IMI HEIMEIER

Duolux

Thermostatic valves with radiator connection systems

Radiator connection valves series –
one- and two-pipe

IMI Hydronic Engineering

Breakthrough Engineering

Duolux

Duolux is a complete series of valves for one- and two-pipe heating systems. The valves are connected to radiators in single-storey heating circuits. Centre-to-centre distance of pipe connections 35 mm.

Key features

- **One-pipe version with mass flow rate distribution 50/50%, simple definition of heating capacity correction factors**
- **Two-pipe version with V-exact II presetting**
- **Various thermostatic valve bodies adapt to every type of installation**
- **Body made of nickel-plated corrosion-free gunmetal**

Technical description

Applications area:
Two- and one-pipe heating systems

Function:
Control
Stepless presetting
Shut-off

Dimensions:
DN 15

Pressure class:
PN 10

Temperature:
Max. working temperature: 120°C, with protection cap or actuator 100°C.
Min. working temperature: -10°C.

Materials:
Manifold:
Valve body: Corrosion resistant Gunmetal.
O-rings: EPDM rubber
Valve disc: EPDM rubber
Spindle: Brass

Thermostatic valve body:
Valve body: Corrosion resistant Gunmetal.
O-rings: EPDM rubber
Valve disc: EPDM rubber
Return spring: Stainless steel
Valve insert (one-pipe): Brass
Valve insert V-exact II (two-pipe): Brass, PPS (polyphenylsulphide) and SPS (syndiotactic polystyrene).

The complete thermostatic insert can be replaced using the fitting tool without draining the system.
Spindle: Niro-steel spindle with double O-ring sealing.

Other:
See “Articles” and “Accessories”.

Surface treatment:
Valve body and fittings are nickel-plated.

Marking:
Two-pipe:
Thermostatic valve body: THE, country code, flow direction arrow, DN and KEYMARK-Designation. II+ -Designation.
White protection cap.
Distributor: THE, flow direction arrows.

One-pipe:
Thermostatic valve body: THE, flow direction arrow, DN.
Axial and straight: Blue protection cap.
Blue stuffing box.
Double angle: Black protection cap.
Black stuffing box.
Distributor: 50/50, THE, flow direction arrows.

Pipe connection:
M24x1,5 male thread for compression fittings for copper or precision steel pipe.

Connection to thermostatic head and actuator:
HEIMEIER M30x1,5

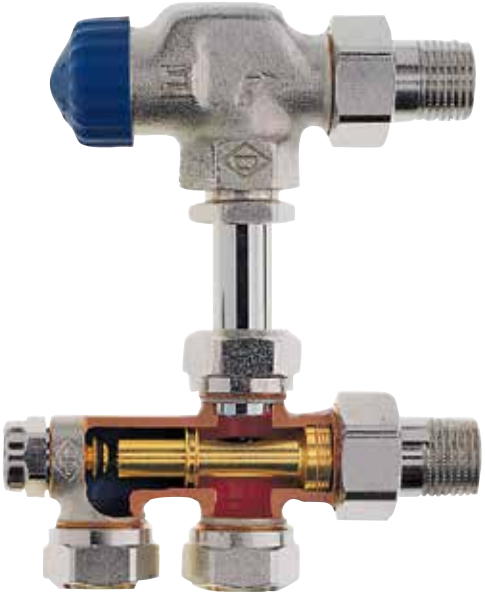
Construction

Duolux two-pipe system
With axial thermostatic valve body and white protection cap

With shut-off
Connector thread M24x1.5

Without shut-off
Connector thread M24x1.5

Duolux one-pipe system
With axial thermostatic valve body and blue protection cap.



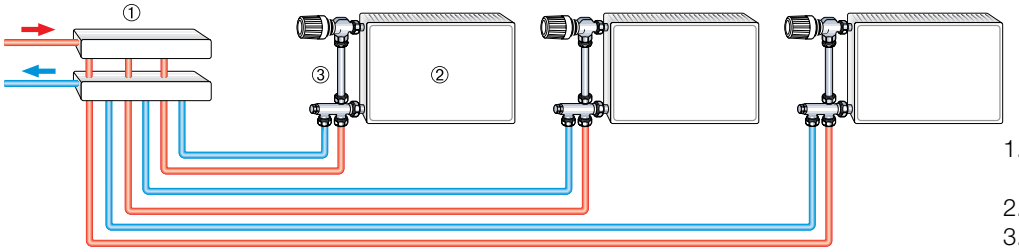
With shut-off
Connector thread M24x1.5

Without shut-off
Connector thread M24x1.5

Application

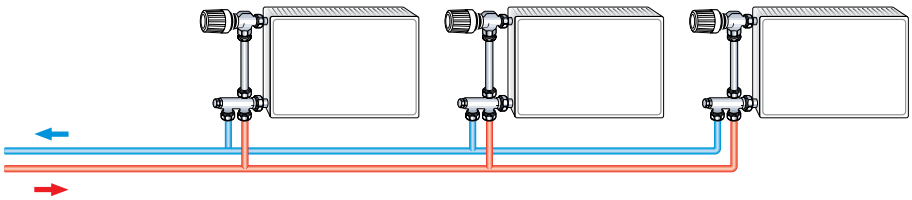
Two-pipe system
Duolux is developed specially to simplify the connection of radiators to hot water heating systems. For these multiradiator systems, also known as “spaghetti” systems, each radiator is connected directly to a central singlestorey heating manifold with its own supply and return pipe.
If the manifold does not include presetting connection devices, Duolux two-pipe distributors equipped with V-exact II thermostatic valve bodies with stepless precision presetting enable an hydraulic balancing between the radiators.
The Duolux two-pipe distributor with shut-off assumes the function of the return shut-off so that the radiator can be removed without draining the system.

Sample application
Two-pipe connection system
All radiators connected in parallel



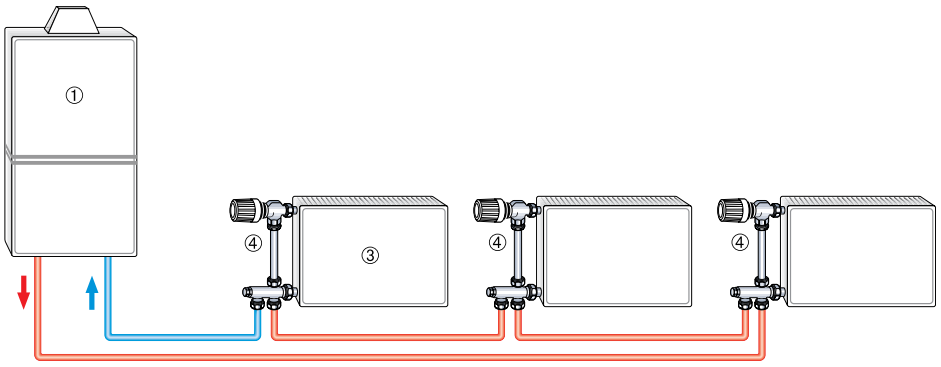
1. Single-storey heating circuit manifold
2. Radiator
3. Duolux for two-pipe systems

“Classical” two-pipe system
Supply and return pipe lines at base bord, for example

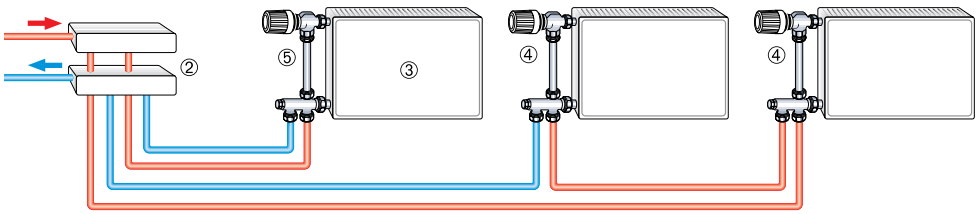


One-pipe system
With a one-pipe system, all radiators in a heating circuit are connected to a closed circular pipeline. Duolux guarantees that a defined portion of the circuit mass flow rate is fed to individual radiators. This portion is set at the factory to 50%, which means the heating capacity correction factors can be more simply defined.
In order to allow for an optimal adaptation to the particular installation site, the Duolux one-pipe distributor with thermostatic valve bodies can be combined in three different variations.
With one-pipe systems, radiators with a closed valve can be minimally heated by the heat flow in the bypass.
In the model with the return shut-off, a radiator may be removed without draining the system. The bypass remains open, independent of the shut-off, so that circuit operation is not interrupted.

Sample application
One-pipe single-storey heating system
Series connection of all radiators



One-pipe system with individual radiators connected as in the two-pipe system



1. Wall mounted gas fired heater
2. Heating circuit manifold
3. Radiator
4. Duolux for one-pipe systems
5. Duolux for two-pipe systems

Notes

– To avoid damage and the formation of scale deposit in the hot-water heating system, the composition of the heat transfer medium should be in accordance with the VDI guideline 2035. For industrial and long-distance energy systems, see the applicable codes VdTÜV and 1466/AGFW FW 510. A heat transfer medium containing mineral oils, or any type of lubricant containing mineral oil can have extremely negative effects and usually lead to the disintegration of EPDM seals. When using nitrite-free frost and corrosion resistance solutions with an ethylene glycol base, pay close attention to the details outlined in the manufacturers' documentation, particularly concerning concentration and specific additives.
– Flush the system before changing thermostatic valves in heavy polluted existing systems.
– The thermostatic valve bodies can be used with all HEIMEIER thermostatic heads and HEIMEIER or TA thermal actuators or motorized . The optimal tuning of the components guarantees maximum safety. When using actuators from other manufacturers, make sure that the pressure power is appropriate for thermostatic valve bodies with soft sealing valve discs.

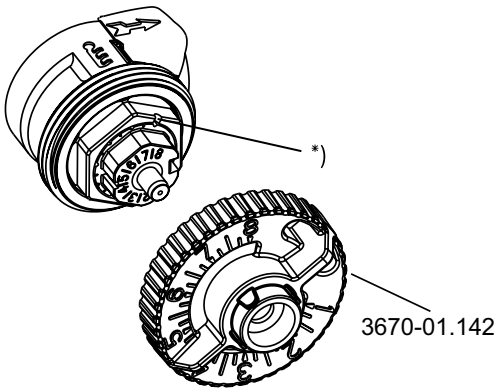
Operation

Two-pipe system

V-exact II Presetting
The presetting can be selected steplessly between 1 and 8. There are 7 additional marks between the preset values, thus enabling exact setting. Setting 8 corresponds to the standard setting (factory setting). The technician can undertake or change the setting with the setting key or spanner (13 mm). This ensures unauthorised persons cannot tamper with the setting.

- Plug the setting key or universal key into the valve insert and turn until it engages in position.
- Turn the index of the desired setting value to the index figure of the valve insert.
- Withdraw the key. The setting on the valve insert is visible from the actuating direction (see fig.).

Front-end visibility



*) Index

Shut-off
Release and unscrew blanking plug (size 19). Using a hexagon key (3 mm), shut off return by turning all the way right. Screw off blanking plug.
Exchange protection cap for thermostatic head, close valve and secure valve body with a plug cap G3/4 once the radiator has been removed.

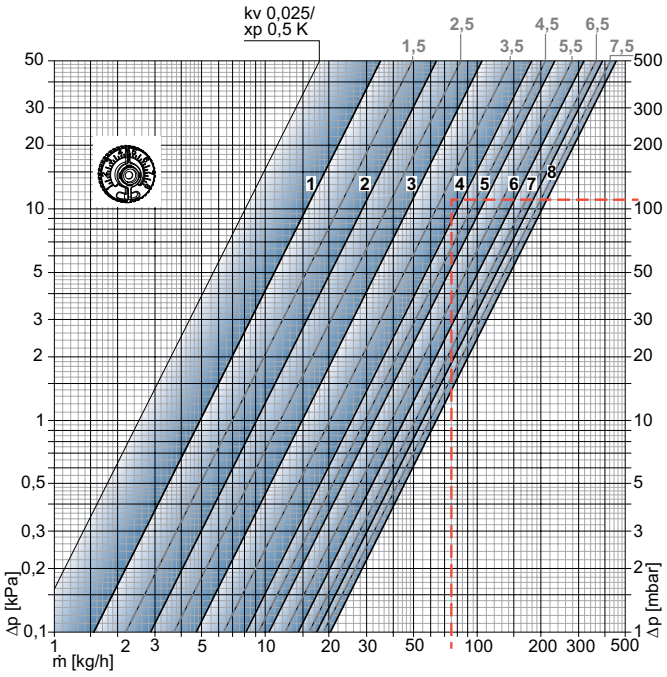
One-pipe system

Shut-off
Release and unscrew blanking plug (size 19). Using a hexagon key (3 mm), shut off return by turning all the way right. Screw off blanking plug.
Exchange thermostatic head with protection cap, close valve and secure valve body with a plug cap G3/4 once the radiator has been removed.
The bypass remains open, independent of the shut-off. This guarantees that operation of the pipeline is not interrupted.

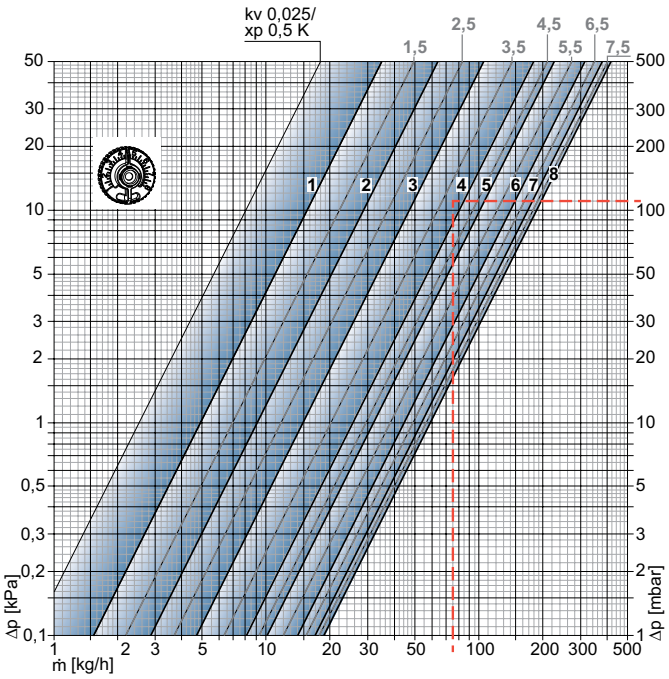
Technical data – Two-pipe system

Diagram of Duolux two-pipe distributor with valve body and thermostatic head

3800 without shut-off
P-band [xp] **2,0 K**



3801 with shut-off
P-band [xp] **2,0 K**



Two-pipe distributor with thermostatic head and valve body

DN 15 (1/2")		Presetting								Kvs without thermostatic valve	Permitted differential pressure, during which the valve is kept closed Δp [bar]	
		1	2	3	4	5	6	7	8		Th.-head	EMO T/TM EMOtec TA-TRI TA-Slider 160
without shut-off	**Kv-value**	0,049	0,090	0,149	0,262	0,325	0,455	0,562	0,630	1,83	1,0	3,5
with shut-off	**Kv-value**	0,049	0,090	0,149	0,260	0,320	0,442	0,540	0,595	1,29		
without shut-off	**Kvs-value**	0,049	0,102	0,184	0,309	0,410	0,540	0,686	0,780	1,83		
with shut-off	**Kvs-value**	0,049	0,102	0,183	0,304	0,399	0,518	0,642	0,712	1,29		

Kv/Kvs = m^3/h at a pressure drop of 1 bar.
Kv [xp] max. 2 K = m^3/h at a pressure drop of 1 bar with thermostatic head.

Sample calculation
Target:
Setting range V-exact II

Given:
Heat flow Q = 1308 W
Temperature spread Δt = 15 K (65/50 °C)
Pressure loss, thermostatic valve ΔpV = 110 mbar

Solution:
Mass flow $m = Q / (c \cdot \Delta t) = 1308 / (1{,}163 \cdot 15) = 75$ kg/h

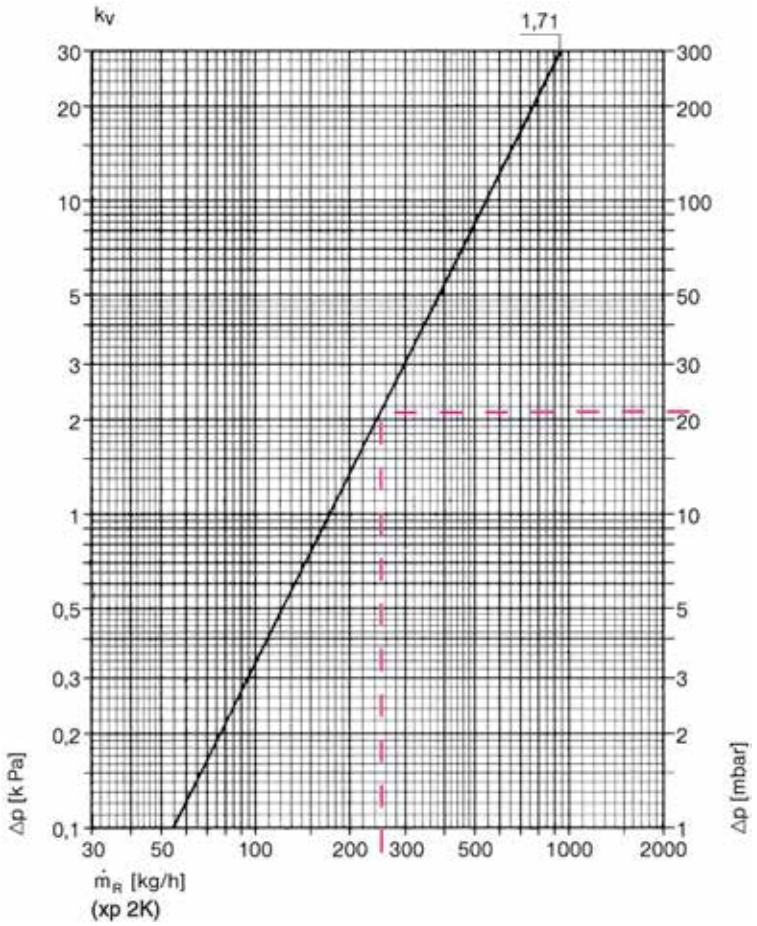
Setting range from Diagram: 4

$$Cv = \frac{Kv}{0{,}86}$$

$$Kv = Cv \cdot 0{,}86$$

Technical data – One-pipe system

Diagram of Duolux one-pipe distributor with valve body and thermostatic head
3802 without shut-off
3803 with shut-off



Equivalent pipe lengths [m]

Kv	12 x 1	14 x 1	15 x 1	16 x 1
1,71	1,7	4,7	7,1	10,6

Copper pipe
t = 80 °C (176 °F)
v = 0,5 m/s

One-pipe distributor (with and without shut-off) with thermostatic head and valve body

	2 K p-band Mass flow distribution [%]	2 K p-band Kv value
DN 15 (1/2")	50/50	1,71

$$Cv = \frac{Kv}{0,86}$$

$$Kv = Cv \cdot 0,86$$

Sample calculation

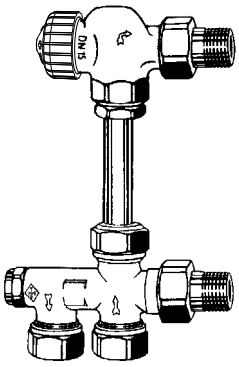
Goal:
Pressure loss in one-pipe circuit

Given:
Heat flow in closed circuit Q = 5820 W
Temp. flux Δt = 20 K (75/55 °C)
Pipe dimension Ø = 16 x 2 mm
Length of pipeline l = 25 m
Total individual resistors ∑ξ = 7,0
Number of radiators n = 5

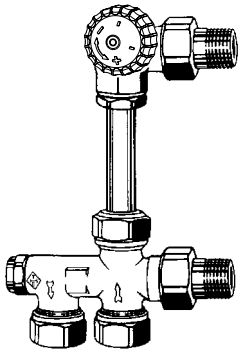
Solution:
Mass flow rate in circuit m_R =
Q / (c · Δt) = 5820 / (1,163 · 20) = 250 kg/h
Pressure drop in line R = 4,2 mbar/m (v = 0,61 m/s)
Pressure loss in line $\Delta p_R = R \cdot l = 4,2 \cdot 25 = 105$ mbar
Pressure loss individual resistors Z =
$5 \cdot \sum\xi \cdot v^2 = 5 \cdot 7,0 \cdot 0,61^2 = 13$ mbar
Pressure loss Duolux $\Delta p_V = 21$ mbar
Pressure loss one-pipe circuit Δp_{total} =
$\Delta p_V \cdot n + \Delta p_R + Z = 21 \cdot 5 + 105 + 13 = 223$ mbar

Valve overview

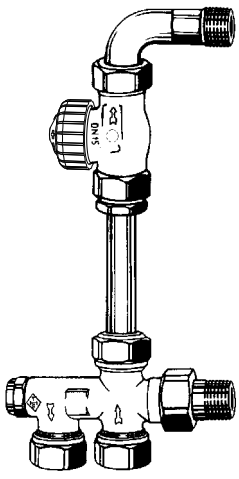
Two-pipe system



Two-pipe distributor with and without shut-off.
Axial valve with white protection cap.
Ascending pipe and compression fittings.

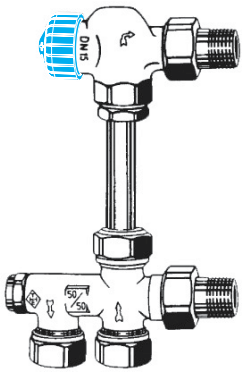


Two-pipe distributor with and without shut-off.
Double angle valve for left or right connection.
White protection cap.
Ascending pipe and compression fittings.

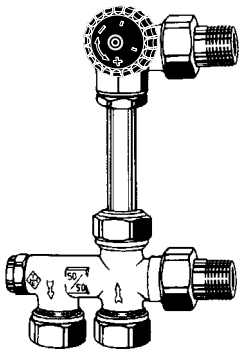


Two-pipe distributor with and without shut-off.
Straight valve with bended nipple and white protection cap.
Ascending pipe and compression fittings.

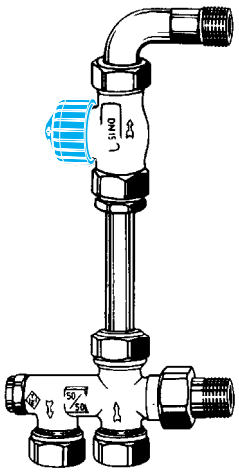
One-pipe system



One-pipe distributor with and without shut-off.
Axial valve with blue protection cap.
Ascending pipe and compression fittings.

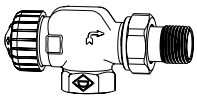


One-pipe distributor with and without shut-off.
Double angle valve for left or right connection.
Black protection cap.
Ascending pipe and compression fittings.



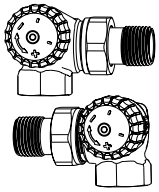
One-pipe distributor with and without shut-off.
Straight valve with bended nipple and blue protection cap.
Ascending pipe and compression fittings.

Articles – Two-pipe system



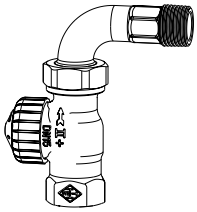
Axial thermostatic valve body V-exact II
With white protection cap.
Nickel-plated gunmetal.

		EAN	Article No
DN 15 (1/2")		4024052838110	3710-02.000



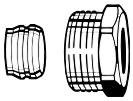
Double angle thermostatic valve body V-exact II
With white protection cap.
Nickel-plated gunmetal.

		EAN	Article No
DN 15 (1/2")	Connection to radiator – left	4024052839117	3713-02.000
DN 15 (1/2")	Connection to radiator – right	4024052839414	3714-02.000



Straight thermostatic valve body with bended nipple V-exact II
With white protection cap.
Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052840717	3756-02.000

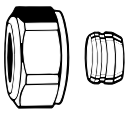


Compression fitting
for precision steel pipes.
Female thread connection Rp1/2.
Metal-to-metal joint.
Brass nickel-plated.

EAN	Article No
4024052175017	2201-15.351

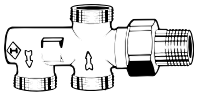
Precision steel pipe
For supply pipe.
Chrome-plated.
Ø 15 mm. 1100 mm long.

EAN	Article No
4024052214518	3831-15.169



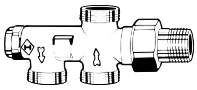
Compression fitting
For precision steel pipe.
Male thread connection M24x1.5.
Nickel-plated.

EAN	Article No
4024052211616	3800-15.351



Two-pipe distributor
Without shut-off.
Nickel-plated gunmetal.

EAN	Article No
4024052210817	3800-02.000



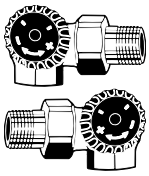
Two-pipe distributor
With shut-off.
Nickel-plated gunmetal.

EAN	Article No
4024052211913	3801-02.000

Articles – One-pipe system

Axial thermostatic valve body
With blue protection cap. Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052180516	2245-02.000

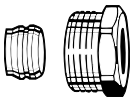


Double angle thermostatic valve body
With black protection cap.
Nickel-plated gunmetal.

		EAN	Article No
DN 15 (1/2")	Connection to radiator – left	4024052184118	2341-02.000
DN 15 (1/2")	Connection to radiator – right	4024052183616	2340-02.000

Straight thermostatic valve body with bended nipple
With blue protection cap.
Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052180110	2244-02.000

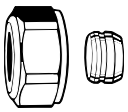


Compression fitting
for precision steel pipes.
Female thread connection Rp1/2.
Metal-to-metal joint.
Brass nickel-plated.

	EAN	Article No
	4024052175017	2201-15.351

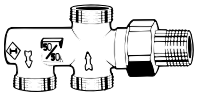
Precision steel pipe
For supply pipe.
Chrome-plated.
Ø 15 mm. 1100 mm long.

	EAN	Article No
	4024052214518	3831-15.169



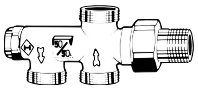
Compression fitting
For precision steel pipe.
Male thread connection M24x1.5.
Nickel-plated.

	EAN	Article No
	4024052211616	3800-15.351



One-pipe distributor 50/50
Without shut-off.
Nickel-plated gunmetal.

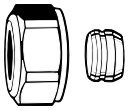
	EAN	Article No
DN 15 (1⁄2")	4024052212514	3802-02.000



One-pipe distributor 50/50
With shut-off.
Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1⁄2")	4024052212811	3803-02.000

Accessories

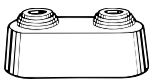


Compression fitting
for copper or precision steel pipe according to DIN EN 1057/10305-1/2.
Male thread connection M24x1.5.
Nickel-plated.
For pipe wall thicknesses from 0.8–1 mm, apply support sleeves.
For details, refer to the pipe manufacturer.

Ø Pipe	EAN	Article No
12	4024052211210	3800-12.351
15	4024052211616	3800-15.351
16	4024052211814	3800-16.351

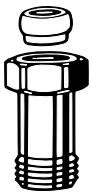
Supporting sleeves
for copper or precision steel pipe with a wall thickness of 1 mm.

L	Ø Pipe	EAN	Article No
25,0	12	4024052127016	1300-12.170
26,0	15	4024052127917	1300-15.170
26,3	16	4024052128419	1300-16.170



Double rosette
White plastic (RAL 9016). Can be divided in the centre.
For various pipe diameters.
Distance between center points 35 mm.
Total height max. 32 mm.

	EAN	Article No
	4024052210718	3800-00.093



Length adjustment fitting
For connecting to plastic, copper, precision steel or multi-layer pipes.
Nickel-plated brass.

L [mm]	EAN	Article No
25,0	4024052298518	9715-02.354
50,0	4024052298617	9716-02.354

Dimensions

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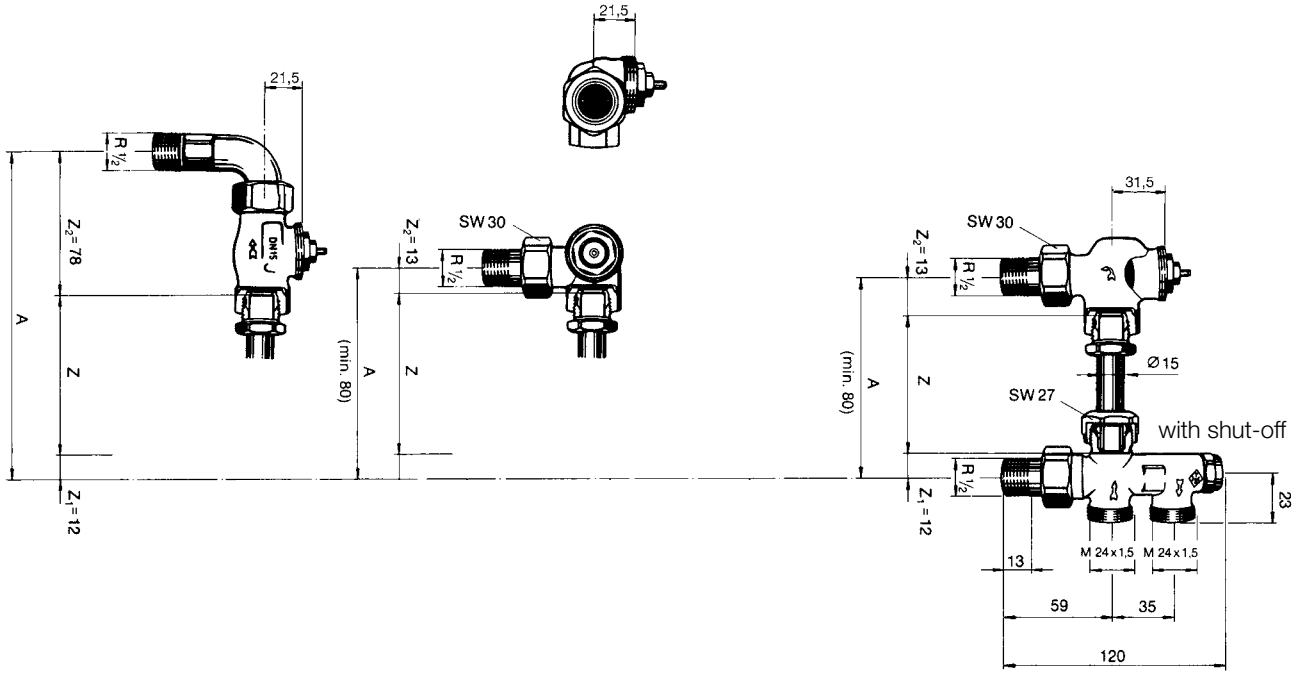
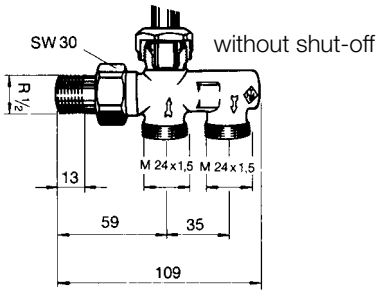
One- and two-pipe systems





Required lengths for precision steel pipe Z:
$Z = A - (Z_1 + Z_2)$

SW = Spanner opening

1 mm = 0,0394 inch

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