

# Duolux



## **Thermostatic valves with radiator connection systems**

Radiator connection valves series –  
one- and two-pipe

*Engineering  
GREAT Solutions*

# 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 presetting available**
- > **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  
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: Brass  
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. Black protection cap.  
Distributor: THE, flow direction arrows.

One-pipe:  
Thermostatic valve body: THE, flow direction arrow, DN.  
Blue protection cap. Blue 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

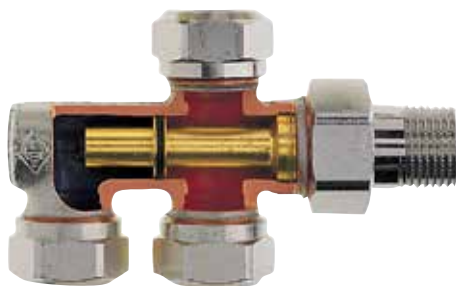
## Construction

### Duolux two-pipe system

With axial thermostatic valve body and black protection cap



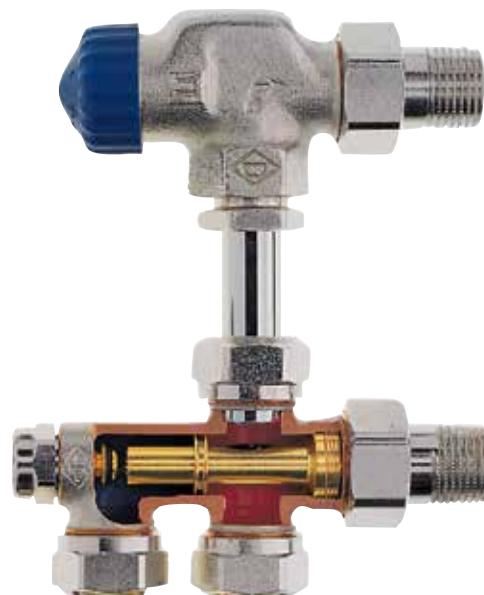
With presetting cone and shut-off  
Connector thread M24x1.5



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

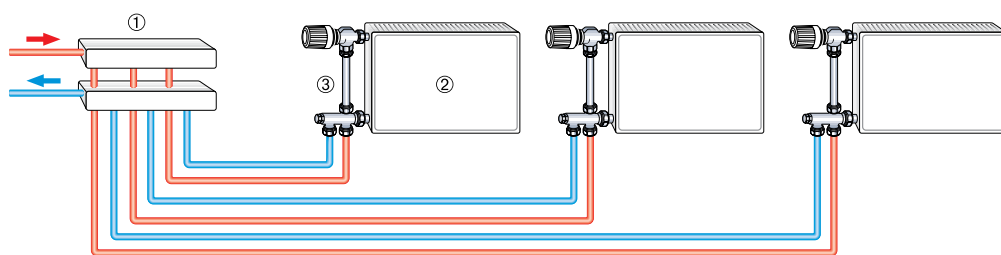
Duolux is developed specially to simplify the connection of radiators to hot water heating systems. For these multiradiator systems, also known as “spaghetti” systems, each radiator is connected directly to a central singlestorey heating manifold with its own supply and return pipe.

If the manifold does not include presetting connection devices, Duolux two-pipe distributors equipped with built-in presetting cones enable an hydraulic balancing between the radiators. This presetting concurrently 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

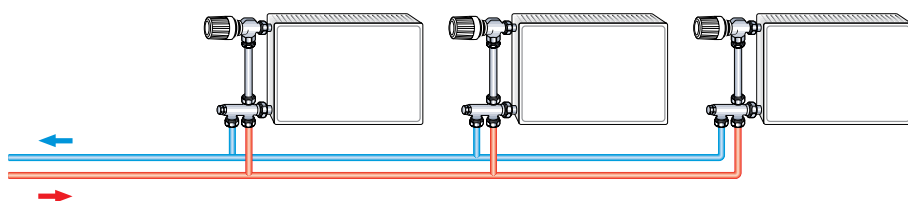
All radiators connected in parallel



- 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.

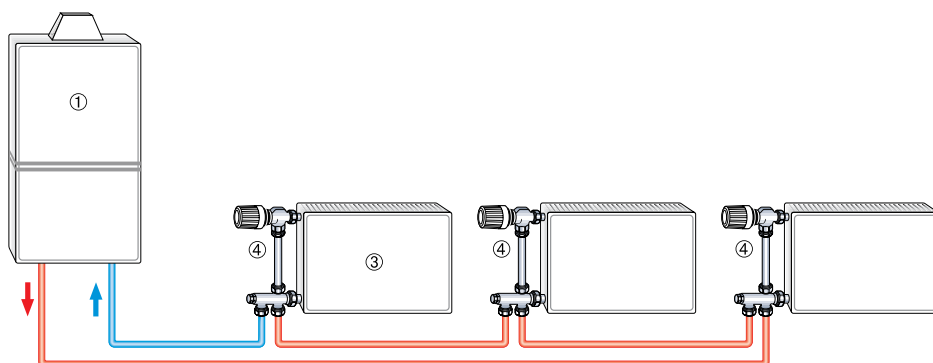
With one-pipe systems, radiators with a closed valve can be minimally heated by the heat flow in the bypass.

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.

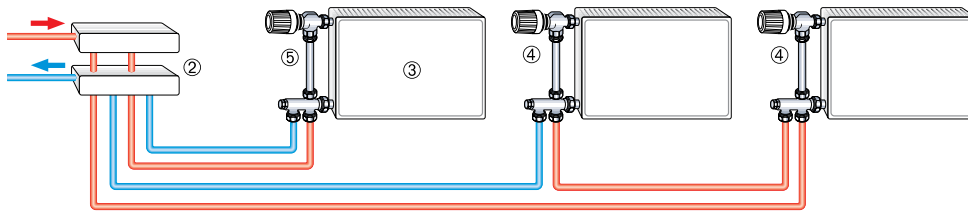
### Sample application

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

#### Presetting

Release and unscrew blanking plug (size 19). Check the zero position using a hexagon key (3 mm), i. e. presetting cone must be open all the way by turning to the left (anticlockwise).

Make the required adjustment based on the diagram by turning to the right (clockwise).

Screw on blanking plug and tighten.

#### 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.

**Important:** Before shutting off the return, determine the preset number of rotations to the left. This helps to guarantee that, after connecting a radiator, the original presetting can be reestablished.

### 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.

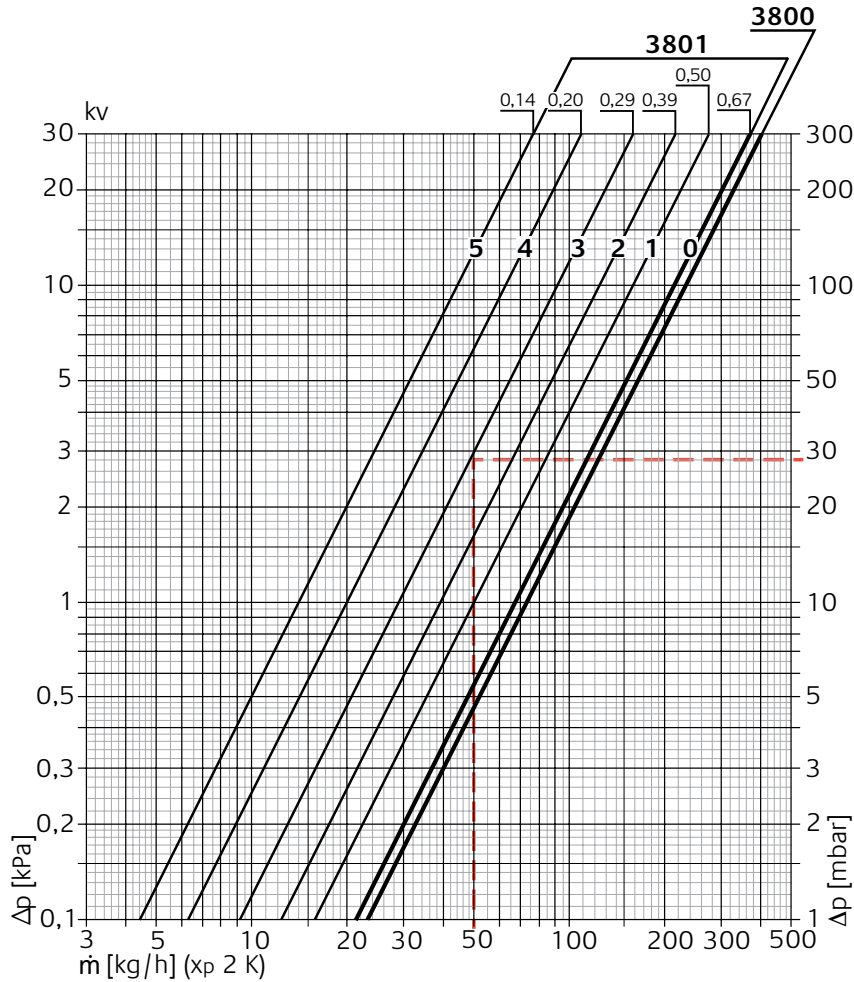
Exchange thermostatic head with protection cap, close valve and secure valve body with a plug cap G3/4 once the radiator has been removed.

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 presetting  
3801 with presetting



Two-pipe distributor with thermostatic head and valve body

	Kv-value (at presetting 0) P-band xp [K]			Kvs	Kvs	Kvs without thermostatic valve	Permitted differential pressure, with valve Δp [bar]	
	1,0	1,5	2,0				Th.- head	EMO T/TM EMOtec EMO 3 TA-Slider 160
DN 15 (1/2") with presetting	0,36	0,54	0,67	1,08	0,98	1,29	1,0	3,5
DN 15 (1/2") without presetting	0,37	0,56	0,73	1,35	1,16	1,83		

Sample calculation

Goal:  
Set value for Duolux two-pipe distributor with shut-off

Given:  
Heat flow Q = 870 W  
Temperature adjustment Δt = 15 K (70/55 °C)  
Pipe dimension Ø = 12 x 2 mm  
Pipe length l = 15 m  
Pressure loss bad radiator Δp<sub>HK1</sub> = 53,5 mbar

Solution:  
Mass flow rate m = Q / (c · Δt) = 870 / (1,163 · 15) = 50 kg/h  
Pressure difference in line R = 1,7 mbar/m  
Pressure loss in line Δp<sub>R</sub> = R · l = 1,7 · 15 = 25,5 mbar  
Pressure loss in line Δp = Δp<sub>HK1</sub> - Δp<sub>R</sub> = 53,5-25,5 = 28,0 mbar  
Presetting value from diagram **3** rotations

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

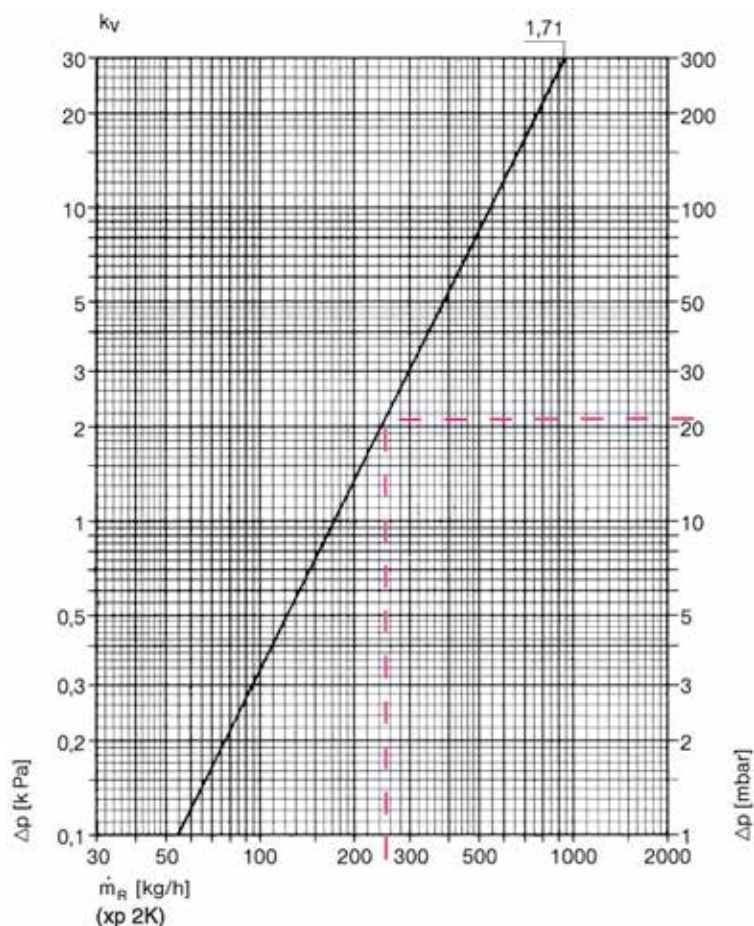
$$Kv = Cv \cdot 0,86$$

## 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  
 $t = 80\text{ °C}$  (176 °F)  
 $v = 0,5\text{ m/s}$

### 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

### Sample calculation

Goal:

Pressure loss in one-pipe circuit

Given:

Heat flow in closed circuit  $Q = 5820\text{ W}$

Temp. flux  $\Delta t = 20\text{ K}$  (75/55 °C)

Pipe dimension  $\varnothing = 16 \times 2\text{ mm}$

Length of pipeline  $l = 25\text{ m}$

Total individual resistors  $\sum \xi = 7,0$

Number of radiators  $n = 5$

Solution:

Mass flow rate in circuit  $m_R =$

$Q / (c \cdot \Delta t) = 5820 / (1,163 \cdot 20) = 250\text{ kg/h}$

Pressure drop in line  $R = 4,2\text{ mbar/m}$  ( $v = 0,61\text{ m/s}$ )

Pressure loss in line  $\Delta p_R = R \cdot l = 4,2 \cdot 25 = 105\text{ mbar}$

Pressure loss individual resistors  $Z =$

$5 \cdot \sum \xi \cdot v^2 = 5 \cdot 7,0 \cdot 0,61^2 = 13\text{ mbar}$

Pressure loss Duolux  $\Delta p_v = 21\text{ mbar}$

Pressure loss one-pipe circuit  $\Delta p_{\text{total}} =$

$\Delta p_v \cdot n + \Delta p_R + Z = 21 \cdot 5 + 105 + 13 = 223\text{ mbar}$

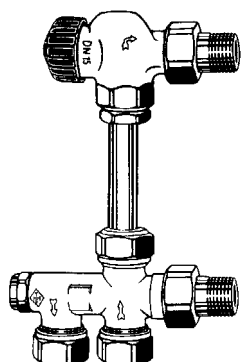
$$Cv = \frac{Kv}{0,86}$$

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

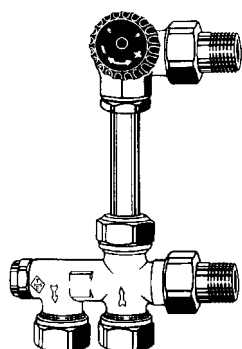


## Valve overview

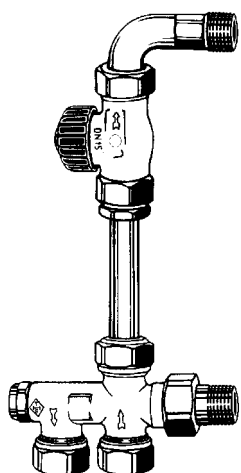
### Two-pipe system



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

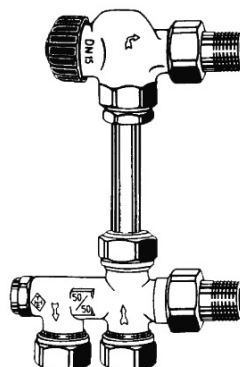


Two-pipe distributor with and without shut-off.  
Double angle valve for left or right connection.  
Black protection cap.  
Ascending pipe and compression fittings.

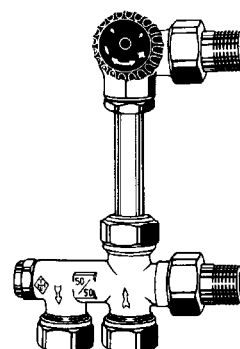


Two-pipe distributor with and without shut-off.  
Straight valve with bended nipple and black protection cap.  
Ascending pipe and compression fittings.

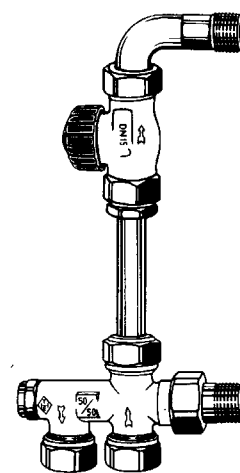
### One-pipe system



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



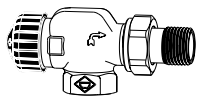
One-pipe distributor with and without shut-off.  
Double angle valve for left or right connection.  
Blue protection cap.  
Ascending pipe and compression fittings.



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

With black protection cap.  
Nickel-plated gunmetal.

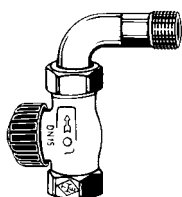
	EAN	Article No
DN 15 (1/2")	4024052178810	2225-02.000



### Double angle thermostatic valve body

With black protection cap.  
Nickel-plated gunmetal.

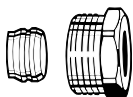
		EAN	Article No
DN 15 (1/2")	Connection to radiator – left	4024052182411	2311-02.000
DN 15 (1/2")	Connection to radiator – right	4024052182213	2310-02.000



### Straight thermostatic valve body with bended nipple

With black protection cap.  
Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052176915	2206-02.000



### Compression fitting

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

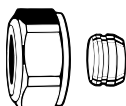
	EAN	Article No
	4024052175017	2201-15.351



### Precision steel pipe

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

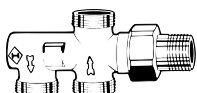
	EAN	Article No
	4024052214518	3831-15.169



### Compression fitting

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

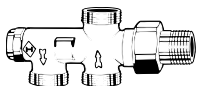
	EAN	Article No
	4024052211616	3800-15.351



### Two-pipe distributor

Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052210817	3800-02.000



### Two-pipe distributor

With shut-off and presetting.  
Nickel-plated gunmetal.

	EAN	Article No
DN 15 (1/2")	4024052211913	3801-02.000

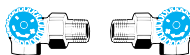
## Articles – One-pipe system



### 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 blue protection cap. Nickel-plated gunmetal.

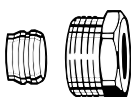
		EAN	Article No
DN 15 (1/2")	Connection to radiator – left	4024052184118	2341-02.000
DN 15 (1/2")	Connection to radiator – right	4024052183616	2340-02.000



### 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.

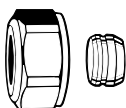
	EAN	Article No
	4024052175017	2201-15.351



### Precision steel pipe

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

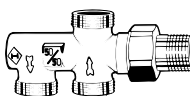
	EAN	Article No
	4024052214518	3831-15.169



### Compression fitting

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

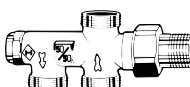
	EAN	Article No
	4024052211616	3800-15.351



### One-pipe distributor 50/50

Nickel-plated gunmetal.

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

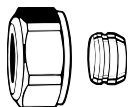


### One-pipe distributor 50/50

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.

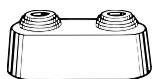
Ø Pipe	EAN	Article No
12	4024052211210	3800-12.351
15	4024052211616	3800-15.351
16	4024052211814	3800-16.351



### Supporting sleeves

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

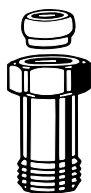
L	Ø Pipe	EAN	Article No
25,0	12	4024052127016	1300-12.170
26,0	15	4024052127917	1300-15.170
26,3	16	4024052128419	1300-16.170



### 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

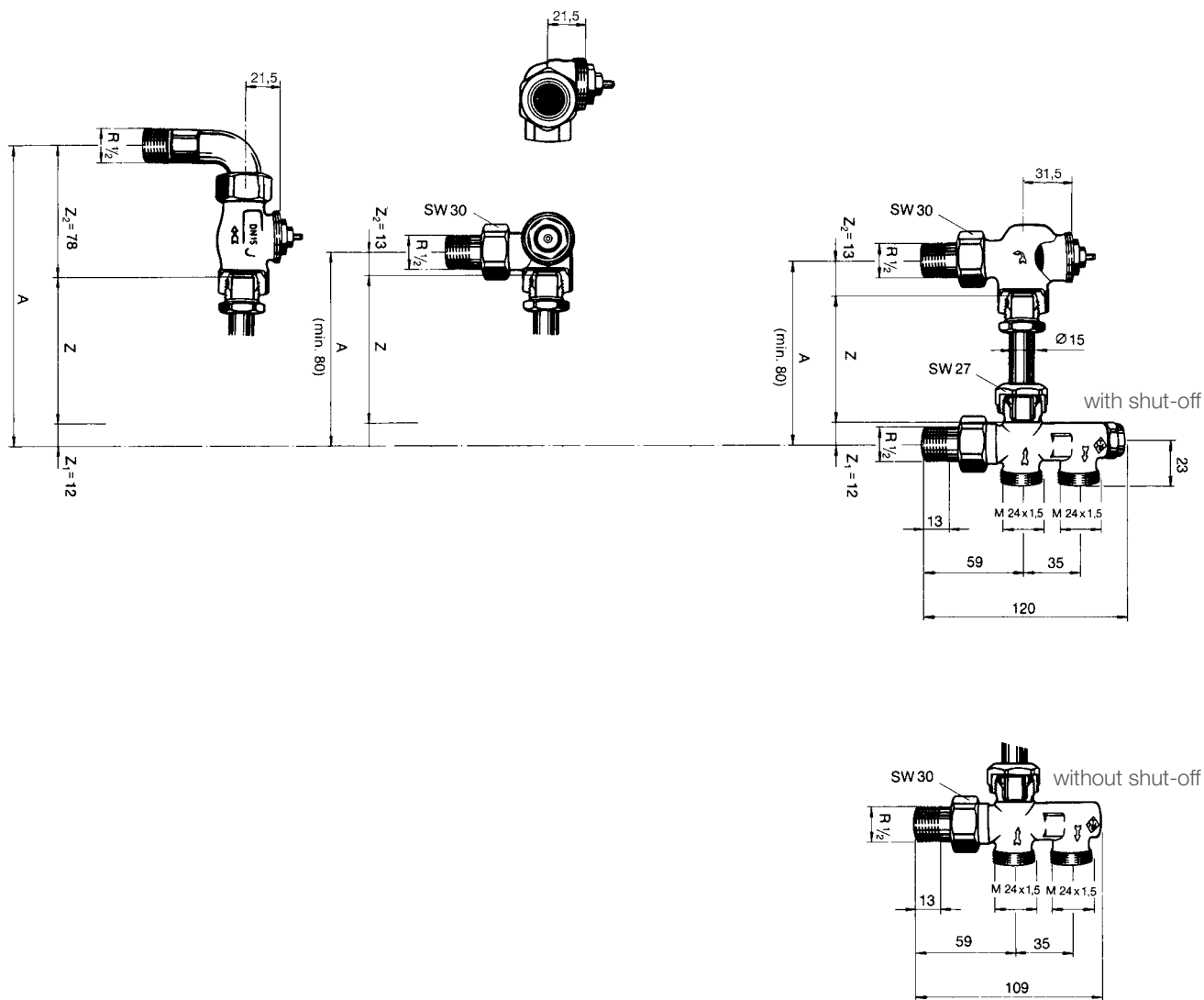
For connecting to plastic, copper, precision steel or multi-layer pipes. Nickel-plated brass.

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

## Dimensions

### Duolux

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