IMI HEIMEIER

# Three-way reversing valve

## Thermostatic 3-way control valves

For heating and cooling systems

IMI Hydronic Engineering

Breakthrough Engineering

# Three-way reversing valve

Three-way reversing valve for mass flow distribution in heating and cooling systems.

## Technical description

**Applications:**
Heating and cooling systems.

**Function:**
Distribution of mass flow

**Dimensions:**
DN 15-25

**Pressure class:**
PN 10

**Max. differential pressure (ΔpV):**
DN 15: 120 kPa = 1.20 bar
DN 20: 75 kPa = 0.75 bar
DN 25: 50 kPa = 0.50 bar

**Temperature:**
Max. working temperature: 120°C, with protection cap or actuator max. 100°C.
Min. working temperature: 2°C.
Low-pressure steam 110°C/0.5 bar.

**Materials:**
Valve body: Corrosion resistant Gunmetal.
O-rings: EPDM rubber
Valve disc: EPDM rubber
Return spring: Stainless steel
Valve insert: Brass
Spindle: Niro-steel spindle with double O-ring sealing. The outer O-ring can be replaced under pressure.

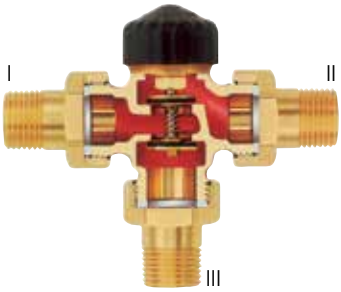
**Marking:**
THE, DN, PN, country code, flow direction arrow, marking of control gates (I, II, III).
Black protection cap.

**Pipe connection:**
Connection with threaded or soldering nipples. Flat sealing.

**Connection to thermostatic head and actuator:**
HEIMEIER M30x1,5

## Construction

**Three-way reversing valve**



## Function

The EMO T thermal actuator is used for two-step control with auxiliary power. In the model **normally open (NO)**, the straight passage I-II of the three-way reversing valve is open without, and the angled exit I-III is closed without current. In the model **normally closed (NC)**, the straight passage I-II of the three-way reversing valve is closed without, and the angled exit I-III is open without current.
Thermostatic heads are used for proportional control without auxiliary power. They also operate in intermediate positions. When the temperature rises, the straight passage I-II is closed and the angled exit I-III is opened.
The TA-Slider 160 and/or EMO 3 / EMO 3/230 motorized actuators are used for proportional and/or three-step control with auxiliary power. The effective direction is determined by the controller or the connection.

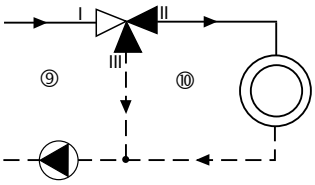
## Application

**Distributing function**
– Switching between heat consuming apparatuses such as the heating circuit and heater for potable water or between various heat generating devices such as boilers, heat pumps, or solar energy systems.
– Output control of heat exchangers via flow rate control, e.g. for air heaters, coolers or other heat exchangers. Volume flow remains steady in the primary circuit.

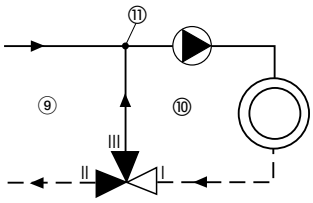
**Mixing function**
– Mixing control through installation in the return pipe (external mixing point). Approximately equal volume flow in the secondary circuit.

**Principle**
Pay attention to the flow direction, see function.

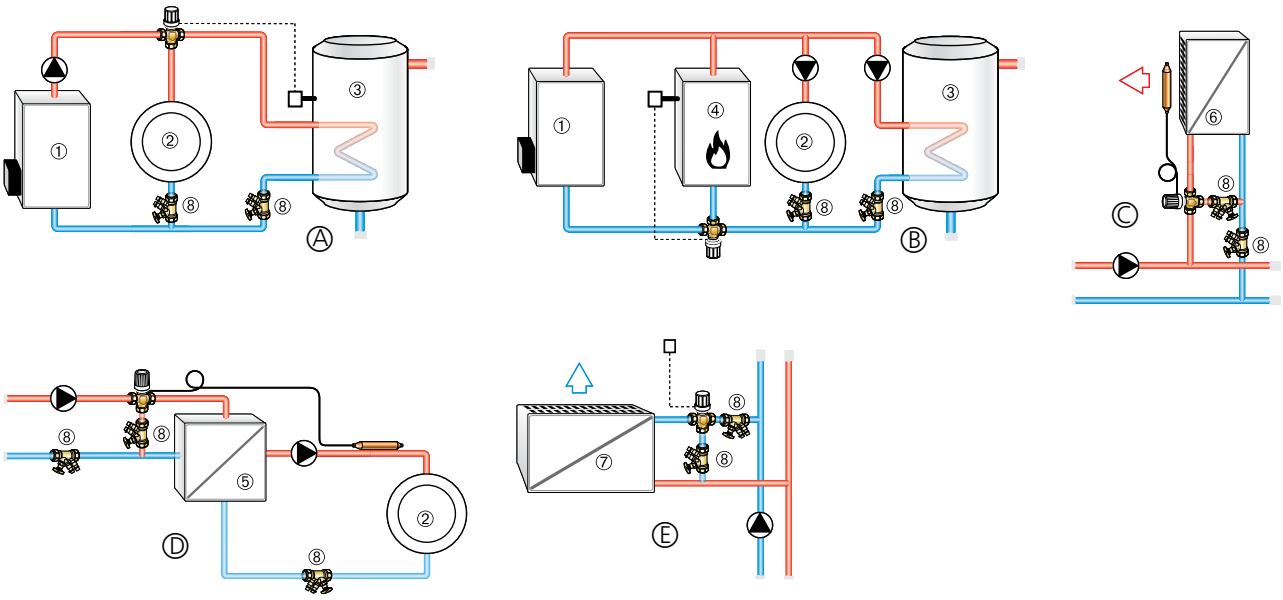
**Distributing function**




**Mixing function**



**Sample application**




1. Oil/gas boiler
2. Heating circuit
3. Hot water storage
4. Boiler for solid fuels
5. Heat exchanger
6. Air heater
7. Fan-coil device
8. STAD balancing valve
9. Primary circuit
10. Secondary circuit

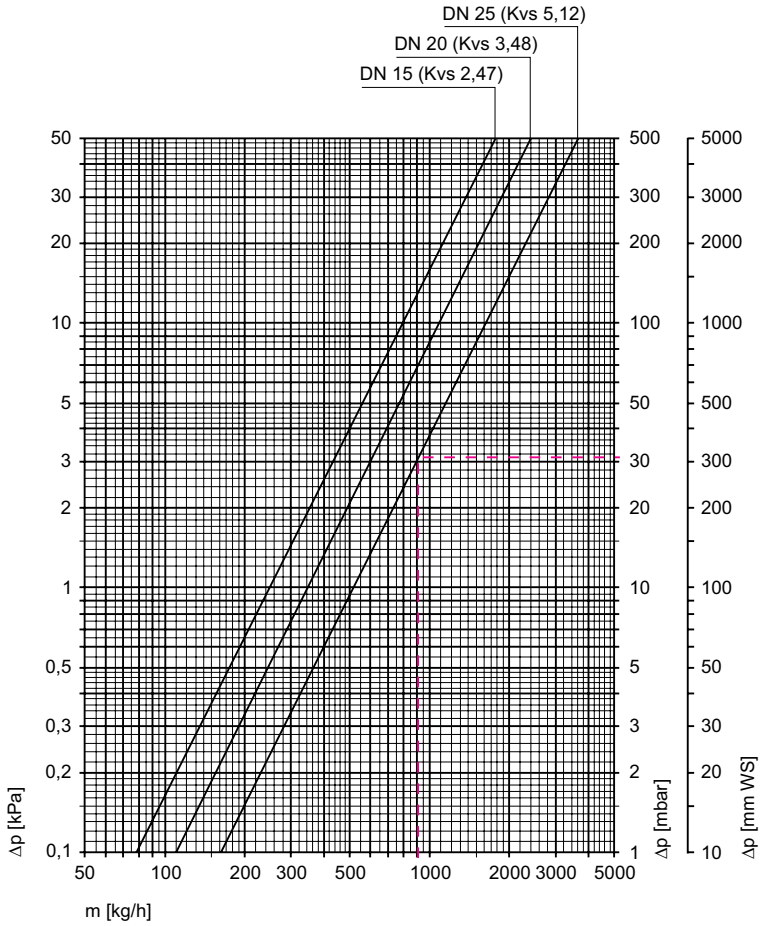
A. Switching between heat consumers such as heating circuits and hot water storages with e. g. EMO T.
B. Switching between heat generating devices such as an oil/gas boiler or boilers for solid fuels with e. g. EMO T.
C. Flow rate control for constant blow-out temperature with air heaterswith thermostatic head K with contact sensor.
D. Switching with fixed-command control of the flow temperature to a secondary circuit of the heat exchanger, such as heaters for potable water, industrial pools, and swimming pool water with thermostatic head K with contact sensor.
E. Control of the water circuit from fan-coil devices (air conditioners / forced air convectors) with e. g. EMO T.

**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.

## Technical data

### Diagram – Three-way reversing valve with actuator




**Three-way reversing valve with Thermostatic head K** *)

| Three-way reversing valve with immersion/sensor | Kv-value P-band [K] | | | | Kvs |
|---|---|---|---|---|---|
| | 2,0 | 4,0 | 6,0 | 8,0 | |
| DN 15 | 0,60 | 1,20 | 1,71 | 2,10 | 2,47 |
| DN 20 | 0,70 | 1,50 | 2,39 | 3,10 | 3,48 |
| DN 25 | 1,08 | 2,28 | 3,48 | 4,62 | 5,12 |

*) The Kv values correspond to the flow in the direction of passage I-II at the given system deviations. The Kvs values corresponds to the flow in the direction I-II with a completely opened valve and in the direction I-III with a closed valve.

### Sample calculation

Goal:
Pressure loss $\Delta p_V$

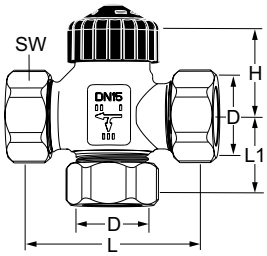
Given:
Three-way reversing valve DN 25 with thermal actuator
Heat flow Q = 21000 W
Temperature adjustment Δt = 20 K (70/50°C)

Solution:
Mass flow m = Q / (c · Δt) = 21000 / (1,163 · 20) = 903 kg/h
Pressure loss from diagram $\Delta p_V$ = 31 mbar

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

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

## Articles



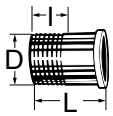

### Three-way reversing valve

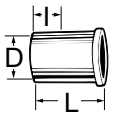
**Flat sealing**

| DN | D | L | L1 | H | SW | Kvs | EAN | Article No |
|---|---|---|---|---|---|---|---|---|
| 15 | G3/4 | 62 | 25,5 | 26,0 | 30 | 2,47 | 4024052222711 | 4160-02.000 |
| 20 | G1 | 71 | 35,5 | 31,0 | 37 | 3,48 | 4024052223114 | 4160-03.000 |
| 25 | G1 1/4 | 84 | 42,0 | 33,5 | 47 | 5,12 | 4024052223510 | 4160-04.000 |

SW = Spanner opening

## Accessories – Flat sealing




### Connecting nipple for flat sealing three-way reversing valves

| DN valve | D | L | I | EAN | Article No |
|---|---|---|---|---|---|
| **Threaded nipple** | | | | | |
| 15 (1/2”) | R1/2 | 27,5 | 13,2 | 4024052222810 | 4160-02.010 |
| 20 (3/4”) | R3/4 | 30,5 | 14,5 | 4024052223213 | 4160-03.010 |
| 25 (1”) | R1 | 33,0 | 16,8 | 4024052223619 | 4160-04.010 |
| **Soldered nipple** | | | | | |
| | **Ø Pipe** | | | | |
| 20 (3/4”) | 22 | 23,0 | 17,0 | 4024052225217 | 4160-22.039 |
| 25 (1”) | 28 | 27,0 | 20,0 | 4024052225415 | 4160-28.039 |