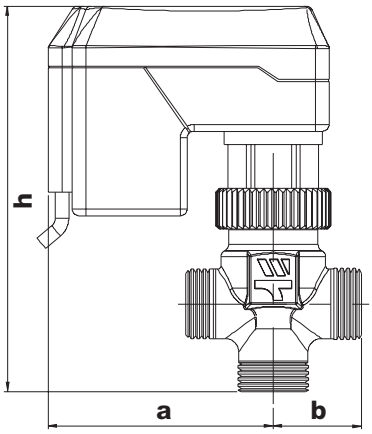


		A	B	Depth
3 points version	(24V)	62	82	50
	(230V)	62	92	50
Version 0.....10V (2-10V)		62	92	50

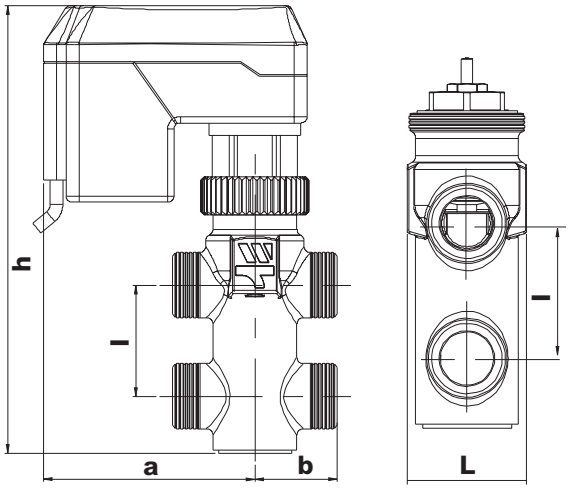
2131 - EMU



3131 - EMU



4131 - EMU



Actuator / Valve Kit	3 points version				Version 0…10V (2-10V)				
	Diameter	a	b	H	a	b	H	l	L
2131	1/2”	65	26	102	75	26	101	-	32
	3/4”	65	28	102	75	28	101	-	32
	1”	65	41	129	75	41	128	-	47
3131	1/2”	65	26	115	75	26	114	-	32
	3/4”	65	28	117	75	28	116	-	32
	1”	65	41	152	75	41	151	-	49
4131	1/2”	65	26	142	75	26	141	35	31
	3/4”	65	28	155	75	28	154	50	33

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www.wattsindustries.com

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2-way, 3-way zone valves
Series VU02 - VU3 - VU4

Main features

- Available in the 2-way and 3-way versions
- With provision for by-pass fitting VU4
- Female connection ND 3/4“ - 1”
- Reduced weight and compact size
- Conforms with UNI standards 8156/81

WATTS INDUSTRIES

Technology by nature

Description

The **Series VU zone valves** are normally used for controlling hot and cold water flows in heating and/or air conditioning systems through an electrical ON/OFF or modulating control.

The valves, made of brass, are offered in the configuration with female connection ND 3/4" and 1", in the following versions :

- 2-way **Series VU02**
- 3-way **Series VU3**
- 3-way and 4 connections if the **VU3** valve is used with by-pass **Series VU4**

The valves can be operated by the following electrothermic actuators :

• with On/ff action, **Series ETE**
• with modulating action, **Series ETM**

Application

The valves are used for shutting off **(two-way) VU02 Series** or for mixing **(3-way) VU3 Series** the heat carrier fluid in a heating or air conditioning system depending on the requirements of the room thermostat (or electronic timing thermostat).

Thanks to the very compact size, the valves of the **VU02 - VU3 Series** are especially suitable for installation on banks of single terminal units (convector heaters, unit ventilators)

VU02

2-way brass zone valve, normally closed (NC).

Type	Part. No.	Nd	Kvs	Kvs (by-pass)	Weight (g)
VU02	VU0220	3/4"F	4.3	--	450
VU02	VU0225	1"F	6.5	--	600

VU3

3-way brass zone valve, normally closed (NC).

Type	Part. No.	Nd	Kvs	Kvs (by-pass)	Weight (g)
VU3	VU320	3/4"F	4.3	2.8	450
VU3	VU325	1"F	6.5	3.3	600

VU4

Tee-fitting for creating the by-pass in valves of the VU3 series.

Type	Part. No.	Nd	Kvs	Kvs (by-pass)	Weight (g)
VU4	VU400	3/4"F	--	--	250
VU4	VU401	1"F	--	--	400

Operation

Operation of the **Series VU** zone valve is through the movement of the valve plug which shuts-off the heat carrier fluid. The valves are normally closed in rest conditions. The valve plug is actuated by a thermostatic wax element incorporated in the electrothermal actuators of the **ETE** or **ETM Series**, which is activated by an electrical resistor against a signal sent by a room thermostat (or electronic timing thermostat).

When the OK signal is received from the control device (room thermostat or electronic timing thermostat), the electrical resistor is heated owing to the flow of current. This allows the built-in sensitive element to expand and exert a thrust on the moving stem thus causing the plug of the valve body to open and determining the operation of normally closed valves of the **VU220, VU225, VU320, VU325 Series**. In the absence of voltage, the VU normally closed valves may be opened by turning the knob of **ETE** or **ETM** actuator in the manual position.

After the stem has completed its entire stroke, the stroke limit microswitch interrupts the power supply. Such solution avoids risk of damaging the actuator if the normal valve plug movement is inhibited for any reason (foreign matter on the valve seat, etc.).

Actuators of the **ETE Series** are also provided with an auxiliary contact **(suffix BO)** for additional commands (metering, control of pump, fan or other equipment).

For the hydraulic flow rate and pressure drop characteristics of the valves, see relative charts.

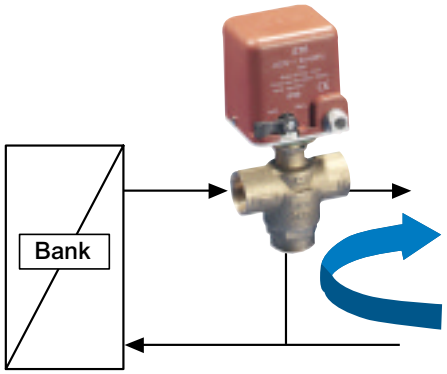
Installation

Zone valve selection depends on the diameter of the piping and on the heating or air conditioning system.
The valves can be connected with copper or plastic pipes. For **2-way valves** of the **VU02** series it is recommended to use by-pass valve **Series 466**.

For obvious reasons (infiltration, condensation, etc.) , it is advisable to avoid installing the valves with the actuator facing down.

Example :

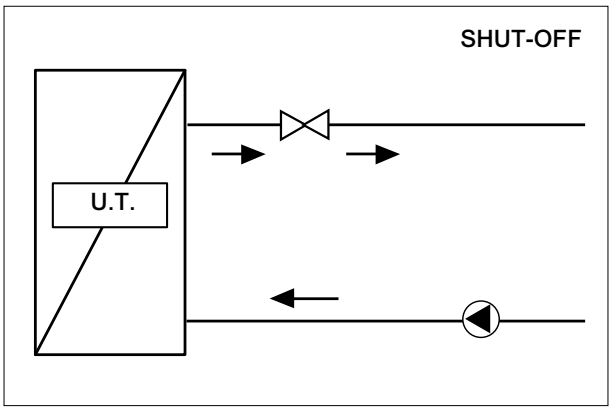
When the valve is closed: way A is closed and the fluid leaves way 3 to return to the boiler via way AB.



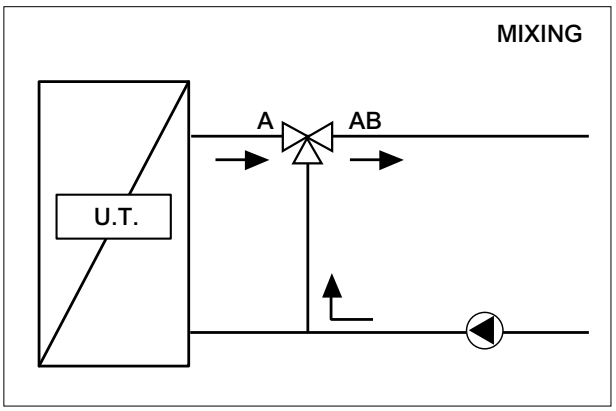
Technical characteristics	
Nominal pressure	16 bar
Max. differential pressure	1.5 bar
Max. operating temperature	110°C
Stroke	4 mm
Usable liquids	Water, water with Glycol solution (max. 50%)

Design features	
Valve body	Brass CW617N (UNI EN 12165)
Plug	Stainless steel
Spring	Stainless steel
O-ring	EPDM

2-way valves of the VU02 series serves for shutting off flow of heat carrier fluid

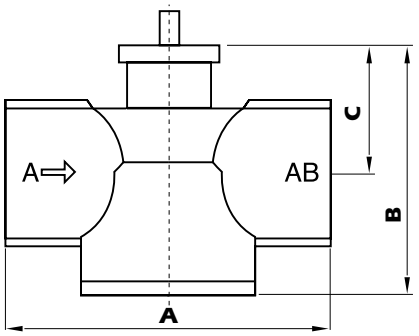


3-way valves of the VU3 series can be used as mixing valves.



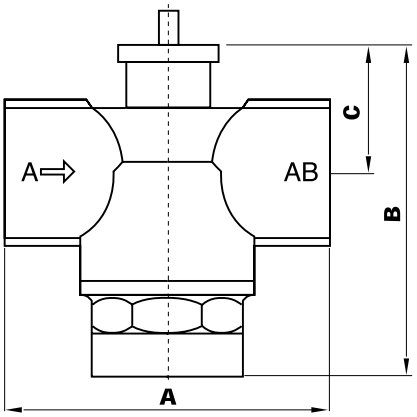
Overall dimensions (mm)

VU02



ND	A	B
3/4”	78	61
1”	83	61

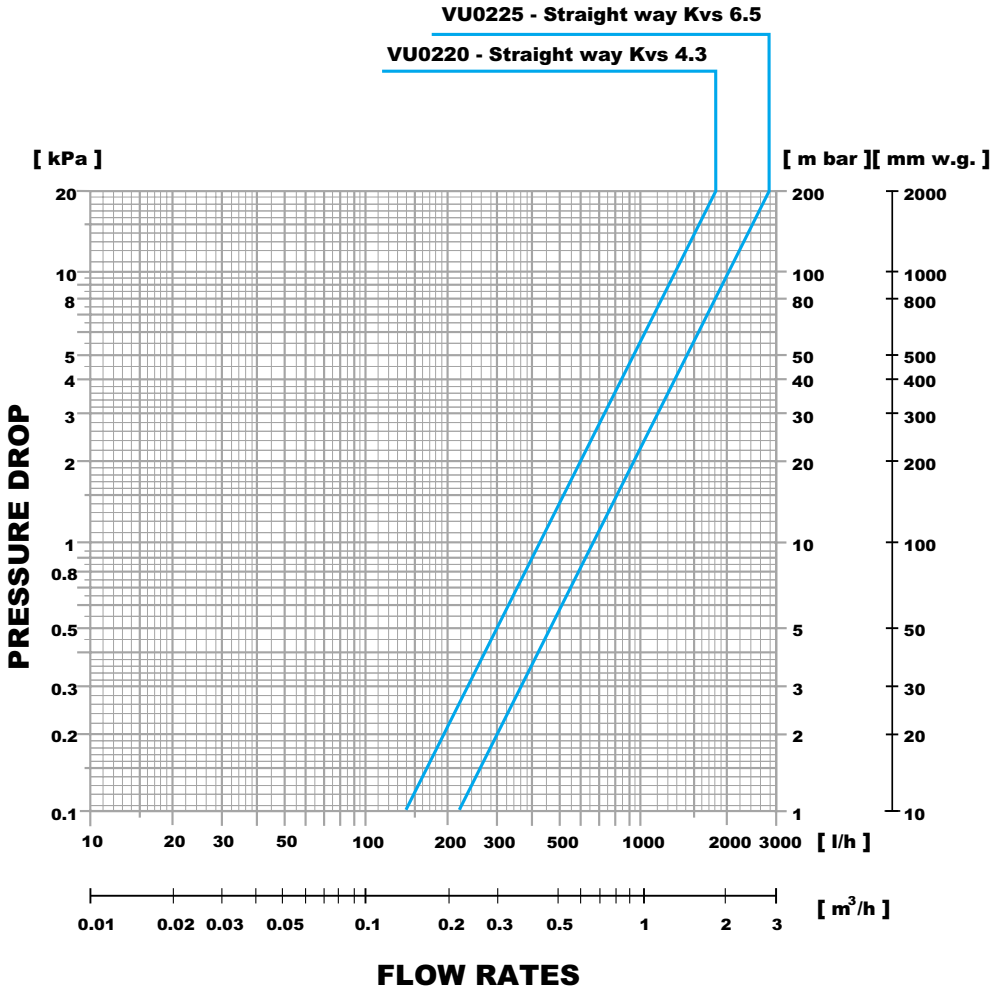
VU3



ND	A	B	C
3/4”	78	77	30
1”	83	77	30

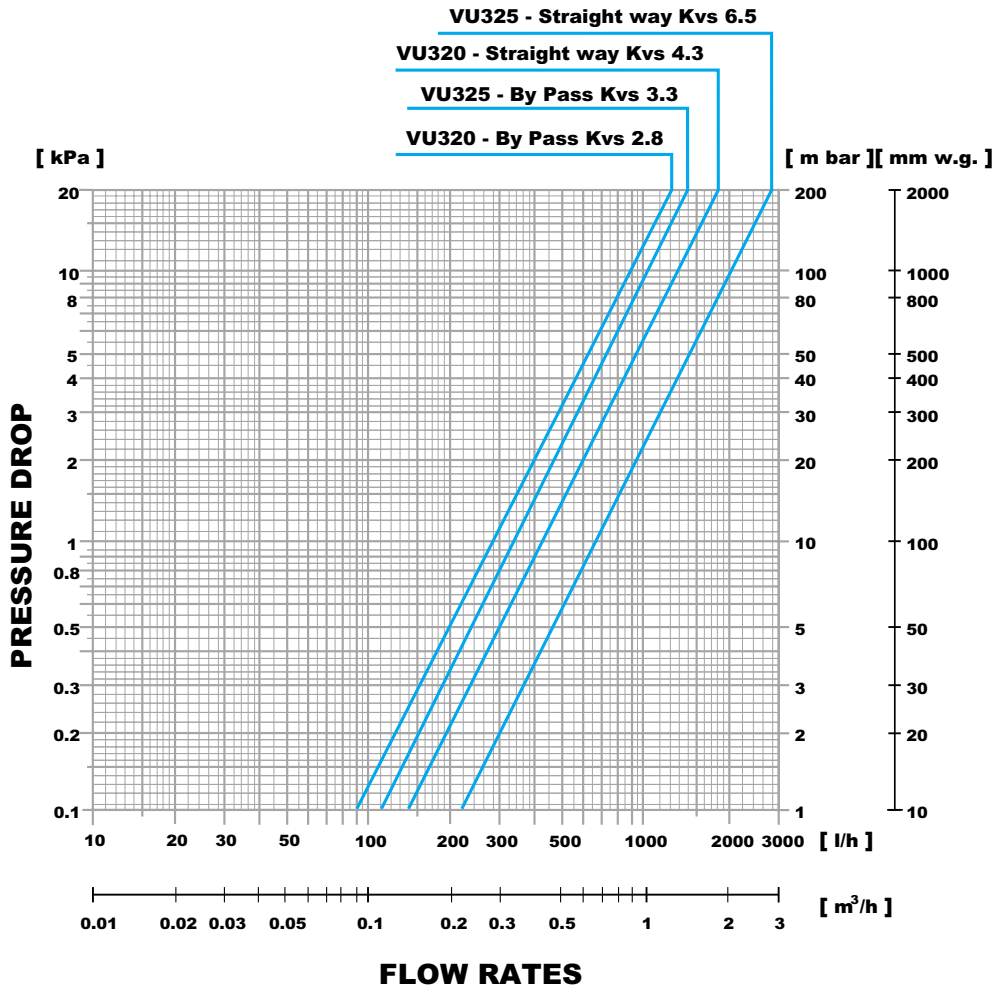
Flow rate/pressure drop charts

VU0220 ND 3/4" - VU0225 ND 1"



Flow rate/pressure drop charts

VU320 ND 3/4" - VU325 ND 1"



Product range Watts Industries

- System disconnectors
- Backflow protection devices
- Check valves
- Safety units
- Safety relief valves
- Pressure reducing valves
- Automatic control valves
- Butterfly valves
- Shut off valves
- Measuring gauges
- Temperature control
- Expansion vessels
- Process switches
- Fuel products
- Gas products
- Electronic controls
- Installation protection products
- Radiator valves
- System products
- Manifolds and fittings

WATTS INDUSTRIES
Technology by nature

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Re-order no. 69-0020-UK-IT/1-06-01-Rev.0

Thermostatic mixing valve
Aquamix Series 61C - 62C - 61CM

Main features

- Available with male and female connections
  - 2 ranges of adjustment (32-50 °C / 42-60 °C)
  - 4 setting positions
- In accordance with following standards:
  - UNI 9753/90 "Control valves for heating systems"
  - BSI 1415 British standards (Anti-scalding safety)

WATTS INDUSTRIES

Technology by nature

Description

The thermostatic mixing valves **Aquamix Series 61C, 62C** and **61CM** are offered in versions with male and female connections as well as 4 setting positions. The valve body is made of brass nichel-plated on both inside and outside; moreover an inner teflon coating is provided in order to reduce scaling caused by hard water.
Each valve is provided with two mesh strainers which, when inserted inside the hot water (+) and cold water (-) ports avoid depositing of coarse particles thereby protecting valve operation.

61C

AQUAMIX.
Thermostatic mixing valve with 4 set positions. Anti-scald protection.
Setting range: 32°C ÷ 50°C. Max. differential pressure: 2 bar. Female connections.
Without internal check valves.

Type	Part No.	Size body	Kvs	Weight (g)
61C	6109C12	1/2"F	1.5	630
61C	6110C34	3/4"F	1.9	550
61C	6111C1	1"F	2.1	650

61CM

AQUAMIX.
Thermostatic mixing valve with 4 set positions. Anti-scald protection.
Setting range: 32°C ÷ 50°C. Max. differential pressure: 2 bar. Connections with male tailpieces. Without internal check valves.

Type	Part No.	Size body	Kvs	Weight (g)
61CM	61CM12	1/2"M	1.5	710
61CM	61CM34	3/4"M	1.9	640
61CM	61CM1	1"M	2.1	730

62C

AQUAMIX
Thermostatic mixing valve with 4 set positions. Anti-scald protection.
Setting range: 42°C ÷ 60°C. Max. differential pressure: 2 bar. Female connections.
Without internal check valves.

Type	Part No.	Size body	Kvs	Weight (g)
62C	6209C12	1/2"F	1.5	630
62C	6210C34	3/4"F	1.9	550
62C	6211C1	1"F	2.1	650

Technical features	
Max. temperature, primary circuit	100 °C
Max. operating pressure	10 bar
Max. differential pressure	2 bar
N° of setting positions	4
Anti-scald safety	BSI 1415
Liquids which can be used	Water

Design features	
Valve body	a) brass, chrome-plated on inside and outside
	b) internally coated with scale-preventing teflon
Thermostatic element	Based on expansion of solid element
Springs	Stainless steel
Plug	Brass

Application

The **Aquamix** valves are used in domestic hot water distribution mains in order to keep a constant temperature of the mixed water against variation in the temperature of the hot water coming from the water heater, in accordance with Italian Decree DPR 412/93 which specifies the compulsory requirement to distribute domestic hot water with a maximum temperature of 48 °C (tolerance + 5 °C). The setting ranges of valves **Series 61C, 62C** and **61CM** allow direct mixing of hot water produced in the water heater (instantaneous or storage type) with cold water from the water main (to the water user at 36 - 38 °C) or obtaining higher values when used as premixer (42 - 50 °C) with consequent final mixing at the domestic water taps.

Operation

Operation is automatic and takes place through a heat-sensitive element inserted in the valve body which, upon coming into contact with the mixed water, either expands or contracts, thus regulating the inlet, with proportional action, of hot and cold water from the side ports in relation to the set value. If there is accidental failure of the cold

water, the valve is provided with a thermal stop device which promptly intervenes to close the disc in order to prevent hot water from entering. Thus it is not possible to emit unmixed water with consequent risk of scalds, and therefore the valve meets requirements of the British Standards. See chart for the hydraulic characteristics of flow rate and pressure drops of the valves.

Setting

The valve setting, i.e. setting of the temperature of the mixed water, is performed by manually turning the graduated handwheel so that the number printed on the handwheel coincides with the reference mark embossed on the valve body. The numbers printed on the handwheel correspond to the temperatures indicated in **(Table 1)**. The valve is factory-set by using hot water at 70 °C and mains water at 15 °C. Variation in temperature of the water in the primary circuit causes a deviation (* 2 °C) to the set values **(Table 2)**. Likewise a variation in pressure between P1 and P2 **(See installation diagrams)** exceeding 2 bar could cause dif-ferences; hence it is recommended to provide the circuit with a balancing valve (STAND type) at the cold water inlet port so as to create the same drop in pressure as occurs when the water flows through the heat exchanger. In order to prevent tampering, the handwheel can be locked in the required setting position as shown in **Pictures 1-2-3**. The reliability of the thermostatic mixing valves **Aquamix Series 61C, 62C** and **61CM** is ensured by 100% testing of the production.

Tab. 1

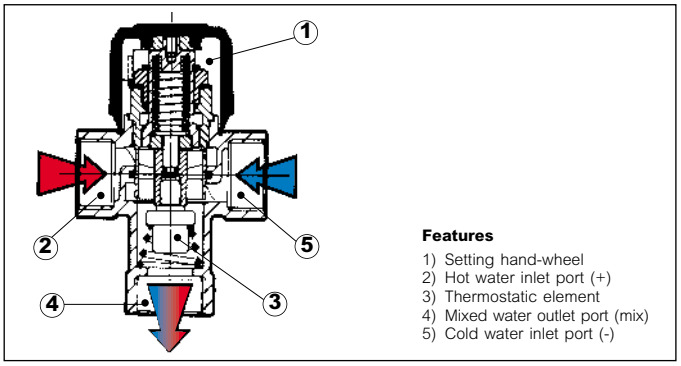
Type	1	2	3	4
61C-61CM	32°	38°	44°	50°
62C	42°	48°	54°	60°

Tab. 2

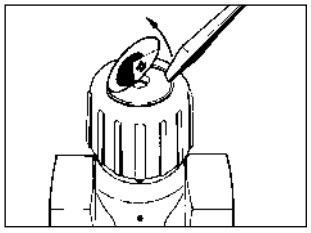
Water, primary circuit	Setting positions			
°C	1	2	3	4
50	30	36	42	48
60	31	37	43	49
70	32	38	44	50
80	33	39	45	51
90	34	40	46	52

Installation

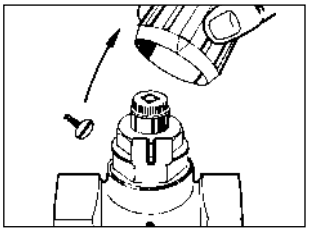
Choice of the thermostatic mixing valves **Aquamix Series 61C, 62C** and **61CM** depends on the SIZE of the connecting piping. The valve can be installed on iron pipes **(Series 61C and 62C)**, copper and plastic pipes **(Series 61CM)** in any position (vertical or horizontal). The valves are designed for periodic maintenance of the internal components in order to remove any scaling without use of solvents and without scratching the metal surfaces. The three ways should be shut off before maintenance. This type of maintenance could be avoided by installing a water softener before the hot water inlet.



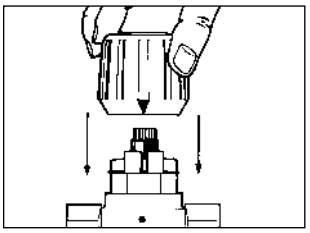
Features
1) Setting hand-wheel
2) Hot water inlet port (+)
3) Thermostatic element
4) Mixed water outlet port (mix)
5) Cold water inlet port (-)



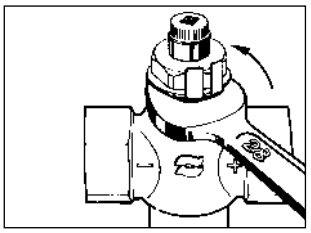
Pic. 1 Remove the label using a screw driver.



Pic. 2 Back-off the stop screw and lift out the handwheel being careful not to turn the control rod.



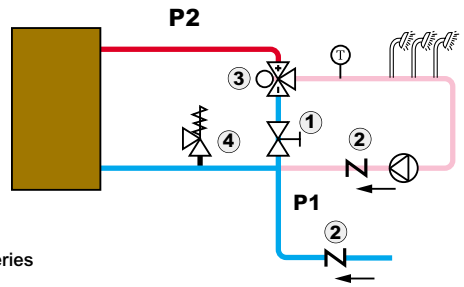
Pic. 3 Refit the handwheel so that the V reference corresponds to the embossed mark on the valve body. The handwheel is locked in this position.



Pic. 4 Using a 28 mm open-ended spanner, unscrew the valve cover and take out the thermostatic element - spring - disc assembly. Clean with water, then reassemble.

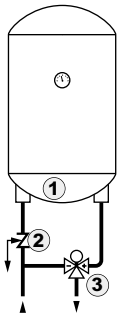
Installation diagrams, Aquamix valve

Domestic water systems with recirculation



1) Setting valve, STAND series
2) Check valve
3) Aquamix valve, 61C - 62C Series
4) Safety valve, MSL Series

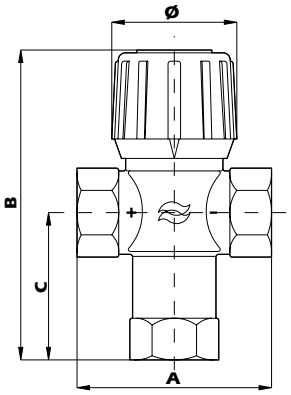
Water heat for domestic use



1) Water heater
2) Safety and check valve
3) Aquamix valve.

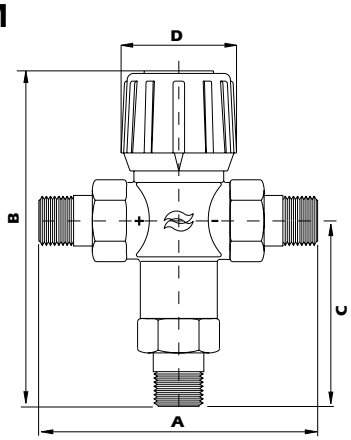
Overall dimensions (mm)

61C/62C



DN	A	B	C	Ø
1/2"	70	107	52	45
3/4"	70	107	52	45
1"	80	110	52	45

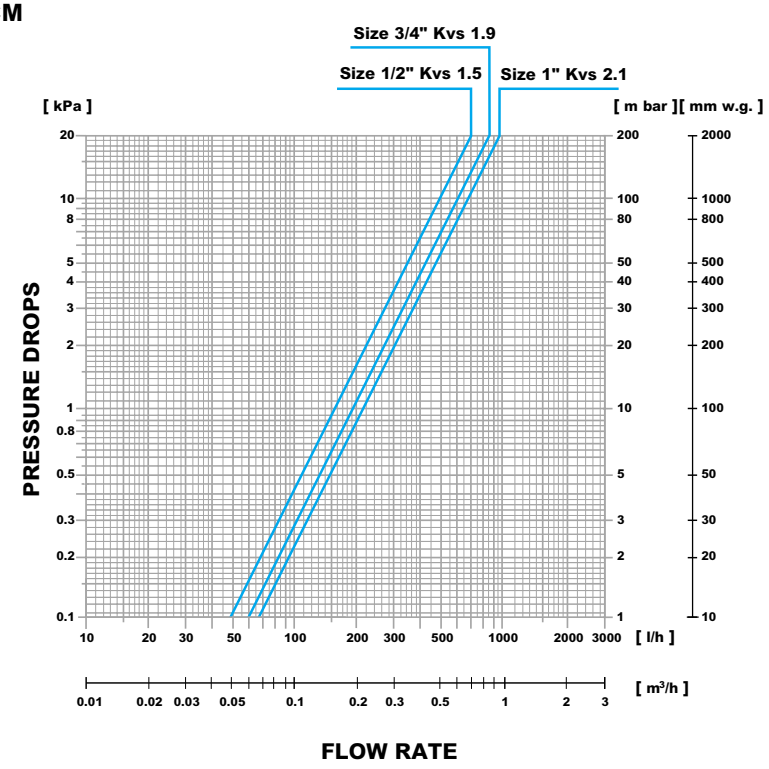
61CM



DN	A	B	C	Ø
1/2"	132	122	62	45
3/4"	136	123	66	45
1"	150	130	72	45

Flow rate/pressure drop charts

61C - 62C - 61CM



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www.wattsindustries.com

Re-order no. 69-0039-UK-IT/1-06-01-Rev.1

Thermostatic mixing valve Aquamix for radiant panel heating systems Series 63C

Main features

- Available in versions with :
  - FF head connections BSP (G) 3/4" and 1"
  - 4 setting positions
  - Low pressure drop
- In accordance with UNI 9753/90

WATTS INDUSTRIES

Technology by nature

Description

The **Aquamix** thermostatic mixing valve, **Series 63C**, is offered with female threaded connections and 10 setting positions.

The valve body is made of brass, chrome-plated, inside and out. The valve has a teflon coating inside which considerably reduces the amount of scaling caused by hard water.

Each valve is provided with two mesh strainers which, when fitted to the hot water (+) and cold water (-) ports avoid debris entering the valve thereby protecting valve operation.

63C

AQUAMIX.
Thermostat mixing valve **for radiant panel systems**.
With 10 set positions and fixed by-pass against over temperature.
Setting range: 25°C / 50°C. Max. differential pressure: 2 bar.

Type	Part No.	BSP (G)	Kvs	Weight (g)
63C	6310C34	3/4"F	1.9	550
63C	6311C1	1"F	2.1	650

Technical features	
Max. temperature	110 °C
Max. pressure	10 bar
Max. differential pressure	2 bar
N° of setting positions	10
Liquids which can be used	Water

Design features	
Valve body and inner parts	1) Brass, nichel-plated on inside and outside CW617N 2) Internally coated with scale-preventing Teflon
Thermostatic element	With solid-state expansion
Springs	Stainless steel
Disc	Brass

Application

The **Aquamix** valves are used to maintain a constant supply temperature to distribution headers for radiant panel heating systems.

The setting range of the valves in the **63C series**, allows for regulating the water temperature between 25° and 50 °C with a tolerance of ± 2 °C.

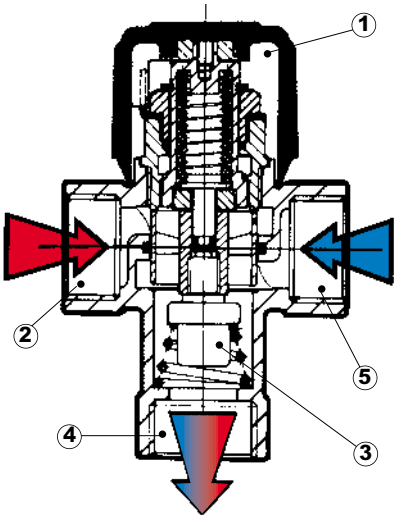
Operation

The operation is automatic. It is based on a heat-sensitive element inserted in the valve body, which, upon coming into contact with the mixed water regulates (with a proportional action) the hot water produced in the boiler and the return water from the radiant panels in accordance with the set temperature.

The valves have a bypass action across the cold water inlet and the mixed water outlet in order to avoid the risk of all the hot water produced by the boiler reaching the radiant panels in the case of failure of the thermostatic element.

However the fitting of a safety thermostat, to stop the pump, is strongly recommended to prevent dangerous overheating, e.g. by accidental tampering with the setting of the valves.

See charts for hydraulic flow rate and pressure drop characteristics of the valves.



Features

1) Setting hand-wheel
2) Hot water inlet port (+)
3) Thermostatic element
4) Mixed water outlet port (mix)
5) Cold water inlet port (-)

Setting

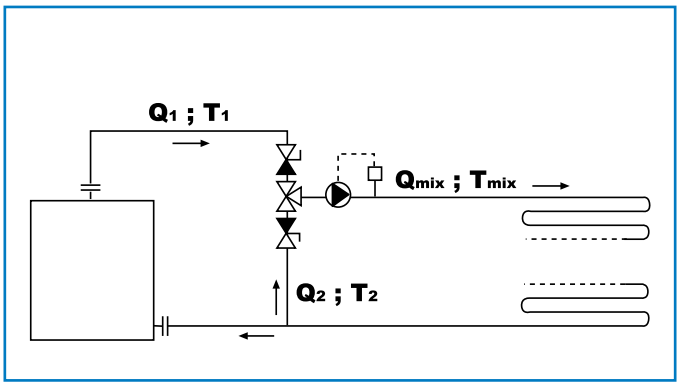
The valve setting, i.e. setting of the temperature of the mixed water feeding the radiant panel heating system, is obtained by manually turning the hand-wheel so that the number printed on the hand-wheel coincides with the reference mark embossed on the valve body.

The numbers stamped on the hand-wheel correspond to the temperatures given in **Table 1** : the valve is factory-set using hot water at 60 °C and mains water at 25 °C.

To prevent tampering, the hand-wheel can be locked in the required set position as shown in figures 1 - 2 - 3.

The reliability of the **Aquamix** thermostatic mixing valves, **Series 63C**, is ensured by 100% testing of the production.

Installation diagram, AQUAMIX valve for radiant panel heating systems



Tab. 1

Position	1	2	3	4	5	6	7	8	9	10
Setting °C	25	27.8	30.5	33.3	36	38.9	41.7	44.4	47.2	50

Installation

Choice of the **Aquamix** thermostatic mixing valves, **Series 63C**, depends on the nominal diameter of the connecting piping.

The valves can be installed in any position (horizontal or vertical).

The valves will require periodic maintenance of the internal components **(Fig.4)** in order to remove any scaling, without use of solvents and without scratching the metal surfaces. Before maintenance, isolate inlets and outlets.

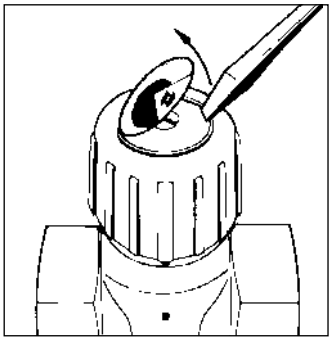


Fig. 1
Remove the label using a screwdriver.

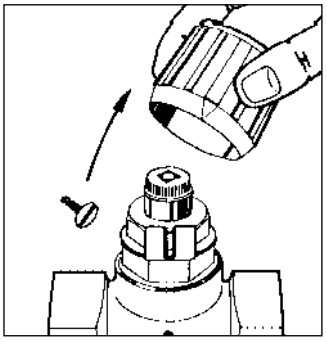
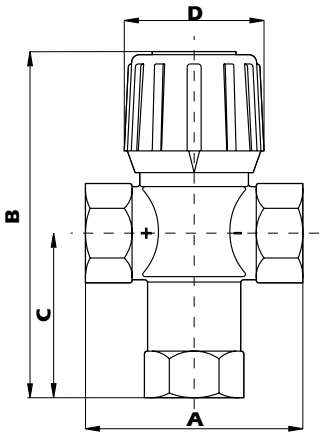


Fig. 2
Release the fixing screw and lift off the hand-wheel being careful not to turn the control spindle.

Overall dimensions (mm)

63C



DN	A	B	C	D
3/4”	70	107	52	45
1”	80	110	55	45

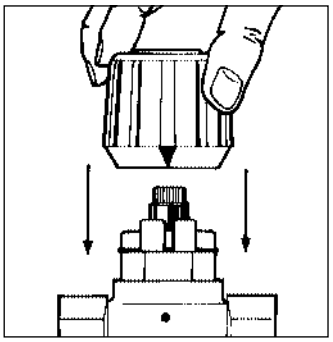


Fig. 3
Fit the hand-wheel back in place so that the V reference mark coincides with the embossed mark on the valve body. The hand-wheel is locked in this position.

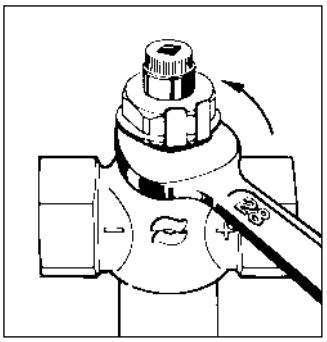
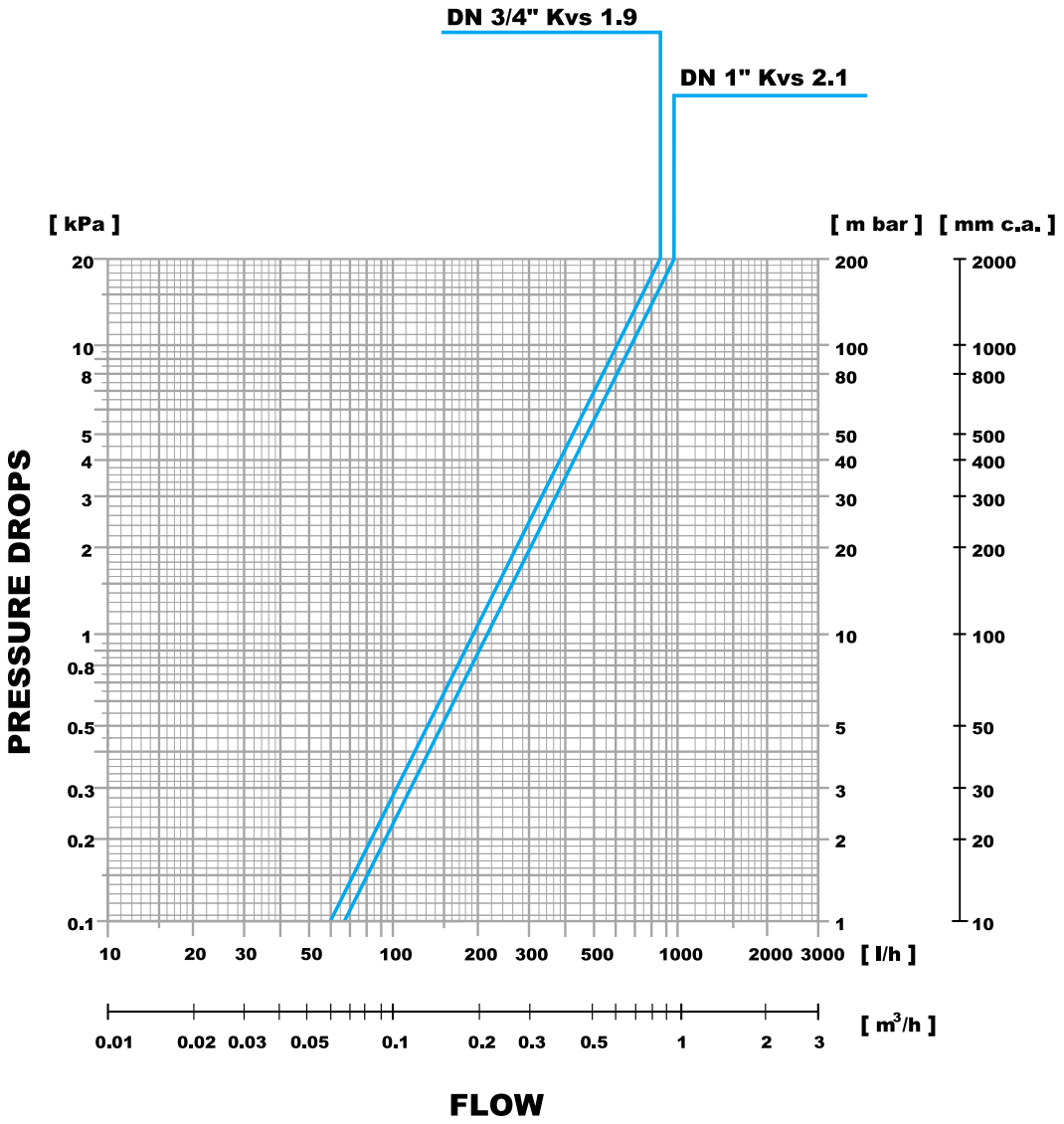


Fig. 4
Using a 28 mm open-ended spanner, unscrew the valve cover and take out the thermostatic element-spring-disc assembly : clean with water, then reassemble.

Flow rate/pressure drop charts

Max. opening **DN 3/4" - DN 1"**



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e-mail : info@wattsindustries.it
www.wattsindustries.com

Re-order no. 69-0040-UK-IT/1-05-11-Rev.1

Remote thermal units for centralized combustion systems DOMO*CAL* Series

Main features

- Full autonomy in choice of activation times and room temperature of the heating system; no limits on the quantity and quality of domestic hot water (DHW)
- Cost allocation on instantaneous consumption basis
- High level of energy efficiency and safety: no flue ducts or flames in the domestic environment
- Primary fluid setting device
- Built-in equalization device
- Low running costs, no noise

WATTS INDUSTRIES

A Division of Watts Water Technologies Inc.

Description

The multi-function **DOMO*CAL*** thermal units are designed to control the heat supply, coming from a district heating station or produced by a conventional heating system, to the individual apartments, whether for space **heating** or **preparation of Domestic Hot Wate**r (DHW).

DOMO*CAL* feeds the heating circuit of each apartment and allows independent control of the room comfort level thanks to the action of a timing thermostat installed in the ambient, that actuates the zone valve incorporated in the unit.

Supply of the DHW produced by the heat exchanger is made available merely by turning the tap for hot water delivery.

Temperature of the hot water is controlled by a thermostatic mixing valve which holds it at the level chosen by the user. The devices and pipes making up the unit are factory-assembled and are inserted in a metal support structure which allows pendant installation.

All inlets and outlets are provided with shut-off valves and union fitting (three-piece): during installation, this allows preparing just the frame at first, then inserting the "body" of the unit at a later stage. Likewise it is easier for the heating system operator to carry out the required maintenance work and also full replacement of the unit when necessary.

The **DOMO*CAL*** thermal unit is equipped with a direct heat (hot/chilled) metering system, **approved by the PTB Institute of Berlin**, which allows subsequent allocation of the costs based on consumption, thus encouraging a more rational use of energy with consequent energy instant savings. The thermal energy drawn from the primary network (user consumption) is measured with great accuracy by a meter whose data/consumption reading is concentrated, transmitted and processed.

The system is also provided with a meter for the drawing off cold mains water.

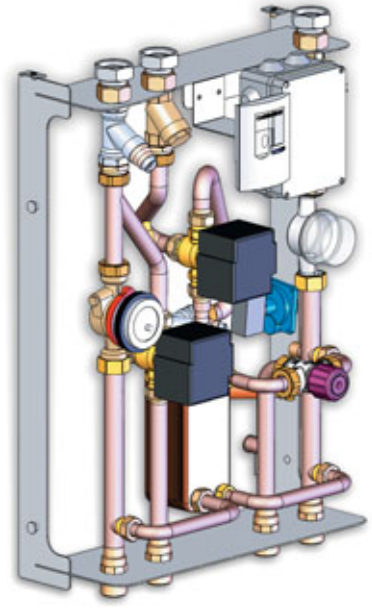
DOMO*CAL*

Wall mounting thermal unit with functions of distribution, control and billing of the thermal energy used in each single apartment for space **heating** and for **production of domestic hot water**. Control of individual room comfort level.

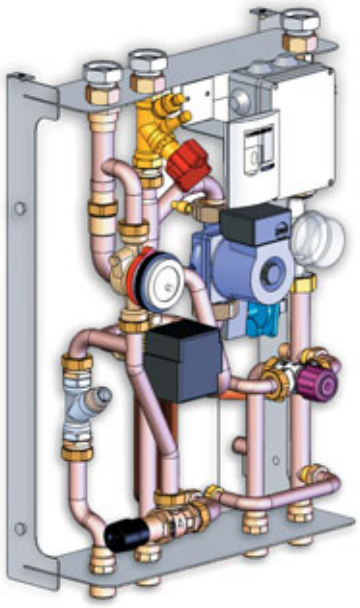
Safety in the apartments is always guaranteed as DOMO*CAL* eliminates the presence of combusted gas inside the home as well as installation of flue ducts.

Type	Part no.	Description
DOMO*CAL*	DCA-2B	Basic model
DOMO*CAL*	DCA-BP2	Model with electric pump and hydraulic equalizer
DOMO*CAL*	DCA-RR2B	Basic model for hot/cold distribution
DOMO*CAL*	DCA-RRBP2	Model with electric pump for hot/cold distribution

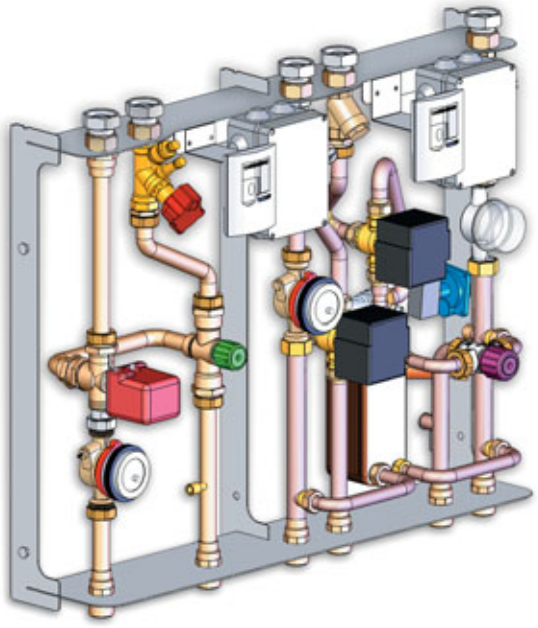
DCA-2B
Unit for distribution of fluid to heating system with radiators and DHW production.



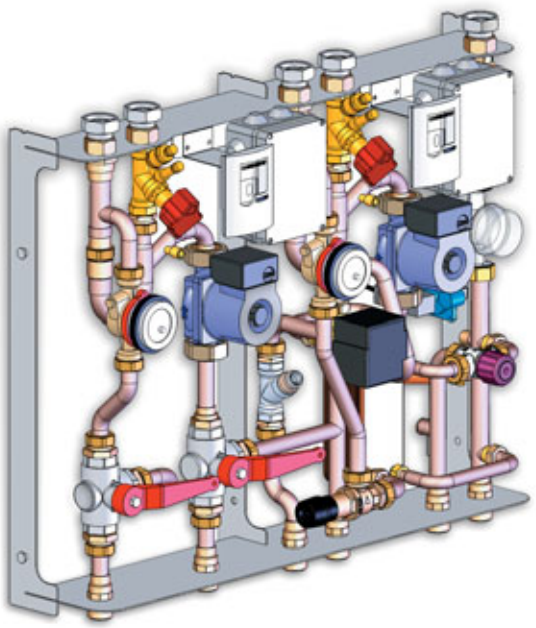
DCA-BP2
Unit for distribution of fluid to heating system with radiators **plus electric pump** and DHW production.



DCA-RR2B
Unit for **distribution of hot/cold fluid to radiators and fan-coils.**
Housed in closed frame.



DCA-RRBP2
Unit for **distribution of hot/cold fluid to radiators and fan-coils with two distinct electric pumps and DHW production**.
Housed in closed frame.



Note: These basic versions are set-up in various configurations thus offering different choice during assembly and positioning: the versions can be mounted either pendant, flush or in the inner courtyard with the unit visible, partially closed by a frame or fully enclosed by a cover.

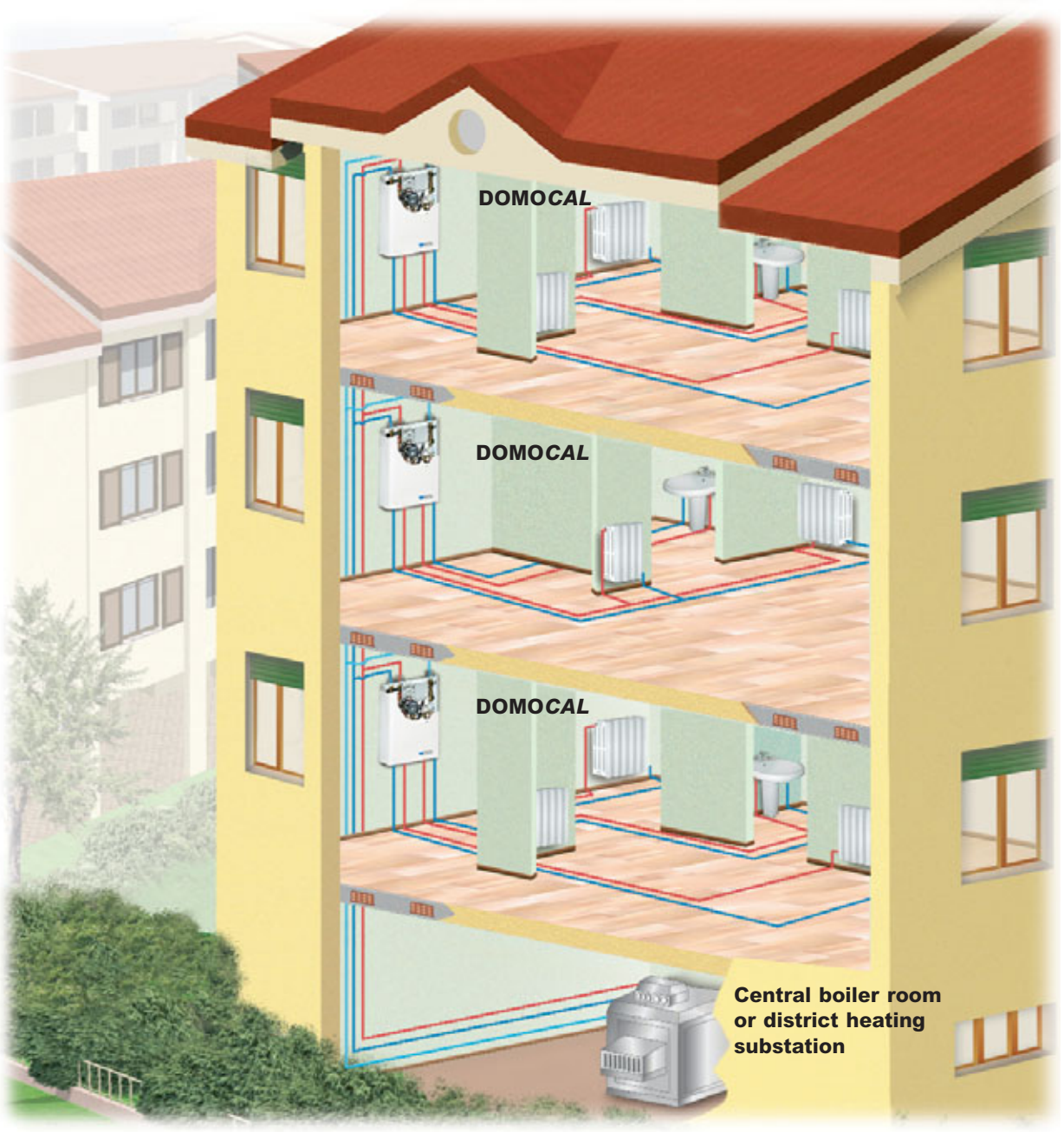
Application

Systems built up with **DOMO*CAL*** thermal units are mainly designed for multi-family buildings. However they can also serve semi-detached houses, district heating or in all those cases where it is possible to produce heat in just the one well-structured central boiler room (optimized climate control) with high levels of seasonal efficiency as in accordance with Italian Legislative Decree D.lgs. 192/2005, but always offering freedom in use to the consumer.

These installations are characterized by a horizontal main laid in the basements or in an underground passage originating from the central boiler room and branching into columns where the stairs or various service rooms are located. Hence the **DOMO*CAL*** thermal units can be positioned close to the building, preferable in the common parts of the building for easier access by the system operator and also not to cause inconvenience to the tenant.

The primary distribution network supplies all remote units with the fluid at the preset temperature and flow rate, substantially constant throughout the year.

Therefore systems with **DOMO*CAL*** thermal units offer a highly advanced technological solution while they ensure room comfort in terms of heat and improved safety. Moreover they allow boilers of lower power rating to be installed in the central boiler room.



Conditions of supply of primary main fluid and performance levels of the heat exchangers

The essential function of the primary mains is that of ensuring the transfer, through appropriate flow of the work fluid, of the heat energy produced in the central boiler room to the various **DOMO*CAL*** units.
The circuit can also be requested to perform the non secondary function of inertial accumulator to cater for part of the considerable heat requirement peaks (DHW) and hence to reduce the power ratings of the boilers with consequent lower costs and improved efficiency.

In order to determine the minimum necessary conditions for supply of the running fluid, define flow rate, diameters, pressure drops, temperature and dimensioning of the primary network, see the design specifications contained in the **"Latest generation systems " Manual which can be requested from Watts Industries**.

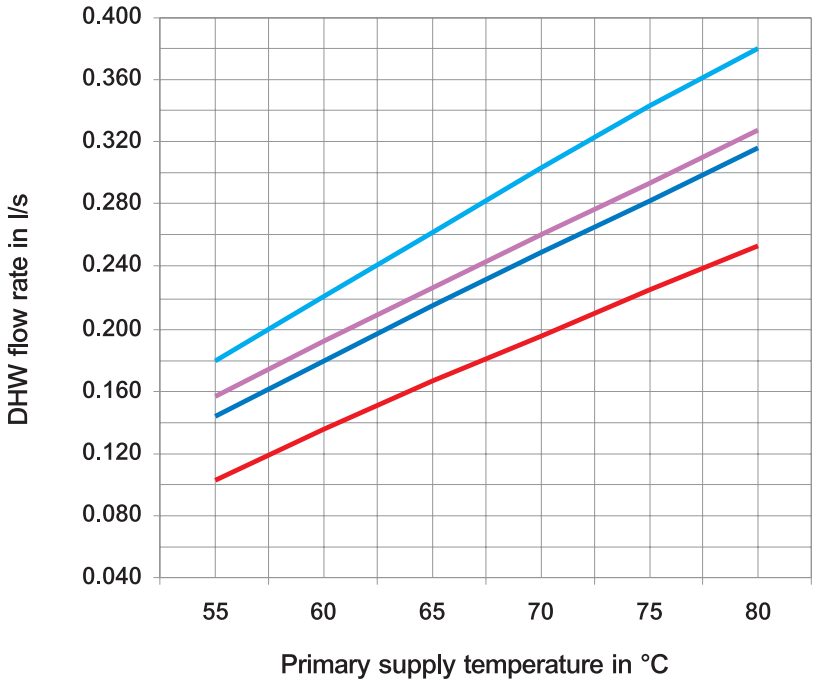
However, the performance range offered by **DOMO*CAL*** is so wide and can be modified at a later date that a basic primary flow rate is fixed initially for all units, leaving the necessary adaptations to a subsequent setting phase of the devices.

This flow rate should be selected according to the most important heat requirement, which is that of DHW production and at the required supply temperature of the mixed water.

On this basis, reference should be made to the table attached to this document, with the thermal performance levels of the 30-plate heat exchangers common to all **DOMO*CAL*** units.
Design flow rates of less than **1 m³/h** of primary fluid are well able to meet the DHW needs for medium-large apartments and **they are appreciably higher than those supplied by normal independent boilers**; moreover they allow good performance levels also in presence of very low primary supply temperatures (55-60 °C).

For example, from the chart below we can deduce that with a primary flow rate of **0.8 m³/h** at a temperature of 75°C we shall obtain a total of **0.24 l/s** (14.4 l/min) **of DHW** with **Δt 36K**.

*Performance levels, DHW heat exchanger, **30 plates***
*with primary flow rate equal to **0.800** **m³/h**; typical with pump on curve 1*



DHW from 10 to 46 °C winter conditions, high level
DHW from 12 to 42 °C summer conditions, high level
DHW from 10 to 40 °C nominal winter conditions
DHW from 15 to 46 °C nominal summer conditions

PERFORMANCE DATA OF THE 30-PLATE HEAT EXCHANGER - Use of the table :

To calculate the performance data, proceed to identify the line corresponding to the values of flow rate Gp and temperature T1 of the primary fluid. Then identify the column headed by the characteristic change in temperature for the DHW production where the theoretical flow rate supplied can be read.
for example, we have a primary flow rate Gp = 0.8 m3/h with a temperature T1 equal to 75°C we shall have (column 3) a theoretical DHW production equal to 0.31 l/s, heated from 10°C (water main temperature) to 40°C (temperature of domestic water supply) and a primary return temperature T2 (column 3) of 32.3°C and power output Q (column 3) of 39.8 kW.

PRIMARY FLUID CHARACTERISTICS										DHW PRODUCTION			
		1		2		3		4		1	2	3	4
									t1	10°C	12°C	10°C	15°C
									t2	46°C	42°C	40°C	40°C
G_p m³/h	T1 in °C	T2 out °C	Q kW	T2 out °C	Q kW	T2 out °C	Q kW	T2 out °C	Q kW	G_{ACS} l/s	G_{ACS} l/s	G_{ACS} l/s	G_{ACS} l/s
0,6	80	32,6	33,1	31,0	34,2	29,3	35,4	31,0	34,2	0,21	0,27	0,27	0,32
0,7	80	34,3	37,2	32,6	38,6	30,9	40,0	32,5	38,7	0,24	0,30	0,31	0,36
0,8	80	35,8	41,1	34,0	42,8	32,4	44,3	33,8	43,0	0,27	0,33	0,34	0,40
0,9	80	37,1	44,9	35,3	46,8	33,7	48,5	35,0	47,1	0,29	0,36	0,38	0,44
1,0	80	38,3	48,5	36,4	50,7	34,8	52,6	36,1	51,1	0,31	0,39	0,41	0,48
1,1	80	39,4	51,9	37,5	54,4	35,9	56,4	37,1	54,9	0,34	0,42	0,44	0,51
0,6	75	32,9	29,4	31,2	30,6	29,4	31,8	31,1	30,7	0,19	0,24	0,25	0,29
0,7	75	34,5	33,0	32,6	34,5	30,9	35,9	32,4	34,6	0,21	0,27	0,28	0,33
0,8	75	35,9	36,4	34,0	38,2	32,3	39,8	33,7	38,5	0,24	0,30	0,31	0,36
0,9	75	37,1	39,7	35,1	41,7	33,5	43,5	34,8	42,1	0,26	0,33	0,34	0,39
1,0	75	38,3	42,7	36,3	45,1	34,6	47,0	35,8	45,6	0,28	0,35	0,37	0,43
1,1	75	39,3	45,7	37,2	48,3	35,7	50,3	36,8	48,9	0,30	0,38	0,39	0,46
0,6	70	33,2	25,7	31,3	27,0	29,5	28,3	31,1	27,1	0,17	0,21	0,22	0,25
0,7	70	34,7	28,7	32,7	30,3	31,0	31,8	32,4	30,6	0,19	0,24	0,25	0,29
0,8	70	36,0	31,6	34,0	33,5	32,2	35,1	33,6	33,9	0,21	0,26	0,27	0,32
0,9	70	37,2	34,4	35,1	36,6	33,4	38,3	34,6	37,0	0,22	0,29	0,30	0,35
1,0	70	38,2	37,0	36,1	39,5	34,4	41,4	35,6	40,1	0,24	0,31	0,32	0,38
1,1	70	39,1	39,5	37,0	42,2	35,4	44,3	36,4	43,0	0,26	0,33	0,35	0,40
0,6	65	33,7	21,8	31,5	23,3	29,7	24,6	31,2	23,6	0,14	0,18	0,19	0,22
0,7	65	35,1	24,4	32,9	26,2	31,1	27,6	32,4	26,5	0,16	0,21	0,22	0,25
0,8	65	36,2	26,8	34,0	28,9	32,2	30,5	33,5	29,3	0,17	0,23	0,24	0,28
0,9	65	37,3	29,0	35,0	31,4	33,3	33,2	34,4	32,0	0,19	0,25	0,26	0,30
1,0	65	38,2	31,1	35,9	33,8	34,3	35,8	35,3	34,5	0,20	0,27	0,28	0,33
1,1	65	39,1	33,2	36,8	36,1	35,1	38,2	36,1	36,9	0,22	0,28	0,30	0,35
0,6	60	34,8	17,6	31,9	19,6	30,0	20,9	31,4	20,0	0,12	0,15	0,16	0,19
0,7	60	35,6	19,9	33,1	21,9	31,2	23,4	32,5	22,4	0,13	0,17	0,18	0,21
0,8	60	36,6	21,7	34,1	24,1	32,3	25,8	33,5	24,7	0,14	0,19	0,20	0,23
0,9	60	37,6	23,5	35,0	26,1	33,3	28,0	34,3	26,9	0,15	0,21	0,22	0,25
1,0	60	38,4	25,1	35,9	28,1	34,1	30,1	35,1	28,9	0,16	0,22	0,24	0,27
1,1	60	39,1	26,7	36,6	29,9	34,9	32,1	35,8	30,9	0,18	0,24	0,25	0,29
0,6	55	35,4	13,7	32,4	15,8	30,4	17,2	31,7	16,3	0,09	0,12	0,14	0,15
0,7	55	36,4	15,1	33,4	17,6	31,5	19,1	32,7	18,2	0,10	0,14	0,15	0,17
0,8	55	37,3	16,4	34,4	19,2	32,5	21,0	33,5	20,0	0,11	0,15	0,17	0,19
0,9	55	38,1	17,7	35,2	20,8	33,3	22,7	34,3	21,7	0,12	0,16	0,18	0,20
1,0	55	38,8	18,8	35,9	22,2	34,1	24,3	35,0	23,3	0,12	0,18	0,19	0,22
1,1	55	39,4	19,9	36,5	23,6	34,8	25,9	35,6	24,8	0,13	0,19	0,20	0,23

The DHW temperature supplied by the unit is always controlled by the AQUAMIX mixing valve which ensures a supply at constant temperature levels set between 32 and 50 °C.

Operation

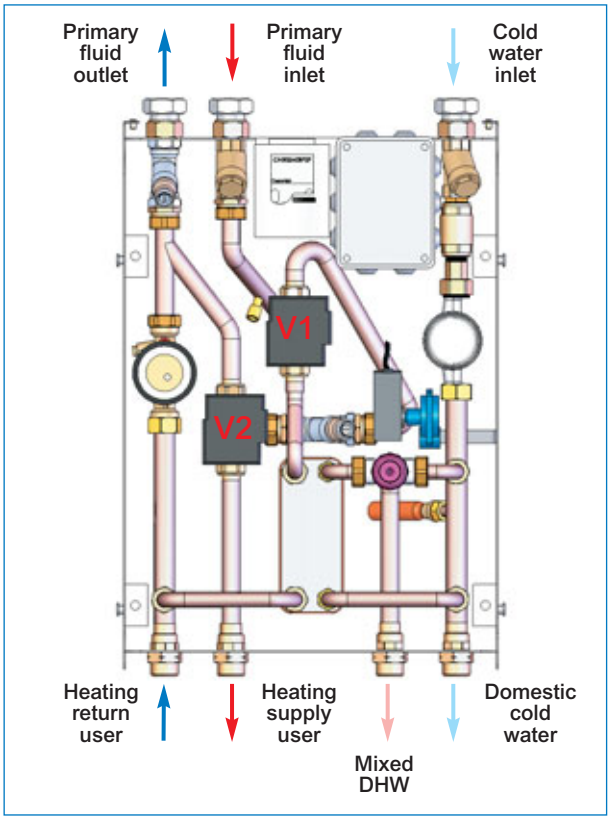
DOMOCAL Series DCA-2B

Domocal Series DCA-2B, is the basic version of the thermal unit range offered by Watts Industries.
Domocal Series DCA-2B allows using the heat transfer fluid coming from the primary network to distribute it directly (V2) to the user for the purpose of heating the apartment or else to divert it via an automatic three-way priority valve DN20 (V1) with on/off action to a plate heat exchanger for domestic hot water (DHW) production.

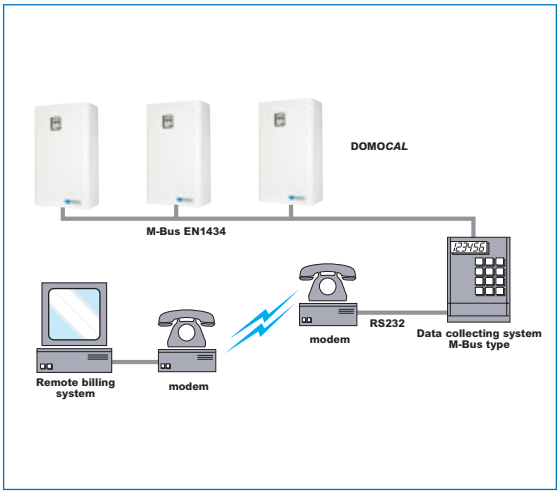
The primary fluid head at the inlet to the unit should also include the driving energy (min. 36kPa) required to feed the local heating system.

The supply temperature to the domestic hot water user is controlled by a thermostatic control valve (AQUAMIX) which mixes the hot water flowing out from the heat exchanger and ensures a supply with constant temperature levels settable in the range from 32 to 50 °C, with the water coming from the water mains.

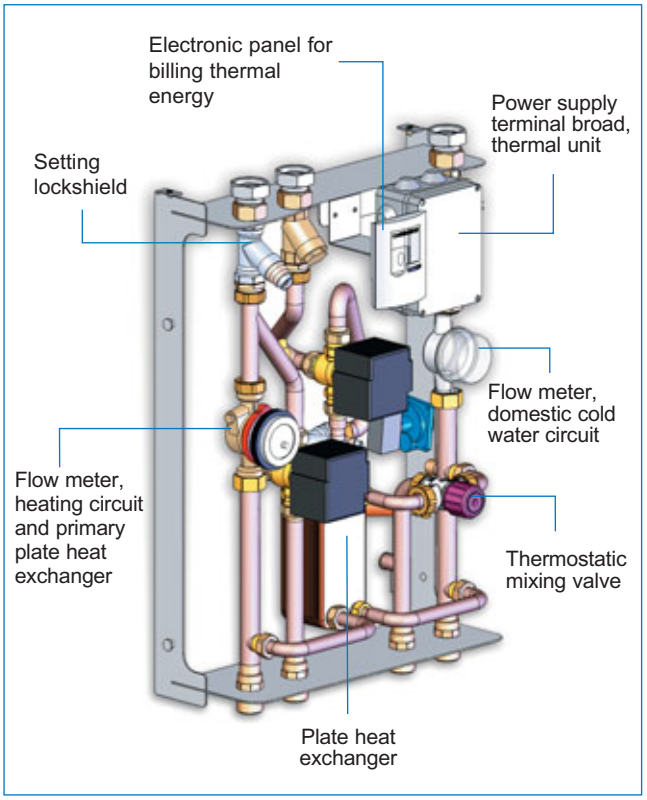
The control logic ensures the **priority given to the DHW production** via a quick-acting switching valve (V1) and the thermal output available to the heat exchanger is used for this purpose.



The **DOMOCAL Series DCA-2B** Unit is provided by a thermal energy meter consisting of a flow meter (Art. WMT DN20) complete with immersion probes on the supply and return lines, designed in accordance with current European standards and approved by PTB of Berlin, for billing the user's instant consumption for heating, and a LCD-panel **(Art. CA502M)** on which can be shown the operating parameters and monthly consumption data stored during the last 36 months.



For easier control of the individual Units, the CA502M panel is provided with serial output for centralized reading of the consumption levels through M-bus concentrators (Art. DR000) complying with EN1434 standard. DOMOCAL Series DCA-2B has provision for **optional mounting** of a flow meter suitable for measuring domestic water consumption.



Functional hydraulic diagram

DOMO*CAL* Series DCA-2B can automatically be configurated according to the different needs :

• Mode of operation in presence of DHW demand

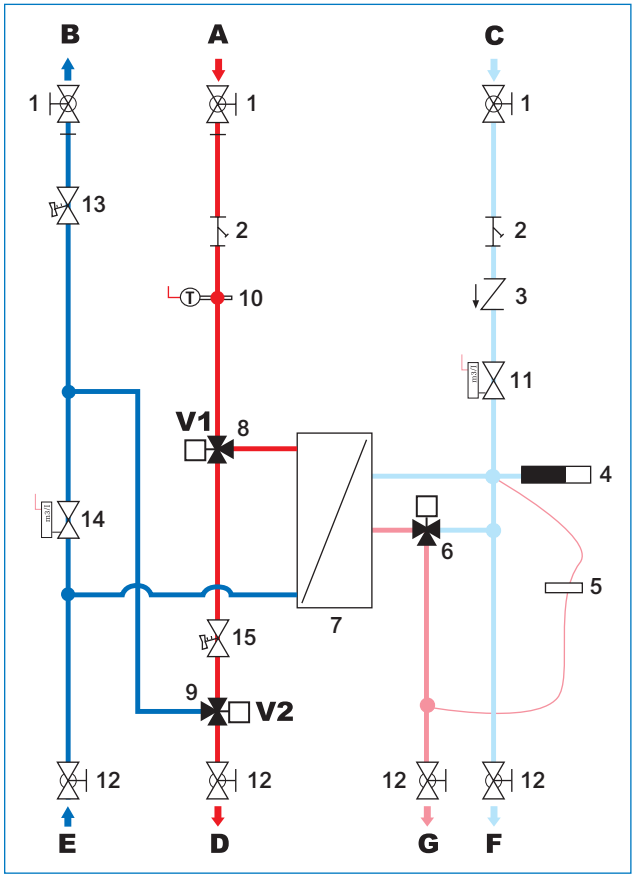
When taps are opened for drawing off DHW, this mode remains activated throughout the entire period of drawing off hot water and has priority over any demand for space heating. The device determining this state consists of a differential pressure switch, acting as flow sensor which sets and holds diverter valve (V1) installed on the primary supply line, for full flow feeding of the primary circuit of the heat exchanger. The flow rate of this fluid is measured by the volumetric sensor of the thermal energy meter installed on the return line of the primary fluid.

• Mode of operation with demand for heating but no DHW demand

The thermostat (ON) controlling the room temperature determines the opening of diverter valve (V2) thus allowing the primary flow, which has already passed through valve (V1), to feed the distribution circuit of the various radiators connected. The return of the system is directly conveyed to the RETURN port of the primary fluid where the flow is measured by the volumetric sensor of the thermal energy meter.

• Mode of operation with no demand for heating or DHW

The unit is “at rest” when the room thermostat, which does not require heat (OFF), determines the closing of diverter valve (V2) thus conveying the primary flow, which has already passed through diverter valve (V1), directly to the general RETURN port. Hence there is no flow through the volumetric sensor which could otherwise generate an appreciable error in measurement over the long term.



Legend

A Inlet, primary fluid
B Outlet, primary fluid
C Inlet, domestic cold water (from water main)
D Supply to heating system
E Return from heating system
F Outlet, domestic cold water
G Outlet, domestic hot water (mixed)

1 Ball valve MF, (1”) with swivel nut
2 Mesh strainer DN 20
3 Check valve (3/4”)
4 Water hammer arrestor
5 Differential pressure switch
6 Thermostat mixing valve AQUAMIX (3/4”) for DHW
7 DHW 30-plate heat exchanger
8 V1 diverter valve (3/4”) for priority of domestic hot water
9 V2 diverter valve (3/4”), control of heating system
10 Supply probe for thermal energy meter (heating system)
11 Flow meter WMT DN 20 complete with probe for domestic cold water
12 Ball valve MF, (3/4”)
13 Balancing valve STK (3/4”) kvs=4.5
14 Flow meter WMT DN 20 complete with probe for thermal energy meter
15 Balancing valve for calibrating flow of the heating system STK (3/4”) kvs = 4.5

Nameplate data (DCA-2B)	
Maximum temperature of hot fluid at inlet	90 °C
Maximum operating pressure (static)	8.0 bar
Nominal temperature of hot fluid at inlet	75 °C
Nominal flow rate of primary fluid	1.0 m^3/h
Nominal head across inlets of the primary fluid	36 kPa
Nominal flow rate of hot fluid at outlet (heating)	0.7 m^3/h
Nominal head of hot fluid at outlet (heating)	17 kPa
Nominal power, heating with thermal gradient 15K	12 kW
Nominal flow rate of DHW	0.21 l/s
Nominal temperature of DHW	46 °C
Nominal power for DHW preparation	32 kW
Adjustable outlet temperature	32 - 50 °C
Heat exchange surface, plate heat exchanger	0.33 m^2
Power supply	230 Vac-50 Hz
Current drawn	0.1 A

Passive hydraulic characteristics	
Primary circuit in DHW preparation	Kv = 1.70
Primary circuit in heating system	Kv = 1.72
Primary circuit in by-pass (unit in rest mode)	Kv = 1.58
Domestic hot water circuit	Kv = 1.3
Domestic cold water circuit	Kv = 3.40

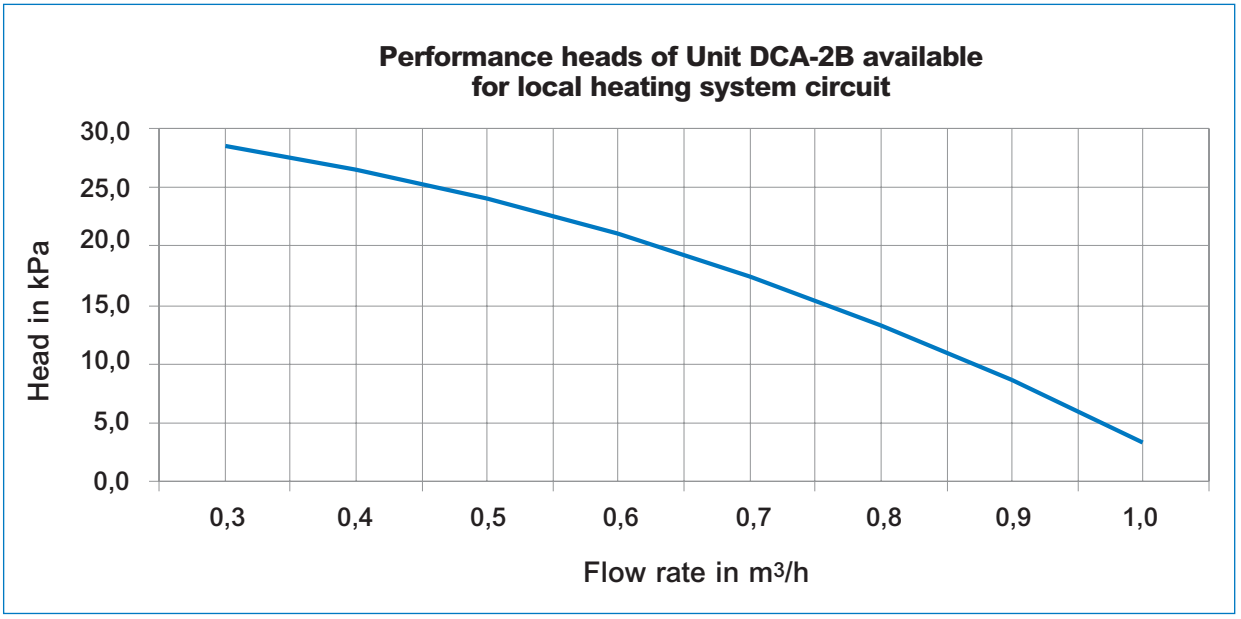
Residual performance heads

The following diagram shows the residual heads of the **DCA-2B Unit** available for the local heating system circuit.

This graph is valid when the unit is fed at the inlets by a head of 36 kPa. If a greater residual head is required, increase the head at the inlets in proportion.

Instead, when the pressure to the unit is greater than the required pressure (thermal units more favoured), compensate excess pressures with the balancing valve (10 see functional diagram).

Bear in mind that the instant flow rate circulating in the heating circuit and in the DHW section, can be read directly on the display of electronic panel **Art. CA502M**.



Flow rate in m^3/h	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
Head in kPa	28,5	26,6	24,0	21,0	17,4	13,3	8,6	3,3

Operation

DOMO*CAL* Series DCA-BP2

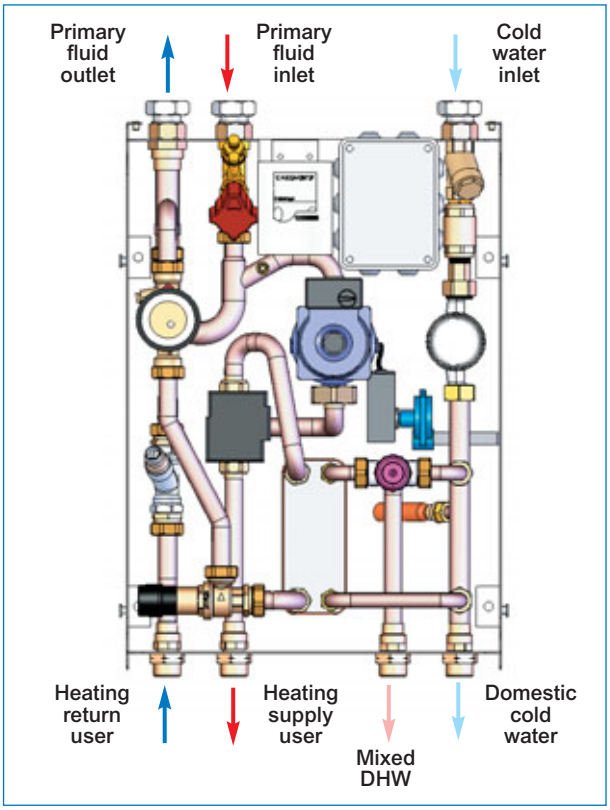
DOMO*CAL* DCA-BP2 is the most independent, reliable and powerful version of the series.

This unit retains the same characteristics and performance levels as the DCA-2B unit, to which there is the added possibility of supplying the heating system also when the characteristics of the primary distributions mains are temporarily lacking, by acting with the independent driving force (electric pump) to tap further quantities of fluid from the primary circuit.

The unit is equipped of a special equalization device controlled by a balancing valve which ensures a substantial stability of the primary circuit (by limiting the effect of the various Units connected to it) as well as considerable freedom in drawing off heat.

Use of the DCA-BP2 unit does not require any particular conditions of flow rate and residual head of the incoming primary fluid, except for the minimum necessary ones to feed the low pressure drop equalization section (2 kPa).

The two circuits, DHW supply and heating for the user, are served by a three-speed electrically driven pump, which, therefore, is adaptable to widely differing needs.

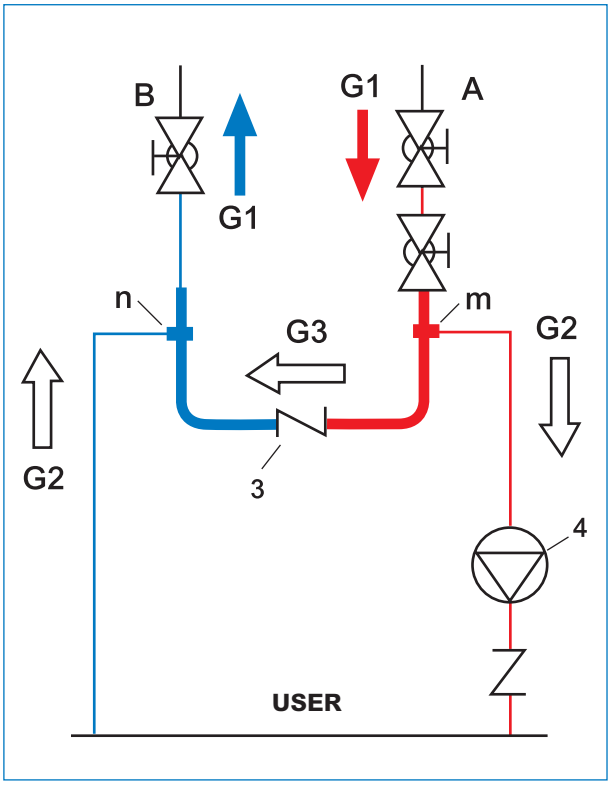


Hydraulic equalization device

The unit is separated from influences of the primary circuit by means of a special hydraulic equalization device which forms the main circuit element of the thermal unit.

This device has a flow rate coefficient not less than 4.5 kv and is provided with a device for controlling flow direction with constant pressure drop not exceeding 2 kPa with flow rate of 1.4 m3/h (max. permissible one for the primary circuit).

The set-up ensures that the thermal interface is only subject to a small influence by the primary pumping system while it ensures an effective autonomous action of the electrically-driven pump installed on board the unit. Full functional documentation covering the special equalization device is published in the "Latest generation systems" Manual which can be requested from Watts Industries.



Data :

A-m-n-B	Primary circuit
m-user-n	Secondary circuit
m-n	Equalization section (DP=0); pipe common to the two circuits (primary and secondary)
G1	Flow rate, primary fluid
G2	Flow rate, secondary fluid, tapped by the electric pump to supply the user
G3	With unit in rest mode G3=G1;
G3	if G2<G1, then G3=G1-G2

If it is temporally required to have a flow rate G2>G1, the pump (4) acts with its own head on the primary circuit by drawing off the necessary fluid.
The check valve (3) prevents mixing.

Functional hydraulic diagram

DOMO*CAL* Series DCA-BP2 can automatically be configurated according to the different needs :

• Mode of operation in presence of DHW demand

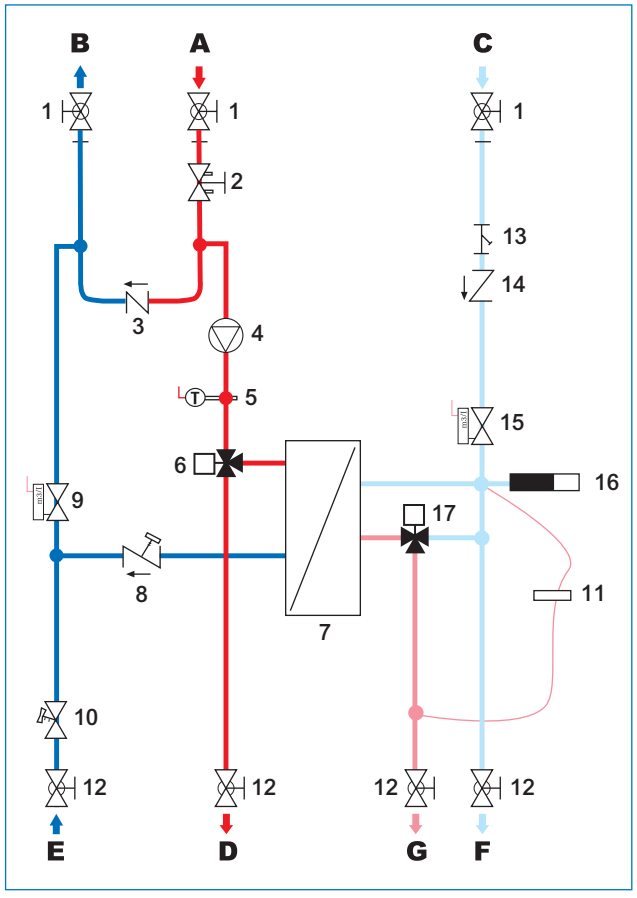
This mode is activated when the user opens any tap for drawing off DHW supplied by the unit and remains activated throughout the entire period of drawing off hot water. It has priority over any demand for space heating. The device determining this state consists of a differential pressure switch (11), acting as flow sensor, which activates the pump and at the same time it holds open port A of diverter valve (6) installed on the supply line, for full flow feeding of primary heat exchanger (7), thus excluding any circulation in the heating system. The fluid flowing out from the primary heat exchanger is conveyed directly to the RETURN port of the primary fluid: such flow rate is measured by the volumetric sensor of the thermal energy meter (9). It should be checked and calibrated in the initial stage to the design values with relief valve (8).

• Mode of operation with demand for heating but no DHW demand

This mode is activated when the thermostat controlling the room temperature is in the ON position. It determines both starting of the pump and opening of port B of valve (6) in order to allow supplying the distribution circuit of the various radiators connected to the unit. Circulation in the heat exchanger primary circuit remains shut-off (port A closed). The return fluid of the heating system is conveyed directly to the RETURN port of the primary fluid: likewise the flow rate for heating is measured by the volumetric sensor for metering the thermal energy (9). It should be checked and calibrated in the initial stage to the design values with balancing valve (10) located on port E.

• Mode of operation with no demand for heating or DHW

This mode (Unit "at rest") is activated when the thermostat controlling the ambient temperature and differential pressure switch (11) are in OFF position. Hence the pump is disactivated and all secondary circulation is shut-off; the thermal energy meter does not detect any consumption. The primary flow continues to circulate between A and B at the preset flow rate.



Legend

A Inlet, primary fluid
B Outlet, primary fluid
C Inlet, domestic cold water (from water main)
D Supply to heating system
E Return from heating system
F Outlet, domestic cold water
G Outlet, domestic hot water (mixed)

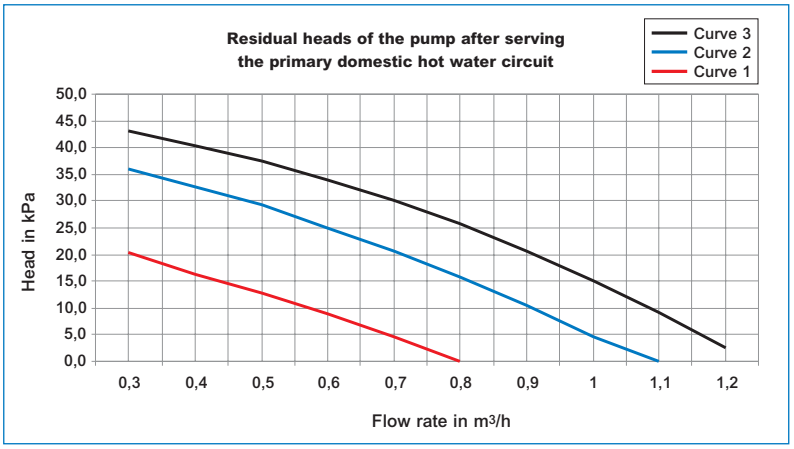
1 Ball valve MF, size (1") with swivel nut
2 Balancing valve STAND DN 20 kvs=5.7
3 Check valve size (3/4")
4 3-speed electrically driven pump
5 Supply probe for thermal energy meter (heating system)
6 Diverter valve size (3/4")for priority of domestic hot water
7 DHW 30-plate heat exchanger
8 Relief valve USVR DN 20
9 Flow meter WMT DN 20 for thermal energy meter complete with probe
10 Balancing valve for calibrating flow of the heating system STK size (3/4") ksv=4.5
11 Differential pressure switch
12 Ball valve MF size (1")
13 Mesh strainer size (3/4")
14 Check valve size (3/4")
15 Flow meter WMT DN 20 complete with probe for domestic cold water
16 Water hammer arrestor
17 Thermostat mixing valve AQUAMIX (3/4") for DHW

Nameplate data (DCA-BP2)	
Maximum temperature of hot fluid at inlet	90 °C
Maximum operating pressure (static)	8.0 bar
Nominal temperature of hot fluid at inlet	75 °C
Nominal flow rate of primary fluid	1.0 m³/h
Nominal head across inlets of the primary fluid	5 kPa
Nominal flow rate of hot fluid at outlet (heating)	0.8 m³/h
Nominal head of hot fluid at outlet (heating)	17 kPa
Nominal power , heating with thermal gradient 15K	14 kW
Nominal flow rate of DHW	0.26 l/s
Nominal temperature of DHW	46 °C
Nominal power for DHW preparation	39 kW
Adjustable outlet temperature	32 - 50 °C
Heat exchange surface, plate heat exchanger	0.33 m²
Power supply	230 Vac-50 Hz
Current drawn	0.6 A

Passive hydraulic characteristics	
Primary circuit in DHW preparation	Kv = 2.00
Primary circuit in heating system	Kv = 2.10
Primary circuit in by-pass (unit in rest mode)	Kv = 4.5
Domestic hot water circuit	Kv = 1.3
Domestic cold water circuit	Kv = 3.4

Residual heads of the pump in kPa

The active characteristics of the pump provided with DOMO*CAL* Series DCA-BP2 in the 3 possible operating positions, are plotted graphically alongside. Generally speaking, the choice of pump curve is normally predetermined by the needs of the DHW circuit. To subsequently limit the performance heads to the actual needs of the heating circuit, adjust balancing valve STK (10). The actual flow rate circulating in the heating circuit can be read on the display of the thermal energy meter (9).



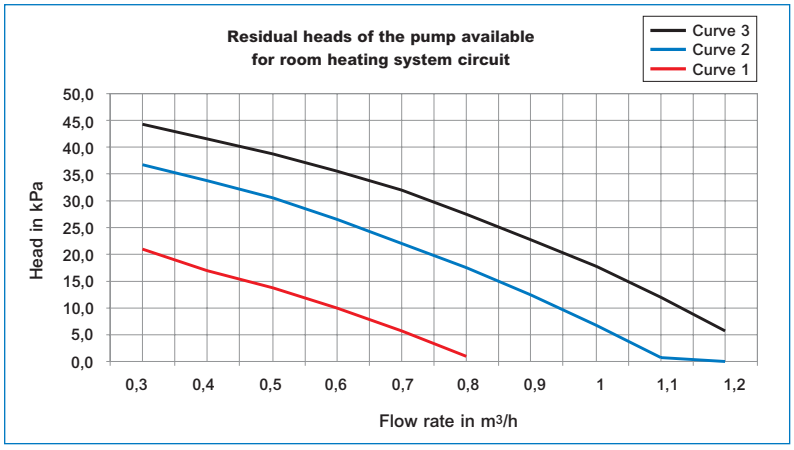
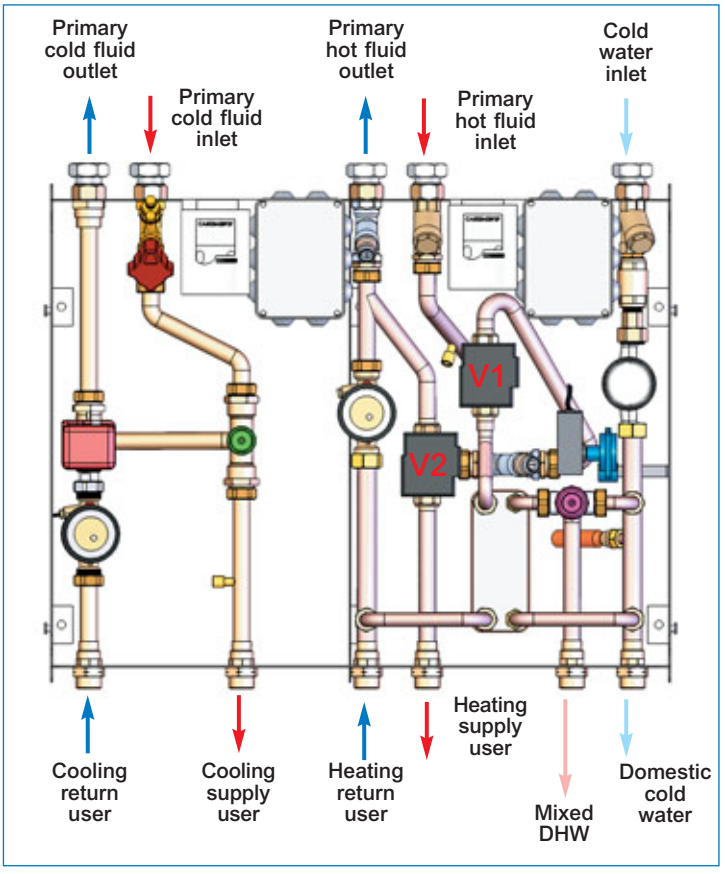


Table values - Residual pump heads for the system circuit										
Flow rate in m³/h	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2
Curve 3	44,1	41,6	38,8	35,4	31,9	27,6	22,9	17,7	12,1	5,8
Curve 2	36,8	33,7	30,4	26,4	22,1	17,5	12,6	6,9	0,8	
Curve 1	21,1	17,1	13,7	10,0	5,7	0,9				

Operation

DOMO*CAL* Series DCA-RR2B

The DOMO*CAL* Thermal unit Series DCA-RR2B incorporate, in addition to the characteristics and performance of the DCA-2B unit designed for supply of hot fluid for space heating (towel- rail radiators in bathrooms) and for domestic hot water (DHW) production, **a circuit section serving for supply of chilled fluid used in fan-coils cooling systems**.



The cooling section is provided with :

- balancing valve, incoming fluid from the primary circuit
- three-way control valve with on/off action, controlled by a room timing thermostat (Art. MILUX), complete with by-pass setting valve.
- thermal energy meter consisting of a flow meter (Art. WMT DN20) complete with immersion type supply and return probes plus electronic LCD-panel (Art. CA502M).

When the control valve is closed on the straight way (by the user), it causes the by-pass valve to have the same pressure drop offered by the downstream circuit concerned. This ensures substantial stability of the primary circuit thus obtaining a constant flow rate whether the flow feeds the user or whether it crosses the by-pass. The two hot/cold circuit sections are **distinct and are in no way connected hydraulically**. The seasonal change-over is therefore performed in the central boiler room by the operator of the system.

Functional hydraulic diagram

DOMO*CAL* Series DCA-RR2B automatically assumes **DURING THE WINTER** (supply from central boiler room, of just the heating section) one of the three modes of operation **described for unit DCA-2B**.

DURING SUMMER, , instead the unit automatically assumes (supply from central boiler room of just the cold section and the hot section for just DHW production) one of the following modes as described below :

- **Mode of operation in presence of DHW demand**

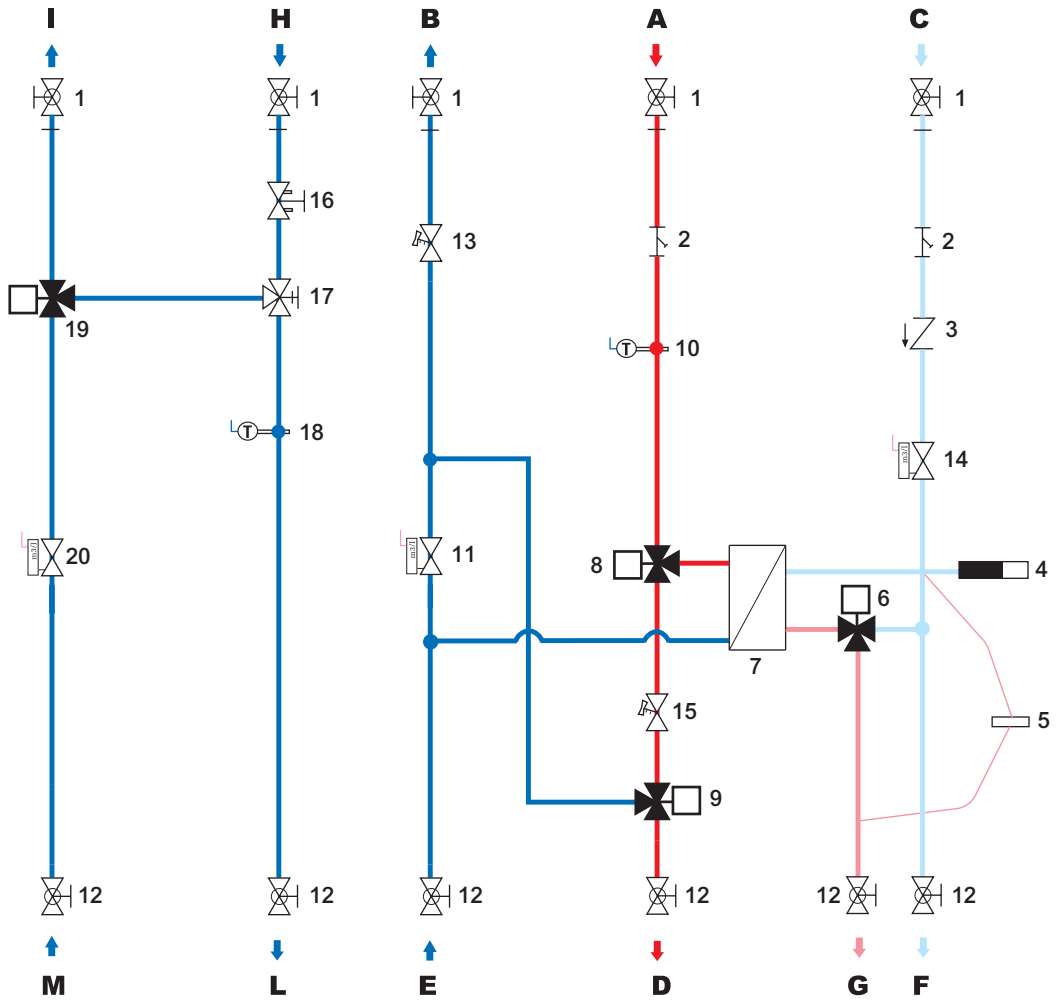
This mode is activated when the user opens any tap for drawing off DHW supplied by the unit and remains activated throughout the entire period of drawing off hot water. The device determining this state consists of a differential pressure switch (5), acting as flow sensor that sets and holds diverter valve (8) installed on the primary supply line, for full flow feeding of the primary circuit of heat exchanger (7). The flow rate of this fluid is measured by the volumetric sensor of the thermal energy meter (11) installed on the return line of the primary fluid. In this mode there is absolutely no inhibition of the room air conditioning circuit, contrary to what occurs during winter operation.

- **Mode of operation with demand for cooling**

This mode is activated when the thermostat (switched to summer) controlling the room temperature is in the “On” position and determines opening of the straight way of control valve (19), thus allowing feeding of the distribution circuit for the fan-coils connected to the unit. The return flow of the cooling system is directly conveyed to the return port of the primary cold fluid; the cooling flow rate is measured by the volumetric sensor of the thermal energy meter (20). During the cooling phase, the unit **independently supplies** the DHW demand.

- **Mode of operation with no demand for cooling or DHW**

This mode (Unit “in rest mode”) occurs when both the timing thermostat controlling the room temperature and differential pressure switch (5) are in the OFF position. Control valves (8 and 19) are both disactivated and all secondary circulation is shut off; thermal energy meters (20 and 11) do not detect any consumption. The primary flow continues to circulate between A and B (hot fluid) and H and I (chilled fluid) at the preset flow rate.



Legend

A Inlet, primary hot fluid
B Outlet, primary hot fluid
C Inlet, domestic cold water (from water main)
D Supply to heating system
E Return from heating system
F Outlet, domestic cold water
G Outlet, domestic hot water (mixed)
H Inlet, chilled primary water
I Outlet, chilled primary water
L Supply, cooling system
M Return, cooling system

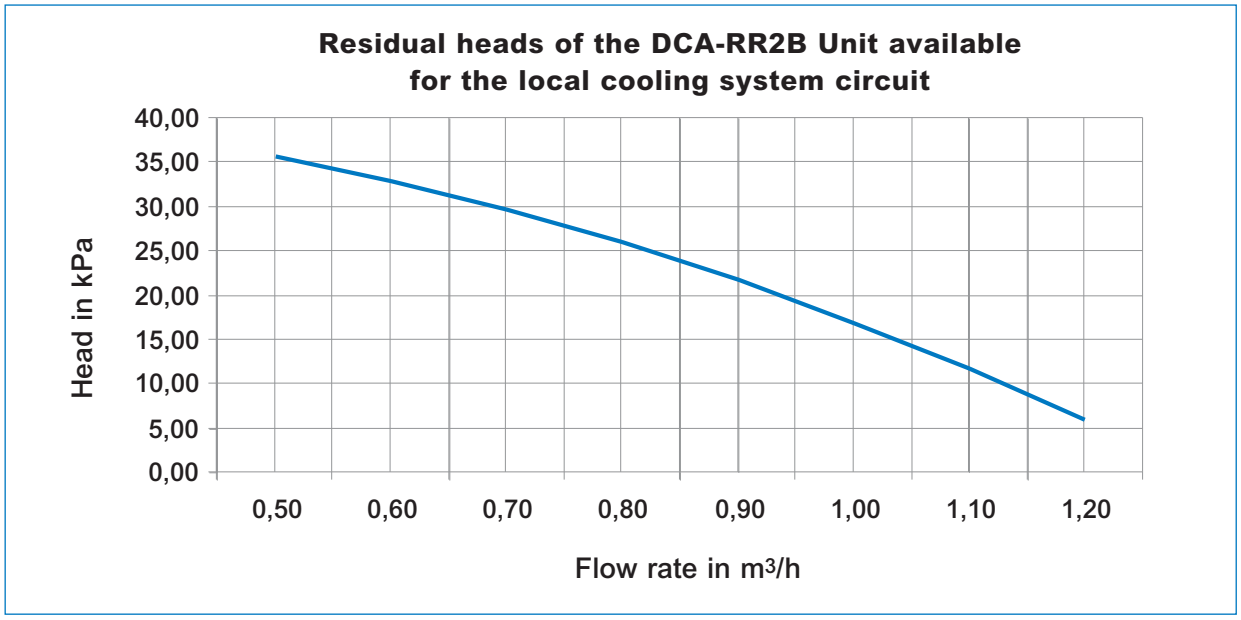
1 Ball valve MF, size (1") with swivel nut
2 Mesh strainer DN 20
3 Check valve size 3/4"
4 Water hammer arrestor
5 Differential pressure switch
6 Thermostat mixing valve AQUAMIX size 3/4" for DHW
7 DHW 30-plate heat exchanger
8 Diverter valve size (3/4") for priority of domestic hot water
9 Diverter valve size (3/4"), control of heating system
10 Supply probe for thermal energy meter (heating system)
11 Flow meter WMT DN 20 heating system and DHW complete with probe
12 Ball valve MF size (3/4")
13 Balancing valve for calibrating flow of the primary system STK size (3/4") Kvs=4.5
14 Flow meter WMT DN 20 complete with probe for domestic cold water
15 Balancing valve for calibrating flow of the heating system STK size (3/4") Kvs=4.5
16 Balancing valve STAND size (3/4") Kvs=5.7
17 3-way By-pass setting valve
18 Supply probe for thermal energy meter (cooling system)
19 3-way electrothermic control valve (cooling system)
20 Flow meter WMT DN 20 complete with probe

Nameplate data (DCA-RR2B)	
Maximum temperature of hot fluid at inlet	90 °C
Nominal chilled fluid temperature at inlet	7 °C
Maximum operating pressure (static)	8.0 bar
Nominal temperature of hot fluid at inlet	75 °C
Nominal flow rate of primary fluids (hot/chilled)	1.0 m^3/h
Nominal head across inlets of the primary fluid (hot)	36 kPa
Nominal head across inlets of the primary fluid (chilled)	42 kPa
Nominal flow rate of hot fluid at outlet (heating)	0.7 m^3/h
Nominal head of hot fluid at outlet (heating)	17 kPa
Nominal power , heating with thermal gradient 15K	12 kW
Nominal fluid rate of chilled fluid at outlet	1.0 m^3/h
Nominal head of chilled fluid at outlet	17.00 kPa
Nominal cooling power (7K)	8 kW
Nominal flow rate, DHW	0.21 l/s
Nominal temperature, DHW	46 °C
Nominal power, DHW preparation	32 kW
Adjustable outlet temperature	32 - 50 °C
Heat exchange surface, plate heat exchanger	0.33 m^2
Power supply	230 Vac-50 Hz
Current drawn	0.6 A

Passive hydraulic characteristics	
Primary circuit in DHW preparation	Kv = 2.00
Primary circuit in heating system	Kv = 2.1
Primary circuit in cooling system	Kv = 2.00
Primary circuit in by-pass (unit in rest mode)	Kv = 4.5
Domestic hot water circuit	Kv = 1.3
Domestic cold water circuit	Kv = 3.40

Residual heads

The following graph shows the residual heads of the **DCA-RR2B Unit** available for the local COOLING system. This graph is valid when the unit is feeded at the inlets by a head of 42 kPa. If a greater residual head is required, increase the heads at the inlets in proportion. Instead, when the pressure to the unit is greater than the required pressure (thermal units more favoured), compensate excess pressures with the balancing valve (16 see functional diagram).
The actual flow rate circulating in the circuit sections (heating, cooling and in the DHW section), can be read directly on the display of electronic panel Art. CA502M.



Residual heads of the pump in kPa available for the cooling system circuit								
Flow rate in m^3/h	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2
Head in kPa	35,8	33,0	29,8	26,0	21,8	17,0	11,8	6,0

Operation

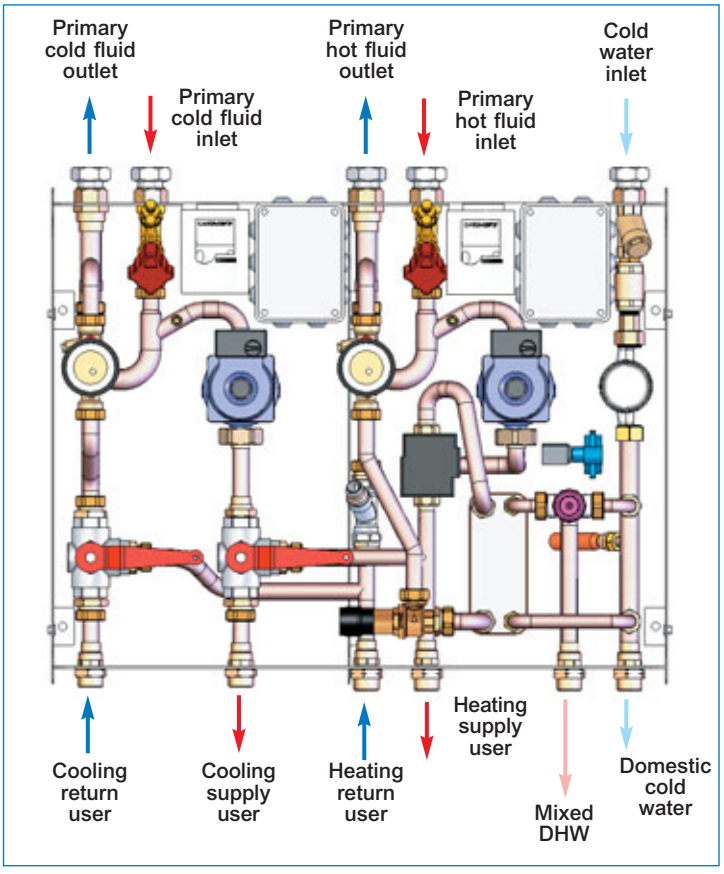
DOMOCAL Series DCA-RRBP2

The DOMO*CAL* thermal unit Series DCA-RRBP2 incorporates the characteristics and performance levels of the DCA-BP2 unit designed for supplying hot fluid used in heating (towel-rail radiators in the bathroom) and the production of domestic hot water (DHW), but it also combines a circuit section serving for supplying chilled fluid used in cooling systems.

Likewise the cooling section is provided with a hydraulic equalization device and is fed by an electrically driven pump with higher power rating than that of the heating section. Two manually-operated 3-way valves allow changing over the supply of the fan-coils from hot fluid to chilled fluid, or viceversa.

The seasonal change-over is performed by the operator of the heating system.

On request there is also the version of the unit with automatic valve operation, piloted by the temperature of the incoming chilled fluid or else through a command coming from the central boiler room.



Functional hydraulic diagram

DOMO*CAL* Series DCA-RRBP2 automatically assumes **DURING WINTER** (three-way shut-off valves, designated 24 and 21 in the diagram, and switched) one of the three modes of operation described for the DCA-BP2 unit. Instead, **DURING SUMMER**, the unit automatically assumes (three-way shut-off valves, designated 24 and 21, in the diagram, and switched) one of the following modes described below :

- **Mode of operation in presence of DHW demand**

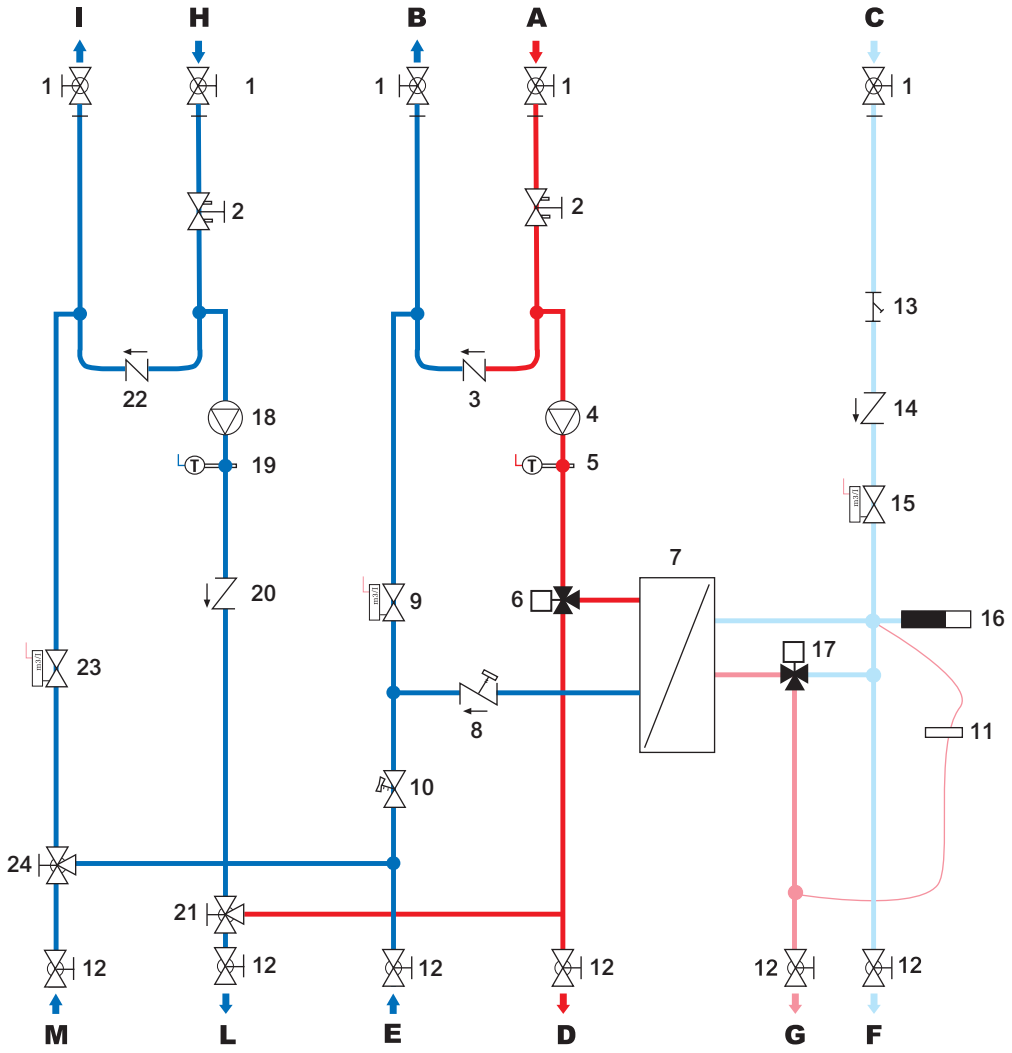
This mode is activated when the user opens any tap for drawing off DHW supplied by the unit and remains activated throughout the entire period of drawing off hot water. The device determining this state consists of a differential pressure switch (11), acting as flow sensor, which activates the pump and at the same time it holds open port A of diverter valve (6) installed on the supply line, for full flow feeding of primary heat exchanger (7). The fluid flowing out from the primary heat exchanger is conveyed directly to the RETURN port of the primary fluid: such flow rate is measured by the volumetric sensor of the thermal energy meter (9). It should be checked and calibrated in the initial stage to the design values with relief valve (8). In this mode, there is absolutely no inhibition of the operation of the room air conditioning circuit, unlike to what occurs during winter operation.

- **Mode of operation with demand for cooling**

This mode is activated when the thermostat (switched to summer) controlling the room temperature is in the “On” position and determines the start-up of pump (18), thus allowing feeding of the distribution circuit for the various fan-coils connected to the unit. The return flow of the cooling system is directly conveyed to the return port of the primary cold fluid; the cooling flow rate is measured by the volumetric sensor of the thermal energy meter (23). During the cooling phase, the unit independently supplies the DHW demand.

- **Mode of operation with no demand for cooling or DHW**

This mode (Unit “in rest mode”) occurs when both the thermostat controlling the room temperature and differential pressure switch (11) are in the OFF position. The pumps are both disactivated and all secondary circulation is shut off; the thermal energy meters do not detect any consumption. The primary flow continues to circulate between A and B (hot fluid) and H and I (chilled fluid) at the preset flow rate.



Legend

A Inlet, primary hot fluid
B Outlet, primary hot fluid
C Inlet, domestic cold water (from water main)
D Supply to heating system
E Return from heating system
F Outlet, domestic cold water
G Outlet, domestic hot water (mixed)
H Inlet, chilled primary water
I Outlet, chilled primary water
L Supply, cooling system
M Return, cooling system

1 Ball valve MF, size (1") with swivel nut
2 Balancing valve STAND DN 20 kvs=5.7
3 Check valve size (3/4")
4 3-speed electrically driven pump
5 Supply probe for thermal energy meter (heating system)
6 Diverter valve size (3/4") for priority of domestic hot water
7 DHW 30-plate heat exchanger
8 Relief valve USVR DN 20
9 Flow meter WMT DN 20 for thermal energy meter complete with probe
10 Balancing valve for calibrating flow of the heating system STK size (3/4") ksv=4.5
11 Differential pressure switch
12 Ball valve MF size (1")
13 Mesh strainer DN 20
14 Check valve, size (3/4")
15 Flow meter WMT DN 20 complete with probe for domestic cold water
16 Water hammer arrestor
17 Thermostat mixing valve AQUAMIX size (1") for DHW
18 3-speed electrically driven pump
19 Supply probe for thermal energy meter (cooling system)
20 Check valve with preset opening
21 Manual 3-way ball valve size (1")
22 Check valve with low pressure drop
23 Flow meter WMT DN 20 complete with probe
24 Manual 3-way ball valve size (1")

Nameplate data (DCA-RRBP2)	
Maximum temperature of hot fluid at inlet	90 °C
Nominal chilled fluid temperature at inlet	7 °C
Max. operating pressure (static)	8.0 bar
Nominal temperature of hot fluid at inlet	75 °C
Nominal flow rate of primary fluids (hot/chilled)	1.0 m³/h
Nominal head across inlets of the primary fluid	5 kPa
Nominal flow rate of hot fluid at outlet (heating)	0.8 m³/h
Nominal head of hot fluid at outlet (heating)	17 kPa
Nominal power, heating with thermal gradient 15K	14 kW
Nominal flow rate of chilled fluid at outlet	1.0 m³/h
Nominal head of chilled fluid at outlet	29.5 kPa
Nominal cooling power (7K)	8 kW
Nominal flow rate of DHW	0.26 l/s
Nominal temperature of DHW	46 °C
Nominal power for DHW preparation	39 kW
Adjustable outlet temperature	32 - 50 °C
Heat exchange surface, plate heat exchanger	0.33 m²
Power supply	230 Vac-50 Hz
Current drawn	0.6 A

Passive hydraulic characteristics	
Primary circuit in DHW preparation	Kv = 2.0
Primary circuit , heating system	Kv = 2.1
Primary circuit, cooling system	Kv = 2.3
Primary circuit in by-pass (unit in rest mode)	Kv = 4.5
Domestic hot water circuit	Kv = 1.3
Domestic cold water circuit	Kv = 3.4

Residual heads of the pump for the cooling circuit

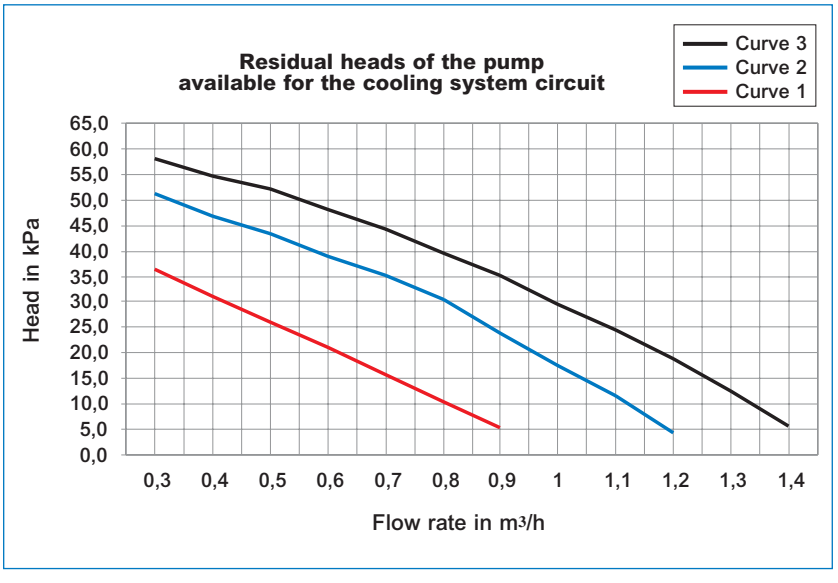
The active characteristics of the pump provided on DOMO*CAL* DCA-RRBP2 (cooling side) regarding the 3 possible operating positions (speed) are given at the bottom of the page. Likewise this section dedicated to cooling, can, if necessary (thanks to the combined action of the equalization device and electrically-driven pump), draw off from the primary circuit quantities of flow also greater than that temporarily expected from the primary network. The most suitable position to select will be the one corresponding to the performance curve closest to the point representing the flow rate/pressure drop of the cooling circuit to be served.

For example

Suppose the system has a cooling power of 8 kW and it is decided to adopt a thermal gradient of 7 K; we shall require a volume flow equal to :

8 / (7 • 1.163) = 980 l/h (0.98 m³/h)

with a pressure drop of 28 kPa, it will be necessary to turn the pump speed selector switch to position 3.



Residual heads of the pump in kPa available for the cooling system circuit												
Flow rate in m³/h	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2	1,3	1,4
Curve 3	58,1	54,7	52,0	48,0	44,4	39,5	35,2	29,47	24,4	18,9	12,6	5,8
Curve 2	51,2	46,9	43,3	39,0	35,3	30,4	23,9	17,70	11,6	4,5		
Curve 1	36,5	31,2	26,2	21,2	15,7	10,4	5,2					

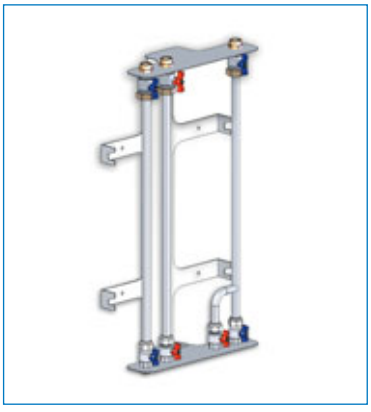
Installation

Systems where the remote thermal units are to be used are normally built and finished over a medium-long period of time and hence have to follow the different phases in construction of the building.
For this reason, the units are designed to allow the building and completion of the primary main which starts in the central boiler room and finishes close to the apartment without it being necessary to mount the chosen DOMO*CAL* remote unit. So any risk of harm from the building works or damage of other nature to the DOMO*CAL* product will be avoided. The DOMO*CAL* unit will be placed in position when each single user is submitted to first testing. For the initial assembly phase, **Watts Industries is able to provide a frame complete with ball shut-off valve DN 3/4"-1" on each section of the circuit (hot, DHW, chilled)** and removable pipes for thorough flushing of the system (precautionary operation always advisable before putting the unit into service). Before the final start-up phase, proceed to manually close the ball valves to shut off the individual circuits, remove the flushing pipes (which can be reused by the installer or by the heating system operator) and insert DOMO*CAL* product.
The unit can be left without the front closing panel if positioned in the inner courtyard or in a protected and sheltered place as so prescribed by the customer; however panels closing on 3 sides (Art. MANT-DCA2A) are always available.

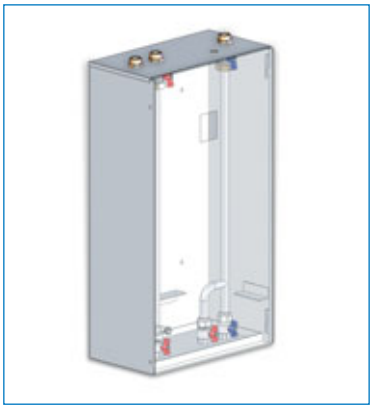
More especially, the frame for models DCA-2B and DCABP2 comes in two versions :

- open (Art. DIMA-DCA2A)
- closed (Art. DIMA-DCA2C)

The closed version has a drainage pan for collecting moisture, connected to the outside using a drain tube. Thanks to these assembly characteristics of the product, DOMO*CAL* allows the heating system operator to intervene also while the system is running in the event of any failure as well as to remove the entire thermal unit and replace it with another of the same performance characteristics.
It is advisable, above all in the case of medium-large systems, to keep one "courtesy" thermal unit to cater for emergencies while awaiting repairs carried out by the service.

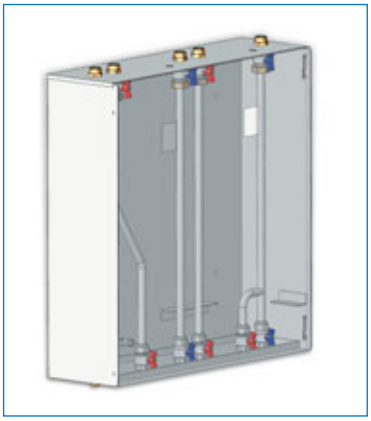


Art. DIMA-DCA2A
For unit DCA-2B and DCA-BP2 fully open with removable system flushing pipes and ball valves



Art. DIMA-DCA2C
For unit DCA-2B and DCA-BP2 fully **closed** with removable system flushing pipes, ball valves and front protection panel

Art. MANT-DCA2A
Panel closed on 3 sides for unit DCA-2B and DCA-BP2 but only in combination with DIMA-DCA-2A (open)



Art. DIMA-DCA2R
For unit DCA-RRBP2 fully closed with removable system flushing pipes, ball valves and front protection panel

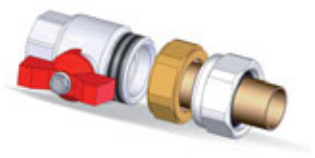
Versatility of DOMO*CAL* thermal units (Patented):

The basic version of the DOMOCAL thermal unit can be supplied set-up in various configurations, thus leaving freedom of choice in assembly and positioning : they can be pendant, flush or in the inner courtyard with the unit either open, or partly closed by a frame or fully closed by a cover. The many different possible combinations can be summed up in the following table, and configuration examples.

DOMOCAL Product	Standard Accessories			Assembly kit (see notes)*
	Frame Open	Frame Closed	Panel closing on 3 sides	
Series **DCA-2B**	DIMA-DCA2A	DIMA-DCA2C	MANT-DCA2A	DCA2-KIT DCA2-KIT-D
Series **DCA-BP2**				
Series **DCA-RR2B**	-	DIMA-DCA2R	-	DCA2-KIT-R
Series **DCA-RRBP2**				

Notes

All combinations involve the use of an assembly KIT different for the type of assembly in place, i.e. :



• **DCA2-KIT**, kit for connecting the DOMO*CAL* unit **directly to the water shafts** (hence without frame) consisting of three ball valve bodies DN 1" for shutting off the primary fluids from the upper inlets, four ball valve bodies DN 3/4" for shutting off the lower outlets towards the users, four spacers made of copper tube sealed with O-ring and four soft sealed single-piece fittings Velofit DN 1" to be mounted on the ball valve body.

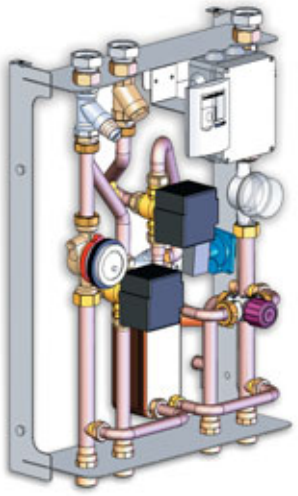
• **DCA2-KIT-D**, kit for connecting the DOMO*CAL* unit **with frame** (open or closed) consisting of four spacers made of copper tube sealed with O-ring and four soft sealed single-piece fittings Velofit DN 1" to be mounted on the ball valve body.

Configuration example n° 1

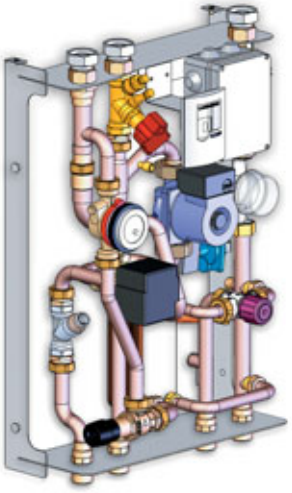
Open DOMO*CAL* unit (whether Series DCA-2B or DCA-BP2) for installations in protected and sheltered places with open frame complete with flushing pipes and fluid shut-off ball valve bodies.
Kit Series DCA2-KIT-D for connection to the frame.

Art. DIMA-DCA2A

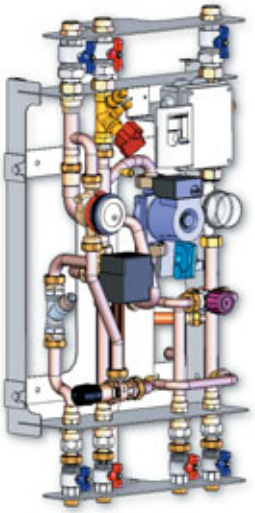
Art. DCA-2B



Art. DCA-BP2



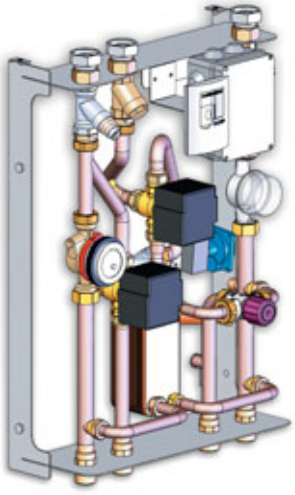
DOMOCAL unit in operation



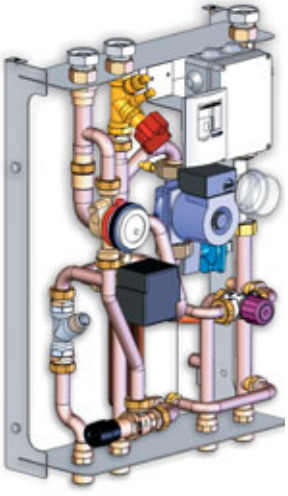
Configuration example n° 2

DOMO*CAL* unit (whether Series DCA-2B or DCA-BP2) with partial cover and front closing panel. Without flushing pipes.
Kit Series DCA2-KIT for direct connection on columns.

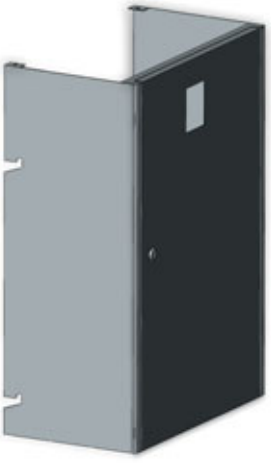
Art. DCA-2B



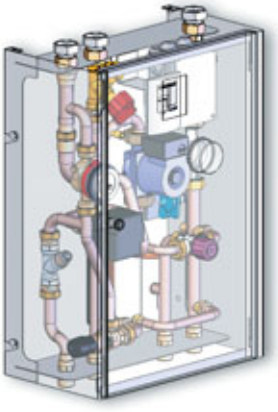
Art. DCA-BP2



Art. MANT-DCA2A



DOMOCAL unit in operation



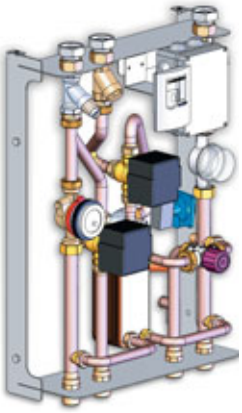
REMARKS : Assembly kits should be ordered separately (see page 20)

Configuration example n° 3

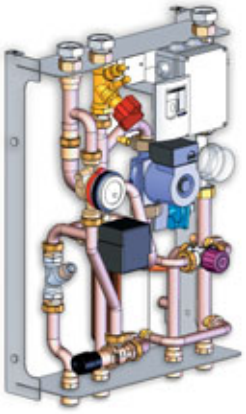
DOMO*CAL* unit (whether Series DCA-2B or DCA-BP2) supplied with open frame complete with flushing pipes, fluid shut-off ball valve bodies, partial cover and front closing panel. **Kit Series DCA2-KIT-D for connection to the frame**.

Art. DIMA-DCA2A

Art. DCA-2B

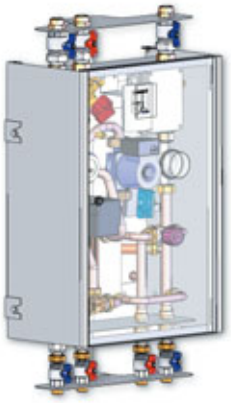


Art. DCA-BP2



Art. MANT-DCA2A

DOMOCAL unit in operation

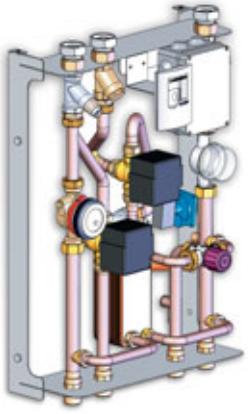


Configuration example n° 4

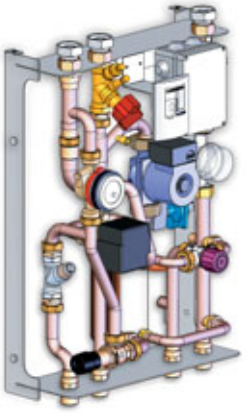
DOMO*CAL* unit (whether Series DCA-2B or DCA-BP2) supplied with closed frame (flushing pipes, fluid shut-off ball valve bodies) plus partial cover and front closing panel. **Kit Series DCA2-KIT-D for connection to the frame.**

Art. DIMA-DCA2C

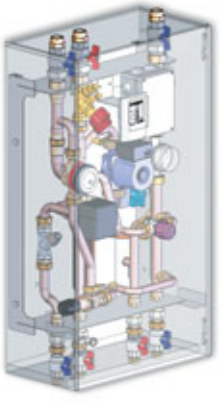
Art. DCA-2B



Art. DCA-BP2



DOMOCAL unit in operation



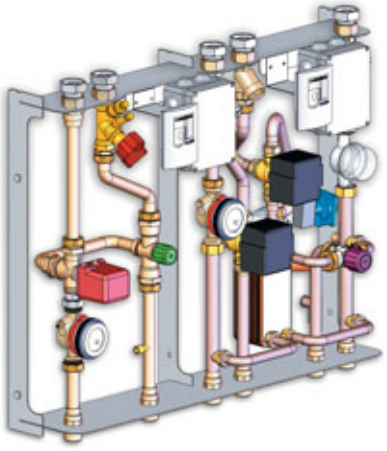
REMARKS : Assembly kits should be ordered separately (see page 20)

Configuration example n° 5

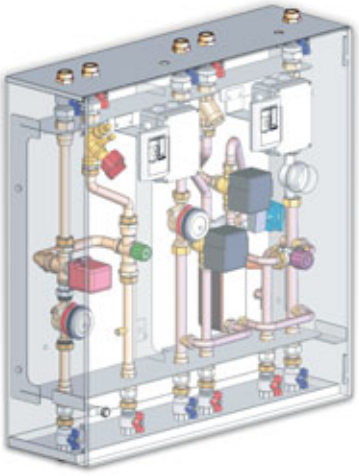
DOMO*CAL* unit for **distribution of hot/cold fluids to radiators and fan-coils, and for DHW production**. Housed in closed frame.

Art. DIMA-DCA2R

Art. DCA-RR2B



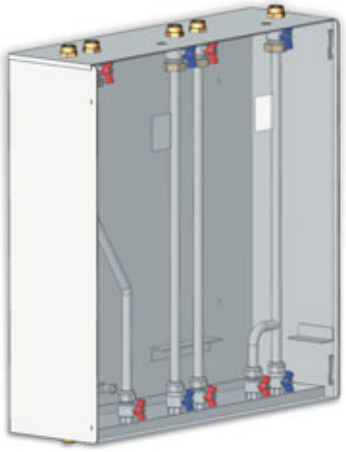
DOMOCAL unit in operation



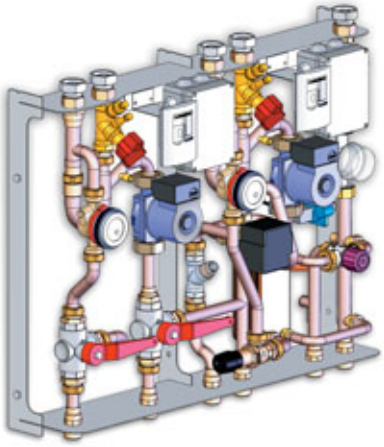
Configuration example n° 6

DOMO*CAL* unit for **distribution of hot/cold fluids to radiators and fan-coils with two electrically-driven pumps, and DHW production**. Housed in closed frame.

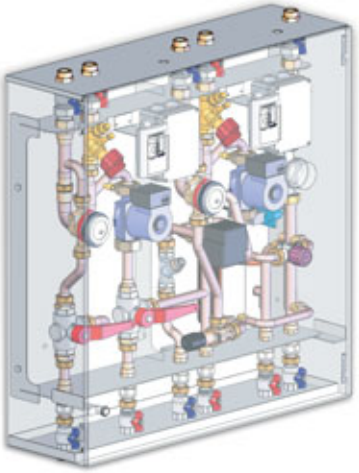
Art. DIMA-DCA2R



Art. DCA-RRBP2



DOMOCAL unit in operation



REMARKS : Assembly kits should be ordered separately (see page 20)

Maintenance (start-up)

The following routine operations are recommended :
- Cleaning of the filters every 12 months.
- Disassembly of the heat exchanger and removal of scale with special liquids every 24 months.

Warranty

The DOMO*CAL* thermal unit is provided with high quality components and is built for long-term correct operation if correctly and regularly maintened. The DOMO*CAL* unit is covered by a 5-year warranty, subject to the preventive stipulation of a maintenance agreement with Watts Industries or the authorized dealer of the same duration.
The warranty will become effective from the date in which the start-up is performed with the measurement of all the more important operating parameters. The values found during testing should be recorded on the calibration and test sheet attached to the certificate of warranty, and such sheet forms integral part of the certificate.

Normative reference

The DOMOCAL thermal units are in accordance with the following European Directives: Low Voltage Directive (LVD) and Electromagnetic Compatibility (EMC) Directive: 73/23/EEC - 89/336/EEC.

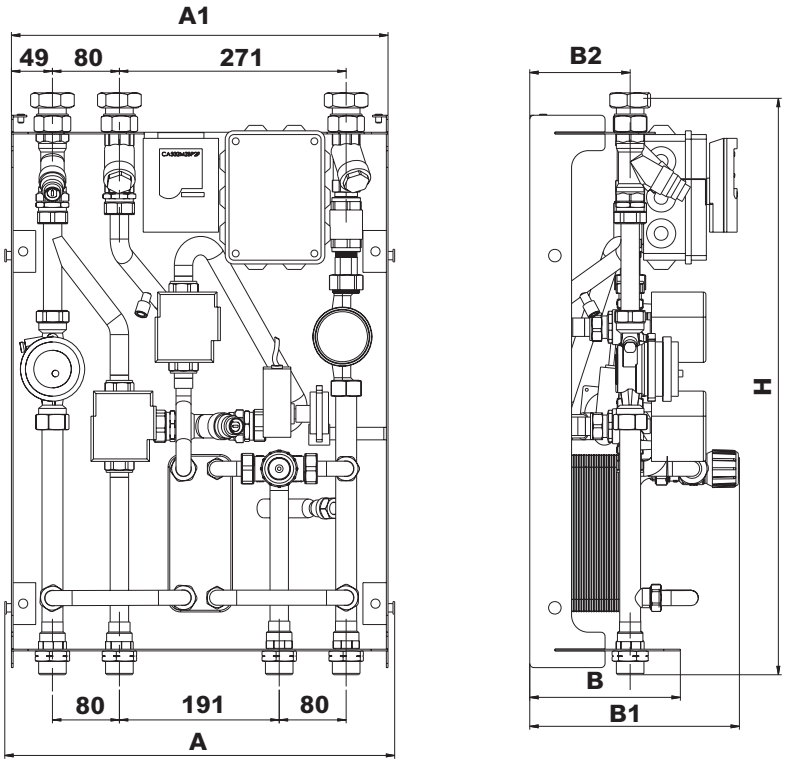
Design manual

Watts Industries offers the design engineers of centralized combustion systems with remote thermal units, a dedicated and original technical manual containing design specifications. In this manual the technical precision of the theory is balanced with the necessary practical awareness for dealing with the problems involved in the construction of these "latest generation systems " to high professional standards.

Request the manual directly from Watts Industries or by the sales network.

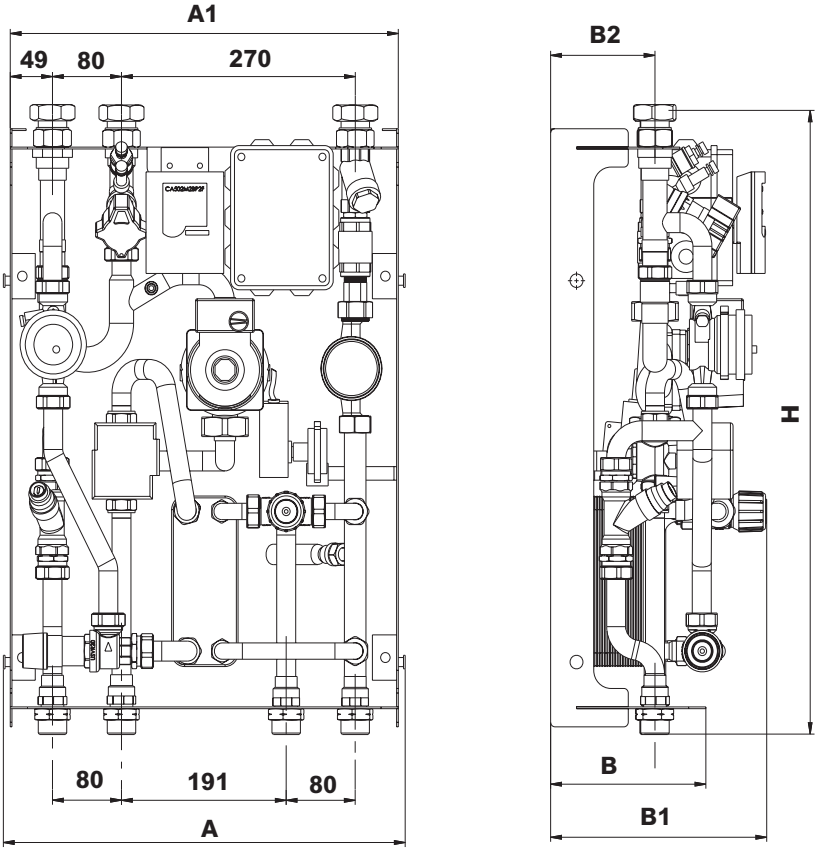
Overall dimensions

DCA-2B



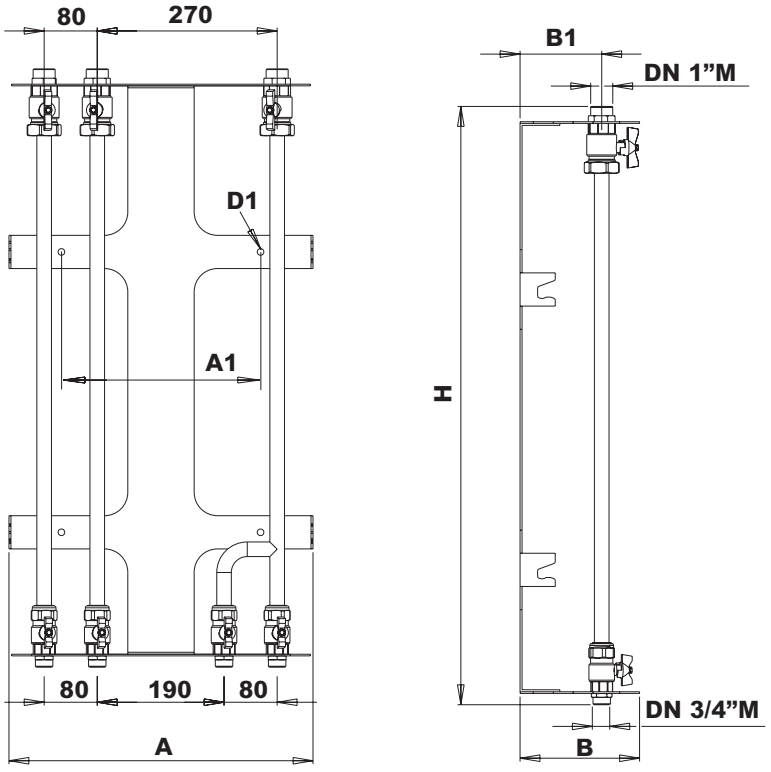
Code	A	A1	B	B1	B2	H
DCA-2B	460	450	180	250	121	688

DCA-BP2



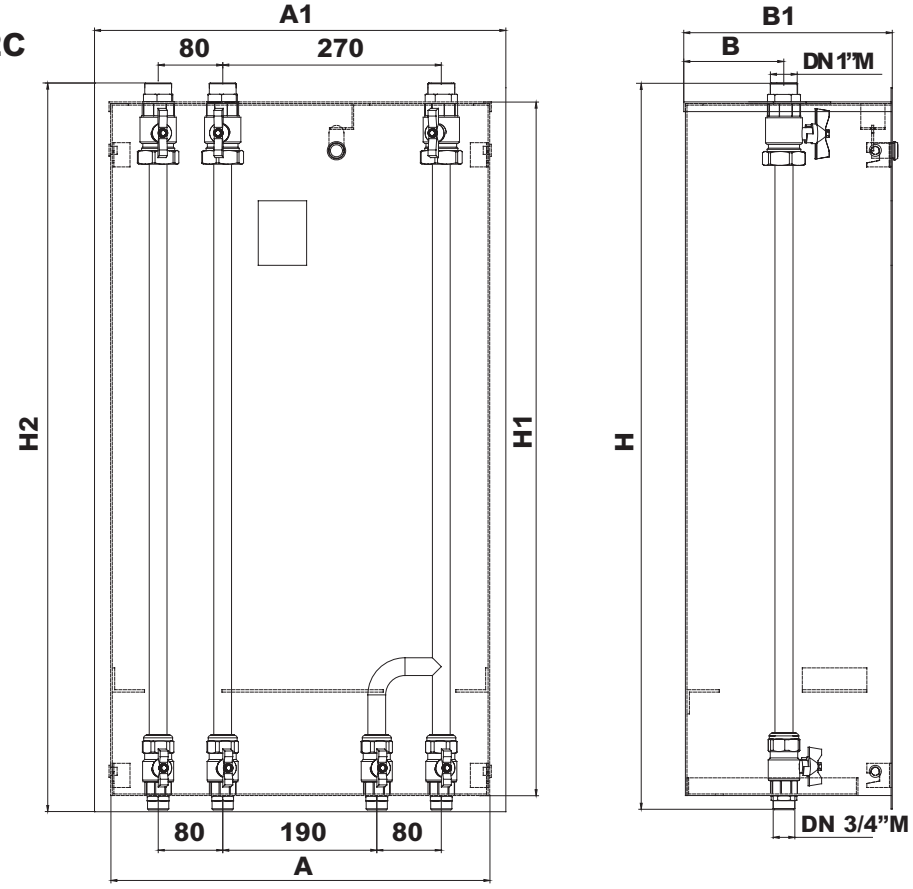
Code	A	A1	B	B1	B2	H
DCA-BP2	466	450	180	250	121	688

DIMA-DCA2A



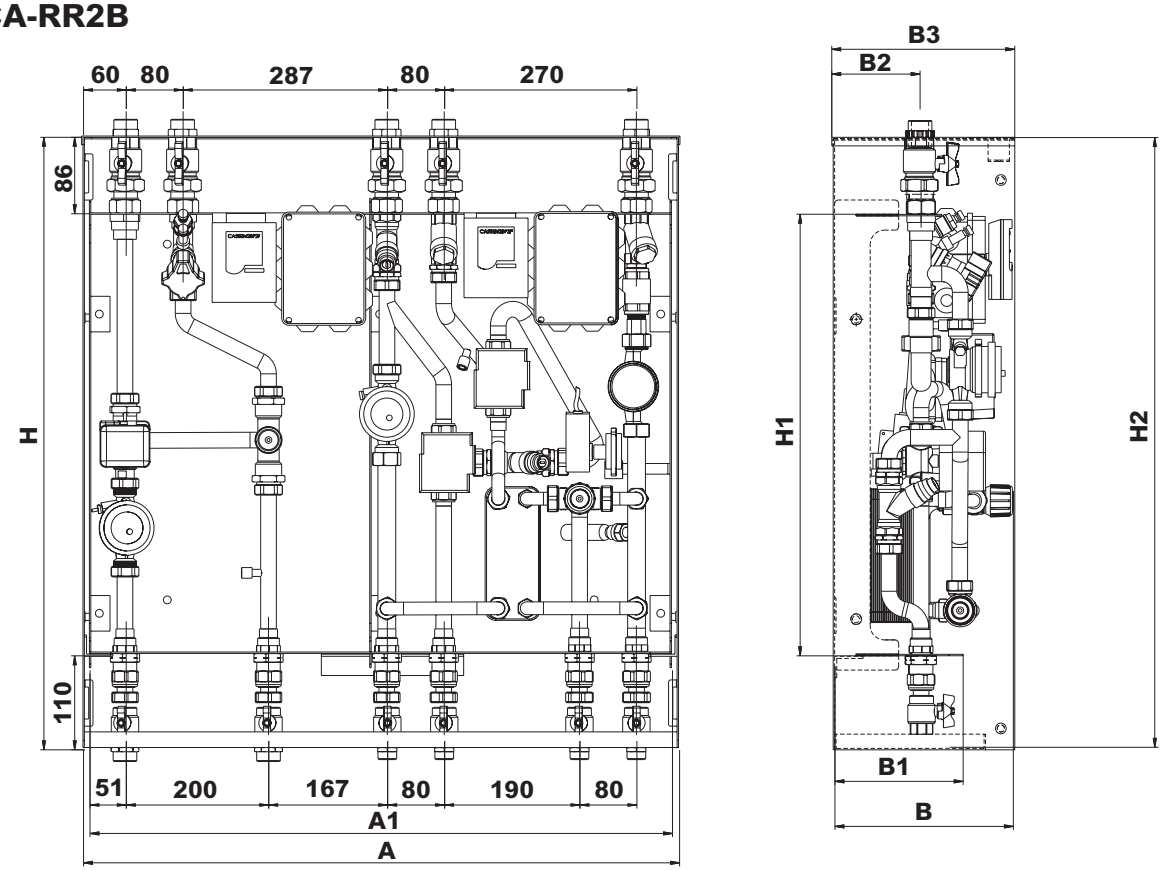
Code	A	A1	B	B1	D	H
DIMA-DCA2A	458	300	180	123	10	900

DIMA-DCA2C



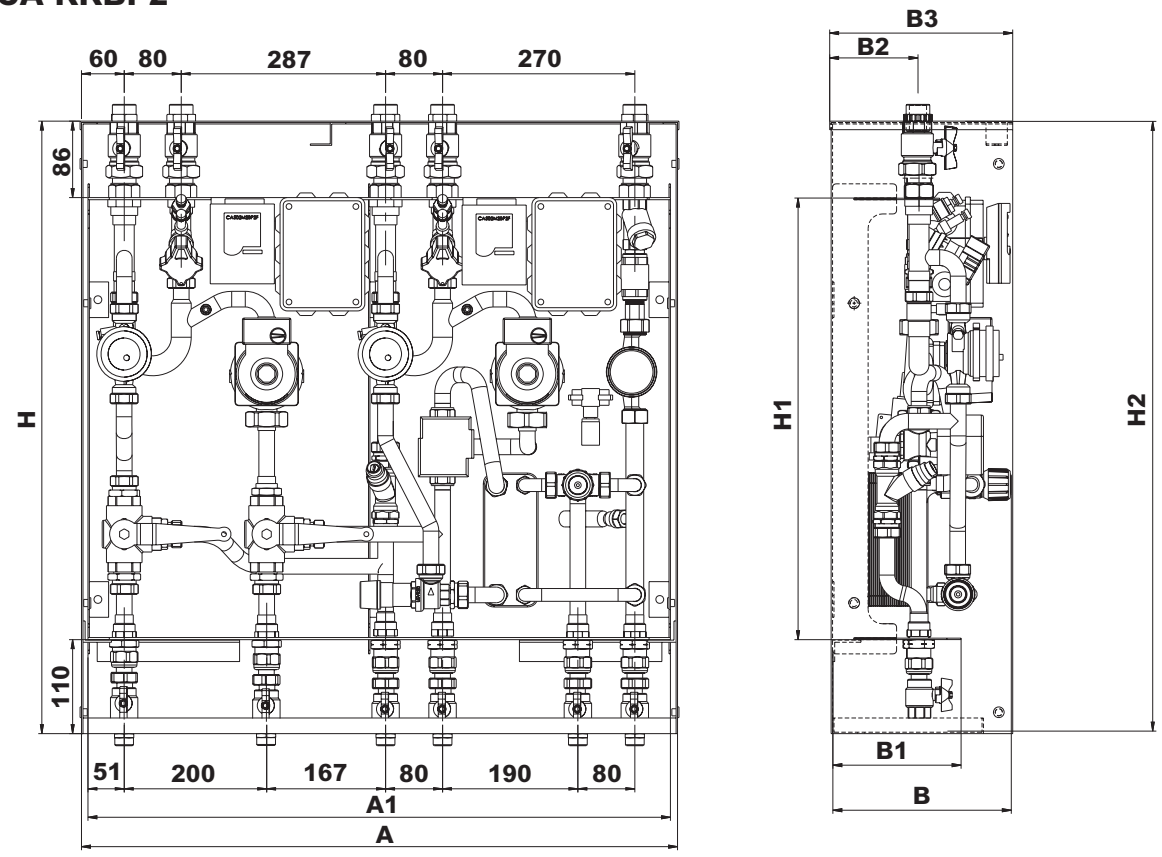
Code	A	A1	H	H1	H2	B1	B
DIMA-DCA2C	470	510	900	860	897	258	124

DCA-RR2B



Code	A	A1	B	B1	B2	B3	H	H1	H2
DCA-RR2B	837	818	251	180	123	257	860	620	900

DCA-RRBP2



Code	A	A1	B	B1	B2	B3	H	H1	H2
DCA-RRBP2	837	818	251	180	123	257	860	620	900

Product line, Watts Industries Domo*solutions*

- Heat energy metering
- Balancing measuring instruments and accessories
- Temperature control and thermal energy metering, Domo*compact*
- Temperature control, thermal energy metering and domestic hot water production, Domo*cal*
- Temperature control and distribution for radiant panel heating systems, Domo*radiant*

WATTS INDUSTRIES
A Division of Watts Water Technologies Inc.

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e-mail : info@wattsindustries.it - www.wattsindustries.com

Re-order no. 95-0050-UK-IT/1-05/07-Rev.1

Preassembled fixed-point control, distribution and pumping unit for radiant panel heating systems DOMO*RADIANT* Series

Main features

DOMO*RADIANT*, is a preassembled module designed for the mixing, pumping and distribution the fluid working in radiant panel heating systems consisting of :

- Central 6-way multifunction valve for mixing of the hot fluid at lower temperature with 3-way mixing valve operated by a thermostatic actuator with positive safety
- Primary flow rate setting device
- Fluid distribution unit for the radiant panel circuits (12 outlets) with manifold DN 1.1/4" side outlets 3/4" eurocone, provided with flow meter
- Fluid distribution unit for the towel radiators (3 outlets) with manifold DN 3/4" side outlets 3/4" eurocone

WATTS® INDUSTRIES

A Division of Watts Water Technologies Inc.

Description

The preassembled unit of the DOMO*RADIANT* Series is designed for modern radiant panel heating systems. It performs all the necessary functions for such purpose, namely:

- providing tight-sealed hydraulic connection of the pipe ends in the various coils making up the radiant panels (CPRFL series); it allows shut-off (if required) and the necessary setting and monitoring of all flow rates
- providing the hydraulic connection for the pipes feeding the towel-rail radiators (807MF series)
- automatic air venting
- mixing of the fluid for the radiant panels and holding it at low temperature
- ensuring the supply and head of the high temperature circuits
- visual temperature monitoring

The device designed for mixing and delivering hot water at the lower temperature consists of a 3-way mixing valve operated by a thermostatic actuator with remote sensor type FH-148SD (range 20-50 °C). The required flow rate for feeding the radiant panels is supplied by a 3-speed electrically driven pump. The manifold can supply up to **12 low temperature circuits** and up to **3 radiators**. Each return outlet is arranged to receive thermostatic actuator series 22C for adjusting the ambient temperature in each individual room. The supply outlet is fitted with flow meter FLMR series able to measure and adjust the flow rate accordingly. **Optionally** the various electrothermic actuators (when provided) can be controlled by a modular control box WFHT series, from 4 to 6 zones through room thermostats.
The Master module is provided with a control relay for the electrically-driven pump which is automatically disactivated when all the actuators are closed. When the actuators are not controlled by the modular box, a by-pass kit is available for controlling the differential pressure. Such kit should be attached to the head connections of the manifolds.
The system, which has been hydraulically tested in the factory, is housed in a special inspection box with single door and with epoxy finishing.

DOMO*RADIANT* - FH01

Preassembled fixed-point control, distribution and fluid pumping unit **for radiant panel heating systems (low temperature)**. The system allows supplying and controlling the individual radiant panel circuits with fluid at lower temperature, which can be set in the range from 20 to 50 °C.

6-way multi-function valve equipped with :
- 3-way mixing valve and built in safety (max 55 °C) through differential Kv
- Thermostatic actuator with remote sensor coupled to 3-way valve
- Integrated hydraulic equalization system
- Calibrated flow meter for setting and display the flow rate
- Auxiliary connections for towel-rail radiators
- Thermometer for primary temperature reading (0-80 °C)
- Shut-off valves

Pumping unit :
- 3-speed electrically-driven pump Grundfos type 25/60 and pipe fittings for connection to the manifold

Distribution unit Including :
- Brass manifolds DN 1.1/4"F , Series 822MM (delivery) and Series FLMR (return) for radiant panel circuits
- Side outlet 3/4"M Eurocone
- Pipe fitting for manifolds complete with thermometer (0-80 °C), float type air vent valve, water drain

Integrated control system (optional and supplied separately) including :
- ON/OFF electrothermic actuators Series 22C
- Modular control box 4/6 zones (Series WFHC), which can be coupled to a weekly programming clock for 2 heating zones
- Electronic room thermostats (Series WFHT) also available in wireless version

Sheet metal inspection box, frame and door, white finishing and of adequate size.
Optional : by-pass kit for checking differential pressure.

Type	Part no.	Panel outlets	Dn panel manifold
FH01	FH010600	n° 6 - 3/4“ EUROCONE	1.1/4”
FH01	FH010700	n° 7 - 3/4“ EUROCONE	1.1/4”
FH01	FH010800	n° 8 - 3/4“ EUROCONE	1.1/4”
FH01	FH010900	n° 9 - 3/4“ EUROCONE	1.1/4”
FH01	FH011000	n° 10 - 3/4“ EUROCONE	1.1/4”
FH01	FH011100	n° 11 - 3/4“ EUROCONE	1.1/4”
FH01	FH011200	n° 12 - 3/4” EUROCONE	1.1/4”

DOMO*RADIANT* - FH01-R

Like FH01 but complete with manifolds for supplying towel-rail radiators (n° 3 outlets Dn 3/4“) (high temperature).

Type	Part no.	Panel outlets	Dn panel manifold
FH01-R	FH01R0630	n° 6 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R0730	n° 7 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R0830	n° 8 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R0930	n° 9 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R1030	n° 10 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R1130	n° 11 - 3/4“ EUROCONE	1.1/4”
FH01-R	FH01R1230	n° 12 - 3/4” EUROCONE	1.1/4”

DOMO*RADIANT* - FH01-G

Preassembled control and fluid pumping unit with 6-way multi-function including: primary fluid flow rate setting device, three-way mixing valve **with fixed-point control** through thermostatic actuator with remote probe, **hydraulic equalization device**, thermometer for measuring primary fluid temperature.

Type	Part no.	Description
FH01-G	FH01-G	One model only

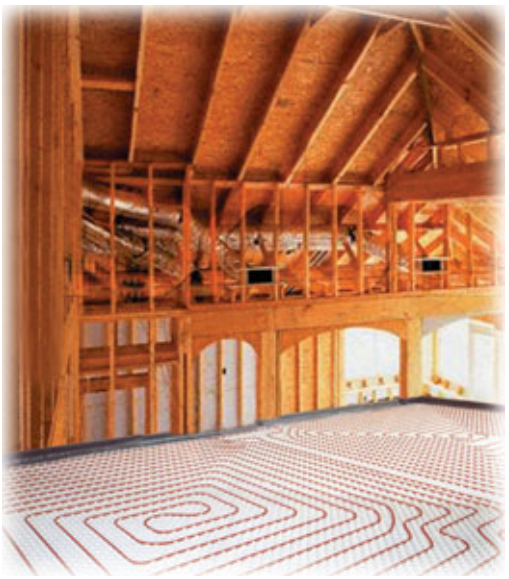
DOMO*RADIANT* - FH01-GR

Like FH01-G but complete with manifolds for supplying towel-rail radiators (high temperature).

Type	Part no.	Radiator side outlets	Description
FH01-GR	FH01-GR	n° 3 - 3/4“ EUROCONE	One model only

FH-Bypass	By-pass kit for differential pressure control with a straight body valve DN 1/2", pipes and fittings for coupling to the **Series FH** modules

Application



The heating of places by using heat radiating floors is by no means of recent technique; documents and archeological finds have born witness to this type of heating used by Egyptians, Greeks and Romans already over two thousand years ago.
Since then radiant heating has undergone considerable variations; the main one is that of having introduced **the use of water as heat-carrier fluid** instead of the direct use of fire and smoke. Radiant panel heating systems are, for their very nature, systems which guarantee maximum room comfort with low energy consumption. For these reasons, the radiant panel heating system is being used more and more in residential buildings, in the service industry, in the industrial world, and in commerce, institutes, churches, etc. with optimum results.
Laying of the pipework is relatively simple while the need to set the flow rates of the individual panels and therefore their efficiency, requires the use of dedicated devices.

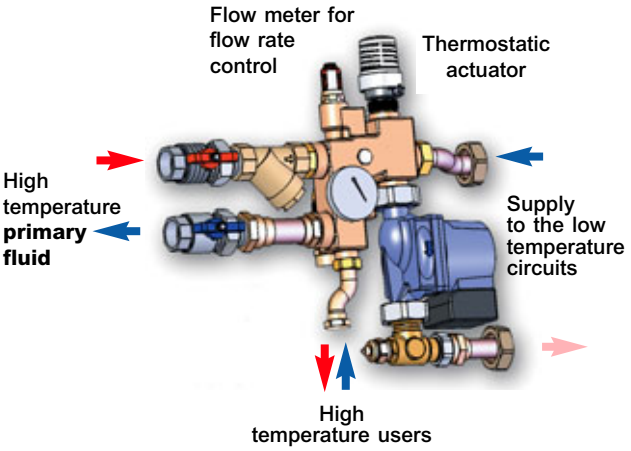
The preassembled **DOMO*RADIANT*** module neatly meets these functions thanks to the 6-way multi-function valve which controls the temperature of the working fluid. With the flow meters installed on each outlet, it ensures great accuracy of the flow rates in the individual panel circuits.
The addition of automatic room temperature control through thermostats which operate noise-free electrotermic actuators, mounted on the low temperature distribution manifold allows a more rational energy use with consequent reduction of energy consumption.

The 6-way multi-function valve (patented)

The multi-function valve is an innovative solution for controlling the underfloor heating system. The hot fluid delivered by the boiler is regulated and made available for the low-temperature supply of the radiant panel circuits thanks to a three-way mixing valve operated by a thermostatic actuator with remote sensor, or diverted directly to the circuits supplying the towel radiators. The multi-function valve is designed to ensure positive safety to the system also in case of failure of the thermostatic actuator.

The special configurations of the internal flow sections determine differential hydraulic characteristics (Kv) in the 3 ways of the mixing valve: max. flow rate with the high temperature primary fluid is always equal to 25% of the total supplied flow rate of the radiant panel heating system, and mixed with the remaining 75% of the low temperature fluid coming from the return circuit of the panels.

Alternative version of the unit with 3-way mixing valve operated by thermostatic actuator with remote sensor type 148SD

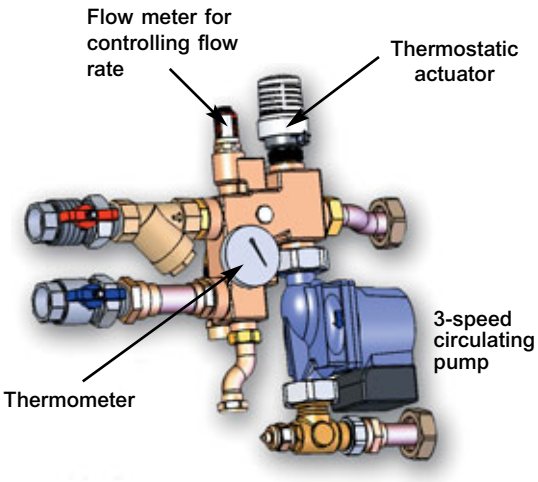


This determines a built-in safety for the system and such factor provides the certainty that the service temperature to the panels does not exceed the threshold of 55°C (under nominal operating conditions).
Main advantages such as :

- Low noise during operation, also in the case of failure or malfunctioning of the mixing unit (valve/actuator)
- No need for safety thermostat against overheating. Continuity of service for the user in the case of faulty operation with control locked on fully open position
- Great accuracy of the fluid temperature control system thanks to the different kv values thus drastically avoiding annoying hunting of the valve which would otherwise merely become an ON/OFF type control with continuous trimming of the safety thermostat.

The multi-function valve incorporates the presence of the hydraulic equalization device. This device is really a section connecting the supply and return lines of the primary circuit, between whose nodes the differential pressure is nil or almost so: such indispensable hydraulic precaution avoids any interference effects due to the influence in terms of residual head of the mains pump with the recirculating pump on board the unit.

The standard accessories are complete with a 3-speed electrically-driven pump to provide the flow rate and head necessary for the panel circuits (see residual head graph), a flow meter for displaying and setting of the total design flow rate and a thermometer for direct reading of the primary fluid



Preassembled manifold for low temperature fluid distribution

The ability to adjust with a high degree of accuracy the flow rates in the various branches to the design value and to yield the correct quantity of energy in the environment, is the performance characteristic which “makes all the difference”, above all in radiant panel heating systems, between an ordinary manifold and the preassembled manifold used in the DOMO*RADIANT* module.

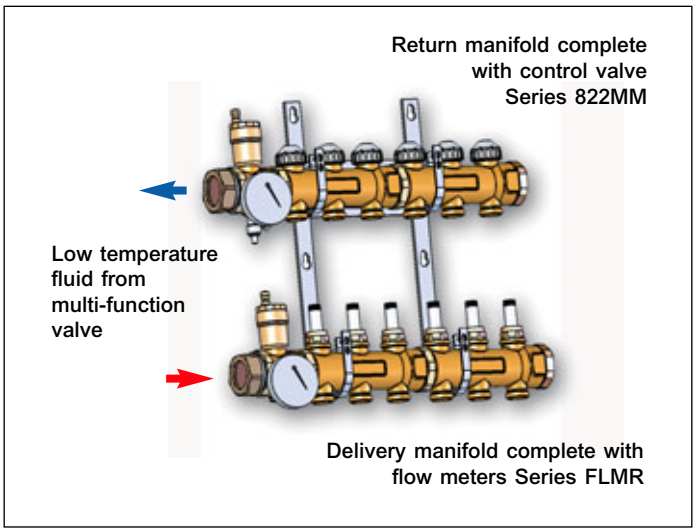
The preassembled manifold serving for distribution of the low temperature fluid, allows **setting the flow rate and automatic control of each single circuit** as well as visual checking of the fluid temperature thanks to the following components :

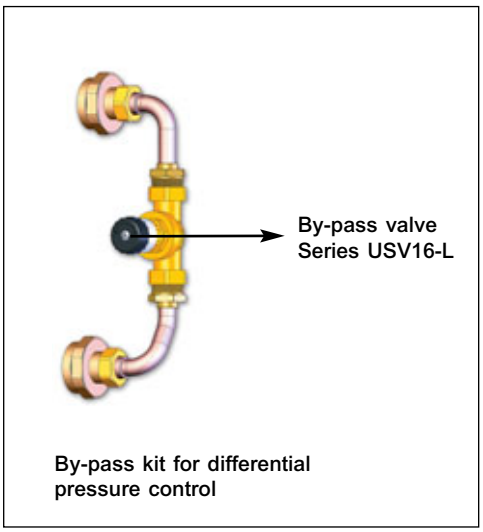
- Modular supply manifolds Series FLMR complete, for each supply outlet, with flow meter (scale 0-6 litres/minute) incorporated in the setting device.
- Modular return manifolds Series 822MM with built-in control valves which can be thermostatted with electrothermic actuators Series 22C (on request)

- End accessory holder (823MP) on the supply and return lines, fitted with float-type manual air vent valve (Series 2161C - Floatvent Dn 3/8"), drain valve (Art. 238), bimetal contact thermometer (Series TBE-63 - Scale 0-80°C)

The manifold unit available with diameter DN 1.1/4" and any number (up to 12) of side outlets DN 3/4" eurocone thread, is assembled with two mounting brackets; when the manifolds are joined well aligned to each other via a lock nut, they ensure a perfectly tight seal thanks to a prefitted O-ring.

It is possible to complete the manifold on the head connections with a by-pass kit; this kit includes a two-way straight body valve, for differential pressure control, which is compulsory when the circuits are controlled by automatic components (electrothermic actuators series 22C).





Integrated room temperature control systems

The preassembled DOMO*RADIANT* module is well suited for use of high-tech. solutions which allow improvements in terms of efficiency, energy saving and comfort.

A simple, independently operating system consists in providing the individual supply branches of the panel circuits with electrothermic actuators Series 22C.

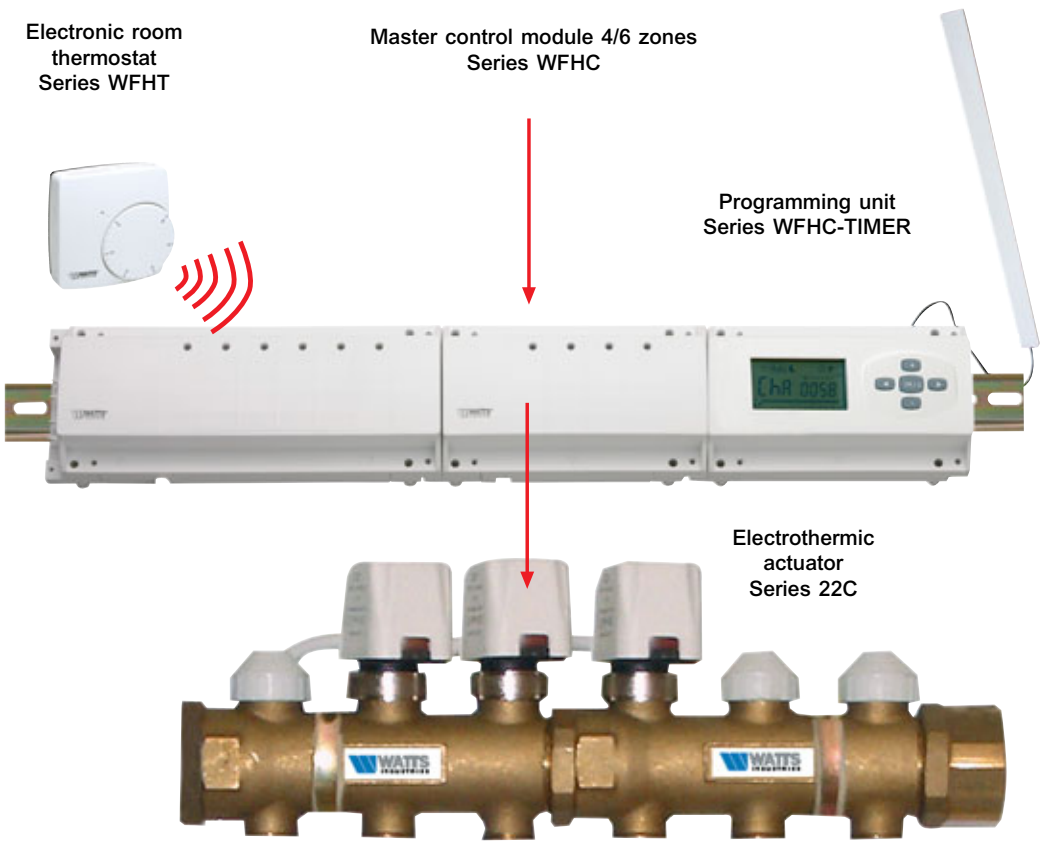
The combination does not require any plumbing work; it can also be carried out with the system under pressure; moreover it is noise-free during operation.

The heat emission of the individual panel circuits can be controlled by thermostats (also available in the wireless version) installed in the individual room or pilot zone: the thermostat control either acts directly or can be centralized in a single easy-to-install control module (Series WFHC with 4 or 6 zones).
Communication between thermostats and actuators is through energization of the relay incorporated in the module: up to two 22C actuators can be connected to each relay. Their mode of operation is signaled by a led.
This room control can be optimized and made more exact according to the user's requirements if the modular boxes are combined with a programmer timer (Series WFHC-TIMER) which allows inserting different timing programmes and ambient temperature conditions (set-point) subdivided by the panel circuits.

The main modular box of the WFHC Series (called Master) is also provided with a relay for controlling the electrically-driven pump. The secondary module (Slave) has a plug-in connector for easy coupling to the master units whereby control units can be obtained for up to 12 zones.

All control equipment/instruments are supplied separately.

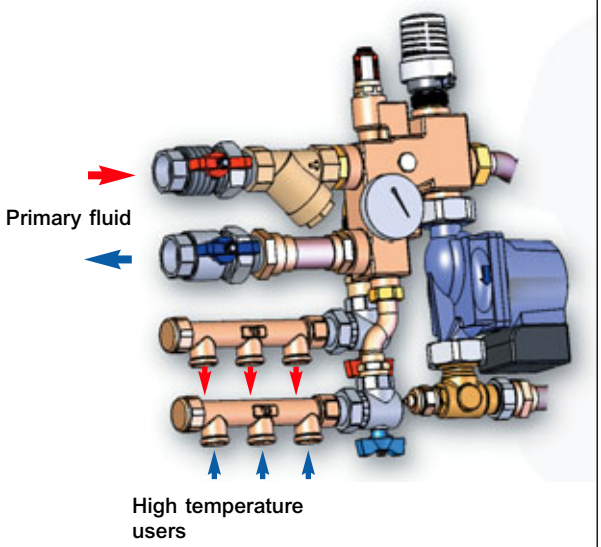
Automatic control system integrated with room thermostats, multi-zone box and electrothermic actuators



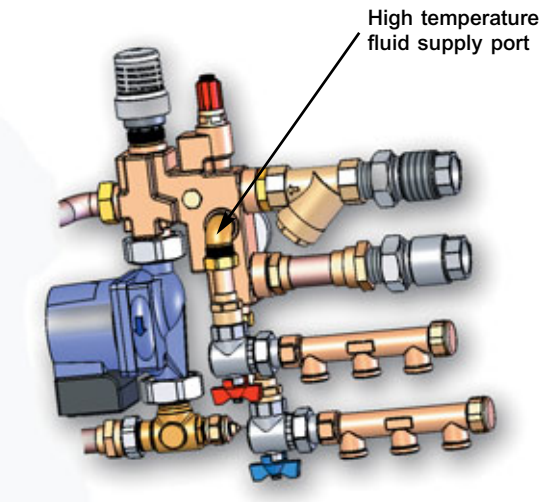
Preassembled high temperature fluid distribution manifold

It is possible to provide the preassembled DOMO*RADIANT* module complete with an independent section for feeding the towel-rail terminal units (conventional radiators, design radiators) which are often necessary in places where the surface available for panel heating is not sufficient (e.g. bathrooms).
In this case, the high temperature primary fluid is diverted to individual brass manifolds Series 807MF, complete with shut-off ball valve.
Manifolds with 3/4" head connection are provided with 3 side outlets size 3/4" eurocone, which easily meet the home users' needs.

Front view of the module :
High temperature circuit section



Back view of the module :
high temperature circuit section



Mode of operation

The special six-way multi-function unit, although very compact in design, controls the module and performs all the main functions as shown in figure 1. Such diagram represents the best fixed-point control circuit with built-in safety, suitable for supplying low temperature systems such as the modern radiant panels in floor heating systems.

The circuit guarantees, with the maximum accuracy, holding the fluid temperature at the required level and conveying the required flow to the radiant panels. At the same time, it allows functioning of the high temperature outlets (for boilers) serving the towel-rail radiators when necessary (bathroom facilities and exposed rooms), so that the entire motive force of the boiler primary pump PP is kept for the latter items.

In order to achieve this, the operating ranges of the two electrically-driven pumps PP and P are held quite separately from the equalization section *x* - *y*, between whose nodes the different pressure is, as is well known, either zero or almost. This means that pump PP is limited to serving the radiators and node x of the equalization section: while pump P withdraws the very hot water from node *x* and mixes it with panel return nodes C and B. In order to have a clearer understanding of the efficiency of the system we shall examine what happens when pump P is disactivated. In such case, if the equalization section is shut-off or is missing, the very hot water sent from the boiler by primary pump PP would invade the panels without possibility of mixing; while with the equalization section, it is not possible for the very hot water to reach the panels, rather it will be diverted from node *x* to node *y* then it will return to the boiler without any consequences. Basically speaking, flow g at temperature *t1* will pass downwards via the equalization section while flow *gc* will be null even if port a of mixing valve VM is fully opened owing to a failure. Hence we have the advantage of being able to suspend the heating to the panels by merely stopping just pump P and here we also have the first built-in safety against over-heating.

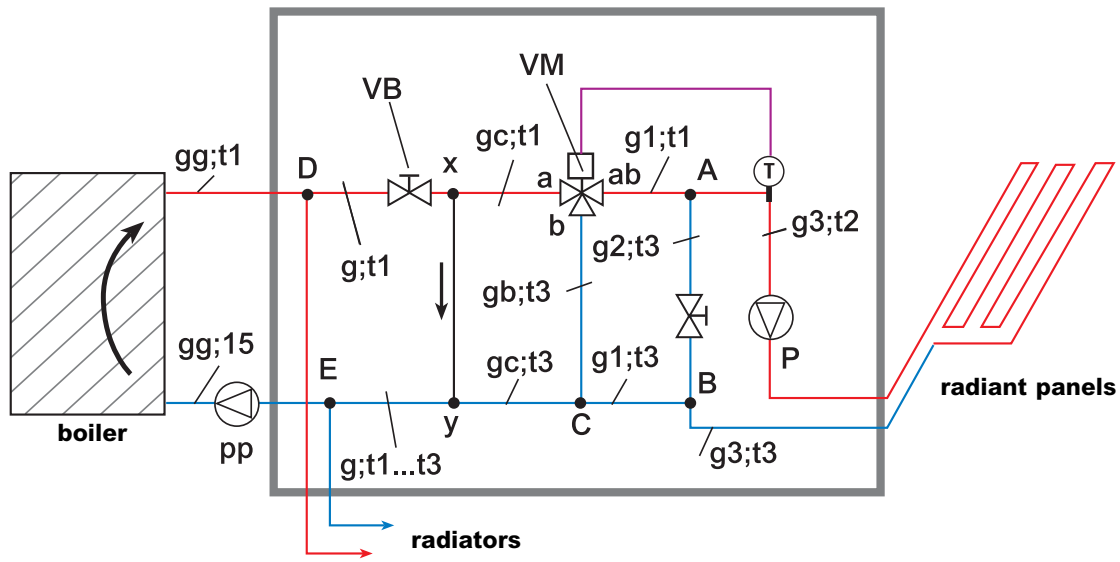
Also as regards correct operation, a flow meter VB for the max. flow rate of very hot water is installed upstream of node *x*. This very hot water is withdrawn directly from the boiler in such a way as to limit to what is strictly necessary (or little more) for the radiant panels (*g* = *g1* max is normally 1/4 of *g3*) by overcoming the differential pressure between *x* - *y* at 0, but leaving the flow and head between nodes D to E. If flow meter VB is not used, flow g would be much higher, tending to be equal to gg; such flow would be discharged in the equalization section

thus determining a serious drop in the residual motive force at nodes D - E and this would cause not sufficient water supply to the radiators. Thanks to this circuit characteristic, the performance levels of the primary pump can also be very high or subject to a certain variability without upsetting the downstream control system protected by equalization section *x - y*. We shall now examine the mixing section controlled by pump P, valve VM and by-pass AB. In order to have the best effect, three-way mixing valve VM has a flow coefficient which when related to the total panel flow *g3*, represents only 1/4 of it or less (the Kvs value is adjustable).

This means that maximum flow rate of very hot water gc, represents only 0.25 of *g3*; while the remaining 0.75 of *g3* involved in the mixture, i.e. *g2*, flows across the return (cold) section of the panels via the calibrated and preset by-pass AB. Thanks to the mixing conditions described above, we can have the certainty that even in the event of any failure, the max. panel supply temperature will be:

0.25 x 80°C + 0.75 x 40°C = 50°C

therefore also remaining within the positive safety limits even without use of any other devices.



Section A-B, Optional (Kit by-pass supplied separately)

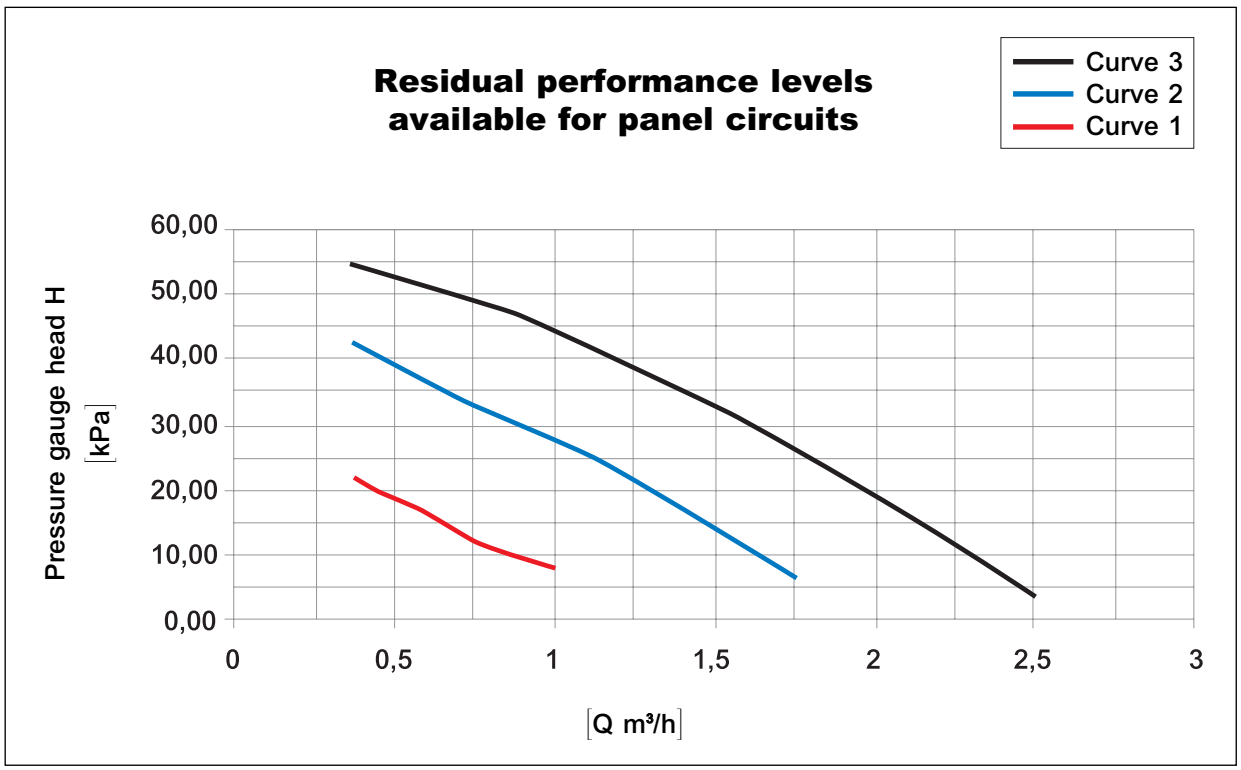
Pic. 1

Technical data	
Valve body material, pump connections, manifold	Brass EN12165 CW617N
Max. primary inlet temperature (boiler side)	80 °C
Nominal pressure, entire module	10 bar
Max. operating pressure (depending on piping)	4 bar
Nominal inlet temperature (from boiler)	**70 °C**
Adjust temperature range, radiant panel	20 - 50 °C
Modulating controller	Proportional Band 10K
Nominal flow rate (3rd pump speed)	1800 l/h
Nominal head to manifold (3rd pump speed)	25 kPa
Power rating (thermal difference ~ 7K)	15 kW
Range of measurement and adjustment, flow meter VB	2-16 l/min (120 to 960 l/h)
Factory setting of flow meter VB	7 l/min. (420 l/h)
Max. temperature which can be reached in the panel circuits in intrinsic safety (system failure, primary temperature 80°C)	55 °C
Max. ratio of primary flow (from boiler)	0.25
Range of measurement/balancing, flow meters. Single panel	1 ÷ 6 l/min. (60 to 360 l/h)
Temperature range, thermometers	20 - 80 °C
Pump centre distance	130mm
Connection to pump	1.1/2”
Connections to manifolds	1.1/4”
Manifold head connection for panels	1.1/4"
DN, panel manifolds outputs	3/4” eurocone
Manifold head connection for radiators	3/4"
DN outlets, radiator manifolds with 3 outlets	3 /4” eurocone

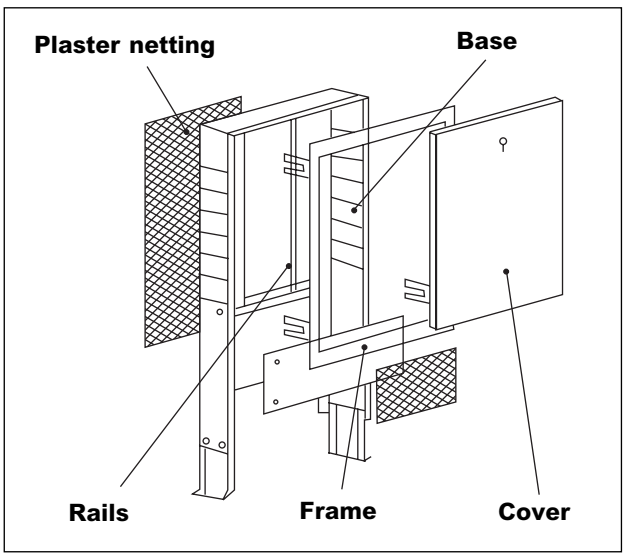
Pump model

With three-speed selector switch and safety thermal overload relay : supply voltage 230V – 50 Hz, degree of protection IP 44.

Residual head										
Curve	**Q [m³/h]**	0.36	0.75	1	1.5	1.75	2	2.5	3.5	3.82
3	**H3 [kPa]**	55.04	49.56	44.66	32.73	26.71	19.64	3.87		
2	**H2 [kPa]**	42.84	33.16	28.16	14.03	6.71				
1	**H1 [kPa]**	21.94	12.56	8.16						



Installation



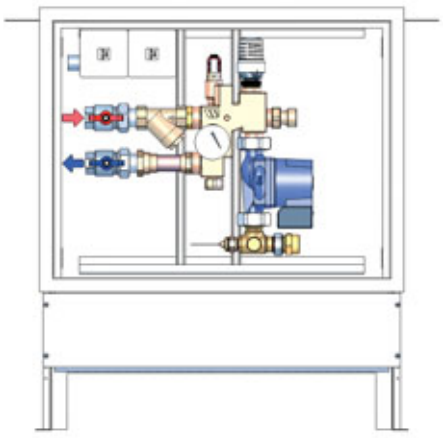
For installation of the presassembled module DOMO*RADIANT* an inspection box is available, fully made of galvanized metal, in various sizes, depending on the number of side outlets required, and complete with door.

Its compact size (110 mm in depth) makes it easy to embed in the internal partition walling: contruction of the system is made easier by removing part of the front frame and side windows.

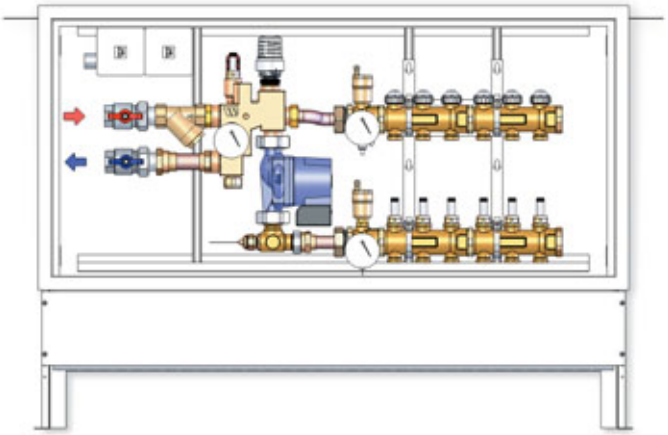
The module is designed to receive the fluid **from both right and left side** : if necessary the installer can turn the entire module upside-down to adapt it to the inlets on the right-hand side (for such purpose, there are connections at the back of the multi-function valve and on the accessory-holder terminal where to insert the thermometers and connect the supply manifolds of the towel-rail radiators).
The box can include any of the configurations available for the module : the examples given below illustrate three versions with 6 panel circuit connections.

All DOMO*RADIANT* solutions are hydraulically factory tested.

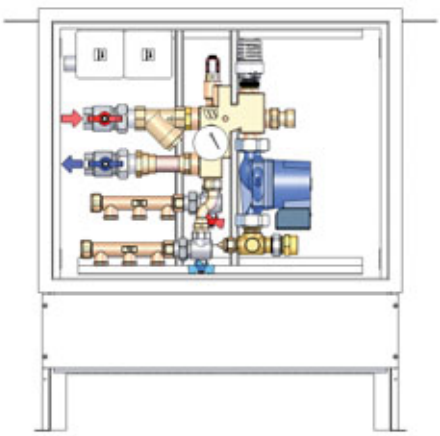
Example preassembled control and fluid pumping unit designed for connecting to the manifolds for distribution low and high temperature fluid (radiant panels and radiator)



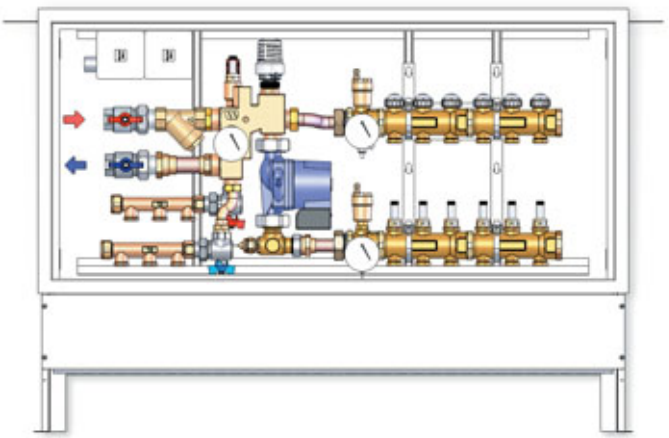
Example of preassembled module with distribution of low temperature fluid for radiant panels



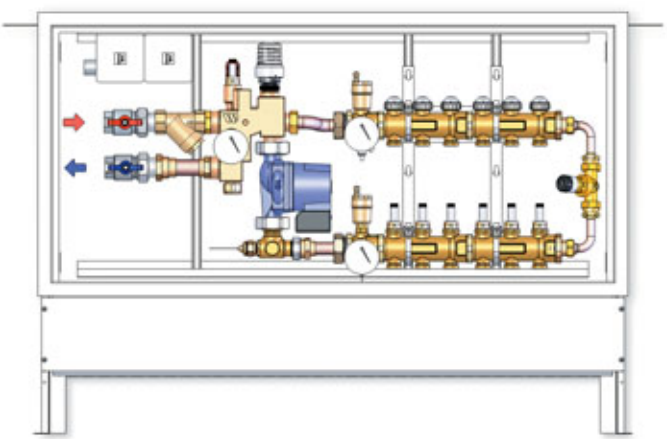
Example preassembled control and fluid pumping unit designed for connecting to the manifolds for distribution low temperature (radiant panels) and complete with distribution manifold for high temperature fluid (radiator)



Example of preassembled module in box with independent distribution of low temperature fluid (panels) and high temperature fluid (radiators)

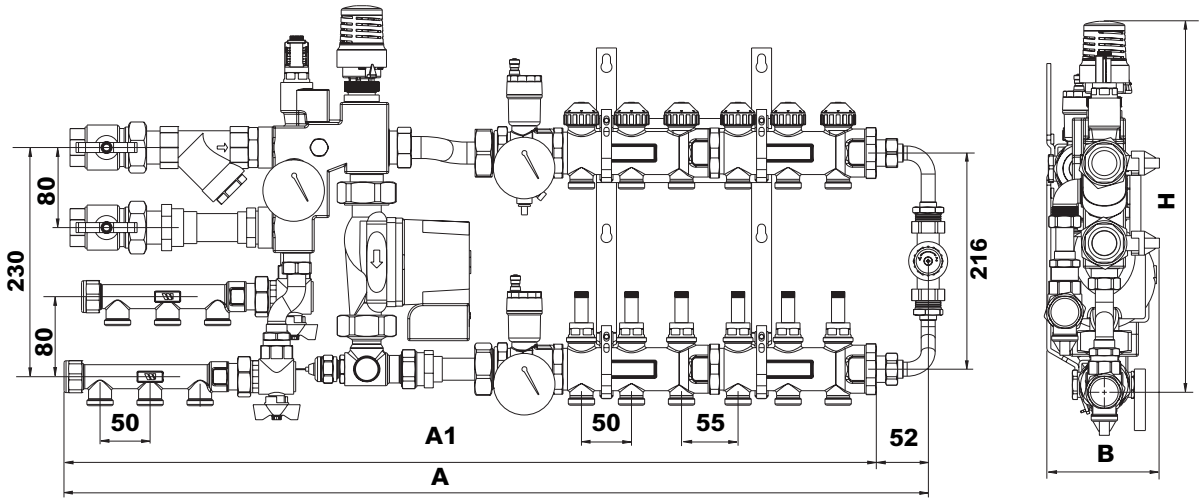


Example of preassembled module in box with independent low temperature fluid distribution.
Complete with by-pass circuit.

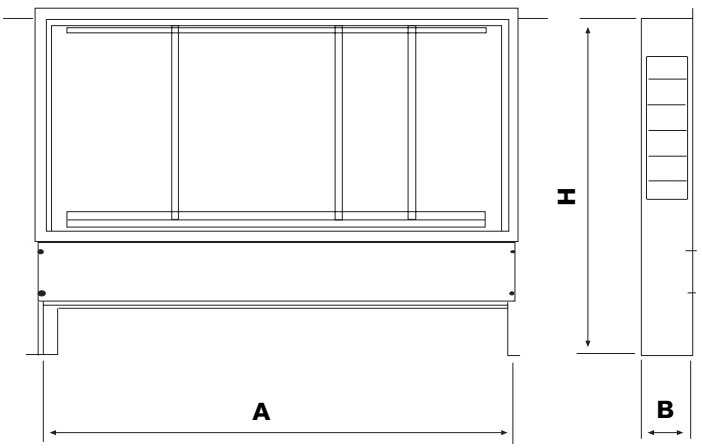


Overall dimensions (mm)

FH01 - FH01-R



N° of branches (panels)	A	A1	B	H
6	865	813	110	372
7	915	863	110	372
8	965	913	110	372
9	1020	968	110	372
10	1070	1018	110	372
11	1120	1068	110	372
12	1175	1123	110	372

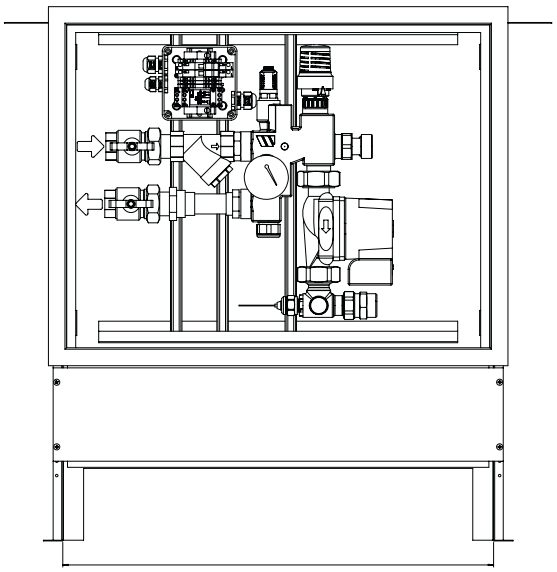


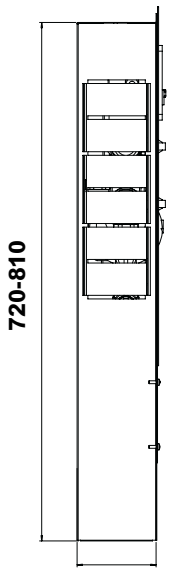
Code	N° of branches (panels)	A	*B	*H
839M10075NV	6-7-8	1000	110/150	720/810
839M12075NV	9-10-11-12	1200	110/150	720/810

* The height and depth of the box can be modified on the spot thanks to the adjustable foot and frame.

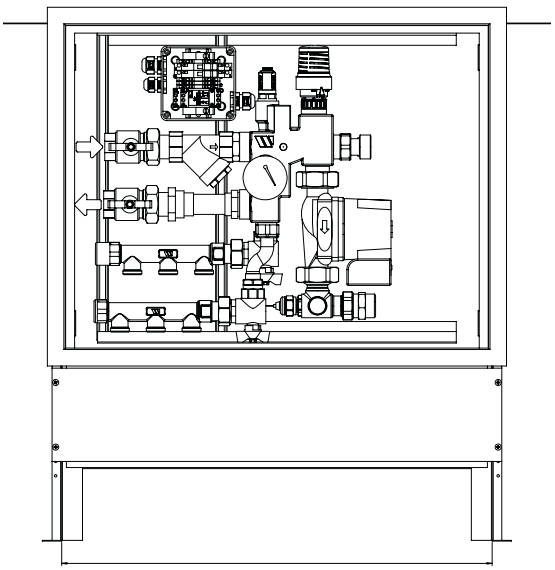
Overall dimensions (mm)

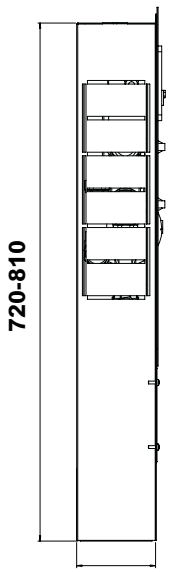
FH01-G





FH01-GR





A Division of Watts Water Technologies Inc.

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Preassembled temperature control/thermal energy meter unit DOMO*COMPACT* Series

Main features

The **DOMO*COMPACT* Series** units monitor the temperature of the heating system and billing of thermal energy to each apartment in buildings with centralized combustion system. Systems provided with **DOMO*COMPACT*** ensure :

- Independent control of both room heat comfort and system activation times.
- Allocation of costs on the basis of effective consumption of heat and domestic hot /cold water).
- Consumption data remote recording and transmission.

The DOMO*COMPACT* Series units have a compact design for a quick and easy installation /maintenance. The same unit can be installed in a wide range of configurations (primary fluid inlet right/left, vertical/horizontal positioning)

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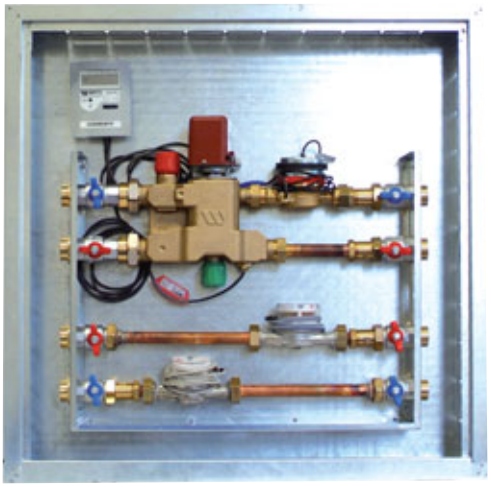
Description

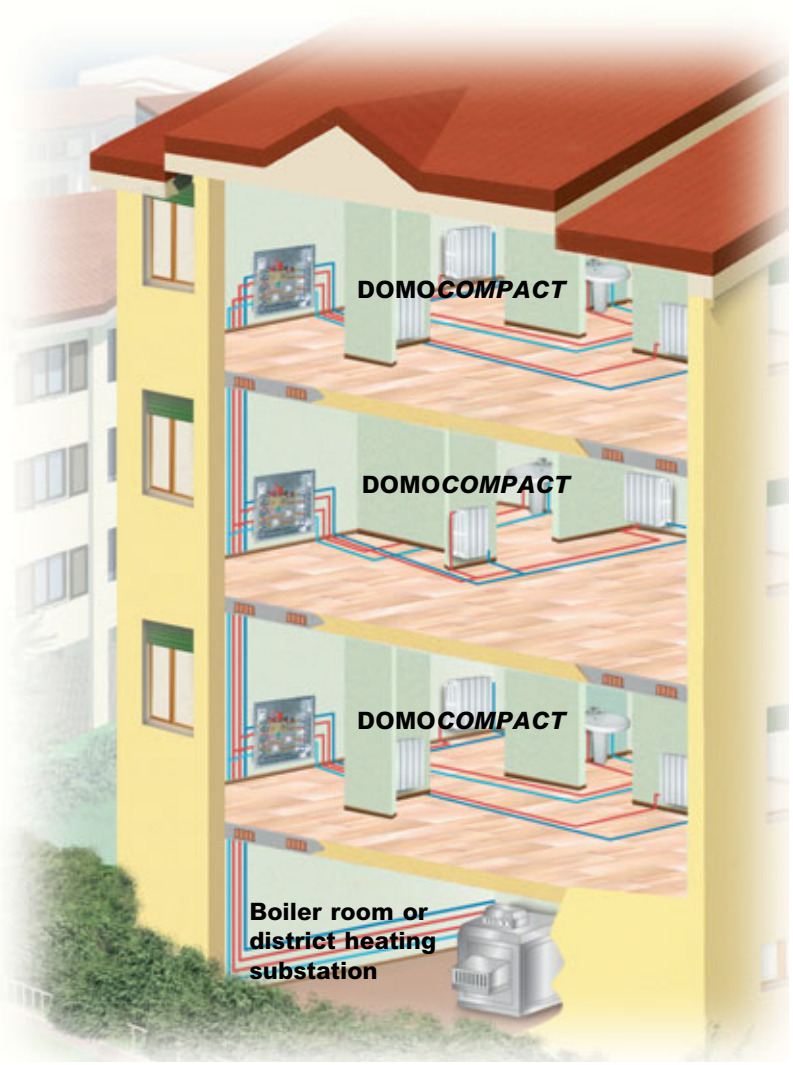
The preassembled temperature control/thermal energy meter units **DOMO*COMPACT* Series** although fed by centralized primary fluid, are able to ensure the same independent control (room comfort level) and adjustment as a conventional system based on water heated therminal units. In fact, the enduser of each apartment can control the performance of his own heating system as regards both heating and domestic water consumption (hot or cold). Most of the functions performed are incorporated in the multifunction valve, therefore the unit is extremely compact.

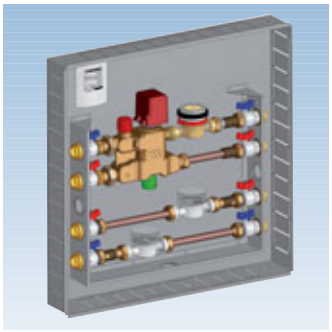


DOMOCOMPACT unit

The **DOMO*COMPACT*** units control the primary fluid flow through the ON/OFF action of a zone actuator electrically connected to a chrono-thermostat located in the master room. When there is demand for heat, the flow of operating fluid (which can be fixed by a special setting device) is supplied to the heating system and measured by a volumetric meter installed on the return line. The thermal energy metering system, approved by the P.T.B. Institute of Berlin, is complete with two temperature sensors on the supply/return lines and an electronic control panel which allows subsequent allocation of the costs based on actual consumption. Reading of the data/consumption for each individual user can also be easily concentrated, transmitted and processed in remote mode. If there is no heat demand, the fluid is returned to the primary circuit by means of a by-pass valve set so that it does not affect the other users. A steel mesh filter inserted in the central brass body, which can be removed for maintenance, protects the heating system against any impurities. The **DOMO*COMPACT*** unit also comes in the version with two independent additional sections for supply of sanitary hot/cold water.

Supply of the mains hot and cold water merely by opening a tap is calculated by a volumetric meter and recorded on the electronic panel; the domestic water sections can be provided with a water hammer arrestor (as option).
On the head connections of each section there are ball valves with 3-piece unions for shutting-off water of the unit when necessary. Replacement and maintenance operations are easy to carry out thanks to the presence of extendible and soft-sealed fittings.





DOMO*COMPACT* - DMSA open frame

Temperature control and thermal energy meter unit for a single user with billing of domestic hot/cold water consumption, preassembled **in open frame**. Through a simple operation, the unit can be adapted to **receive the main inlets from the column mounted on any of the four sides**.
Primary flow checked by the volumetric flow meter.
The **temperature control and setting** functions are incorporated in a bronze multi-function valve consisting of :
- 3-way zone valve PATENTED, complete with electrothermic actuator 24Vac or 230Vac (Art. ETE) coupled to the by-pass setting valve
- Water strainer (with steel mesh) protecting against impurities
- Setting and balancing valves
- Provision for piezometric connections

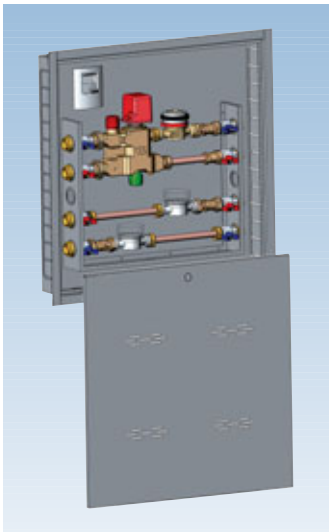
Thermal energy metering function based on :
- Electronic panel CA502, battery-powered, with two temperature probes Pt 500
- Single-jet turbine flow meter (Art. WMT)

The flow meters are designed for centralized reading of consumption via M-Bus EN 1434

Flow meter and protection function, hot or cold domestic water circuits (Kvs=4.0) performed by a single-jet turbine flow meter (Art. WMT) and built-in check valve.
With an additional accessory, it is possible to provide the domestic water sections with a water hammer arrestor.

Easy maintenance thanks to the presence of a ball shut-off valve (Art. 210) upstream and downstream of the individual circuit sections assembled with volumetric flow meters and special extendible fittings. **DOMO*COMPACT*** is supplied mounted on a frame in an enclosure box of suitable size.

Type	Description	Dn C/H	Dn D/W	Supply
DMSA120AH	Unit with heating section	20	-	230V
DMSA120AHC	Unit with heating/air conditioning section	20	-	230V
DMSA120BH	Unit with heating section	20	-	24V
DMSA120BHC	Unit with heating/air conditioning section	20	-	24V
DMSA125AH	Unit with heating section	25	-	230V
DMSA125AHC	Unit with heating/air conditioning section	25	-	230V
DMSA125BH	Unit with heating section	25	-	24V
DMSA125BHC	Unit with heating/air conditioning section	25	-	24V
DMSA220AH	Unit with heating section + 1 domestic water section (hot or cold)	20	20	230V
DMSA220AHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	20	20	230V
DMSA220BH	Unit with heating section + 1 domestic water section (hot or cold)	20	20	24V
DMSA220BHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	20	20	24V
DMSA225AH	Unit with heating section + 1 domestic water section (hot or cold)	25	20	230V
DMSA225AHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	25	20	230V
DMSA225BH	Unit with heating section + 1 domestic water section (hot or cold)	25	20	24V
DMSA225BHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	25	20	24V
DMSA320AH	Unit with heating section + 2 domestic water sections (hot or cold)	20	20	230V
DMSA320AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	20	20	230V
DMSA320BH	Unit with heating section + 2 domestic water sections (hot or cold)	20	20	24V
DMSA320BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	20	20	24V
DMSA325AH	Unit with heating section + 2 domestic water sections (hot or cold)	25	20	230V
DMSA325AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	25	20	230V
DMSA325BH	Unit with heating section + 2 domestic water sections (hot or cold)	25	20	24V
DMSA325BHC	Unit with heating/air conditioning section	25	20	24V

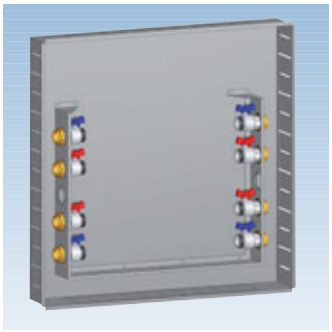


DOMOCOMPACT - DMSC closed frame

Temperature control and thermal energy meter unit for a single user with billing of domestic water (hot and cold) consumption, premounted in frame, **closed by a front panel fitted with lock**.

Same characteristics and functions as the unit in the DMSA Series.

Type	Description	Dn C/H	Dn D/W	Supply
DMSC120AH	Unit with heating section	20	-	230V
DMSC120AHC	Unit with heating/air conditioning section	20	-	230V
DMSC120BH	Unit with heating section	20	-	24V
DMSC120BHC	Unit with heating/air conditioning section	20	-	24V
DMSC125AH	Unit with heating section	25	-	230V
DMSC125AHC	Unit with heating/air conditioning section	25	-	230V
DMSC125BH	Unit with heating section	25	-	24V
DMSC125BHC	Unit with heating/air conditioning section	25	-	24V
DMSC220AH	Unit with heating section +1 domestic water section (hot or cold)	20	20	230V
DMSC220AHC	Unit with heating/air conditioning section +1 domestic water section (hot or cold)	20	20	230V
DMSC220BH	Unit with heating section +1 domestic water section (hot or cold)	20	20	24V
DMSC220BHC	Unit with heating/air conditioning section +1 domestic water section (hot or cold)	20	20	24V
DMSC225AH	Unit with heating section +1 domestic water section (hot or cold)	25	20	230V
DMSC225AHC	Unit with heating/air conditioning section +1 domestic water section (hot or cold)	25	20	230V
DMSC225BH	Unit with heating section +1 domestic water section (hot or cold)	25	20	24V
DMSC225BHC	Unit with heating/air conditioning section +1 domestic water section (hot or cold)	25	20	24V
DMSC320AH	Unit with heating section + 2 domestic water sections (hot or cold)	20	20	230V
DMSC320AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	20	20	230V
DMSC320BH	Unit with heating section + 2 domestic water sections (hot or cold)	20	20	24V
DMSC320BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	20	20	24V
DMSC325AH	Unit with heating section + 2 domestic water sections (hot or cold)	25	20	230V
DMSC325AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	25	20	230V
DMSC325BH	Unit with heating section + 2 domestic water sections (hot or cold)	25	20	24V
DMSC325BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot or cold)	25	20	24V

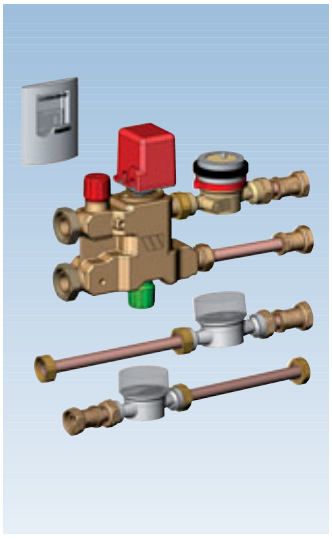


DIMA-DMS

Frame for housing the basic components making up the temperature control/thermal energy meter unit , with billing of domestic hot/ cold water **DMSA and DMSC Series**.

The inner frame, complete with pairs of ball valves and check device, is **designed** to receive pipes Series PIPE-DMS for flushing of the system or directly the chosen premounted single circuit section **SZ-DMS Series**.

Type	Part number	Description	Dn C/H	Dn D/W
DIMA-DMS	DIMA-DMS120	Frame for units DMSA and DMSC with heating/air conditioning section	20	-
DIMA-DMS	DIMA-DMS125	Frame for units DMSA and DMSC with heating/air conditioning section	25	-
DIMA-DMS	DIMA-DMS220	Frame for units DMS-A and DMS-C with heating/air conditioning section + 1 domestic water section (hot or cold)	20	20
DIMA-DMS	DIMA-DMS225	Frame for units DMS-A and DMS-C with heating/air conditioning section + 1 domestic water section (hot or cold)	25	20
DIMA-DMS	DIMA-DMS320	Frame for units DMS-A and DMS-C with heating/air conditioning section + 2 domestic water sections (hot and cold)	20	20
DIMA-DMS	DIMA-DMS325	Frame for units DMS-A and DMS-C with heating/air conditioning section + 2 domestic water sections (hot and cold)	25	20



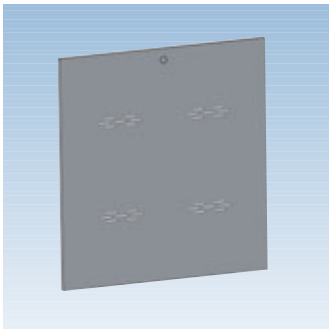
SZ-DMS

Basic components for building up temperature control/thermal energy meter units Series DMSA and DMSC.
Section of preassembled circuit for heating/air conditioning consisting of :

- Brass multi-function valve (patented) with 3-way zone valve coupled to electrothermic actuator (Art. ETE) and by-pass setting valve
- Water strainer (with steel mesh) protecting against impurities.
- Setting and balancing valves
- Provision for piezometric connections
- Electronic panel CA502M , battery-powered, with n°2 temperature probes Pt 500 single-jet turbine flow meter (Art. WMT)

Preassembled circuit sections for metering the domestic hot/cold water consisting of :
- One single-jet turbine flow meter (Art. WMT).
- Pipe with female fitting

Type	Part number	Description	Dn	Supply
SZ-DMS	SZ-DMS20AH	Circuit for heating section	20	230V
SZ-DMS	SZ-DMS20AHC	Circuit for heating/air conditioning section	20	230V
SZ-DMS	SZ-DMS20BH	Circuit for heating section	20	24V
SZ-DMS	SZ-DMS20BHC	Circuit for heating/air conditioning section	20	24V
SZ-DMS	SZ-DMS25AH	Circuit for heating section	25	230V
SZ-DMS	SZ-DMS25AHC	Circuit for heating/air conditioning section	25	230V
SZ-DMS	SZ-DMS25BH	Circuit for heating section	25	24V
SZ-DMS	SZ-DMS25BHC	Circuit for heating/air conditioning section	25	24V
SZ-DMS	SZ-DMS20SANC	Circuit for domestic hot water	20	-
SZ-DMS	SZ-DMS20SANF	Circuit for domestic cold water	20	-

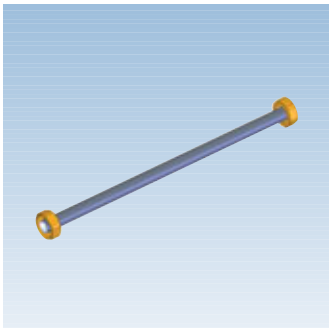


MT-DMS

Protective front panel for temperature control/thermal energy metering units Series DMSA.
Of suitably reinforced metal sheet construction.
Fitted with simple lock, with opening/closing by screwdriver.

Type	Part number	Description	Size (mm)
MT-DMS	MANT-DMS	Protective front panel, DOMO*COMPACT* units	(650 x 650)

DOMO*COMPACT* accessories DMSA/DMSCS Series

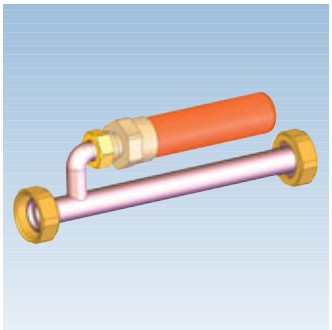


PIPE-DMS

Pipes with female end fitting for flushing of the fluid distribution mains for heating and domestic hot /cold water.

The pipes, reusable for all units of the DOMO*COMPACT* Series, are of suitable length for joining to the ball valve bodies already fixed on the frame DIMA-DMS Series.

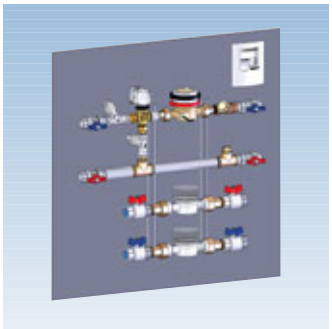
Type	Part number	Description	Dn
PIPE-DMS	PIPE-DMS201	Pair of preflushing pipes for units DMSA120 … and DMSC120...	20
PIPE-DMS	PIPE-DMS202	n°3 preflushing pipes for units DMSA220.. and DMSC220.. (hot or cold)	20
PIPE-DMS	PIPE-DMS203	n°4 preflushing pipes for units DMSA320.. and DMSC320.. (hot or cold)	20
PIPE-DMS	PIPE-DMS251	Pair of preflushing pipes for units DMSA125.. and DMSC125..	25
PIPE-DMS	PIPE-DMS252	n°3 preflushing pipes for units DMSA225.. and DMSC225.. (hot and cold)	25
PIPE-DMS	PIPE-DMS253	n°4 preflushing pipes for units DMSA325.. and DMSC325.. (hot and cold)	25



APW-DMS

Accessory component for adding the water hammer arrestor function in the units of the DMSA and DMSC series, consisting of:
- **Water hammer arrestor,** piston type DN 1/2“
- Suitably sized connecting pipe
- Male end fitting for joining to the single domestic water section (SZ-DMS Series)

Type	Part number	Description	Size (mm)
APW-DMS	APWDMS15	Basic water hammer arrestor	one size only

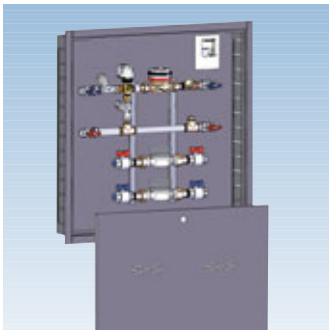


DMSA-*MINI*

Temperature control/thermal energy meter unit for **low flow requirements** (< 450 l/h) and metering of domestic hot/cold water, preassembled on chassis sheet. For design requirements regarding hydraulic performance, the heating section is assembled with single in-line components (shut-off lockshield valve, zone valve, volumetric meter, filter, ball valve).
Thermal energy metering function based on :
- Electronic panel CA502M , battery-powered, with n°2 temperature probes Pt 500
- Single-jet turbine flow meter (Art. WMT)

Energy meters are designed for centralized reading of the consumption via M-Bus EN 1434 **Flow metering function,** hot or cold domestic water circuits (Kvs=4.0) performed by a single-jet turbine flow meter (Art. WMT).
The unit is designed for installation only in **horizontal position (inlets on left)**.

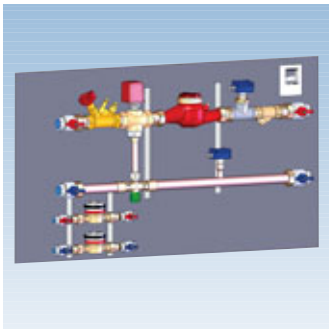
Type	Description	Dn C/H	Dn D/W	Supply
DMSA115AH	Unit with heating section	15	-	230V
DMSA115AHC	Unit with heating/air conditioning section	15	-	230V
DMSA115BH	Unit with heating section	15	-	24V
DMSA132BHC	Unit with heating/air conditioning section	15	-	24V
DMSA215AH	Unit with heating section + 1 domestic water section(hot or cold)	15	20	230V
DMSA215AHC	Unit with heating/air conditioning section + 1 domestic water section(hot or cold)	15	20	230V
DMSA215BH	Unit with heating section + 1 domestic water section(hot or cold)	15	20	24V
DMSA215BHC	Unit with heating/air conditioning section + 1 domestic water section(hot or cold)	15	20	24V
DMSA315AH	Unit with heating section + 2 domestic water sections (hot and cold)	15	20	230V
DMSA315AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	15	20	230V
DMSA315BH	Unit with heating section + 2 domestic water sections (hot and cold)	15	20	24V
DMSA315BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	15	20	24V



DMSC-*MINI*

Like model DMSA-MINI but with the components housed in frame, closed by a front panel fitted with lock.

Part number	Description	Dn C/H	Dn D/W	Supply
DMSC115AH	Unit with heating section	15	-	230V
DMSC115AHC	Unit with heating/air conditioning section	15	-	230V
DMSC115BH	Unit with heating section	15	-	24V
DMSC132BHC	Unit with heating/air conditioning section	15	-	24V
DMSC215AH	Unit with heating section + 1 domestic water section (hot or cold)	15	20	230V
DMSC215AHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	15	20	230V
DMSC215BH	Unit with heating section + 1 domestic water section (hot or cold)	15	20	24V
DMSC215BHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	15	20	24V
DMSC315AH	Unit with heating section + 2 domestic water sections (hot and cold)	15	20	230V
DMSC315AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	15	20	230V
DMSC315BH	Unit with heating section + 2 domestic water sections (hot and cold)	15	20	24V
DMSC315BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	15	20	24V

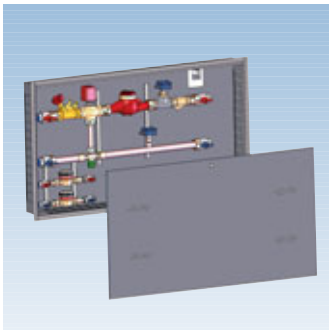


DMSA-*MAXI*

Temperature control/thermal energy meter unit for **high flow requirements** (>3000 l/h) and metering of domestic hot/cold water, preassembled on chassis sheet. For design requirements regarding hydraulic performance, the heating section is assembled with single **in-line** components (balancing valve, zone valve, volumetric meter, probe, filter).
Thermal energy metering function based on:
- Electronic panel CA502M, battery powered, with n°2 temperature probes Pt 500
- Single-jet turbine flow meter (Art. WMT)

Energy meters are designed for centralized reading of consumption levels via M-Bus EN 1434. **Flow metering function**, hot or cold domestic water circuits (Kvs=4.0) performed by a single-jet turbine flow meter (Art. WMT).
The unit is designed for installation only in **horizontal position (inlets on left)**.

Part number	Description	Dn C/H	Dn D/W	Supply
DMSA132AH	Unit with heating section	32	-	230V
DMSA132AHC	Unit with heating/air conditioning section	32	-	230V
DMSA132BH	Unit with heating section	32	-	24V
DMSA132BHC	Unit with heating/air conditioning section	32	-	24V
DMSA232AH	Unit with heating section + 1 domestic water section (hot or cold)	32	20	230V
DMSA232AHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	32	20	230V
DMSA232BH	Unit with heating section + 1 domestic water section (hot or cold)	32	20	24V
DMSA232BHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	32	20	24V
DMSA332AH	Unit with heating section + 2 domestic water sections (hot and cold)	32	20	230V
DMSA332AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	32	20	230V
DMSA332BH	Unit with heating section + 2 domestic water sections (hot and cold)	32	20	24V
DMSA332BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	32	20	24V



DMSC-*MAXI*

Like model DMSA-MAXI but with the components housed in **frame, closed by a front panel fitted with lock.**

Part number	Description	Dn C/H	Dn D/W	Supply
DMSC132AH	Unit with heating section	32	-	230V
DMSC132AHC	Unit with heating/air conditioning section	32	-	230V
DMSC132BH	Unit with heating section	32	-	24V
DMSC132BHC	Unit with heating/air conditioning section	32	-	24V
DMSC232AH	Unit with heating section + 1 domestic water section (hot or cold)	32	20	230V
DMSC232AHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold))	32	20	230V
DMSC232BH	Unit with heating section + 1 domestic water section (hot or cold))	32	20	24V
DMSC232BHC	Unit with heating/air conditioning section + 1 domestic water section (hot or cold)	32	20	24V
DMSC332AH	Unit with heating section + 2 domestic water sections (hot and cold)	32	20	230V
DMSC332AHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	32	20	230V
DMSC332BH	Unit with heating section + 2 domestic water sections (hot and cold)	32	20	24V
DMSC332BHC	Unit with heating/air conditioning section + 2 domestic water sections (hot and cold)	32	20	24V

Application

The temperature control/thermal energy meter units of the **DOMO*COMPACT* Series** are mainly used in multiple unit buildings (terrace villas, residential apartment blocks, shopping centres, building complexes with variously owned units) or in all those cases where it is possible to produce heat from a central boiler. This plant engineering solution normally has less construction costs than in the case of independent solutions and meets users' demands in terms of comfort, safety and costs savings. Such installations are characterized by a general distribution at source originating in a boiler room and branching into columns mounted where the stairs or service rooms are located.

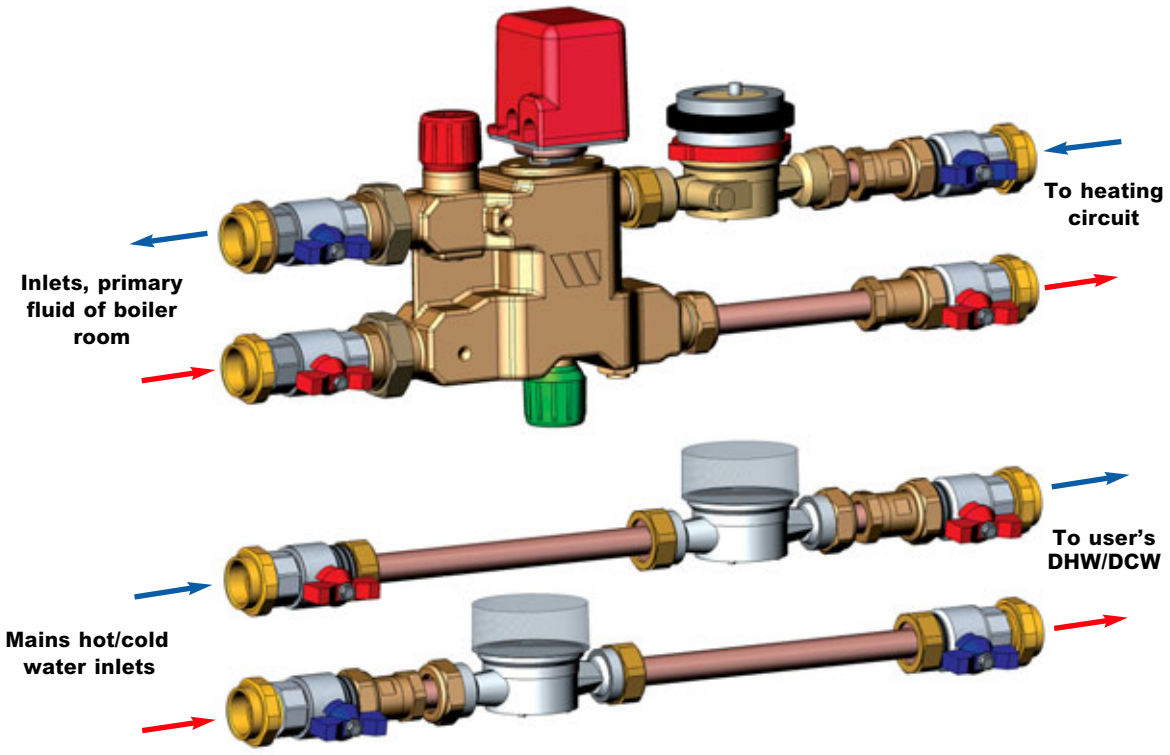
Hence the temperature control/thermal energy meter units of the Domocompact Series are installed close to the buildings, preferable in the common areas of the building for an easy access by the system operator and for reading maintenance operations.

The primary distribution line should supply all **DOMO*COMPACT*** units with fluid at the preset temperature and flow rate substantially constant throughout the year.
The differences in head available for the units will be appropriately compensated by built-in setting devices.

Hence heating/hot water systems with the **DOMO*COMPACT*** temperature control/thermal energy units represent a highly advanced technological solution. They ensure room comfort in terms of heating and enable meeting the requirements : 2002/91/CE "EPBD" Energy Performance Building Directive.

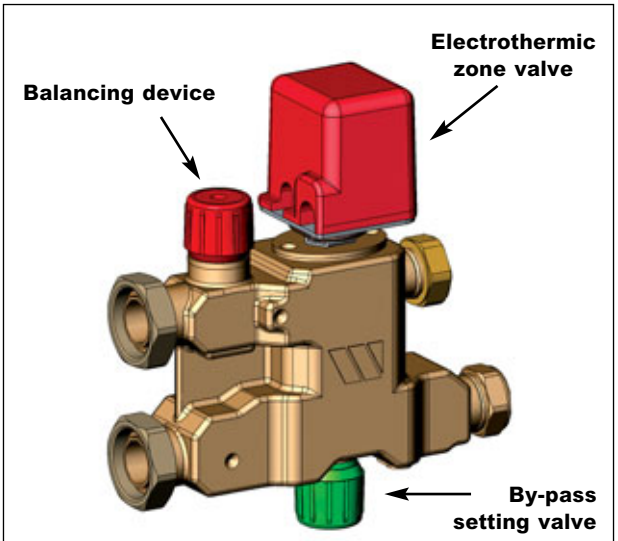
DOMO*COMPACT* units DMSA o DMSC Series

Description of flow inlets/outlets for the individual section of temperature control and thermal energy metering for heating or domestic water.



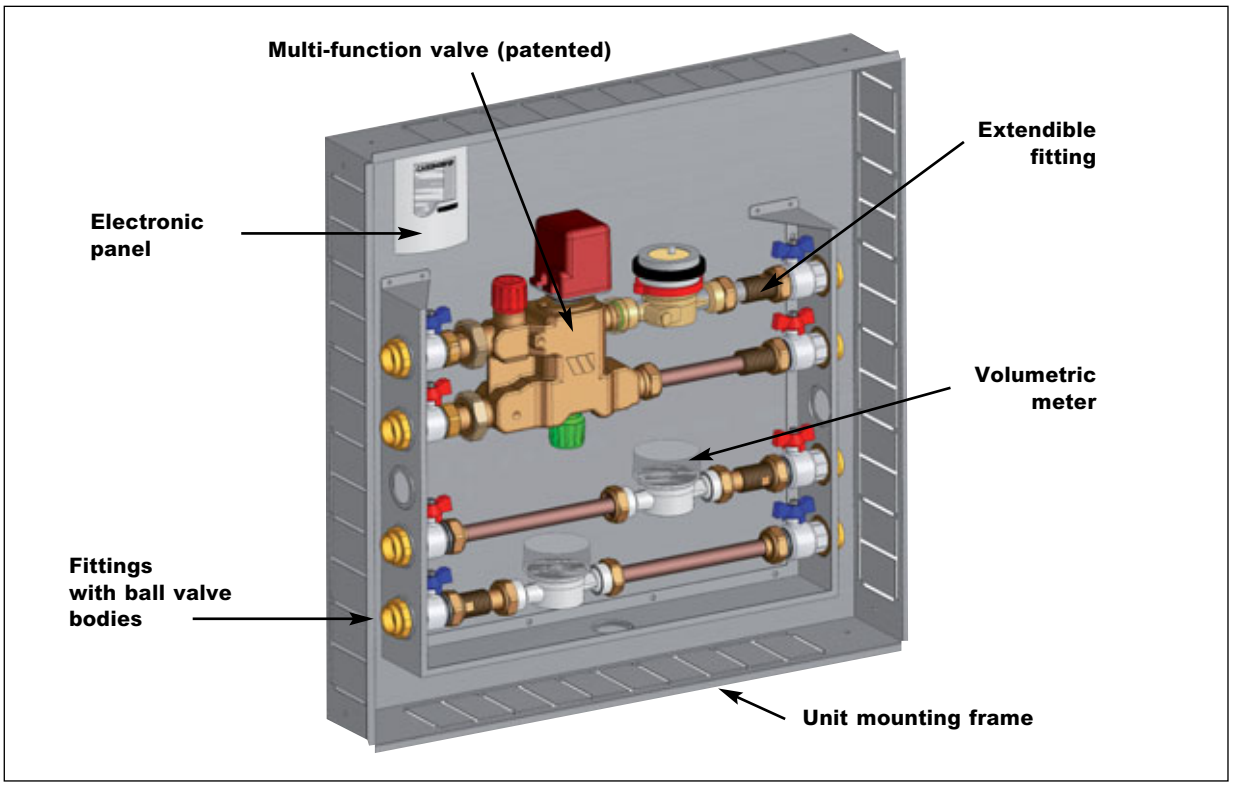
Operation

The unit receives the primary fluid from the central boiler room and supply it to the distribution manifold which, in turn, serves the end units.
This heat supply is controlled by a programmable chrono-thermostat, installed in the mastor room, which determines the progressive opening/closing of the electrothermic actuator mounted on the central valve body, thus allowing the hot fluid to flow directly towards the user.
The heat supplied is billed by a direct thermal energy metering system (enthalpy) consisting of three basic components : an electronic panel which totalizes in digits the thermal energy usage, by a water meter provided with a transmitter of pulses proportional to the flow volume, and a pair of thermometer probes.
The electronic panel, provided with a liquid crystal display, shows the operating parameters and consumption data stored; a serial M-bus output conforming to EN 1434-4 allows centralized and/or remote reading (…. via modem).
The multi-function body, in addition to its automatic control (on/off) and measuring functions, is provided with two setting devices, namely : one for setting the main flow, whose rate can be read on the electronic panel display, while the other serves for limiting the flow via the by-pass in order not to affect the supply of the other units.

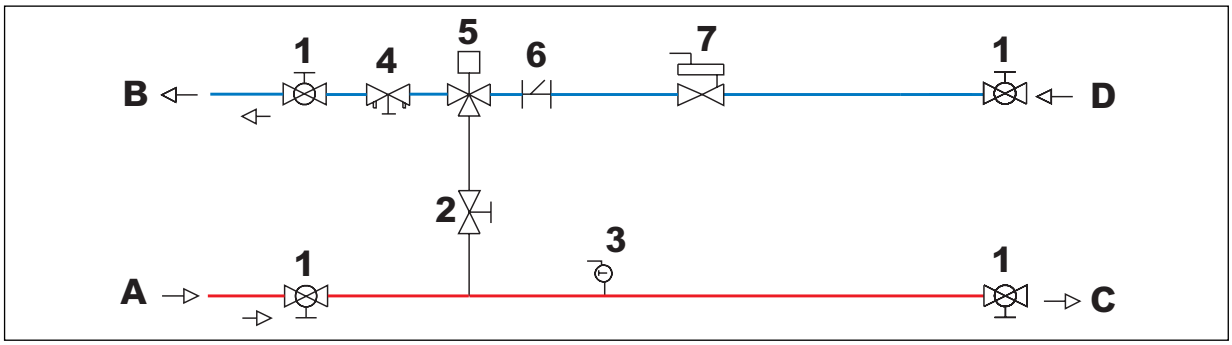


Multi-function valve functions (patented)

In the lower part of the unit there are two circuits designed for supplying hot and cold water for sanitary. Each of these circuits consists of a volumetric meter which counts effective consumption levels each time the water supply is opened. When required, the addition of an accessory component complete with water hammer arrestor on the two branches protects the systems from any surges in pressure caused by sudden stops or restrictions of the flow, thus avoiding noise and vibrations in the pipe.



Functional hydraulic circuit diagram, Units DMSA-DMSC Series (heating/air conditioning section)



Legend:

A Primary fluid inlet
B Primary flow outlet
C Supply to heating system
D Return from heating system
1 MF ball valve
2 By-pass setting valve
3 Probe on supply line for thermal energy meter
4 Balancing device
5 5 3-way motor-operated valve
6 Strainer mesh
7 Single-jet turbine flow meter

Fluid dynamic characteristics of the DOMO*COMPACT* units (heating section)

DN	Flow rate (m^3/h)			Kvs	Pressure drop (kPa)	
	min.[1]	nominal	max.[2]		nominal	max
15	0.12	0.42	0.60	1.2	12.3	25.0
20	0.20	0.95	1.30	3.6	14.4	27.0
25	0.20	1.80	2.30	3.7	28.0	45.8
32	0.28	3.30	4.30	6.5	25.5	43.4

[1] Lower flow rate, which the volumetric flow sensor WMT succeeds in measuring while remaining in the higher accuracy range

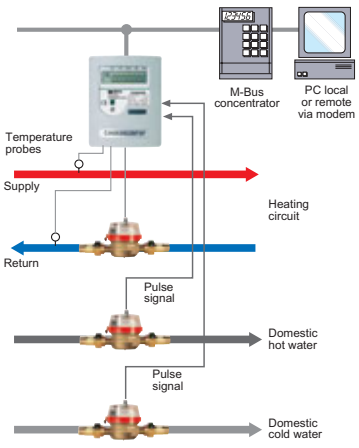
[2] Max. recommended flow rate (minimum noise and minimum stress on the volumetric probe)

Centralization of data and energy consumption

The electronic panel CA502M Series provided on the units is an instrument designed for measuring the thermal energy in all heat exchange systems, such as heating and air conditioning systems. It can also acquire other data via pulse inputs (version P) for billing hot and cold domestic water. The model adopted is powered by batteries, and is electrically connected directly in the factory in the case of the preassembled units DMSA, DMSC, DMS-Mini, DMS-Extra. In the case of partial supply of individual basic components forming the DMSA and DMSC units, final connections of the probes and single-jet turbine flow meters must be made by the installer. By pressing on-board button, the memorized operating parameters and consumption data can be viewed on the LCD display. Standard position of the display shows the totalized thermal energy (MWh). The CA502 panels are designed for centralized reading of the consumption levels as they are provided with serial M-bus data outputs in accordance with EN1434-4. The reading is performed by data concentrators with display and remote connections by modem at local stations where an operator, via appropriate software, records the various consumption levels. On request, it is also available in the version with digital outputs (version R).

Version P

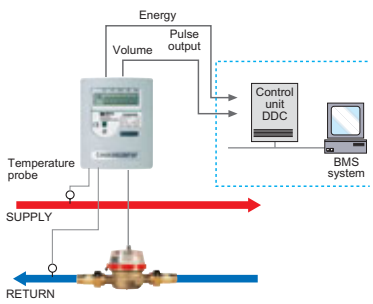
Provided with 2 pulse inputs for connection of another 2 external meters (e.g. domestic hot/cold water) for remote reading.



Version R

Provided with 2 digital outputs for the thermal energy consumption and volume repetition.

The outputs can be used for data centralization in the case of connection to DDC control unit in a Building Management system.



Selection of the unit

By filling the following simple table with the performance references, it is possible to generate the part N° of the unit to meet the required performances.

Example
Requirement 20 temperature control/thermal energy meter (DN 20) and domestic hot/cold water meter units are to be specified or adopted. A 24V power supply is available.

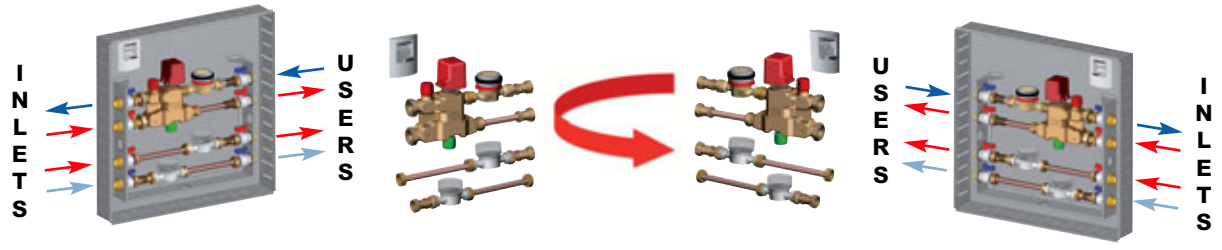
The units should be installed in protected area specified in the building design and connected horizontally to the various pipe lines mounted on the single floor with inlets coming from the left (15 units) and from the right (5 units).

	Frame	Sections	DN	Power supply	Function
		1 heating and/or air conditioning			
	A (open, for intallation in inner courtyard of protected service areas)	**2** heating and/or air conditioning + 1 domestic water billing section	**20** (flow <950l/h)	**B** (24V)	**H** heating
	C (closed, for open installation)	**3** heating and/or air conditioning + 2 domestic water billing sections	**25** (flow <1800l/h)	**A** (230V)	**HC** heating and air conditioning
DMS	*A*	*3*	*20*	*B*	*HC*

The final Part number generated is: **DMSA320BHC** in a quantity of 20 pieces.

The Domo*compact* design, DMSA and DMSC Series, **allows using the same unit for different installation conditions** : inlet of primary fluid on left or right, and with horizontal/ vertical arrangement.
The 5 models with primary fluid inlet on the right side requires the installer to observe the flow direction on the thermal energy volumetric meter.

The rotation by 180° is very easy and does not require any special tool.

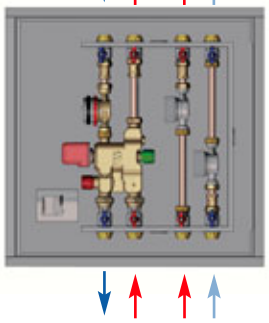


Unit installes horizontally
Inlets on right or left sides

DOMOCOMPACT, a versatile unit:

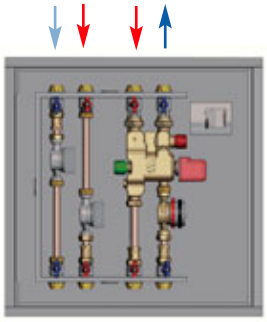
Primary fluid inlets and outlets adaptable connections.
The unit offers a wide range of configurations to meet system requirements without any hydraulic operations.

USERS



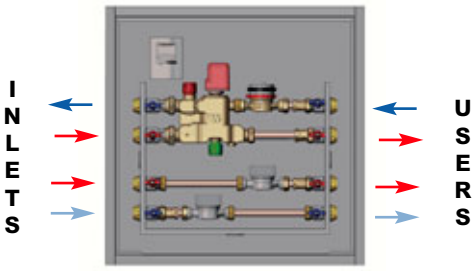
INLETS ON BOTTOM

INLETS ON TOP



USERS

rotation 90°



rotation -90°

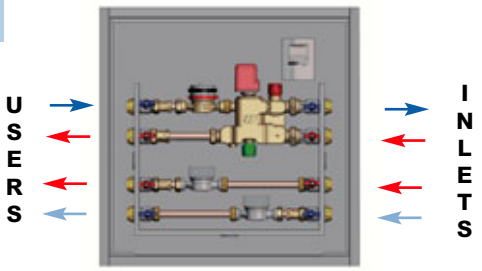
Horizontal unit with left inlets to be installed vertically

Heating sections located on left or right side

Horizontal unit with right inlets to be installed vertically

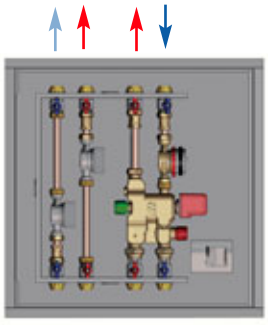
Heating sections located on left and right side

rotation 90°



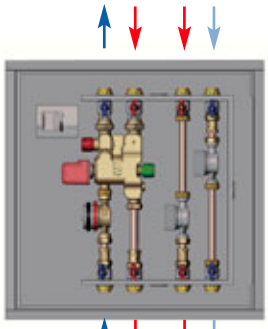
rotation -90°

USERS



INLETS ON BOTTOM

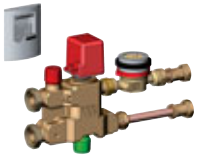
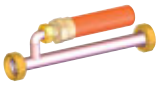
INLETS ON TOP



USERS

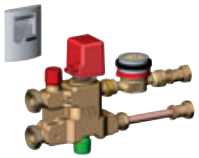
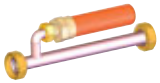
Synoptic table, Domocompact unit, DMSA Series

The following two synoptic tables summarize the functions and basic components of the DOMOCOMPACT. The basic components can be supplied only when the installation of the finished DOMOCOMPACT unit has to follow step by step the stages of the building construction and the engineering of the hvac system.

DOMOCOMPACT	FUNCTIONS							COMPONENTS				ACCESSORIES	
 Preassembled unit with open frame DMS Series	Temperature control	Temperature control Heating/Air conditioning	Billing 1 domestic water circuit	Billing 1 domestic water circuits	24V powered actuator	230V powered actuator	DN	 Mounting frame	 Temperature control heating/ air conditioning section	 Billing section DHW	 Billing section DCW	 Flushing pipes	 Water hammer arrestor for domestic water sections
DMSA120AH	✓					✓	20	DIMA-DMS120	SZ-DMS20AH	SZ-DMS20SANC	SZ-DMS20SANF	PIPE-DMS201 (2 pipes DN20)	N°1 APW-DMS15
DMSA120AHC		✓				✓	20		SZ-DMS20AHC				
DMSA120BH	✓				✓		20		SZ-DMS20BH				
DMSA120BHC		✓			✓		20		SZ-DMS20BHC				
DMSA125AH	✓					✓	25	DIMA-DMS125	SZ-DMS25AH			PIPE-DMS251 (2 pipes DN25)	
DMSA125AHC		✓				✓	25		SZ-DMS25AHC				
DMSA125BH	✓				✓		25		SZ-DMS25BH				
DMSA125BHC		✓			✓		25		SZ-DMS25BHC				
DMSA220AH	✓		✓			✓	20	DIMA-DMS220	SZ-DMS20AH			PIPE-DMS202 (3 pipes DN20)	
DMSA220AHC		✓	✓			✓	20		SZ-DMS20AHC				
DMSA220BH	✓		✓		✓		20		SZ-DMS20BH				
DMSA220BHC		✓	✓		✓		20		SZ-DMS20BHC				
DMSA225AH	✓		✓			✓	25	DIMA-DMS225	SZ-DMS25AH			PIPE-DMS252 (3 pipes DN25)	
DMSA225AHC		✓	✓			✓	25		SZ-DMS25AHC				
DMSA225BH	✓		✓		✓		25		SZ-DMS25BH				
DMSA225BHC		✓	✓		✓		25		SZ-DMS25BHC				
DMSA320AH	✓			✓		✓	20	DIMA-DMS320	SZ-DMS20AH			PIPE-DMS203 (4 pipes DN20)	N°2 APW-DMS15
DMSA320AHC		✓		✓		✓	20		SZ-DMS20AHC				
DMSA320BH	✓			✓	✓		20		SZ-DMS20BH				
DMSA320BHC		✓		✓	✓		20		SZ-DMS20BHC				
DMSA325AH	✓			✓		✓	25	DIMA-DMS325	SZ-DMS25AH			PIPE-DMS253 (4 pipes DN25)	
DMSA325AHC		✓		✓		✓	25		SZ-DMS25AHC				
DMSA325BH	✓			✓	✓		25		SZ-DMS25BH				
DMSA325BHC		✓		✓	✓		25		SZ-DMS25BHC				

Example of DMSA325BHC reading

Preassembled unit (DMS) with open frame (A) DN 25 consisting of :
1 mounting frame (DIMA-DMS325)
1 temperature control section (SZ-DMS25BHC), 24 V power supply
2 domestic water billing sections (SZ-DMS20SANC and SZ-DMS20SANF)

DOMO*COMPACT*	FUNCTIONS							COMPONENTS					ACCESSORIES	
 Preassembled unit with closed frame DMS Series	Temperature control	Temperature control Heating/Air conditioning	Billing 1 domestic water circuit	Billing 1 domestic water circuits	24V powered actuator	230V powered actuator	DN	 Mounting frame	 Temperature control heating/ air conditioning section	 Billing section DHW	 Billing section DCW	 Front panel	 Flushing pipes	 Water hammer arrestor for domestic water sections
DMSC120AH	✓					✓	20	**DIMA-DMS120**	SZ-DMS20AH			**MANT-DMS**	**PIPE-DMS201 (2 pipes DN20)**	
DMSC120AHC		✓				✓	20		SZ-DMS20AHC					
DMSC120BH	✓				✓		20		SZ-DMS20BH					
DMSC120BHC		✓			✓		20		SZ-DMS20BHC					
DMSC125AH	✓					✓	25	**DIMA-DMS125**	SZ-DMS25AH				**PIPE-DMS251 (2 pipes DN25)**	
DMSC125AHC		✓				✓	25		SZ-DMS25AHC					
DMSC125BH	✓				✓		25		SZ-DMS25BH					
DMSC125BHC		✓			✓		25		SZ-DMS25BHC					
DMSC220AH	✓		✓			✓	20	**DIMA-DMS220**	SZ-DMS20AH	**SZ-DMS20SANC**			**PIPE-DMS202 (3 pipes DN20)**	**N°1 APW-DMS15**
DMSC220AHC		✓	✓			✓	20		SZ-DMS20AHC					
DMSC220BH	✓		✓		✓		20		SZ-DMS20BH					
DMSC220BHC		✓	✓		✓		20		SZ-DMS20BHC					
DMSC225AH	✓		✓			✓	25	**DIMA-DMS225**	SZ-DMS25AH				**PIPE-DMS252 (3 pipes DN25)**	
DMSC225AHC		✓	✓			✓	25		SZ-DMS25AHC					
DMSC225BH	✓		✓		✓		25		SZ-DMS25BH					
DMSC225BHC		✓	✓		✓		25		SZ-DMS25BHC					
DMSC320AH	✓			✓		✓	20	**DIMA-DMS320**	SZ-DMS20AH		**SZ-DMS20SANF**		**PIPE-DMS203 (4 pipes DN20)**	**N°2 APW-DMS15**
DMSC320AHC		✓		✓		✓	20		SZ-DMS20AHC					
DMSC320BH	✓			✓	✓		20		SZ-DMS20BH					
DMSC320BHC		✓		✓	✓		20		SZ-DMS20BHC					
DMSC325AH	✓			✓		✓	25	**DIMA-DMS325**	SZ-DMS25AH				**PIPE-DMS253 (4 pipes DN25)**	
DMSC325AHC		✓		✓		✓	25		SZ-DMS25AHC					
DMSC325BH	✓			✓	✓		25		SZ-DMS25BH					
DMSC325BHC		✓		✓	✓		25		SZ-DMS25BHC					

Example of DMSC325BHC reading
Preassembled unit (DMS) with CLOSED frame (DMSC) DN 20 consisting of : 1 mounting frame (DIMA-DMS320) 11 temperature control section (SZ-DMS25BHC), 24 V power supply
2 domestic water billing sections (SZ-DMS20SANC and SZ-DMS20SANF
1 cover (MANT-DMS)

Installation

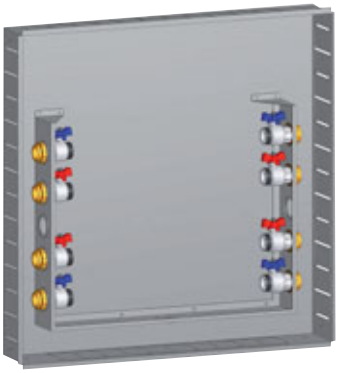
Already in the architectural design stage it is necessary to specify/provide a service room for the installation of the **DOMO*COMPACT*** units. This solution allows easier management, reading of consumption data) as well as quick and easy maintenance by qualified personnel. Systems where the DOMOCOMPACT units are to be used are generally built and finished within a medium-long time frame; therefore they must follow the various stages in construction of the building. For this reason, the units are designed to allow engineering and completion of the primary line without immediately mounting the complete DOMOCOMPACT model. In this way it is possible to avoid risk of damage at the worksite or to the DOMOCOMPACT that will be installed only after the pipe flushing is performed.

As regards the initial assembly stage **Watts Industries** has available **a frame complete with ball valve bodies for shut-off service on each section of the circuit** (heating, domestic hot/cold water) and recommends to use removable pipes for thorough flushing of the system (such precaution is always advisable before placing the unit into service). Before the final start-up phase, proceed to manually close the ball shut-off valves for each single circuit, remove the flushing pipes (which can be reused by the installer or the system operator) and insert the **DOM*COMPACT*. Take care in this phase to observe the water flow direction required by the flow volumetric meter.**

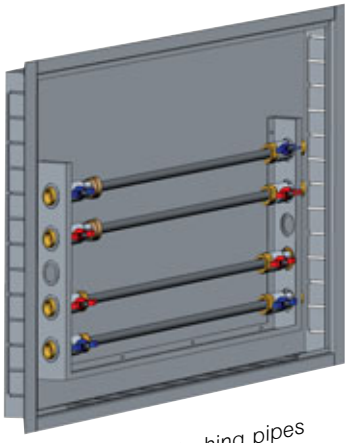
The unit can be left open, mounted on the frame if located in an inner courtyard or protected and sheltered place as provided by the customer; however, suitably sized enclosure boxes are available.
The frame is also fitted with a condensate drip pan connected to the outside by a drain valve. Thanks to these assembly characteristics the DOMOCOMPACT allows the system operator to carry out work while the system is operating in the case of any failure and also to remove the entire unit replacing it with another one of the same size. **It is advisable especially for medium-large sized systems to keep a "courtesy" temperature control/thermal energy meter unit so as to cater for emergencies while awaiting repairs by authorized personnel.**

The **DOMO*COMPACT*** systems are built for long-term operation.
To preserve their performances unchanged durign the years it is recommended to clean the filter every 12 months.

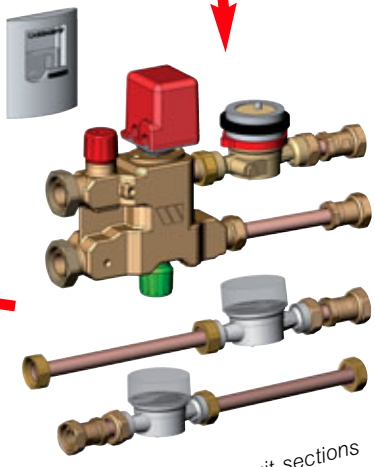
PHASES IN COMPOSITION AND PIPE INSTALLATION



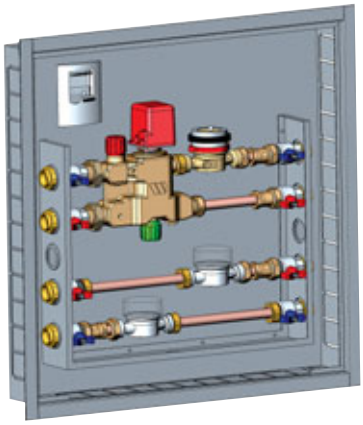
Mounting frame



Frame with flushing pipes



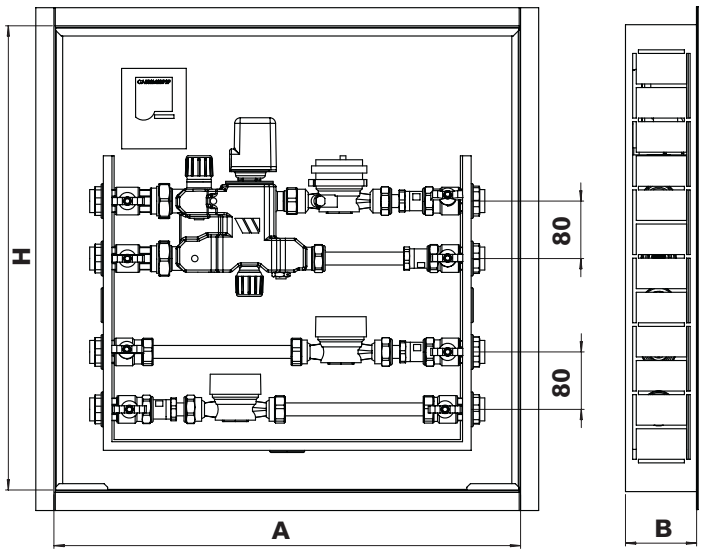
Assembly of circuit sections



Overall unit when functioning

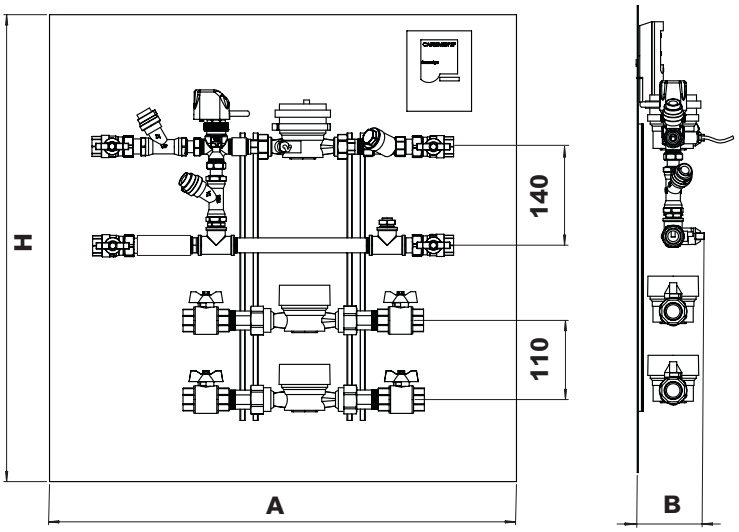
Overall dimensions (mm)

DMSA - DMSC



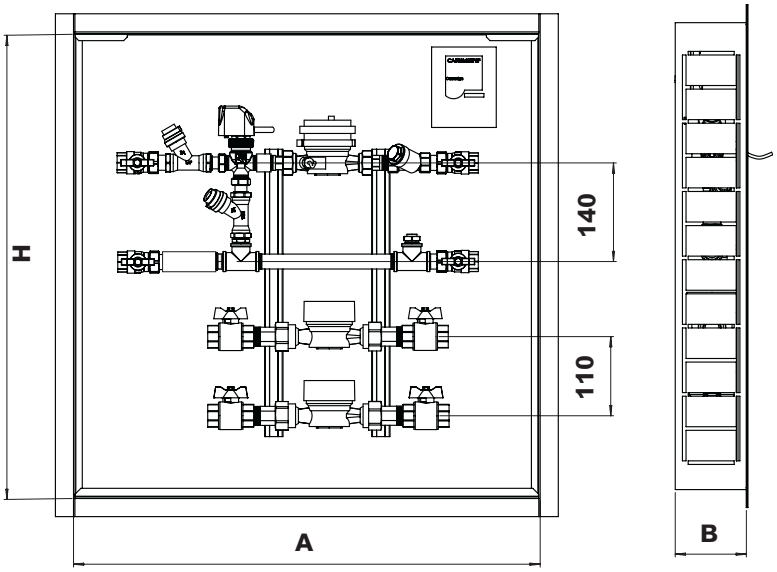
A (mm)	B (mm)	H (mm)
650	100	650

DMSA-*MINI*



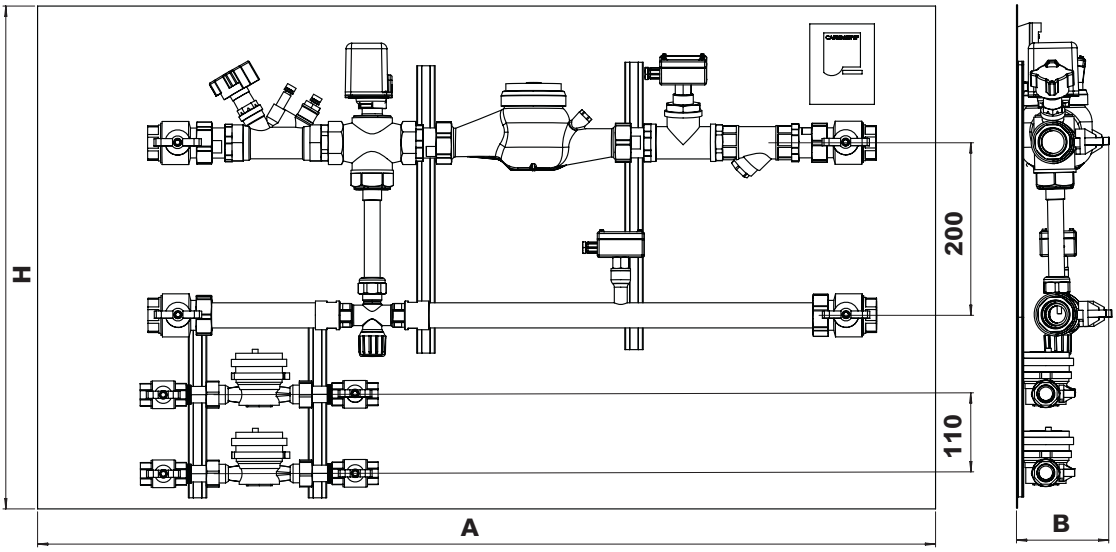
A (mm)	B (mm)	H (mm)
650	100	650

DMSC-*MINI*



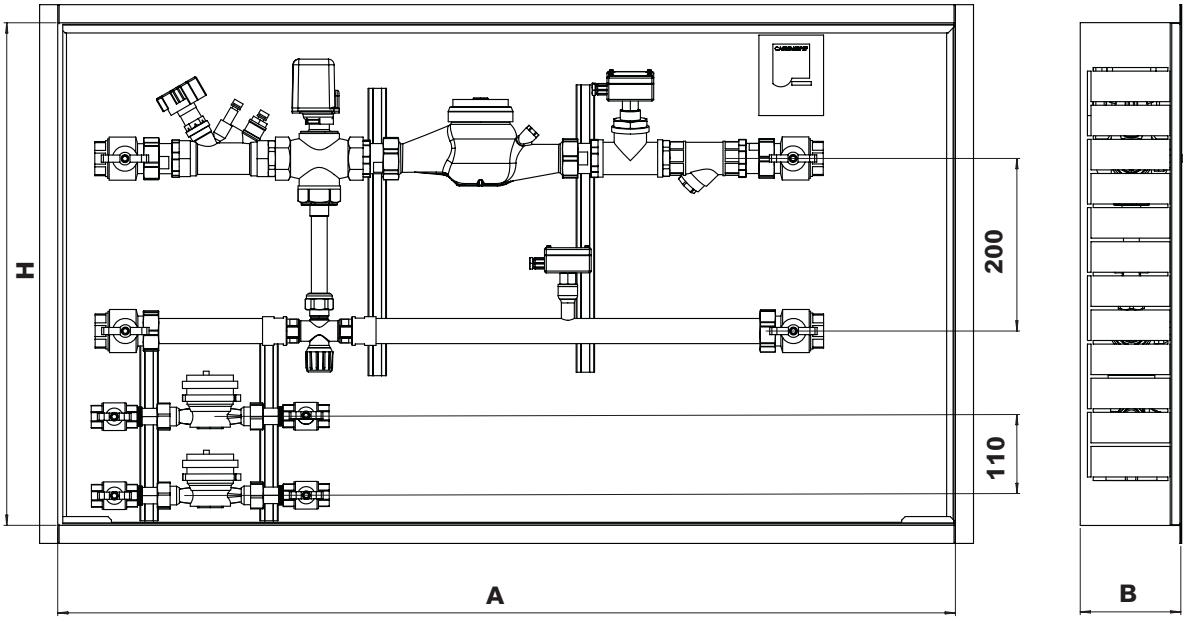
A (mm)	B (mm)	H (mm)
650	100	650

DMSA-*MAXI*



A (mm)	B (mm)	H (mm)
1250	140	700

DMSC-*MAXI*



A (mm)	B (mm)	H (mm)
1250	140	700

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- Temperature control and distribution for radiant panel heating systems, Domo*radiant*

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