Modulating control valve PN16 with magnetic actuator

M3P...GY
M3P...FY

for hot and chilled water
with positioning control and position feedback

M3P...GY

M3P...FY

Mixing or straight-through valves with magnetic actuators for modulating control of hot and chilled water systems.

- **Fast positioning time (< 1 s)**
- **High resolution (> 1 : 1000)**
- **High rangeability**
- **1 –> 3 closed when de-energised**
- **With positioning control and position feedback**
- **Low friction, robust and maintenance-free**

Use

The M3P...GY and M3P...FY valves are mixing or through port valves with a ready-mounted magnetic actuator. The actuator is equipped with connecting electronics for positioning control and position feedback. If the power is off, the valve control path 1 –> 3 is closed.

Warning : The valve is suitable for straight-through or three-way applications and may be installed ONLY in a mixing arrangement.

The short positioning time, high resolution and high rangeability make these valves ideal for proportional control of hot and chilled water systems.
The low-friction, robust and maintenance-free construction make regular service unnecesary.

Type summary

The M3P...Y valves are available in a screwed and a flanged version:

M3P...GY Screwed valves with DN8 ... DN50
M3P...FY Flanged valves with DN8 ... DN100

For operating data and type overview see table on page 2

Operating data

Valve type		DN	k_{VS}	Δp_{Vmax}		P_N	P_{med}	q [mm²]		
screwed	flanged	[mm]	[m³/h]	[kPa]	[bar]	[VA]	[VA]	1,5	2,5	4,0
								L [m]		
M3P08GY	**M3P08FY**	08/15	0,6	500	5	13	3	60	100	170
M3P10GY	**M3P10FY**	10/15	1,5	500	5	13	3	60	100	170
M3P15GY	**M3P15FY**	15	3,0	500	5	13	3	60	100	170
M3P20GY	**M3P20FY**	20	5,0	300	3	13	3	60	100	170
M3P25GY	**M3P25FY**	25	8,0	300	3	16	4	50	80	135
M3P32GY	**M3P32FY**	32	12	300	3	20	5	40	65	110
M3P40GY	**M3P40FY**	40	20	300	3	26	6	30	50	80
M3P50GY	**M3P50FY**	50	30	300	3	40	10	20	30	50
–	**M3P65FY**	65	50	300	3	40	10	20	30	50
–	**M3P80FY**	80	80	300	3	80	20	10	16	27
–	**M3P100FY**	100	130	200	2	120	30	6	10	17

Legend:

Δp_{Vmax} = Max. admissible pressure differential

P_N = Nominal power

P_{med} = Mean operating power

k_{VS} = Flow rate to VDI/VDE2173, tolerance ±10 %

q = Cross section of DC 20 V or AC 24 V cable (Cu)

L = Max. cable length. With 4-wire connections, the maximum permissible length of the separate 1.5 mm² Cu signal cable is 200 m.

Ordering

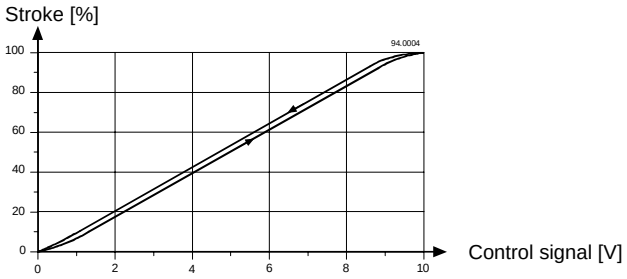
The valves are supplied complete with the magnetic actuator and the terminal housing. The blank flanges or screwed taps required for straight-through applications must be ordered separately (see 'Accessories' on page 3).
When placing an order, please specify the quantity, product description and type code.

Example:
1 flanged valve M3P40FY and **1 blank flange Z155/40**

Technical / Mechanical design

See data sheet N4028 for a detailed description of operation.

The control signal is converted in the terminal housing into a phase cut signal which generates a magnetic field in the coil. This causes the only moving part, the armature, to change its position in accordance with the interacting forces (magnetic field, counter-spring, hydraulics etc.). The armature responds rapidly to any change in signal, transferring the corresponding movement directly to the control disc, enabling fast changes in load to be corrected quickly and accurately.
The valve position is measured continuously. Any disturbance in the system is rapidly corrected by the internal positioning controller, which ensures that the control signal and the valve stroke are exactly proportional, and also provides a feedback signal indicating the valve position.



If the power is switched off or fails, the valve control path (port 1 –> 3) is automatically closed by the force of the spring.
The valve stem is sealed with a maintenance-free O-ring gland.

Manual adjustment

Control path ports 1 –> 3 can be opened mechanically to between 0 and approximately 90 %, by turning the handwheel clockwise. The manual adjustment facility can also be used as a mechanical method of low limit control, i.e. the valve will exercise its normal control function between the manually-set position and the 100% open position. For full-stroke automatic control, the handwheel must be set to 0 (the anticlockwise end-stop).

Accessories

- For flanged valves: Close off port '2' in straight-through applications. The blank flange kit consists of a seal, screws, spring washers and nuts.

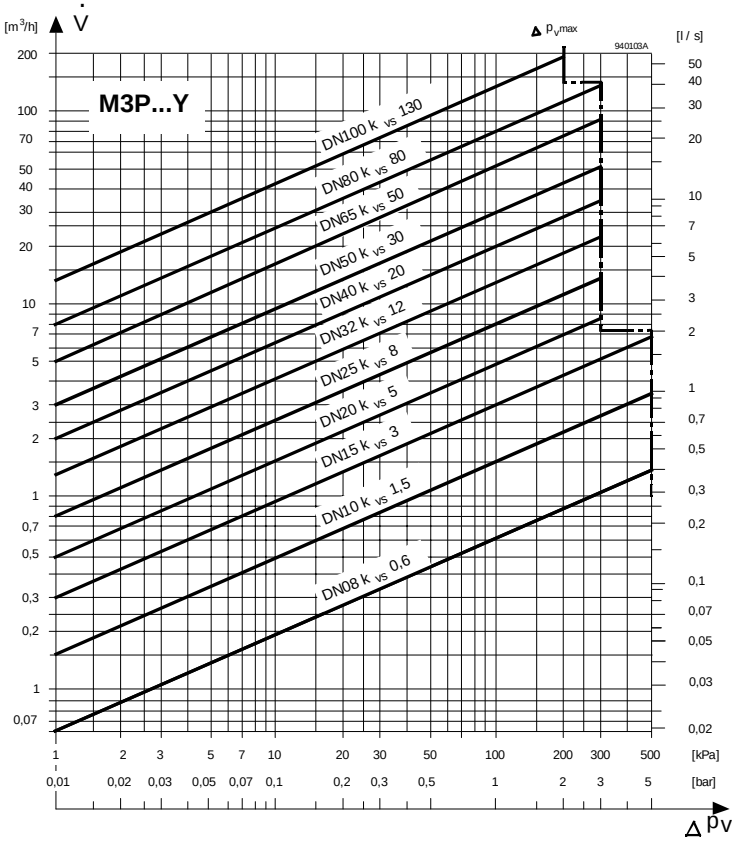
Z155/15 ... Z155/32	Screwed tap for flanged valves with DN15 ... DN32 or
Z155/15F ... Z155/32F	Blank flange kit for flanged valves with DN15 ... DN32
Z155/40 ... Z155/100	Blank flange kit for flanged valves with DN40 ... DN100

- See sheet N4000 for a summary of valves for water and steam

Sizing

Water flow chart

Flow / pressure differential relationship. k_{vs} signifies the volume of water V in m^3/h which flows through the open valve at a pressure differential Δp_v of 100 kPa (1 bar). See data sheet N4023 for notes on calculating the value of k_{vs}.



Mounting notes

Two mounting instructions are enclosed with the valve: Ref. 35638 (valve) and Ref. 35677 (ZM... terminal housing).

Caution : Always disconnect the power before fitting or removing the terminal housing. The terminal housing is calibrated and matched to the actuator, and should be replaced only by qualified personnel.

- The M3P...Y valve is suitable for straight-through or three-way applications but may be installed ONLY in a mixing arrangement.
- Vertical to horizontal mounting: Protection standard IP31.
  The valve must not be suspended below the horizontal.
- The M3P...GY screwed valves are flat-faced to facilitate sealing with the gaskets supplied. The use of sealing compounds, tape or hemp thread is not recommended.
- The actuator must not be lagged.
- Only three-way valves are supplied, but these may be used in straight-through applications by sealing port 2 as described on page 4.

Recommendation

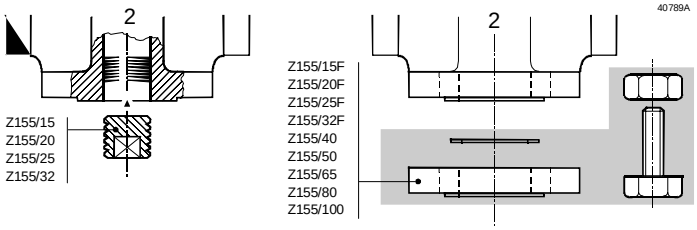
Water systems should be cleaned, flushed and treated in accordance with current good practice, as described, for example, in BSRIA Application Guides AG 8/91 and AG2/93. For other relevant information, see also CIBSE Guide B (Section 7).

Straight-through applications

Flanged valves in straight-through applications

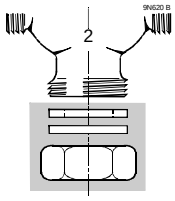
Close off port '2' with the type Z155/... accessories, which must be ordered separately. The blank flange kit consists of a seal, screws, spring washers and nuts.

- for DN15 ... DN32 Screwed tap (Z155/15 ... Z155/32)
  or blank flange (Z155/15F ... Z155/32F)
- for DN40 ... DN100 Blank flange kit (Z155/40 ... Z155/100)



Screwed valves in straight-through applications

Close off port '2' with the accessories supplied (nut, cover and gasket).



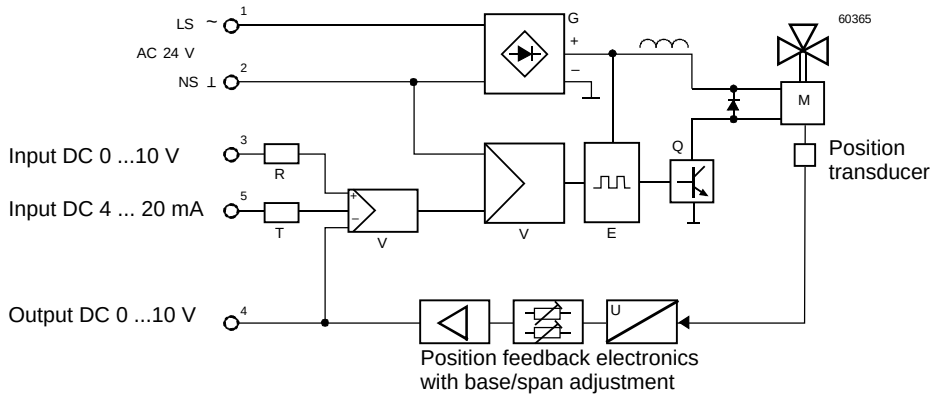
Technical data

Electrical interface	Only admissible with low voltage (SELV, PELV)
Control signal	DC 0 ...10 V or DC 4 ... 20 mA
Supply voltage	AC 24 V, 50/60 Hz
– Max. voltage tolerance	+15/–10 %
Nominal power	See 'Operating data', page 2
Position feedback (output signal):	DC 0 ...10 V = 0 ...100 % stroke
Max. load	1.5 mA
Accuracy	± 3 % of full scale
Nominal pressure	PN16
Operating pressure $p_{e}max$	1 MPa (10 bar)
Pressure differential $\Delta p_{v}max$	See 'Operating data' on page 2
Leakage at Δp_v = 0.1 MPa (1bar)	1 –> 3 Max. 0.05 % k_{vs} (to VDI/ VDE2174)
	2 –> 3 Depends on application data (approx. 2 % k_{vs})
Water temperature	2 ...120 °C
Valve characteristic (stroke, kv)	Linear, optimised in low-opening range
Resolution $\Delta H / H_{100}$	> 1 : 1000 (H = stroke)
Type of operation	Modulating
Manual adjustment	0 % to max. 90 % depending on DN
Position when de-energised	1 –> 3 closed
Orientation	Upright to horizontal
Positioning time	< 1 s
Materials (valve body):	
Housing	Cast iron
Inner valve	CrNi steel
Seat	Brass
Valve spindle seal	EPDM (O-ring)
Connection terminals	Screw terminals for 4 mm^2 wire
Protection standard	Upright to horizontal mounting IP31 to IEC529
Ambient temperature	2 ... 50 °C
Weight (incl. packaging)	See 'Dimensions' on page 7
Conformity	Meets the requirements for CE marking

Internal diagram

Block diagram of the signal converter

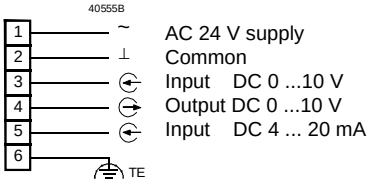
NS = system ground



Key to block diagram

E	Phase cut converter	R	Input resistor 50 k ohms
G	Bridge rectifier	T	Voltage / current converter (load on 350 ohms to NS)
M	Magnetic valve	U	Position/ voltage converter
Q	Phase cut output	V	Differential amplifier

Connection terminals



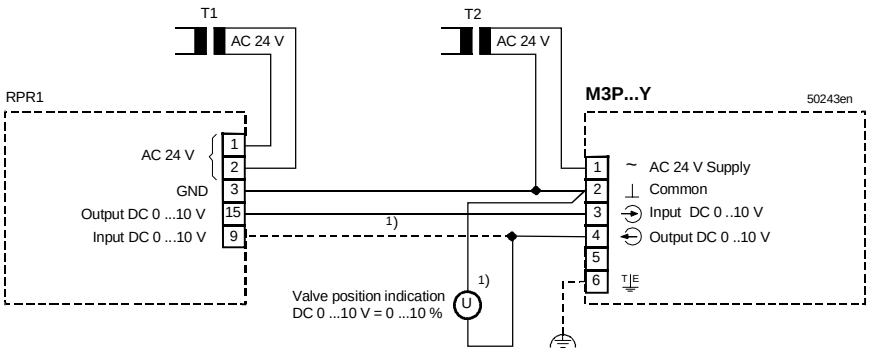
Warning :
If the controller and the valves receive their power supply from separate sources, the valve transformer must not be earthed on the secondary side.

Connection diagrams

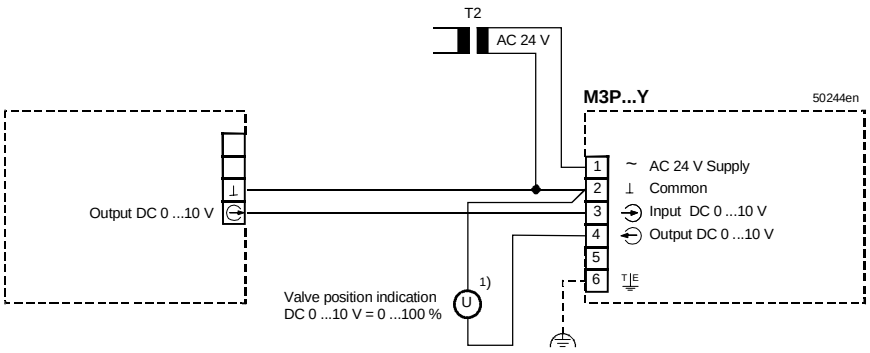
- **with DESIGO 30** – refer to manual R21
- **with INTEGRAL RS** – refer to manual K21

- **with MULTIREG**

Warning : The transformer T2 must not be earthed on the secondary side and should be suitably fused.

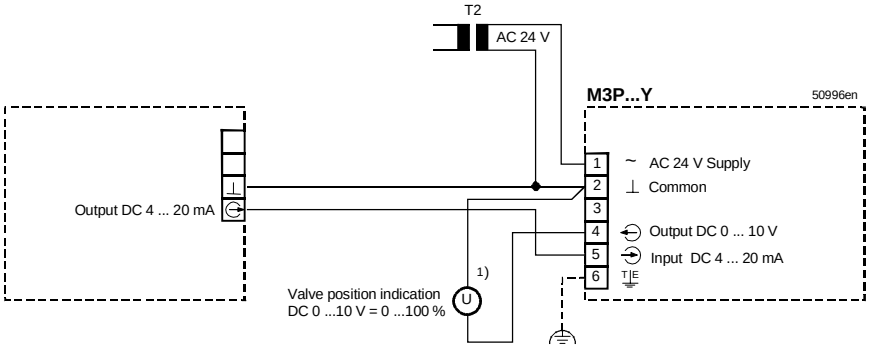


- **with other controllers** (output DC 0 ...10 V)



1) only where required

• **with other controllers**
(output DC 4... 20 mA)



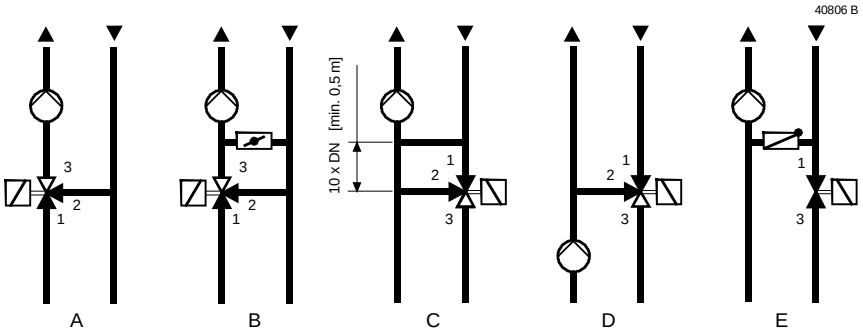
1) only where required

Application examples

The hydraulic circuits shown here are schematic diagrams only, without installation-specific details.

Warning : The valve is suitable for straight-through or three-way applications and may be installed ONLY in a mixing arrangement.

Hydraulic circuits

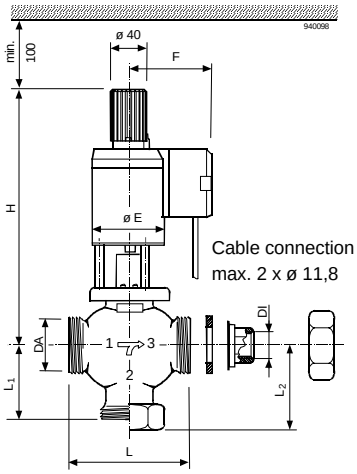


Legend

A Mixing circuit
B Mixing circuit with bypass (underfloor heating)
C Injection circuit
D Diverting circuit
E Injection circuit with straight-through valve

Dimensions

M3P...GY
Screwed valves with terminal housing

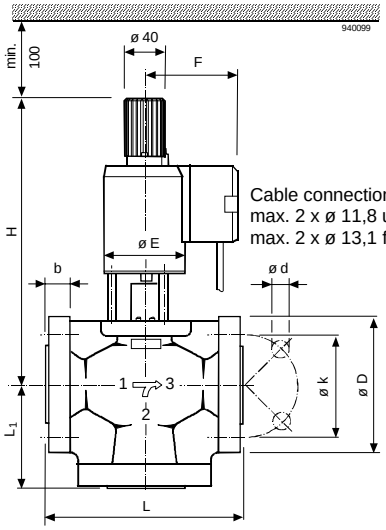


Screwed fittings and gaskets are supplied with these valves.

– All dimensions in mm
– Screwed fittings to ISO49 / DIN2950
DA = External thread G [inches] to ISO228/1
DI = Internal thread Rp to ISO7/1
* = Dimensions when used as straight-through valve
W = Weight in kg (incl. packaging)

Valve type	DI	DA	L	L_1	L_2 *	H	E	F	W
M3P08GY	Rp ½	G 1	80	42.5	51	250	60	73	3.2
M3P10GY	Rp ½	G 1	80	42.5	51	250	60	73	3.2
M3P15GY	Rp ½	G 1	80	42.5	51	250	60	73	3.2
M3P20GY	Rp ¾	G 1¼	95	52.5	61	252	60	73	3.9
M3P25GY	Rp 1	G 1½	110	56.5	65	270	70	78	5.2
M3P32GY	Rp 1¼	G 2	125	67.5	76	288	80	84	7.8
M3P40GY	Rp 1½	G 2¼	140	80.5	94	332	100	94	12.1
M3P50GY	Rp 2	G 2¾	170	93.5	109	351	100	94	16.4

M3P...FY
Flanged valves with terminal housing



– Counter-flanges are not supplied.
– Flange dimensions to DIN2533, PN16
– All dimensions in mm
W = Weight in kg (incl. packaging)

Valve type	L	L_1	D	b	k	d	H	E	F	W
M3P08FY	130	65	95	14	65	4x14	250	60	73	4.9
M3P10FY	130	65	95	14	65	4x14	250	60	73	5.0
M3P15FY	130	65	95	14	65	4x14	250	60	73	5.0
M3P20FY	150	75	105	16	75	4x14	252	60	73	6.2
M3P25FY	160	80	115	16	85	4x14	270	70	78	7.8
M3P32FY	180	90	140	18	100	4x18	288	80	84	11.8
M3P40FY	200	100	150	18	110	4x18	332	100	94	17.0
M3P50FY	230	105	165	20	125	4x18	351	100	94	21.9
M3P65FY	290	125	185	20	145	4x18	470	125	108	39.6
M3P80FY	310	140	200	22	160	8x18	508	145	124	45.5
M3P100FY	350	160	220	24	180	8x18	570	145	124	59.0