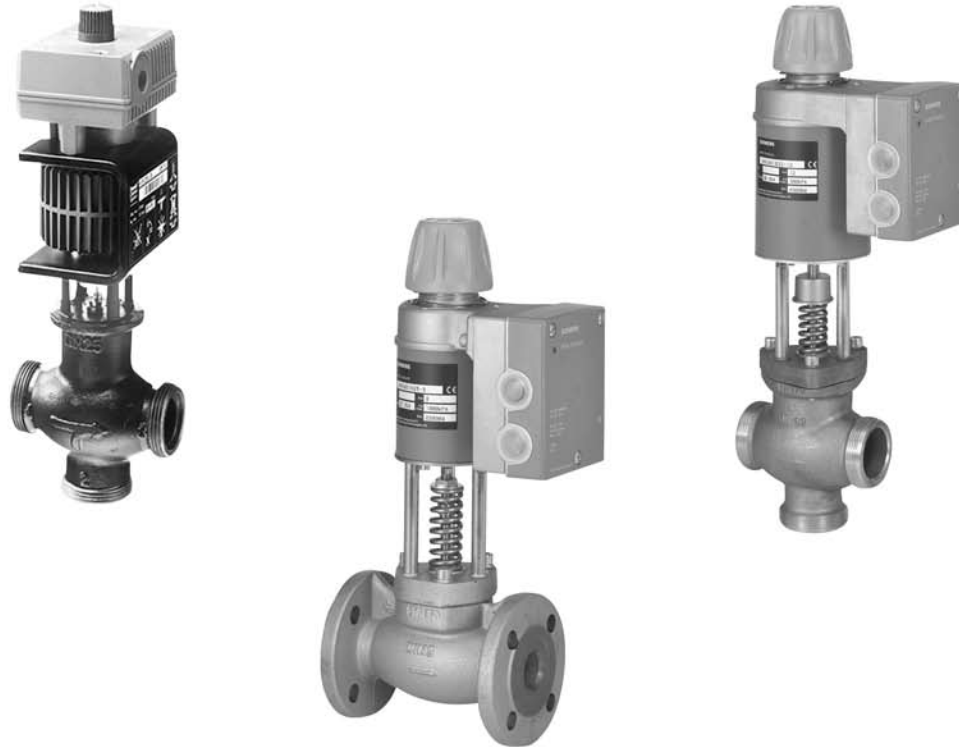


## Magnetic Valves



D-173

Valves

Magnetic Valves use magnetic actuation to enhance response time and provide stability. Large signal changes switch the actuator to the large signal band, allowing high-gain response to quickly position the valve element. Small signal changes switch the actuator to the small signal band to provide loop stability and precise positioning.

**Note:** To use any current magnetic valve with phase cut control signal use SEZ91.6 signal converter.

D-174

Valves

## Save trees with paperless invoicing

Once your order has been shipped, an invoice will be sent to you via e-mail, so you can conserve paper while avoiding the hassles of paperwork.



## Control Valves for Hot and Chilled Water



MXG461...U  
Magnetic Control Valve.

### Description

The Magnetic MX.. Mixing Valve uses magnetic actuation to enhance response time and provide stability. Large signal changes switch the actuator to the large signal band, allowing high-gain response to quickly position the valve element. Small signal changes switch the actuator to the small signal band to provide loop stability and precise positioning.

### Features

- Fast positioning time (< 2 seconds)
- 1000:1 resolution
- Magnetic actuation
- No periodic maintenance
- Manual override
- Auto calibration
- Dip switch selectable signal input (0 to 10 V or 4 to 20 mA)
- Dip switch selectable flow characteristic
- Built-in position feedback

### Applications

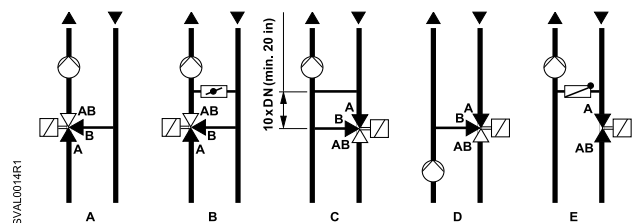
The Magnetic MX.. Mixing Valve is designed for modulating control of chilled water and low-pressure hot water and is well suited for HVAC systems.

The valves can be configured for straight-through or 3-way applications and can be used in closed loop applications. Valves are shipped with NPT screwed fittings. A flanged version is also available in the 2-1/2" line size.

D-175

Valves

### Application Drawing



### Hydraulic Circuits.

#### Key

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

# Magnetic Control Valve Specifications

Type of Operation .....Modulating  
 Positioning Time .....< 2 sec.  
 Ambient Temperature ..... 23 to 113°F (-5 to +45°C)  
 Valve Body Material .....Cast Iron  
 Seat/Inner Valve Material .....Brass/steel  
 Permissible Operating Pressure ..... 150 psi  
**Leakage**  
 A→AB ..... Max. 0.02% Cv  
 B→AB ..... Max. 0.2% Cv

Media Temperature .....34 to 266°F (1 to 130°C)  
 Valve Flow Characteristic .....Linear or Equal Percentage  
 Valve Stem Seal .....O-ring  
 Resolution .....1000:1  
 Mounting Position ..... Upright to horizontal

## Sizing

Part No.	Line Size (in.)	C <sub>v</sub> (gpm)	Δ P <sub>max</sub>		Max. Close-off Pressure (psi)	S <sub>NA</sub> <sup>1</sup> (VA)	P <sub>med</sub> <sup>1</sup> (W)	I <sub>nt</sub> <sup>1</sup> (A)	Wire Gauge			
			(psi)	(bar)					18	16	14	12
			Cable Length L (ft)									
MXG461.15-0.6U	1/2	0.7	44	3	44	29	5	3.15	108	213	361	525
MXG461.15-1.5U	1/2	1.7	44	3	44	29	5	3.15	108	213	361	525
MXG461.15-3.0U	1/2	3.5	44	3	44	29	5	3.15	108	213	361	525
MXG461.20-5.0U	3/4	5.8	44	3	44	29	5	3.15	108	213	361	525
MXG461.25-8.0U	1	9.3	44	3	44	29	5	3.15	108	213	361	525
MXG461.32-12U	1-1/4	14.0	44	3	44	29	5	3.15	108	213	361	525
MXG461.40-20U	1-1/2	23.0	44	3	44	44	6	4.00	66	118	197	328
MXG461.50-30U	2	35.0	44	3	44	44	6	4.00	66	118	197	328
MXF461.65-50U	2-1/2	58.0	44	3	44	46	6	5.00	49	98	164	262

\*All data relates to a supply of 24 Vac.

### Key

- Δ P<sub>vmax</sub> Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve.
- S<sub>NA</sub> Nominal apparent power for selecting transformer
- P<sub>med</sub> Typical power consumption
- I<sub>n</sub> Required slow fuse
- C<sub>v</sub> Flow rate to IEC534-2-4  
 Control path A → AB (normally closed): Tolerance ±5%  
 Control path B → AB (normally open): Tolerance ±10%
- L Maximum cable length. With four-wire connections, the maximum permissible length of the separate 16 AWG Cu (copper) signal cable is 656 feet. With three wire connections, the maximum permissible cable length is reduced to 1/3 of the values shown in the table.
- 1 All data relates to a 24 Vac supply.

## MX..Valves with Electronics Module Product Ordering

Valve Size	Cv	Part No.
<b>NPT Union</b>		
1/2"	0.7	MXG461.15-0.6U
1/2"	1.8	MXG461.15-1.5U
1/2"	3.5	MXG461.15-3.0U
3/4"	5.9	MXG461.20-5.0U
1"	9.4	MXG461.25-8.0U
1-1/4"	14.0	MXG461.32-12U
1-1/2"	23.4	MXG461.40-20U
2"	35.1	MXG461.50-30U
<b>Flanged</b>		
2-1/2"	58.2	MXF461.65-50U*

### Table Note:

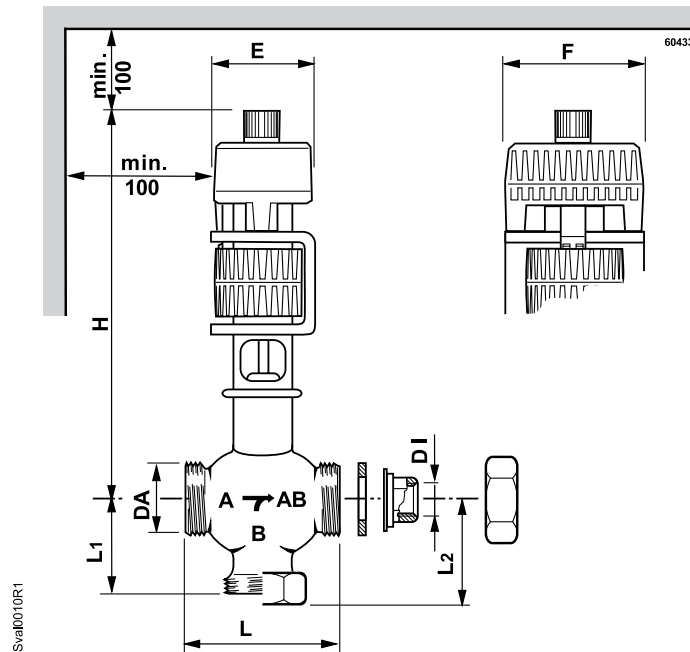
\*No blanking flange

D-176

Valves

# Dimensions and Weights

## MX.461...U Valves with Electronics Module



Dimensions shown in inches (mm).

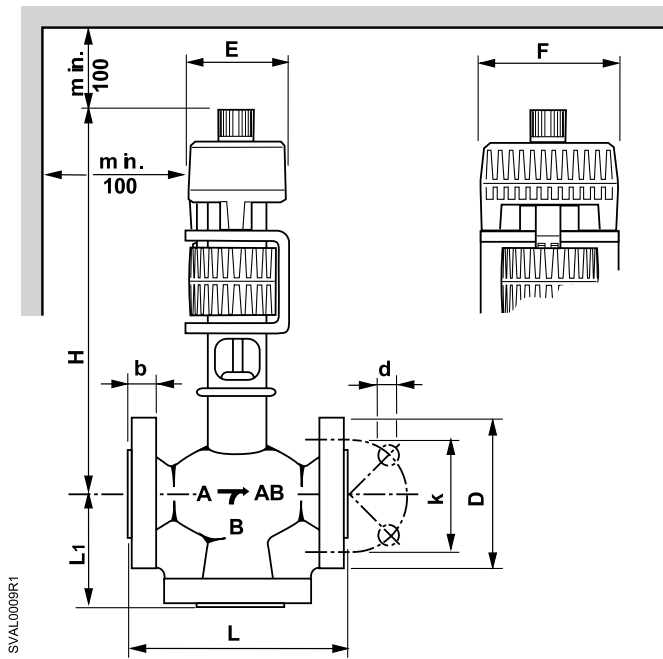
Part No.	DI	DA	L	L1	L2*	H	E	F	Weight lb. (kg)
MXG461.15-0.6U	1/2	1	3.15 (80)	1.67 (42.5)	2.01 (51)	9.45 (240)	3.15 (80)	3.94 (100)	8.4 (3.8)
MXG461.15-1.5U	1/2	1	3.15 (80)	1.67 (42.5)	2.01 (51)	9.45 (240)	3.15 (80)	3.94 (100)	8.4 (3.8)
MXG461.15-3.0U	1/2	1	3.15 (80)	1.67 (42.5)	2.01 (51)	9.45 (240)	3.15 (80)	3.94 (100)	8.4 (3.8)
MXG461.20-5.0U	3/4	1-1/4	3.74 (95)	2.07 (52.5)	2.40 (51)	10.24 (260)	3.15 (80)	3.94 (100)	9.3 (4.2)
MXG461.25-8.0U	1	1-1/2	4.33 (110)	2.22 (56.5)	2.56 (65)	10.63 (270)	3.15 (80)	3.94 (100)	10.4 (4.7)
MXG461.32-12U	1-1/4	2	4.92 (125)	2.66 (67.5)	2.99 (76)	11.22 (285)	3.15 (80)	3.94 (100)	12.3 (5.6)
MXG461.40-20U	1-1/2	2-1/4	5.51 (140)	3.17 (80.5)	3.70 (94)	12.60 (320)	3.94 (100)	4.72 (120)	20.5 (9.3)
MXG461.50-30U	2	2-3/4	6.69 (170)	3.68 (93.5)	4.29 (109)	13.39 (340)	3.94 (100)	4.72 (120)	26.2 (11.9)

**Table Note:**

\*When used as a straight-through valve

# Dimensions and Weights

## MX.461...U Flanged Valves with Electronics Module



Dimensions shown in inches (mm).

D-178

Valves

Part No.	L	L1	D	b	k	d 4X	H	E	F	Weight lb. (kg)
MXF461.65-50U	11.42 (290)	4.92 (125)	7.00 (177.8)	0.88 (22.4)	5.50 (139.7)	0.75 (19.05)	15.43 (392)	3.15 (80)	3.94 (100)	63.1 (28.6)

## Control Valves for Hot and Chilled Water with ZM Signal Module



Magnetic M3P..FY  
Mixing Valve with Actuator.

### Description

The Magnetic M3P..FY Mixing Valve is used to enhance response time and provide stability. Large signal changes switch the actuator to the large-signal band, allowing high gain response to quickly position the valve element. Small signal changes switch the actuator to the small-signal band to provide loop stability and precise positioning.

### Features

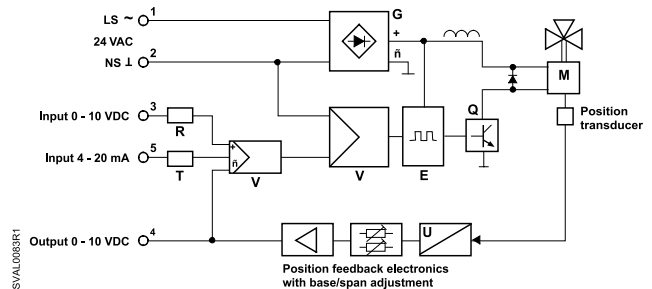
- Fast positioning time (< 1 second)
- >1000:1 resolution
- Magnetic actuation
- No periodic maintenance
- Manual override
- Built-in position control and feedback
- Low friction, heavy-duty and maintenance free

### Applications

The Magnetic M3P..FY Mixing Valve is designed for modulating control of chilled water and low-pressure hot water, especially in HVAC systems. The valves are also configured for straight-through applications. The valves may be shipped with flanged fittings: 2BN is two-way with Companion Flange Kit, and 3BN is three-way with Companion Flange Kit. The valves are used in closed loop applications.

D-179

Valves



Block Diagram of Signal Converter.

#### Key

- E** Phase cut converter
- G** Bridge rectifier
- M** Magnetic Valve
- Q** Phase cut output
- R** Input resistor 50K Ohms
- T** Voltage/current converter (load on 250 Ohms to NS)
- U** Position/Voltage converter
- V** Differential amplifier

# M3P...FY Valves Specifications

Type of Operation .....Modulating  
 Positioning Time .....≤ 1 sec.  
 Ambient Temperature ..... 35 to 122°F (2 to 50°C)  
 Valve Body Material .....Cast Iron  
 Seat/Inner Valve Material .....Chrome/Nickel Steel  
 Max. Body Pressure .....230 psi  
 Leakage (at 14.5 psi (1 bar))  
     1 → 3 .....Max. 0.03% Cv  
     2 → 3 .....Approx. 2% Cv

Media Temperature ..... 36 to 248°F (2 to 120°C)  
 Valve Flow Characteristic .....Linear  
 Valve Stem Seal Material .....O-ring  
 Resolution .....1000:1  
 Mounting Position ..... Upright to horizontal

## Sizing

Part No.	Valve Size (in.)	C <sub>v</sub> (gpm)	Δ P <sub>v</sub> max		P <sub>N</sub> (VA)	P <sub>med</sub> (VA)	Wire Gauge (AWG)		
			(psi)	(bar)			16	14	12
							Max. Wiring Length (ft.)		
M3P80FY	3	93	44	3	80	20	33	52	89
M3P100FY	4	152	29	2	120	30	20	33	56

### Key

Δ P<sub>v</sub>max Max. admissible pressure differential/Close-off Pressure  
 C<sub>v</sub> Flow rate  
 P<sub>N</sub> Nominal power  
 P<sub>med</sub> Mean operating power

D-180

Valves

## M3P...FY Valves with ZM Module Product Ordering

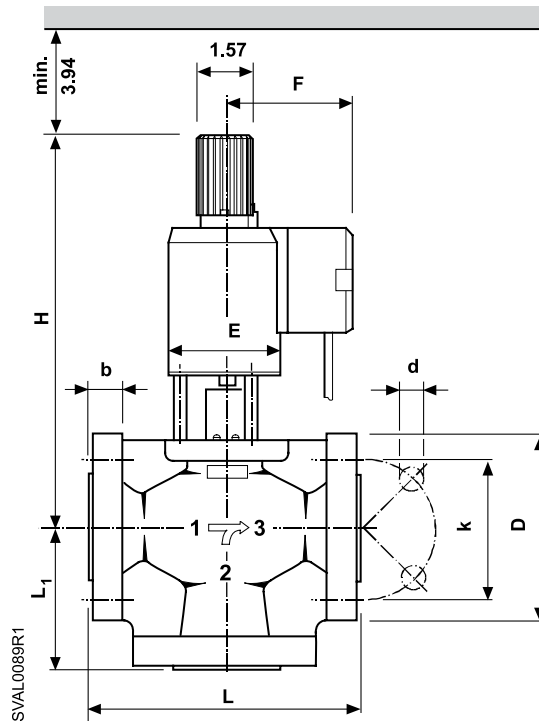
Description	Cv	Part No.
<b>Without Flanges</b>		
3" 3-way, Pilot Position	93	M3P80FY
4" 3-way, Pilot Position	152	M3P100FY
<b>With Flanges</b>		
3" 2-way, Pilot Position	93	M3P80FY/2BN
4" 2-way, Pilot Position	152	M3P100FY/2BN
3" 3-way, Pilot Position	93	M3P80FY/3BN
4" 3-way, Pilot Position	152	M3P100FY/3BN

### Table Note:

\*No blanking flange



## M3P..FY Control Valve



Dimensions shown in inches (mm).

Part No.	L	L1	D	b	k	d	H	E	F	Weight lb. (kg)
M3P80FY	12.20 (310)	5.51 (140)	7.87 (200)	0.87 (22)	6.30 (160)	8x 0.71 (8x18)	20.00 (508)	5.71 (145)	4.88 (124)	100.0 (45.5)
M3P100FY	13.78 (350)	6.30 (160)	8.66 (220)	0.94 (24)	7.09 (180)	8x 0.71 (8x18)	22.44 (570)	5.71 (145)	4.88 (124)	130.0 (59.0)

**Table Notes:**

Counter flanges are not supplied. Flange dimensions to DIN2533, PIN16

## FREE Valve Tagging

Perfect for large and complex jobs! Simply specify each valve's location when placing your initial order and we will tag them before shipping, saving you time and expense. And, use the online order form to place orders easily — once you enter a valve or valve actuator part number, a text box accepts tag information.

Try out this FREE service today. Give us a call at 1-888-593-7876 or visit us online at [www.usa.siemens.com/buildingtechnologiesonlineordering](http://www.usa.siemens.com/buildingtechnologiesonlineordering)



## Modulating Control Valves

*with Magnetic Actuators, Positioning Control and Position Feedback for Hot Water and Steam*



MVF461H Series Magnetic Control Valve.

### Description

MVF461H Series Modulating Control Valves are control valves with magnetic actuators, for modulating control of hot water, high temperature hot water, and steam.

### Features

- Fast positioning time (< 2 seconds)
- Selectable valve characteristic: Equal percentage or linear
- Selectable standard interface: 0/2 to 10 Vdc or 0/4 to 20 mA
- High resolution (>1:1000)
- High rangeability
- Wear-free inductive stroke measurement
- Spring return A+AB closed when de-energized
- Positioning control and position feedback signal
- Low-friction, heavy-duty and maintenance-free

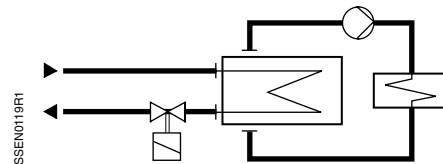
### Applications

The MVF461H... Control Valves are through-port valves with magnetic actuators. The actuator is equipped with an electronics module for positioning control and position feedback. If the power is off, the valve control path A+AB is closed.

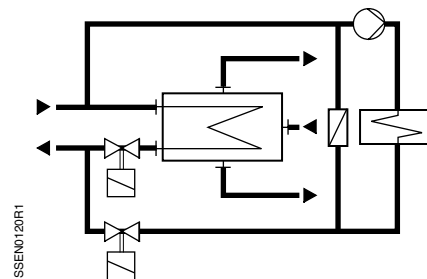
The short positioning time, high resolution and high rangeability make these valves ideal for proportional control of district heating stations, and heating applications using high temperature hot water and steam.

D-183

Valves



Direct Heating (Supply) System, Indirect Connection.



Direct Heating (Supply) System, Directly connected to Water-Heating System.

# MVF461H Modulating Control Valve Specifications

## Electrical

Low-voltage Use Only ..... Class 2 (SELV, PELV)

## 24 Vac

Operating Voltage ..... 24 Vac +20/-15%  
 Frequency ..... 45 to 65 Hz  
 Typical Power Consumption ..... See Sizing Table  
 Standby ..... <1 W (valve fully closed)  
 Nominal Apparent Power ..... See Sizing Table  
 Suitable Fuse ..... Slow

## 24 Vdc

Operating Voltage ..... 20 to 30 Vdc

## Functional Data of Actuator

### Input

Positioning Signal Y ..... 0/2 to 10 Vdc, 0/4 to 20mA  
 Impedance  
 0/2 to 10 Vdc ..... 100 kΩ/5nF  
 0/4 to 20 mA ..... 240 Ω/5nF

### Forced Control

Impedance ..... 22 kΩ  
 Closing the Valve (Z connected to G0) ..... <1 Vac; <0.8 Vdc  
 Opening the valve (Z connected to G0) ..... > 6 Vac; >5 Vdc  
 No Function (Z not wired) ..... Positioning signal Y active

### Output

Position Feedback Signal Voltage ..... 0/2 to 10 Vdc;  
 load resistance > 500Ω  
 Current ..... 0/4 to 20 mA;  
 load resistance < 500Ω  
 Stroke Measurement ..... Inductive  
 Nonlinearity ..... ±3% of end value

## Functional Data of Valve

Nominal Pressure ..... ANSI 125 (PN 16)  
 Perm. Operating Pressure<sup>1</sup> ..... Water up to 248°F (120°C)  
 232 psi (16 bar)  
 Water above 248°F (120°C):  
 188 psi (13 bar)  
 Saturated steam: 130 psi (9 bar)

Pressure Differential  $\Delta p_{max}$  /  $\Delta p_s$  ..... 145 psi (10 bar)

Leakage at  $\Delta p = 0.1$  MPa (1 bar) ..... A → AB Maximum 0.05% CV

Media Temperature ..... 34 to 356°F (>1 to 180°C)

Valve Characteristic<sup>2</sup> ..... Equal percentage or linear, optimized near the closing point

Resolution  $\Delta H/H100$  ..... 1:1000 (H = Stroke)

Type of Operation ..... Modulating

Position when De-energized ..... A → AB closed

Orientation ..... Upright to horizontal

Positioning Time ..... < 2 seconds

## Materials

Valve Body ..... Modular Cast Iron  
 Cover Flange ..... Modular Cast Iron  
 Seat/Inner Valve ..... Stainless Steel  
 Valve Stem Seal ..... EPDM (O-ring)

## Electrical Connections

Cable Entries ..... 3 x M20 x 1.5 or PG13.5/G1/2  
 Connection Terminals ..... Screw terminals for up to 12 AWG wires  
 Min. cross-sectional area 4) 0.75 mm<sup>2</sup>

## Ambient Conditions

Temperature  
 Operation and Storage ..... 23 to 113°F (-5 to +45°C)  
 Transport ..... -13 to +158°F (-25 to +70°C)  
 Humidity ..... 5 to 95% RH, non-condensing

Agency Approvals ..... IP31 to IEC 529

Conforms to CE requirements

UL 873

Certified to Canadian standard C22.2

No. 24

C-Tick N-474

PED 97/23/EC: pressure-carrying parts Par. 1,  
 section. 2.1.4 / Par. 3, section 3Fluid group 2

## Notes

<sup>1</sup>Tested at 1.5 x PN (24 bar), similar to DIN 3230-3

<sup>2</sup>Can be selected via DIP switch.

<sup>4</sup>In case of strong vibrations, use high-flex stranded wires.

D-184

Valves

## Sizing

Part No.	Line Size (in.)	C <sub>v</sub> (gpm)	$\Delta p_s$ (psi)	$\Delta p_v$ max (bar)	S <sub>NA</sub> (VA)	P <sub>med</sub> (W)	I <sub>N</sub> Fuse	Wire Gauge (AWG)		
								16	14	12
								Max. Wiring Length (ft.)		
MVF461H15-0.6	1/2	0.7	145	145	33	15	3.15	130	215	360
MVF461H15-1.5	1/2	1.8	145	145	33	15	3.15	130	215	360
MVF461H15-3	1/2	3.5	145	145	33	15	3.15	130	215	360
MVF461H20-5	3/4	5.9	145	145	33	15	3.15	130	215	360
MVF461H25-8	1	9.4	145	145	33	15	3.15	130	215	360
MVF461H32-12	1-1/4	14.0	145	145	43	20	4	100	165	260
MVF461H40-20	1-1/2	23.3	145	145	65	20	6.3	100	165	260
MVF461H50-30	2	35.0	145	145	65	26	6.3	65	100	165

## Key

$\Delta P_{max}$  Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve (maximum recommended operating differential pressure)

$\Delta P_s$  Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close-off pressure)

S<sub>NA</sub> Nominal apparent power for selecting the transformer

P<sub>med</sub> Average true power

I<sub>N</sub> Slow fuse (mandatory)

C<sub>v</sub> Nominal flow rate of cold water 41 to 86°F (5 to 30°C)

L Maximum cable length. With four-wire connections the maximum permissible length of the separate 14 AWG Cu signal cable is 656 feet (200 m)

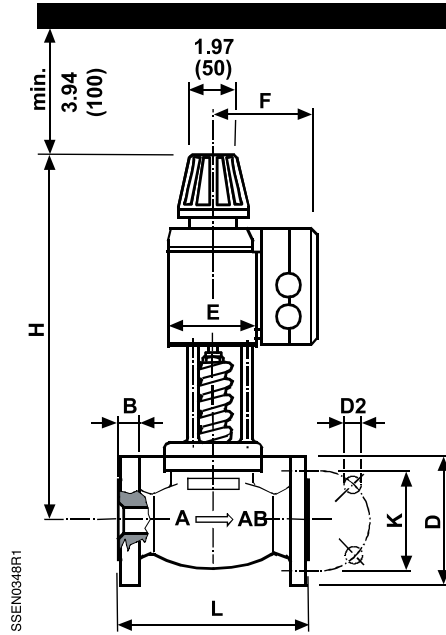
## MVF461H Modulating Control Valve Product Ordering

Valve Size (in)	Cv	Part No.
<b>Without Flanges</b>		
1/2	0.7	<b>MVF461H15-0.6</b>
1/2	1.8	<b>MVF461H15-1.5</b>
1/2	3.5	<b>MVF461H15-3</b>
3/4	5.9	<b>MVF461H20-5</b>
1	9.4	<b>MVF461H25-8</b>
1-1/4	14.0	<b>MVF461H32-12</b>
1-1/2	23.3	<b>MVF461H40-20</b>
2	35.0	<b>MVF461H50-30</b>
<b>With NPT Flanges</b>		
1/2	0.7	<b>MVF461H15-0.6-N</b>
1/2	1.8	<b>MVF461H15-1.5-N</b>
1/2	3.5	<b>MVF461H15-3-N</b>
3/4	5.9	<b>MVF461H20-5-N</b>
1	9.4	<b>MVF461H25-8-N</b>
1-1/4	14.0	<b>MVF461H32-12-N</b>
1-1/2	23.3	<b>MVF461H40-20-N</b>
2	35.0	<b>MVF461H50-30-N</b>
<b>With Weld Flanges</b>		
1/2	0.7	<b>MVF461H15-0.6-W</b>
1/2	1.8	<b>MVF461H15-1.5-W</b>
1/2	3.5	<b>MVF461H15-3-W</b>
3/4	5.9	<b>MVF461H20-5-W</b>
1	9.4	<b>MVF461H25-8-W</b>
1-1/4	14.0	<b>MVF461H32-12-W</b>
1-1/2	23.3	<b>MVF461H40-20-W</b>
2	35.0	<b>MVF461H50-30-W</b>

### Ordering Notes

- When placing an order, specify the quantity, product number and description.  
**Example: 1 MVF461H15-0.6 valve**
- The valve body and magnetic actuator assemblies cannot be separated.

# Dimensions and Weights



Dimensions shown in inches (mm).

D-186

Valves

Part No.	DN	L	D	D2	B	K	H	E	F	Weight lb. (kg)
MVF461H15-0.6	15	5.12 (130)	3.74 (95)	0.16x0.55 (4x14)	0.55 (14)	2.56 (65)	13.4 (340)	3.15 (80)	4.53 (115)	18.3 (8.3)
MVF461H15-1.5	15	5.12 (130)	3.74 (95)	0.16x0.55 (4x14)	0.55 (14)	2.56 (65)	13.4 (340)	3.15 (80)	4.53 (115)	18.3 (8.3)
MVF461H15-3	15	5.12 (130)	3.74 (95)	0.16x0.55 (4x14)	0.55 (14)	2.56 (65)	13.4 (340)	3.15 (80)	4.53 (115)	18.3 (8.3)
MVF461H20-5	20	5.91 (150)	4.13 (105)	0.16x0.55 (4x14)	0.63 (16)	2.95 (75)	13.3 (339)	3.15 (80)	4.53 (115)	19.6 (8.9)
MVF461H25-8	25	6.30 (160)	4.53 (115)	0.16x0.55 (4x14)	0.63 (16)	3.35 (85)	13.6 (346)	3.15 (80)	4.53 (115)	22.1 (10.0)
MVF461H32-12	32	7.09 (180)	5.51 (140)	0.16x0.71 (4x18)	0.71 (18)	3.94 (100)	15.12 (384)	3.94 (100)	4.92 (125)	34.6 (15.7)
MVF461H40-20	40	7.87 (200)	5.91 (150)	0.16x0.71 (4x18)	0.71 (18)	4.33 (110)	15.79 (401)	3.94 (100)	4.92 (125)	39.2 (17.8)
MVF461H50-30	50	9.05 (230)	6.50 (165)	0.16x0.71 (4x18)	0.79 (20)	4.92 (125)	17.58 (449)	4.92 (125)	5.43 (138)	60.0 (27.2)

Table expressed in inches (mm).

## Modulating Control Valves

*with Magnetic Actuators, Positioning Control and Position Feedback for Domestic Water*



MXG461B Series Modulating Control Valve.

### Description

The MXG461B Modulating Control Valve is a control valve with magnetic actuators, for modulating control of domestic water, cold water and hot water systems.

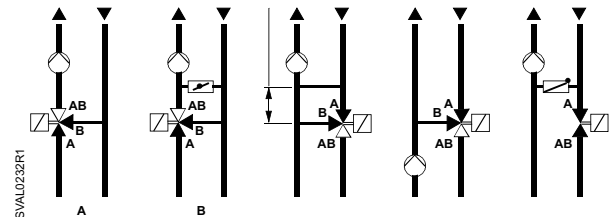
### Features

- Fast positioning time (< 2 seconds)
- Selectable valve characteristic: Equal percentage or linear
- Selectable standard interface: 0/2 to 10 Vdc or 0/4 to 20 mA
- High resolution (>1:1000)
- High rangeability
- Wear-free inductive stroke measurement
- Spring return A → AB closed when de-energized
- Positioning control and position feedback signal
- Low-friction, heavy-duty and maintenance-free

### Applications

The MXG461B... Modulating Control Valves are through-port or mixing valves with magnetic actuators. The actuator is equipped with an electronics module for positioning control and position feedback. If the power is off, the valve control path A → AB is closed.

The short positioning time, high resolution and high rangeability make these valves ideal for modulating control of domestic, hot and cold water systems.



#### Key

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

#### Caution

1. Use the valve only as a mixing or straight-through valve, not a diverting valve. Note the direction of flow.
2. Do not allow high temperature water (W) to enter the mixing water circuit (M).
3. Ensure that adequate air venting is provided for the entire hydraulic system.
4. Select a non-return valve with minimum pressure loss for the circulating pipes.

# MXG461B Modulating Control Valve Specifications

## Electrical

Low-voltage Use Only ..... Class 2 (SELV, PELV)

## 24 Vac

Operating Voltage ..... 24 Vac +20/-15%  
 Frequency ..... 45 to 65 Hz  
 Typical Power Consumption ..... See Table 1 P<sub>med</sub>  
 Standby ..... <1 W (valve fully closed)  
 Nominal Apparent Power ..... See Sizing Table  
 Suitable Fuse ..... Slow, see Table 1

## 24 Vdc

Operating Voltage ..... 20 to 30 Vdc

## Functional Data of Actuator

### Input

Positioning Signal Y ..... 0/2 to 10 Vdc or 0/4 to 20mA  
 Impedance  
     0/2 to 10Vdc ..... 100 kΩ/5nF  
     0/4 to 20 mA ..... 240 Ω/5nF  
 Forced Control  
 Impedance ..... 22 kΩ  
 Closing the Valve (Z connected to G0) ..... <1 Vac; <0.8 Vdc  
 Opening the Valve (Z connected to G0) ..... > 6 Vac; >5 Vdc  
 No Function (Z not wired) ..... Positioning signal Y active

### Output

Position Feedback Signal Voltage ..... 0/2 to 10 Vdc;  
     load resistance > 500Ω  
 Current ..... 0/4 to 20 mA;  
     load resistance < 500Ω  
 Stroke Measurement ..... Inductive  
 Nonlinearity ..... ±3% of end value

## Functional Data of Valve

Nominal Pressure ..... ANSI 125 (PN 16)  
 Operating Pressure p<sub>o</sub>max<sup>1</sup> ..... 232 psi (16 bar)  
 Pressure Differential Dp<sub>v</sub>max ..... See Sizing Table.  
 Leakage ..... A\*AB Maximum 0.05% Cv  
     B\*AB Depends on application data  
     (0.2% Cv)  
 Water Temperature<sup>2</sup> ..... -4 to +248°F (-20 to +120°C)  
 Valve Characteristic<sup>3</sup> ..... Equal percentage or linear, optimized  
     near the closing point

Resolution DH/H100 ..... >1:1000 (H = Stroke)  
 Type of Operation ..... Modulating  
 Position when De-energized ..... A\*AB closed  
 Orientation ..... Upright to horizontal  
 Positioning Time ..... < 2 seconds

## Materials

Valve Body ..... Red Bronze  
 Cover Flange ..... Red Bronze  
 Seat/Inner Valve ..... Steel  
 Valve Stem Seal ..... EPDM (O-ring)  
 Pipe Connections ..... Screwed Fittings, Bronze/brass

## Electrical Connections

Cable Entries ..... 3 x M20 x1.5 or PG13.5/G1/2  
 Connection Terminals ..... Screw terminals for 12 AWG wires  
 Min. Cross-sectional Area<sup>4</sup> ..... 0.75 mm<sup>2</sup>  
 Max. Cable Length ..... Refer to sizing table.

## Ambient Conditions

Temperature  
 Operation and Storage ..... 23 to 113°F (-5 to 45°C)  
 Transport ..... -13 to +158°F (-25 to +70°C)  
 Humidity ..... 5 to 95% RH

## Agency Approvals

IP31 to IEC 529  
 Conforms to CE requirements  
 UL 873  
 Certified to Canadian standard C22.2 No. 24  
 C-Tick N-474  
 PED 97/23/EC:  
 pressure-carrying parts  
 Par. 1, section. 2.1.4 / Par. 3, section 3  
 Fluid group 2

## Notes

- <sup>1</sup> Tested at 1.5 x PN (24 bar), similar to DIN 3230-3
- <sup>2</sup> For medium temperatures <32°F (0°C), the Z366 stem heating element is required.
- <sup>3</sup> Can be selected via DIP switch.
- <sup>4</sup> In case of strong vibrations, use high-flex stranded wires.

## Sizing

Part No.	Valve Size (in.)	C <sub>v</sub> (gpm)	Δ p <sub>s</sub> (psi)	Δ p <sub>v</sub> max (bar)	S <sub>NA</sub> (VA)	P <sub>med</sub> (W)	I <sub>N</sub> Fuse	Wire Gauge (AWG)		
								16	14	12
								Max. Wiring Length (ft.)		
MXG461B15-0.6	1/2	0.7	145	70	33	15	3.15	130	215	360
MXG461B15-1.5	1/2	1.8	145	70	33	15	3.15	130	215	360
MXG461B15-3	1/2	3.5	145	70	33	15	3.15	130	215	360
MXG461B20-5	3/4	5.8	116	70	33	15	3.15	130	215	360
MXG461B25-8	1	9.3	102	40	33	15	3.15	130	215	360
MXG461B32-12	1-1/4	14	87	40	43	20	4	100	165	260
MXG461B40-20	1-1/2	23	87	40	43	20	4	100	165	260
MXG461B50-30	2	35	87	40	65	22	6.3	65	100	185

## Key

Δ P<sub>v</sub>max Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve (maximum recommended operating differential pressure)  
 Δ P<sub>s</sub> Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close-off pressure)  
 S<sub>NA</sub> Nominal apparent power for selecting the transformer

P<sub>med</sub> Average true power  
 I<sub>N</sub> Slow fuse (mandatory)  
 C<sub>v</sub> Nominal flow rate of cold water 41 to 86°F (5 to 30°C)  
 L Maximum cable length. With four-wire connections the maximum permissible length of the separate 14 AWG Cu signal cable is 656 feet (200 m)



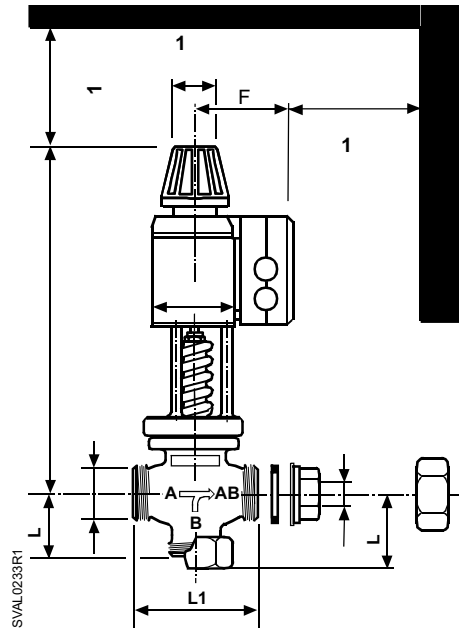
## MXG461B Modulating Control Valve Product Ordering

Valve Size (in)	Cv	Part No.
1/2	0.7	<b>MXG461B15-0.6</b>
1/2	1.8	<b>MXG461B15-1.5</b>
1/2	3.5	<b>MXG461B15-3</b>
3/4	5.8	<b>MXG461B20-5</b>
1	9.3	<b>MXG461B25-8</b>
1-1/4	14	<b>MXG461B32-12</b>
1-1/2	23	<b>MXG461B40-20</b>
2	35	<b>MXG461B50-30</b>

### Ordering Notes

- When placing an order, specify the quantity, product number and description.  
**Example: 1 MXG461B15-0.6 valve and 1 Z366 stem heater**
- The valve body and magnetic actuator assemblies cannot be separated. The brass/bronze fittings are included. The Z366 stem heater must be ordered separately.
- The screwed fittings and gaskets are supplied with these valves.

# Dimensions and Weights



Dimensions shown in inches (mm).

D-190

Valves

Part No.	DN		G (in)	L1	L2	L3	H	E	F	Weight lb. (kg)
	(mm)	(in)								
MXG461B15-0.6	15	Rp x	G1B	3.15 (80)	1.67 (42.5)	1.97 (50)	13.4 (340)	3.15 (80)	4.53 (115)	15.65 (7.1)
MXG461B15-1.5	15	Rp x	G1B	3.15 (80)	1.67 (42.5)	1.97 (50)	13.4 (340)	3.15 (80)	4.53 (115)	16.09 (7.3)
MXG461B15-3	15	Rp x	G1B	3.15 (80)	1.67 (42.5)	1.97 (50)	13.4 (340)	3.15 (80)	4.53 (115)	16.09 (7.3)
MXG461B20-5	20	Rp x	G1xB	3.74 (95)	2.07 (52.5)	2.36 (60)	13.3 (339)	3.15 (80)	4.53 (115)	16.97 (7.7)
MXG461B25-8	25	Rp 1	G1xB	4.33 (110)	2.22 (56.5)	2.52 (64)	13.6 (346)	3.15 (80)	4.53 (115)	18.73 (8.5)
MXG461B32-12	32	Rp 1x	G2B	4.92 (125)	2.66 (67.5)	2.95 (75)	15.12 (384)	3.94 (100)	4.92 (125)	28.22 (12.8)
MXG461B40-20	40	Rp 1x	G2xB	5.51 (140)	3.17 (80.5)	3.66 (93)	15.79 (401)	3.94 (100)	4.92 (125)	32.19 (14.6)
MXG461B50-30	50	Rp 2	G2xB	6.69 (170)	3.68 (93.5)	4.2 (108)	402 (15.83)	3.94 (100)	4.92 (125)	41.00 (18.6)

Table expressed in inches (mm).

### Table Notes:

- A: External thread G...B to ISO228/1
- DN: Internal thread Rp to ISO7/1
- Fittings to ISO 49/DIN 2950 (supplied complete with flange gaskets)

## Terminal Housing for Magnetic Valves



ZM, ZM../A Terminal Housing for Magnetic Valves.

### Description

ZM../A Terminal Modules are signal transducers/power amplifiers. They convert a 0 to 10 Vdc or 4 - 20 mA control signal and a 24 Vac power supply into a 0 to 20 Vdc phase cut signal.

### Applications

ZM../A Terminal Modules are for use with Magnetic Valves only.

D-191

Valves

## Terminal Housing Specifications

**Supply Voltage** .....24 Vac +15/-10%, Class 2, 50/60 Hz

**Current Consumption** .....Max. 1 mA @ 0 to 10 Vdc  
(input impedance 2 x 56 kΩ)

**Control Signals** ..... 0 to 10 Vdc, 4 to 20 mA, 0 to 20 Vdc phase cut

**Shunt Resistance (4 to 20 mA)** ..... 150 Ohms

**Mean Operating Data** ..... Refer to appropriate Valve.

**Housing Material** ..... Aluminum

**Connection Terminals** ..... For max. 1 x 12 AWG or 2 x 14 AWG

**Ambient Temperature**

ZM100/A, ZM110, ZM120/A ..... 36 to 122°F (2 to 50°C)

ZM101/A, ZM111, ZM121/A ..... -40 to +122°F (-40 to +50°C)

ZM200/A, ZM210, ZM220/A ..... 36 to 122°F (2 to 50°C)

**Agency Approvals** ..... Conforms to CE requirements

**Dimensions**

ZM1.. ..... 1.6"H x 2.4"W x 3.0"D

ZM2.. ..... 1.6"H x 3.5"W x 4.5"D

**Shipping Weights**

ZM100/A, ZM111, ZM120/A ..... 0.5 lb.

ZM101/A, ZM121/A ..... 0.5 lb.

ZM110 ..... 0.4 lb.

ZM200/A ..... 1.0 lb.

ZM210 ..... 0.8 lb.

ZM220/A ..... 1.0 lb.

## Terminal Housing Product Ordering

Description	Part No.
<b>Terminal Housing.</b> Converts 0-10Vdc input to 0-20Vdc phase cut output.	
• up to 40W, IP30 rated housing	<b>ZM100/A</b>
• up to 40W, IP54 rated housing	<b>ZM101/A</b>
• up to 120W, IP30 rated housing	<b>ZM200/A</b>
<b>Terminal Housing.</b> For straight through 0-20 Vdc electrical housing only.	
• up to 40W, IP30 rated housing	<b>ZM110</b>
• to 40W, IP54 rated housing	<b>ZM111</b>
• up to 120W, IP30 rated housing	<b>ZM210</b>
<b>Terminal Housing.</b> Converts 0-20mA/24Vdc input to 0-20Vdc phase cut output.	
• up to 40W, IP30 rated housing	<b>ZM120/A</b>
• to 40W, IP54 rated housing	<b>ZM121/A</b>
• up to 120W, IP30 rated housing	<b>ZM220/A</b>

D-192

Valves

Accessories & Service Kits

D-219