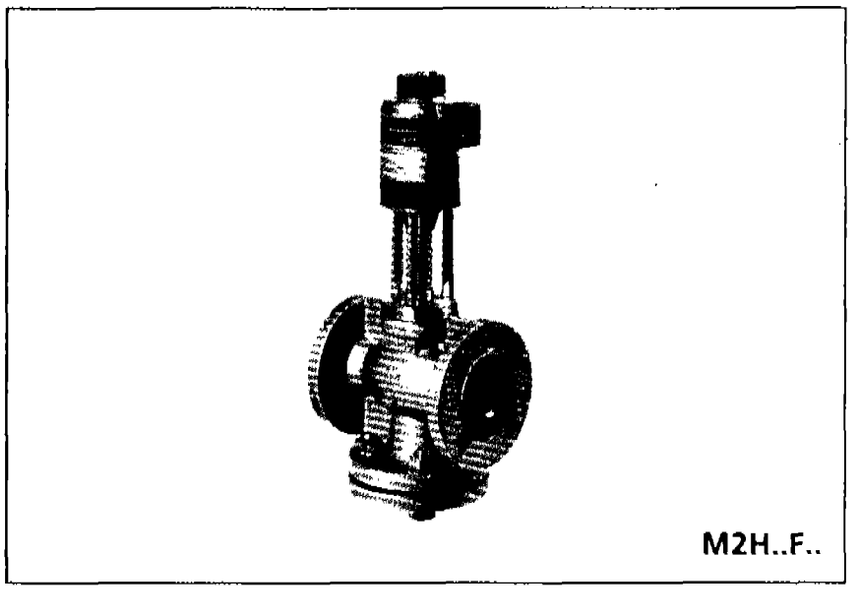
Modulating control valve for HTHW and steam



M2H..F..

Application

Straight-through or three-way valve with magnetic actuator for the modulating control of HTHW and steam in district heating house stations and heating plants.

Features:

- robust, maintenance free
- friction free
- high resolution
- high rangeability
- closed in de-energised position

Technical data

Control voltage	0 ... 20 VDC phase cut
Type of operation	modulating
Positioning time*	approx 1s
Protection standard	IP 20
Valve characteristic (stroke, k_v)	linear
In de-energised position	closed
Temperature:	
– ambient t_{zul}	2 ... 50 °C
– medium t_{zul}	2 ... 180 °C
Nominal pressure	PN 16
Operating pressure $p_e$max:	
– water up to 120°C	1.6 MPa (16 bar)
– above 120°C	1.3 MPa (13 bar)
– saturated steam (gauge)	0.9 MPa (9 bar)
Differential pressure Δp_vmax	1.0 MPa (10 bar)
Leakage max:	
1 → 3	0.05 % k_{vs}
2 → 3	approx 2 % k_{vs} (depending on application data)
Material:	
– valve body	GGG40 (spheroidal graphite cast iron)
– seat/inner valve	chrome nickel steel
– valve steam seal	chrome nickel bellows

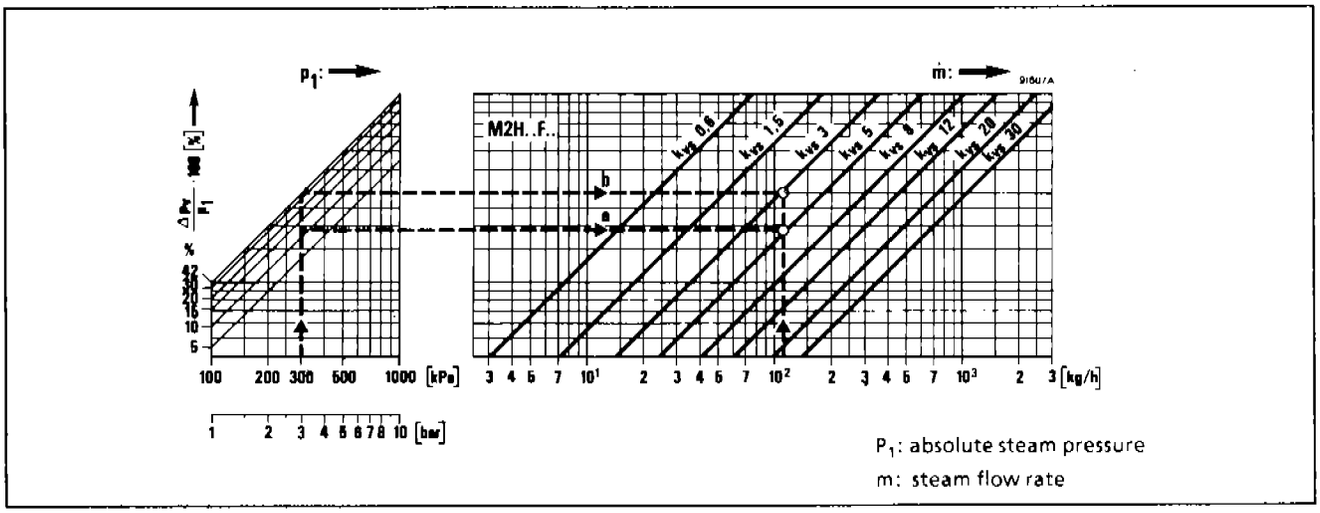
* The valve may be fitted with a Z200/.. damping device where required. The closing time is then 10 ... 30 s. For application of the Z200 see sheet S1-04.02.

Types and operating data

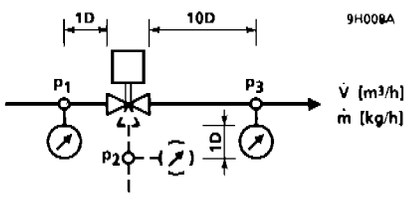
P_N = Nominal power
P_{med} = Mean operating power
L = Max cable length between controller and valve
q = Cross section of cable (Cu)

Type	DN	k_{vs}	P_N	P_{med}	q[mm2]		
					1.5	2.5	4
	[mm]	[m^3/h]	[W]	[W]	L [m]		
M2H15F06	15	0.6	16	4	50	85	135
M2H15F15	15	1.5	16	4	50	85	135
M2H15F	15	3.0	16	4	50	85	135
M2H20F	20	5.0	16	4	50	85	135
M2H25F	25	8.0	20	5	40	65	110
M2H32F	32	12.0	26	6	30	50	80
M2H40F	40	20.0	26	6	30	50	80
M2H50F	50	30.0	40	10	20	30	50

Saturated steam flow chart



Pressure ratio



Key:
p_1 = absolute pressure at inlet side
p_3 = absolute pressure at outlet side
$\dot{m}$ = steam flow rate in kg/h
k = factor for superheated steam
1 + 0.0013 x Δ T superheat
(with saturated steam k = 1)

Pressure ratio $\frac{p_1 - p_3}{p_1} \cdot 100\ \%$

Pressure ratio <42 % below critical pressure drop.
Pressure ratio ≥42 % above critical pressure drop.

Calculation of k_{vs}

a) At below the critical pressure drop

$$\frac{p_1 - p_3}{p_1} \cdot 100 < 42\ \%$$

$$k_{VS} = 0.042 \cdot \frac{\dot{m}}{\sqrt{p_3\,(p_1 - p_3)}} \cdot k$$

b) at above the critical pressure drop

$$\frac{p_1 - p_3}{p_1} \cdot 100 \geq 42\ \%$$

$$k_{vs} = 0.084 \cdot \frac{\dot{m}}{p_1} \cdot k$$

Example of a) below the critical pressure drop

given: saturated steam = 133.54 [°C]
p_1 = 3.0 [bar] ≙ 300 [kPa]
$\dot{m}$ = 110 [kg/h]
pressure ratio = 12 %

required: k_{VS}, valve type

Solution: $p_3 = p_1 - \frac{12}{100} \cdot p_1$

$= 3 - \frac{12}{100} \cdot 3 = 2.64$ [bar] ≙ 264 (kPa)

$$k_{VS} = 0.042 \cdot \frac{110}{\sqrt{2.64\,(3\text{-}2.64)}} \cdot 1 = 4.739$$

Selected: k_{VS} = 5 → type M2H20F

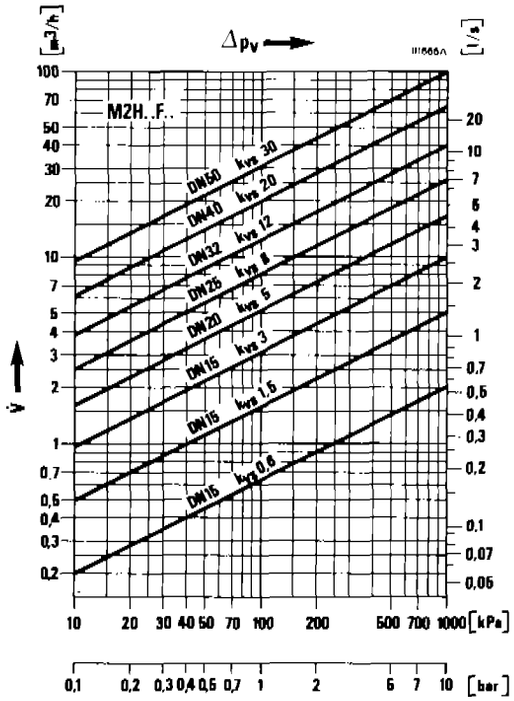
Example of b) above critical pressure drop

given: saturated steam = 133.54 [°C]
p1 = 3.0 [bar] ≙ 300 [kPa]
$\dot{m}$ = 110 [kg/h]
pressure ratio = above critical
pressure drop admissible (≥ 42 %)

required: k_{VS} valve type

Solution: $k_{VS} = 0.084 \cdot \frac{110}{3} \cdot 1 = 3.08$

Selected: k_{VS} = 3 → type M2H15F



Water flow chart

Flow/pressure differential relationship.

Principle of operation/construction

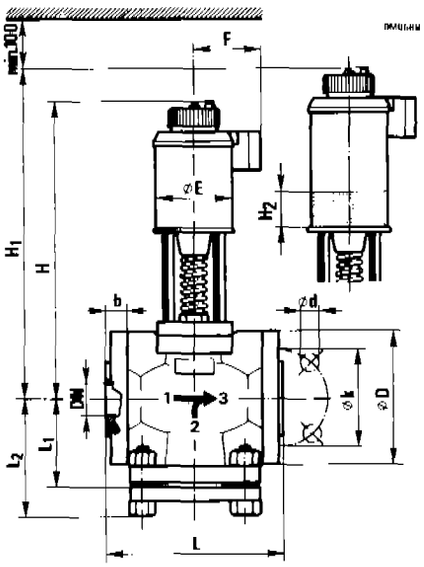
The only moving part, the core, is free from friction and changes its position against a counterspring with each change in current. The smallest movement is transferred directly to the valve plug so that modulating control down to infinitesimally low rates of flow is achieved.

Because of its short positioning time, the valve can be used in cases where fast changes in load have to be corrected.

The valve has no stuffing box, the stem being sealed to the outside by means of bellows.

Manual control

The valve can be opened and closed manually by turning the hand wheel.



Dimensions [mm] and weights [kg]

Flange dimensions according to DIN 2533, PN 16

Type M2H..F..	DN 15	20	25	32	40	50
L	130	150	160	180	200	230
L_1	65	75	80	90	100	105
L_2	89	101	106	118	128	135
D	95	105	115	140	150	165
b	14	16	16	18	18	20
k	65	75	85	100	110	125
d	4 x 14	4 x 14	4 x 14	4 x 18	4 x 18	4 x 18
H	278	280	298	333	396	400
H_1	310	312	332	367	430	434
E	70	70	80	100	100	100
F	60	60	65	75	75	75
G	7.2	9.1	11.2	17.2	22.4	28.4

G : Weight including packaging
L_1 : When used as three-way valve
L_2 : When used as straight-through valve (as supplied from factory)
H_1 : Installation height with Z200/. damping device fitted (H_2)

Mounting

It is essential that a fine mesh strainer is installed in front of the valve to prevent the ingress of grit into the valve.

The three-way valve must always be installed as mixing valve.
Noters on installation steam systems see sheet S1-04.05.

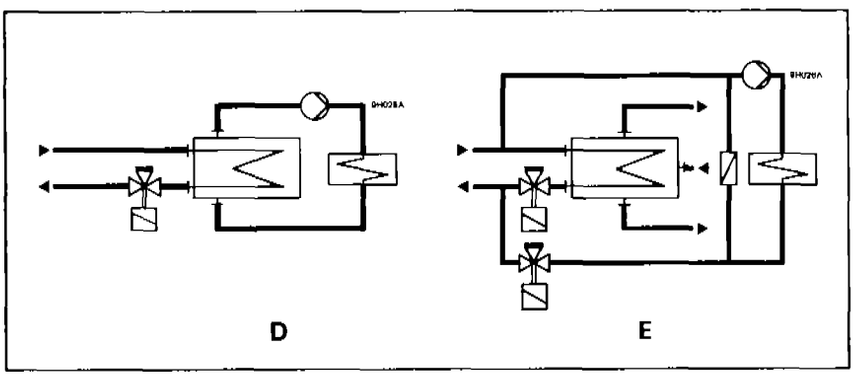
To prevent solids and deposits from affecting the hydraulic system, it is recommended to follow the flushing intrctuons given in:

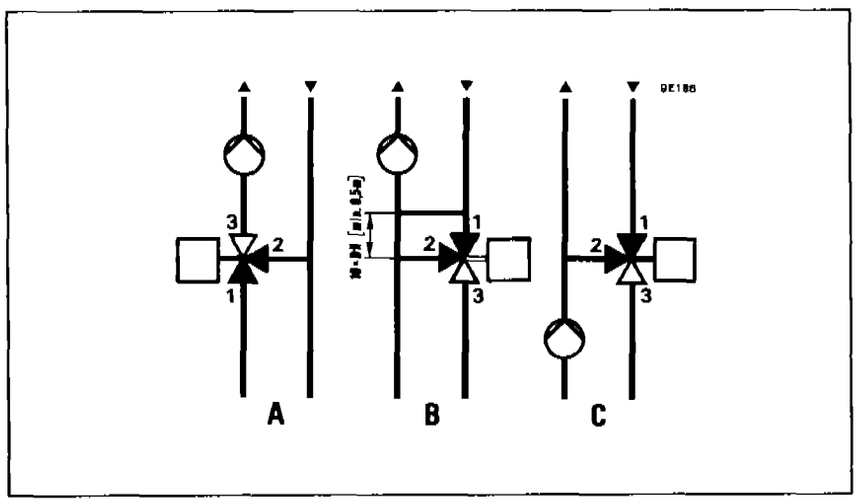
"BSRIA - Technical Memorandum TM2 184".

Installation examples for straight-through valves
(system principles without installation specific details)

D: District heating supply, indirect connection

E: District heating supply, heating system, direct connection, water heating system





Installation examples for three-way mixing valves
(system principles without installation specific details)

A: Mixing circuit
B: Injection circuit
C: Diverting circuit