SIEMENS

4457

Modulating control valves PN16 with magnetic actuator

for media containing mineral oils

M3P80FYP
M3P100FYP

Mixing or straight-through valves, DN80 and DN100, with magnetic actuators for modulating control or dosing control of media containing mineral oils in closed circuits.

- **Fast positioning time (1 s)**
- **High resolution (> 1 : 1000)**
- **Control signal DC 0 ...10 V or DC 4 ... 20 mA (user-selected)**
- **1 –> 3 closed when de-energised**
- **With positioning control, position feedback and manual control**
- **Robust and maintenance-free**
- **Wear-free inductive stroke measurement**

Use

The M3P...FYP 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 direction of flow MUST be as indicated on the valve (1 –> 3).

The short positioning time, high resolution and high rangeability make these valves ideal for proportional control or dosing control of fluids containing mineral oil (SAE05 ... SAE50) in closed circuits.

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Siemens Building Technologies
Landis & Staefa Division

Application examples

- Temperature control in mixing circuits for motor oil circulation
- Temperature control in mixing circuits for screw-compressors (compressed air)
- Temperature control of fuel circuits in mixing circuits for petrol and diesel oil
- High pressure control for the calibration of components for electronic injection components
- Control of cutting-oil emulsion for industrial grinding machines

Applications for CHW and LPHW systems, see data sheet CA1N4454E.

The low-friction, robust and maintenance-free construction makes regular service unnecessary and ensures a long service life.

Type summary

The M3P...FYP valve is available in two sizes:

M3P80FYP Flanged valve with DN80
M3P100FYP Flanged valve with DN100

Flanged valves up to DN65 and screwed valves up to DN50 see sheet CA1N4456E.

Operating data

Valve type	DN [mm]	k_{vs} [m^3/h]	Δp_{max} [kPa]	[bar]	P_N [VA]	P_{med} [VA]	q [mm^2] 1.5	2.5	4.0
							L [m]		
M3P80FYP	80	80	300	3	80	20	10	16	27
M3P100FYP	100	130	200	2	120	30	6	10	17

Legend:
k_{vs} = Flow rate to VDI/ VDE2173, tolerance ±10 %
Δp_{max} = Max. admissible pressure differential
P_N = Nominal power
P_{med} = Mean operating power
q = Cross section of cable (Cu)
L = Max. cable length. With 4-wire connections, the maximum permissible length of the separate 1.5 mm^2 Cu signal cable is 200 m.

Ordering

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

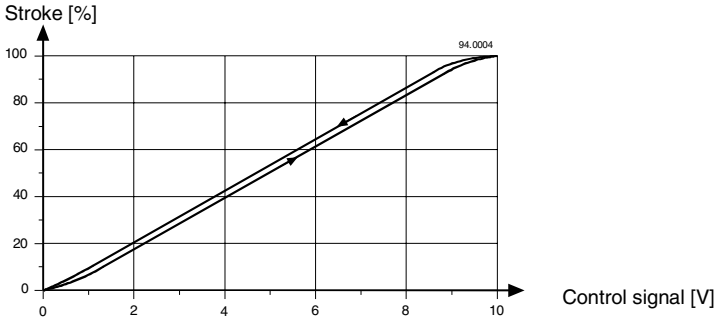
Example: **1 flanged valve M3P80FYP** and **1 blank flange Z155/80**

Technical / Mechanical design

See data sheet CA1N4028E 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 armature to change its position in accordance with the interacting forces (magnetic field, counterspring, 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.

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.

Z155/80 Blank flange kit for flanged valve, DN80
Z155/100 Blank flange kit for flanged valve, DN100

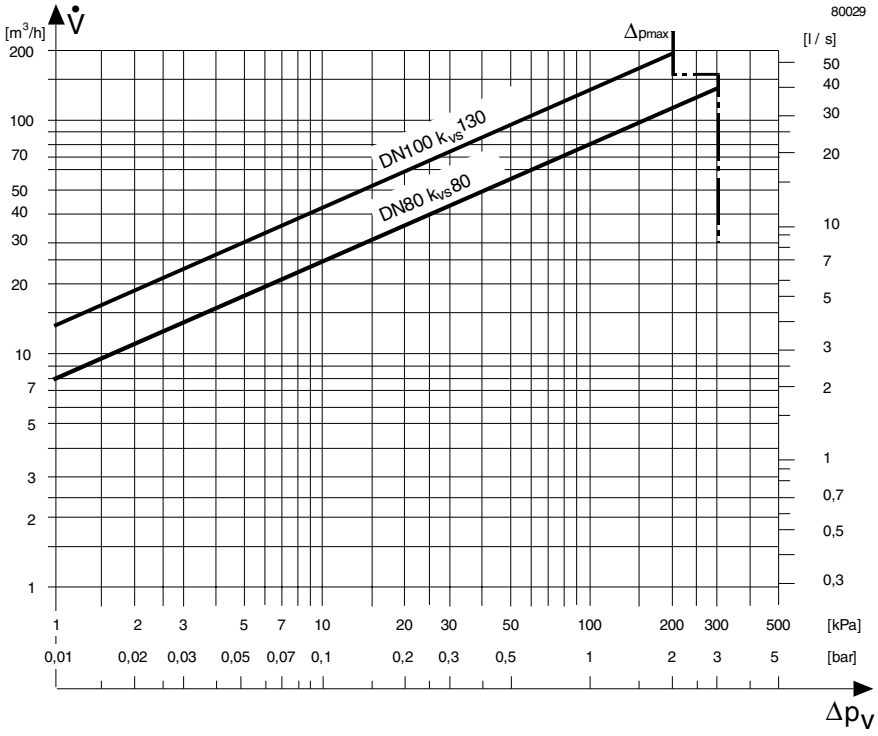
See sheet CA1N4000E for a summary of valves for water and steam.

Sizing

Water flow chart

Flow / pressure differential relationship.

k_{vs} signifies the volume of water $\dot{V}$ in m^3/h which flows through the open valve at a pressure differential Δp_v of 100 kPa (1 bar).
See data sheet CA1N4023E for notes on calculating the value of k_{vs}.



Mounting

Two mounting instruction leaflets are enclosed with the valve: Ref. 35638 (valve) and Ref. 35677 (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.

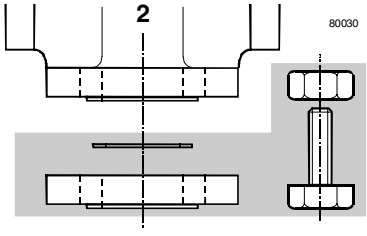
- The M3P...FYP valve is suitable for straight-through or three-way applications but may be installed ONLY in a mixing arrangement.
- Vertical to horizontal mounting: Protection standard IP31.
- The valve must not be suspended below the horizontal.
- The actuator must not be lagged.

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

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.



Maintenance

- The valves and actuators require no maintenance or service.
- The valve stem is sealed from external influences by a maintenance-free O-ring gland.
- Should the valve electronics prove faulty, the electronics module should be replaced with replacement part ZM250. Mounting instructions are enclosed (Ref. 35731).

⚠ **Warning** **Under operating conditions within the limits defined by the application data, the actuator will become hot, but this does not represent a fire risk. Always maintain the minimum clearance specified (see "Dimensions")**

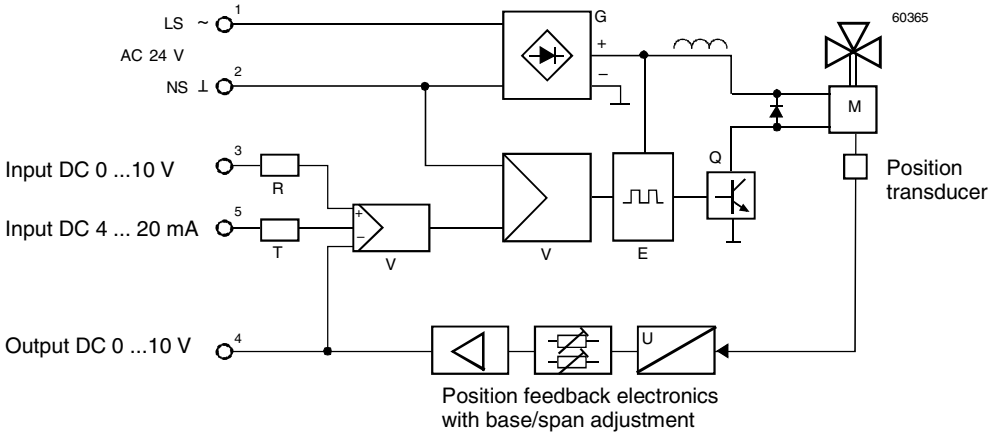
Technical data

Electrical interface	Power supply	Only admissible with low voltage (SELV, PELV)
	Supply voltage	AC 24 V, 50/60 Hz
	– Max. voltage tolerance	+15/–10 %
	Nominal power	See table 'Operating data'
	Control signal (user-selected)	DC 0 ...10 V or DC 4 ... 20 mA
	Position feedback (output signal):	DC 0 ...10 V = 0 ...100 % stroke
	– Max. load	1.5 mA
	– Accuracy	± 3 % of full scale
Function data	Nominal pressure	PN16
	Operating pressure p_{emax}	1000 kPa (10 bar)
	Pressure differential Δp_{max}	See table 'Operating data'
	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})
	Admissible media	Mineral oils SAE05 ... SAE50, mineral-oil-based diesel fuels, heat transfer oils
	Valve characteristic (stroke, k_v)	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
Electrical connection	Connection terminals	Screw terminals for 4 mm² wire
Ambient conditions	Ambient temperature	2 ... 50 °C
	Media temperature	2 ...120 °C
Materials (valve body)	Housing	Cast iron
	Inner valve	CrNi steel
	Seat	Brass
	Valve stem seal	Viton® (fluoroelastomer – FPM product)
Dimensions / Weight	Dimensions	See table in section 'Dimensions'
	Weight (incl. packaging)	See table in section 'Dimensions'
Safety	Protection standard	Upright to horizontal mounting IP31 to IEC529
	Conformity	Meets the requirements for **CE** marking

Internal diagram

Block diagram of the signal transducer

NS = System ground

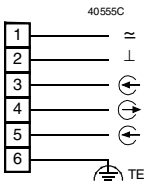


Key to block diagram

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.**



LS	AC 24 V	
NS	AC 24 V	
Input	DC 0 ... 10 V	
Output	DC 0 ... 10 V	
Input	DC 4 ... 20 mA	

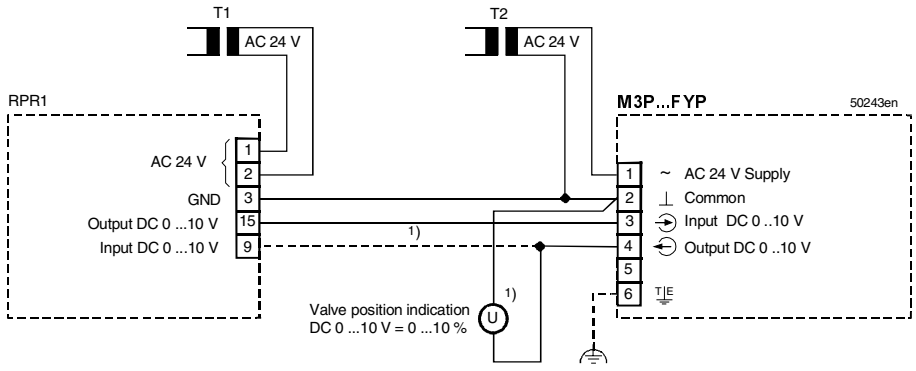
Connection diagrams

• with DESIGO 30 – refer to Technical manual R21

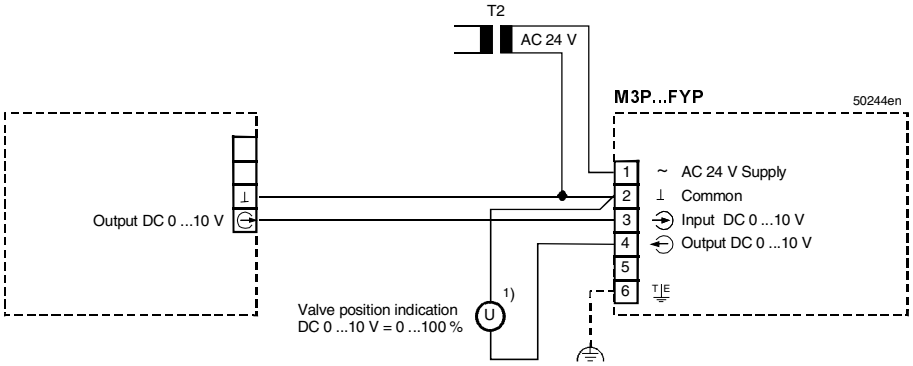
• with INTEGRAL RS – refer to Technical manual K21

• with MULTIREG

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

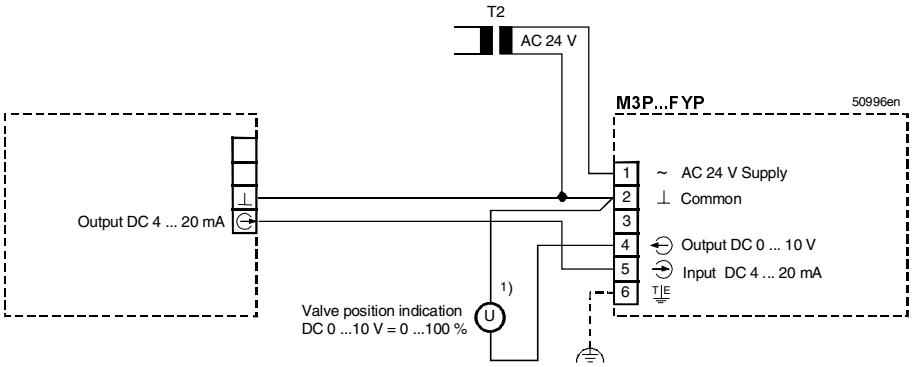


• with other controllers (output DC 0 ...10 V)



1) only where required

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



1) only where required

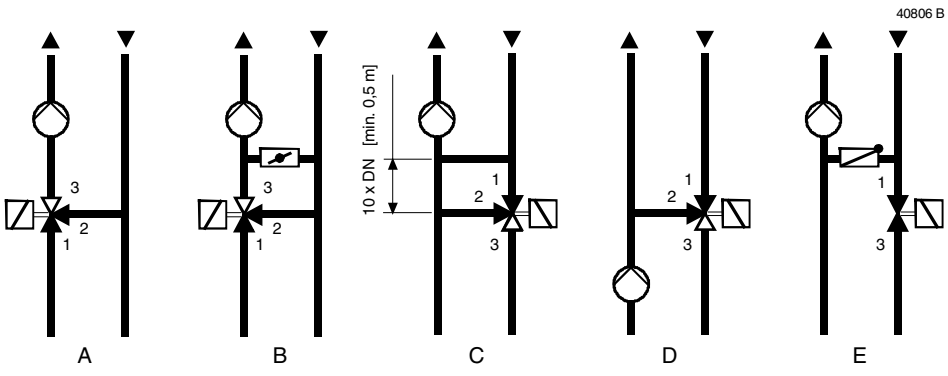
Application examples

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. Observe the direction of flow.

Hydraulic circuits

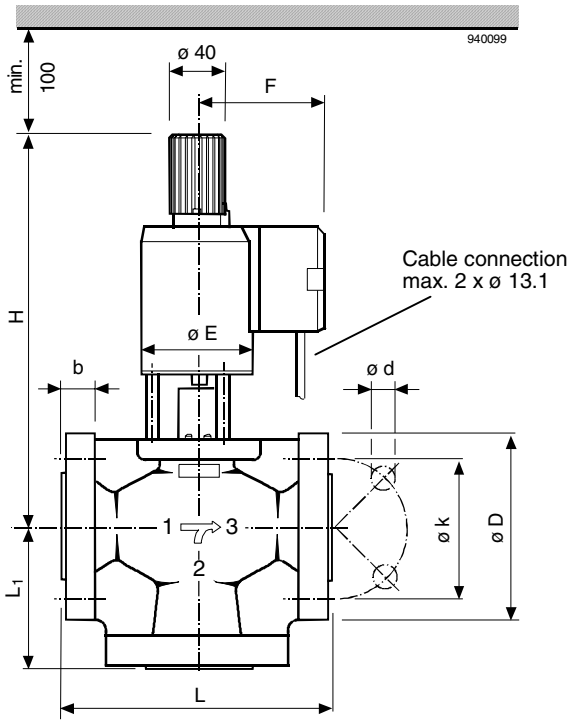


Legend

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

Dimensions

All dimensions in mm



– Counter-flanges are not supplied.
– Flange dimensions to DIN2533, PN16

Valve type	L	L_1	D	b	k	d	H	E	F	W
M3P80FYP	310	140	200	22	160	8x18	508	145	124	45.5
M3P100FYP	350	160	220	24	180	8x18	570	145	124	59.0

W = Weight in kg (including packaging)