

M2FP03GX

Modulating Pilot Valve to Control Main Valves



Description

Modulating pilot valve with magnetic actuator as the controlling element for 2- to 5-inch main valves for modulating control of chillers, or for direct control of low C_V (k_{vs}) values.

Features

- Short positioning time (approximately 1 second).
- High resolution.
- Hermetically sealed.
- Versatile electrical interface with terminal housing ZM.. module.
- Friction-free.
- Robust and maintenance-free.

Application

Suitable for use with safety refrigerants such as R22, R134a, R404A, R407C, R507 and for ammonia R717. Unsuitable for applications with gas/liquid mixtures.

Product Number



Product Number	C_V (k_{vs})	Δp_{max} psi (MPa)
M2FP03GX	0.35 (0.3)	261 (1.8)

Δp_{max} = Maximum permissible differential pressure across the valve's control path valid for the entire actuating range.

k_{vs} = Nominal flow rate of cold water through the fully open valve (H_{100}) by a differential pressure of 100 kPa (1 bar), to VDI 2173.

C_V = Nominal flow rate of cold water through the fully open valve (H_{100}) with a differential pressure of 1 psi.

Warning/Caution Notations

WARNING:		Personal injury or loss of life may occur if you do not perform a procedure as specified.
CAUTION:		Equipment damage may occur if you do not follow a procedure as specified.

Ordering

The M2FP03GX pilot valve and the ZM../A terminal housing must be ordered separately.

Accessories/ Terminal Housing ZM...

ZM Module Part Number	Operating Voltage	Control Signal	Working Range
ZM101/A	24 Vac	0 to 10 Vdc	4 to 8 Vdc
ZM121/A	24 Vac	4 to 20 mA	8 to 16 mA

Technical Design

The armature or magnetic core is designed as a floating component within the pressure system, so that no external shaft gland is required. Therefore, leakage losses common with moving parts are avoided.

Mechanical Design

The control signal is converted in the ZM../A module 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, and so on). 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 is normally closed. A spring closes the valve automatically if the power is switched off or fails.

Application Example

The diagram shown here is an example only, without installation-specific details.

Screw-in valve application with a third-party main valve.

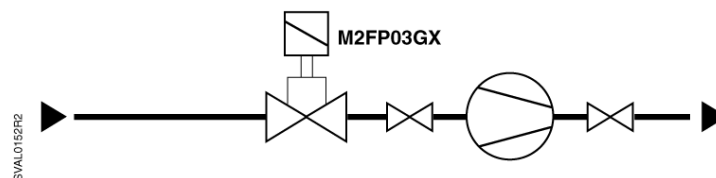


Figure 1. Suction Throttle Control Application.

Engineering Notes



CAUTION:

The characteristics of the main valve and the manufacturer's recommendations must be observed.

Mounting Notes

- Mounting instructions are enclosed with the valve (Document Number 35552).
- The pilot valve can be mounted in any orientation, but upright mounting is preferable.
- To protect the valve from dirt, a mesh filter should be fitted on the supply side (mesh gauge 60 to 120, 0.004 to 0.008 inches [0.1 to 0.2 mm]).
- The pilot valve can be fitted directly to various commercially available main valves, with the M24 x 1.5 screwed spigot. Note that it cannot be screwed into the valve body until welding or soldering work is complete.
- To prevent damage to the O-ring and to protect the pilot valve from dirt and metal fillings, the protective cap on the spigot should not be removed until immediately before the valve is fitted.



CAUTION:

Always switch off the power supply before connecting or disconnecting the ZM... terminal housing.

Maintenance Notes

The M2FP03GX pilot valve is maintenance-free. If repairs are needed, it must be replaced as a complete unit.

Warranty

Application-specific technical data must be observed. If specified limits are not observed, Siemens Industry, Inc. will not assume any responsibility.

Specifications

Electrical

Extra low-voltage only (SELV, PELV)	
Operating voltage ¹	24 Vac +15/-10%
Frequency	50 to 60 Hz
Typical power consumption P_{med}	5W
Rated apparent power S_{NA}	13 VA
Required fuse I_F	1A, slow
Control signals	
ZM101/A	0 to 10 Vdc or 0 to 20 Vdc phase cut
ZM121/A	4 to 20 mA or 0 to 20 Vdc phase cut
Input resistance	
0 to 10 Vdc	> 100K ohm
4 to 20 mA	< 150 ohm
Connection terminals	Screw terminals for 12 AWG wire
Positioning time	Approximately 1 second

Product Specific Data

Permissible operating pressure $p_{e,max}$	Maximum 464 psi (32 bar)
Maximum pressure differential $\Delta p_{v,max}$	261 psi (18 bar)
Leakage at $\Delta p = 14.5$ psi (1 bar)	Approximately 0.25%
Permissible media	Organic safety refrigerants (R22, R134a, R404A, R407C, R507, and so on), and ammonia (R717).
Medium temperature	-40°F to 212°F (-40°C to 100°C)
Valve characteristic	Linear
Type of operation	Modulating
Position when de-energized	Valve stem retracted (valve control path closed)
Orientation	Any

Materials	Body Seat/inner valve	Steel CrNi steel
Dimensions and weight	Dimensions Weight (Including packaging)	See Dimensions. 3.6 lb (1.64 kg)
Connection to main valve	Threaded connection	M24 x 1.5 mm
General Ambient Conditions	Temperature Humidity	-40°F to 122°F (-40°C to 50°C) 10 to 100% rh
Safety	CE conformity to EMV requirements Immunity Emission ² Electrical safety Housing protection Upright to horizontal Environmental compatibility	2004/108/EC EN 61000-6-2 [2005] Industrial ² EN 61000-6-3 [2007] Residential EN 60730-1 IP54 to EN 60529 ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EC (RoHS)

- 1) No operating voltage is required for the 0 to 20 Vdc Phs power positioning signal.
 - 2) Transformer 160 VA.
- S_{NA} = Rated apparent power for transformer selection.
 P_{med} = Typical power consumption.

Connection Terminals



WARNING :

If a ZM.../A terminal housing is used with 0 to 20 Vdc Phs (phase cut), do not connect to 24 Vac.

Always turn off the power supply before connecting or disconnecting the ZM... terminal housing.

ZM101/A (0 to 10 Vdc or 0 to 20 Vdc phase cut)



ZM121/A (4 to 20 mA or 0 to 20 Vdc phase cut)

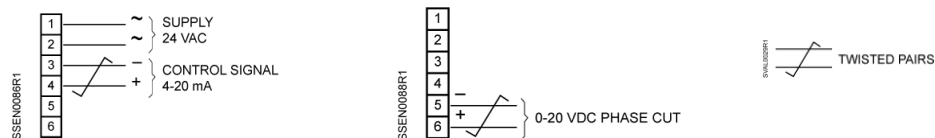


Figure 2. Connection Terminals.

Dimensions

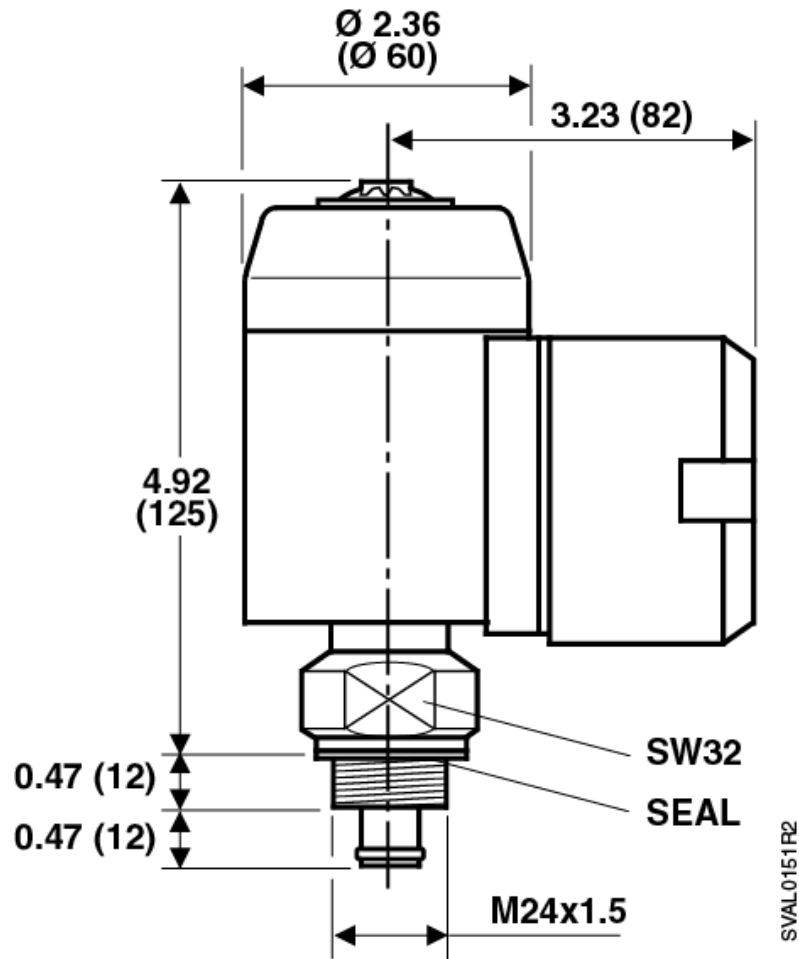


Figure 3. Dimensions in Inches (Millimeters).

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