Two-way Single Seat Globe Valves

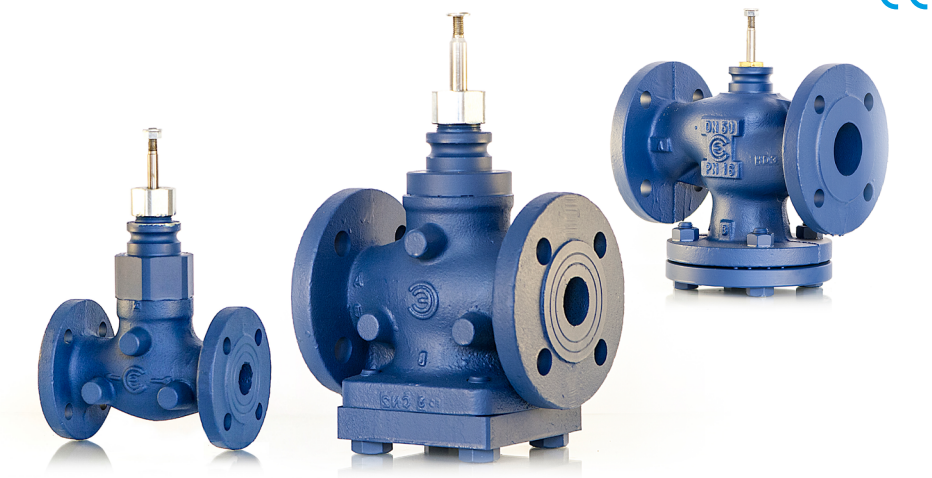
2F..

APPLICATION AND USE

2F.. series valves are used to control fluids belonging to the group showed in the table according to article 13 of 2014/68/UE directive (PED) in air-conditioning, thermoventilation and heating plants and in industrial processes; therefore, they cannot be employed as safety valves.

MANUFACTURING CHARACTERISTICS

They consist in a two-way simple seat valve body to be assembled on an electrical bidirectional actuator.



Model / Technical data	2FGB DN25÷150	2FGA DN15÷100	2FSA DN25÷65	2FAA DN15÷80	2FAA.P DN15÷80	2FAA.T DN15÷80
Construction	PN16	PN16	PN25	PN40	PN40	PN40
Body	flake cast iron	hydraulic cast iron	spheroidal cast iron	steel	steel	steel
Seat	flake cast iron	stainless steel	steel	stainless steel	stainless steel	stainless steel
Plug	brass (DN25÷100) bronze (DN125÷150)	stainless steel	steel	stainless steel	stainless steel	stainless steel
Stem (Ø 9mm)	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
Control characteristics	equalpercentage	equalpercentage	equalpercentage	equalpercentage	equalpercentage	equalpercentage
Stem packing	EPDM O-ring (4)	Teflon V-ring	Teflon V-ring	Teflon V-ring	(2)	(2)
Max. fluid temperature °C	150	200	230	230	350	230
Min. fluid temperature °C	-10 (1)	-10 (1)	-10 (1)	-10 (1)	-10 (1)	-20 (1)
Storage temperature	-20T60°C					
Fluid (4)	Group 2	Group 2	Group 2	Group 2	Group 1	Group 1
Connections	Flanged PN16	Flanged PN16	Flanged PN25	Flanged PN40	Flanged PN40	Flanged PN40
Leakage % Kvs (5)	0,03	0,02	0,02	0,02	0,02	0,02
Lowered stem action	normally open	normally closed	normally open	normally closed	normally closed	normally closed

(1) For applications with possible ice formation on stem and gasket, see 248 accessory.
(2) Graphite packing for high temp.; forced lubrication on extended neck. Teflon gasket for low temperatures, see (3).
(3) Double O-ring and graphited teflon scraper ring.
(4) Group 1: just diathermic oil. For different fluids, please contact our Sales Support.
Group 2: water, overheated water, glycol added water 50% max., steam. For different fluids, please contact our Sales Support.
(5) Leakage is measured according to the EN1349 standard.

MOTORIZED VALVES OPTIONS

A125-2 Flanges with ANSI 125 bolt holes (for 2FGA DN25,32,50,65 and 2FGB DN25÷150 valves)
A150-2 Flanges with ANSI 150 bolt holes (for 2FAA DN32÷65 and 2FSA DN50÷65 valves)
A300-2 Flanges with ANSI 300 bolt holes (for 2FSA DN25÷65 and 2FAA DN15,32,40,50,65 valves)
2FGBxxPS89 Grooved valves PN16 to which it is possible to add the relating joint not supplied with the product. General dimensions remain the same. Joint and pipe dimensions are shown in the "Dimensions" paragraph.

ACCESSORIES

248 Stem heater for applications on -10°C low temperature fluid with MVH and MVE actuators
GVB40 Thermal insulation for DN40 for 2FGB40 valves
GVB50 Thermal insulation for DN50 for 2FGB50 valves
GVB65 Thermal insulation for DN65 for 2FGB65 valves
GVB80 Thermal insulation for DN80 for 2FGB80 valves
GVB100 Thermal insulation for DN100 for 2FGB100 valves
GVB125 Thermal insulation for DN125 for 2FGB125 valves
GVB150 Thermal insulation for DN150 for 2FGB150 valves
GVB40PS89 Thermal insulation for DN40 for 2FGB40PS89 valves
GVB50PS89 Thermal insulation for DN50 for 2FGB50PS89 valves
GVB65PS89 Thermal insulation for DN65 for 2FGB65PS89 valves
GVB80PS89 Thermal insulation for DN80 for 2FGB80PS89 valves
GVB100PS89 Thermal insulation for DN100 for 2FGB100PS89 valves
GVB125PS89 Thermal insulation for DN125 for 2FGB125PS89 valves

Controlli S.p.A.
16010 Sant'Olcese (GE)
Tel. 010 73 06 1
Fax. 010 73 06 870/871
www.controlli.eu

ACTUATORS TECHNICAL CHARACTERISTICS, ELECTRICAL WIRING DIAGRAM AND INSTALLATION

See actuators data sheets and mounting instructions. Kvs is the flow rate in m^3/h of water at a temperature between 5°C and 40°C passing through a valve open at nominal stroke with 100kPa (1bar) differential pressure.

MAX DIFFERENTIAL AND CLOSE-OFF PRESSURE [kPa]

MODEL	DN	Kvs	MVH	MVHA/C*	MVH3K	MVE.06	MVE.10	MVE.15	MVE.22
			A-AB	A-AB	A-AB	A-AB	A-AB	A-AB	A-AB
2FGA	15R0	0,6	1600	1600	1600	1600	1600	1600	1600
	15R1	1							
	15R2	1,6							
	15R3	2,5							
	15	4	1600	1600	1600	1600	1600	1600	1600
	20	6,3	1600	1510	1600	1250	1600	1600	1600
	25	10	1600	920	1600	760	1410	1600	1600
	32	16	1600	920	1600	760	1410	1600	1600
	40	24	1340	620	1600	510	950	1500	1600
	50	32	870	400	1600	330	620	980	1480
	65	63	350	160	830	130	250	400	610
	80	110	230	100	550	80	160	260	400
	100	140	140	60	350	50	100	160	250
2FAA 2FAA..P 2FAA..T	15R2	1,6	3000	3000	3000	3000	3000	4000	4000
	15	4	3000	1870	3000	1450	3210	4000	4000
	20	6,3	2840	1110	3000	850	1900	3220	4000
	25	10	1740	670	3000	510	1160	1980	3110
	32	16	1740	670	3000	510	1160	1980	3110
	40	24	1170	450	2920	340	780	1330	2100
	50	32	760	290	1910	220	510	870	1370
	65	63	310	110	790	80	200	350	560
	80	110	200	70	520	50	130	230	370
2FGB	25R4	4	1600	1100	1600	940	1590	1600	1600
	25R7	6,3	1600	1100	1600	940	1590	1600	1600
	25	10	1600	1100	1600	940	1590	1600	1600
	32 (1)	19	1170	590	1600	500	860	1300	1600
	40R19	19	1170	590	1600	500	860	1300	1600
	40	25	1170	590	1600	500	860	1300	1600
	50	40	730	360	1600	310	530	810	1200
	65	63	430	210	960	180	310	480	710
	80	100	280	130	620	110	200	310	460
	100	130	170	80	390	70	120	190	290
	125	200	100	50	240	40	70	120	180
	150	300	70	30	160	30	50	80	120
2FSA	25R4	4	2500	2150	2500	1850	2500	2500	2500
	25R7	6,3	2150	1080	2500	930	1580	2390	2500
	25	10	2150	1080	2500	930	1580	2390	2500
	32	16	1450	730	2500	620	1060	1610	2390
	40	25	1040	520	2310	440	760	1160	1720
	50	40	660	330	1470	280	480	740	1090
	65	63	390	190	860	160	280	430	640
2FGBxxPS89	40	25	1170	590	1600	500	860	1300	1600
	50	40	730	360	1600	310	530	810	1200
	65	63	430	210	960	180	310	480	710
	80	100	280	130	620	110	200	310	460
	100	130	170	80	390	70	120	190	290
	125	200	100	50	240	40	70	120	180

(1) Same dimensions as a DN40 valve

100kPa = 1bar = $10m_{H_2O}$

Kvs is the flow rate expressed in m^3/h of water at a temperature between 5°C and 40°C passing through a valve open at the nominal stroke with 100kPa (1bar) differential pressure.

*2FGB-2FSA valves: in emergency MVH.A valve closed; MVH.C valve open.
2FGA-2FAA valves: in emergency MVH.A valve open; MVH.C valve closed.

MAX REGULATION DIFFERENTIAL PRESSURE [kPa]

The max regulation differential pressure, it means the pressure which can be used during the stroke, is conditioned by wear between seat and plug and by the performance guaranteed by the actuator for the evaluated valve. So we recommend not to overcome the differential pressure whose value corresponds to the minimum between the one here following (maximum admitted value not to cause wear) and the one shown in the previous table (max close-off differential pressure).

2FGB = 200kPa
2FGA =600kPa
2FSA = 800kPa
2FAA/2FAAP/2FAAT = 1200kPa

Note: The max operating pressures at different temperatures for various PN classes must correspond to the following standards: UNI 1092-02 and UNI 12516-1.

INSTALLATION

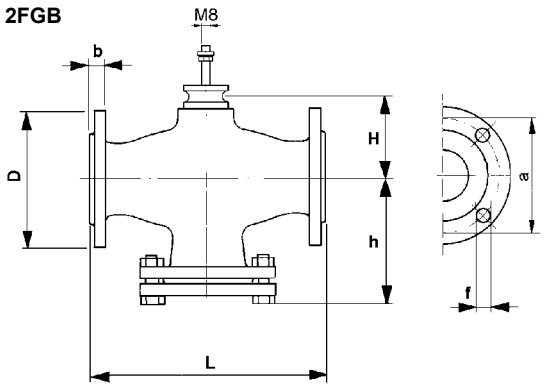
Hydraulic connections:
Respect the fluid direction as indicated by the arrow on the valve body or, in case letters are used with inlet in A and outlet AB.

Valve mounting:
Before mounting the valve, make sure pipes are clean, free from welding slags. The pipes must be perfectly aligned with the valve body and not subjected to vibrations. For installations on plants with high temperature fluids (steam, overheated water, diathermic oil) use expansion joints to avoid the dilatation of pipes to stress the valve body. Install the valves with the actuator in vertical position for fluid temperature up to 120°C; with higher temperatures they should be mounted horizontally.
Avoid the valve installation in plants which are considered aggressive and/or corrosive for valve materials.
Please contact our Sales Support in order to define which potentially aggressive or polluting substances can be used.
We disclaim all responsibility in case of valve failure due to external fortuitous events (fire, earthquakes etc.).

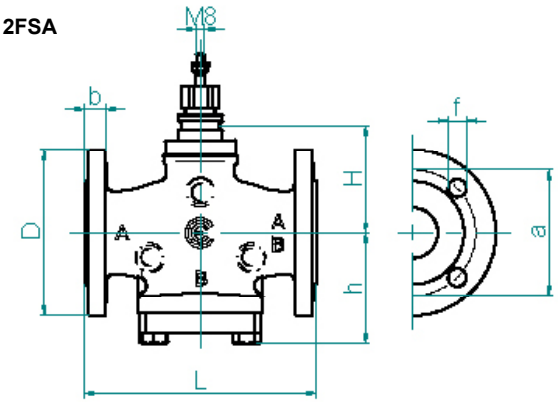
Notes: The actuator can be rotated with respect to the valve body by blocking the ring nut; after such operation re-tighten the ring nut.

OVERALL DIMENSIONS [mm]

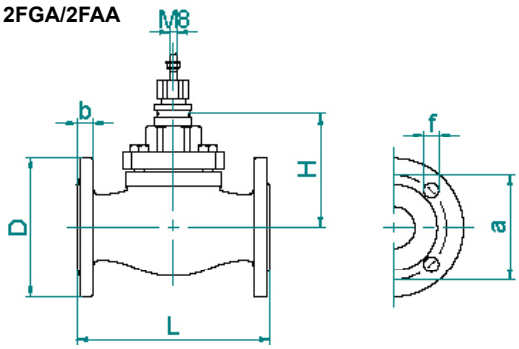
2FGB



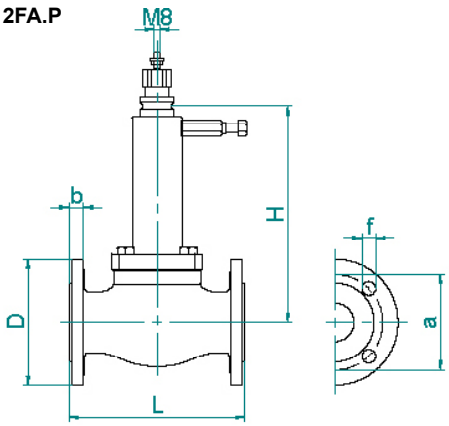
2FSA



2FGA/2FAA



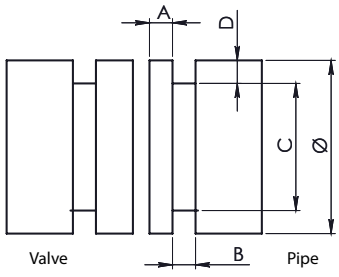
2FA.P



Model	DN	L	H	h	D	b	a	f	Holes nr.	Weight [kg]	Stroke [mm]
2FGB PN16	25	160	50	106	115	16	85	14	4	6,8	16,5
	32 (1)	200	64	128	150	18	100	18	4	12	25
	40	200	64	128	150	18	110	18	4	12	25
	50	230	66	145	165	20	125	18	4	17	25
	65	290	84	175	185	20	145	18	4	23	25
	80	310	94	187	200	22	160	18	8	30	45
	100	350	105	207	220	22	180	18	8	45,6	45
	125	400	128	234	250	24	210	18	8	55	45
	150	480	146	277	285	24	240	22	8	71	45
2FGA PN16	15	130	107	--	95	16	65	14	4	3,5	16,5
	20	150	109	--	105	16	75	14	4	4,5	16,5
	25	160	112	--	115	16	85	14	4	5,5	16,5
	32	180	121	--	140	18	100	18	4	8,7	25
	40	200	129	--	150	18	110	18	4	10,3	25
	50	230	137	--	165	20	125	18	4	13,7	25
	65	270	175	--	185	20	145	18	4	19,6	25
	80	310	190	--	200	22	160	18	8	31,7	45
	100	350	215	--	220	24	180	18	8	43,5	45
2FAA PN40	15	130	107	--	95	16	65	14	4	4,1	16,5
	20	150	109	--	105	16	75	14	4	5,1	16,5
	25	160	112	--	115	16	85	14	4	6,1	16,5
	32	180	121	--	140	18	100	18	4	10,1	25
	40	200	152	--	150	18	110	18	4	12,3	25
	50	230	160	--	165	20	125	18	4	17	25
	65	270	175	--	185	20	145	18	8	23,8	25
	80	310	190	--	200	22	160	18	8	32	45
2FSA PN25	25	160	92	83	115	18	85	14	4	6	16,5
	32	180	97	102	140	18	100	18	4	10	25
	40	200	98	104	150	18	110	18	4	11	25
	50	230	107	110	165	20	125	18	4	16	25
	65	270	117	124	185	22	145	18	8	20	25
2FAAP 2FAAT PN40	15	130	178	--	95	16	65	14	4	6,2	16,5
	20	150	180	--	105	18	75	14	4	8,3	16,5
	25	160	183	--	115	18	85	14	4	8,6	16,5
	32	180	269	--	140	18	100	18	4	14,7	25
	40	200	277	--	150	18	110	18	4	15,4	25
	50	230	285	--	165	20	125	18	4	25	25
	65	270	300	--	185	22	145	18	8	29	25
	80	310	315	--	200	24	160	18	8	38	45

(1) Same dimensions as a DN40 valve

PS89 models (PN16)



valve DN	grooved joint DN	Ø			A	B	C		D
		external pipe diameter			gasket seat	groove width	groove diameter		groove depth (ref.)
		base	max.	min.	± 0.76*	± 0.76*	max.	min.	
40	50	60,30	60,90	59,70	15,88	7,95	57,20	56,80	1,6
50	65	76,10	76,90	75,40	15,88	7,95	72,30	71,80	1,98
65	80	88,90	89,80	88,10	15,88	7,95	84,90	84,50	1,98
80	100	114,30	115,40	113,50	15,88	9,53	110,10	109,60	2,11
100	125	139,70	141,10	138,90	15,88	9,53	135,50	135	2,11
125	150	168,30	169,90	167,50	15,88	9,53	164	163,40	2,16

* ± 0,76 for grooved joint DN < 100
± 1,14 for grooved joint DN ≥ 100

The performances stated in this sheet can be modified without any prior notice

Globe Valves Actuators

MVE5xx

MODEL	FORCE [N]	POWER SUPPLY	DESCRIPTION
MVE504	400	24Vac/dc	long yoke, modulating/ floating control
MVE506	600		
MVE510	1000		
MVE515	1500		
MVE504S	400	24Vac/dc	short yoke, modulating/ floating control
MVE506S	600		
MVE510S	1000		
MVE515S	1500		

APPLICATION AND USE

MVE is a flexible electro mechanical actuator for the control of two and three-way globe valves in:

- heating and cooling systems;
- Air Handling Units;
- district heating plants;
- industrial temperature control systems.

The actuator can be controlled either by a proportional (modulating) signal or by an increase/decrease (Floating) signal.
It is easy to mount and connect the actuator. Direct mounting is possible to any CONTROLLI flanged valve. Linkage kits are available for CONTROLLI threaded valves as well as for valves of other manufacturers (table p. 3). The actuator has a fine resolution (500 steps on the full stroke range) for exacting fluid control and it is able to self-calibrate on a different stroke without the need of any user action (this function is DIP switch selectable on the field).
MVE has intelligent behaviour and alarm functionality in case of unexpected operation, feedback of alarms to the user is provided by LEDs (GREEN and RED) on the control board.
N.B.: Do not use the actuator if not coupled with its relating valve.

OPERATION

The actuator translates the control signal (modulating or 3 point floating) from the controller into a valve position. A modern brushless DC motor in the actuator drive a gear train and a worm gear – screw jack mechanism convert the motor revolutions into accurate and repeatable linear movements.

Control Signal

MVE can be controlled by one of 2 main control types:
- 3 point floating ;
- Modulating (or proportional) signal with filed selectable range (e.g., 0-10Vdc, 2-10Vdc, 0-5/2-6Vdc, 5-10/6-10Vdc and 4-20mA).

Manual Override

There is a manual operation handle on the actuator. When it is lowered (manual override ON), the power supply to the motor power stage circuitry is cut and the motor stops. The actuator can be operated manually and the valve positioned accordingly.
The manual override lever stays in position until it is raised again, then board and motor will be powered again. At the end of this operation the actuator moves to initial position (on the basis of DIP n. 1 setting) then it follows the control signal. When the manual override is engaged the GREEN and the RED LED are ON.
Manual operation handle can also be used to modify any DIP switch setting or as re-set function after any alarm occurrence.
The actuator is supplied with the manual override lowered (ON). It is not necessary to remove power supply to modify DIP switches setting.

Position Feedback

The actuator utilizes a 2-10Vdc position feedback (look at DIP n. 1 setting).

Calibration

The actuator has both auto and manual stroke calibration, DIP n. 7. In factory delivery the auto stroke calibration is enabled – manual calibration is not necessary unless maintenance is required on the valve or certain alarm functions are desired.

End Point Auxiliary Switches (with accessory DMVE)

End point switches change over when the valve is fully open or closed. They are free contacts with 24V AC/DC, 4A max voltage on terminals. End point switches can be utilized to indicate valve stroke end positions and for relay control of additional plant equipment. When the actuators are controlled individually or in sequence, it is possible to use the end switches to toggle when the valve is fully open or fully closed. The auxiliary switch position according to control signal (Y) is shown in the picture below.

Control signal (Y)	Relay KC1	Relay KC2
0-0,5Vdc	KC1 to K2	KC2 to K3
0,5-9,5Vdc	KC1 to K1	KC2 to K3
9,5-10Vdc	KC1 to K1	KC2 to K4

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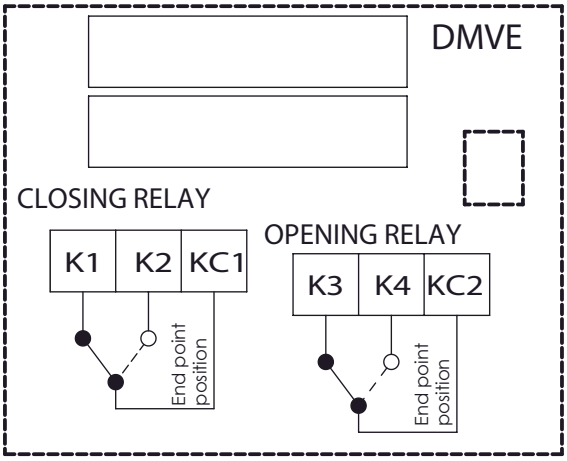


Diagnostic

The actuator is provided with a self diagnostic algorithm able to detect faulty conditions:

- stroke calibration out of range 5-60mm;
- unexpected stall condition (e.g. valve stuck or extra stroke due to actuator link loose);
- voltage supply out of range.

These faulty conditions are signalled through the GREEN and RED LED on the electronic board blinking accordingly (see Diagnostic – Alarm Function Table).

TECHNICAL FEATURES

DESCRIPTION		MVE504 MVE504S	MVE506 MVE506S	MVE510 MVE510S	MVE515 MVE515S
Supply voltage L1 Ln		AC: 24Vac ±20% 50-60Hz DC:22-30Vdc (Reference Ln)			
Power consumption (running)		10VA / 4,5W	13VA / 6W	18VA / 8W	21VA / 11W
Power consumption (holding)		8VA / 4W	11VA / 5W	11VA / 5W	13VA / 7W
Running time	Modulating	15 s (for valves with stroke from 5 to 15 mm)			
		20 s (for valves with stroke from 15 to 25 mm)			
		30 s (for valves with stroke from 25 to 60 mm)			
	Floating	60 s			
Transformer Size [VA]		20	20	30	50
Stroke			5-60 mm (limited to 30mm for MVE.S)		
Force		400 N	600 N	1000 N	1500 N
Duty cycle		max 50%/60 minutes			
Analogue input Y M		voltage 0-10Vdc - impedance > 100kΩ (range: 0-10Vdc, 2-10Vdc, 0-5/2-6Vdc, 5-10/6-10Vdc) 500Ω (range 4-20mA)			
Digital inputs Y1 Y2		connection to L1 or Ln when powered in AC connection to Ln only when powered in DC			
Output V+		voltage 16Vdc ± 0,5Vdc; max load 25mA			
Output U		voltage 2-10Vdc (0-100%); max load 2mA			
Number of cycles of manual action		6.000			
Number of cycles of automatic action		100.000			
Type of action		type 1			
Type of movement		linear			
Room temperature		operation -10T55°C; storage -20T55°C			
Room Humidity		max 90% R.H.			
Protection degree		Nema 2 (*) / IP54 (**)			
Insulation class		III			
Printed Circuit Board		FR4 (material) PLC (Performance Level Categories) = 3 PTI (Proof Tracking Index) = 175 - 249V CTI (Comparative Tracking Index) = PTI Pollution Degree = 2			
Standard		Emission/Immunity EMC 2014/30/UE according to EN 61326-1:2013 standard			
Standard(s) for safety		UL 60730-1A Part 1: General Requirements UL 60730-2-14 Part 2: Particular Requirements for Electric Actuators CAN/CSA-E60730-1:02 Part 1: General Requirements with Amendment 1			
Material		housing: aluminium - cover: ABS plastic			
Colour		aluminium / white			
Weight [kg]		1,7 (MVE5xx); 1,6 (MVE5xxS)			
Date code		yy/ww			

***To guarantee "Nema Type 2" protection:**

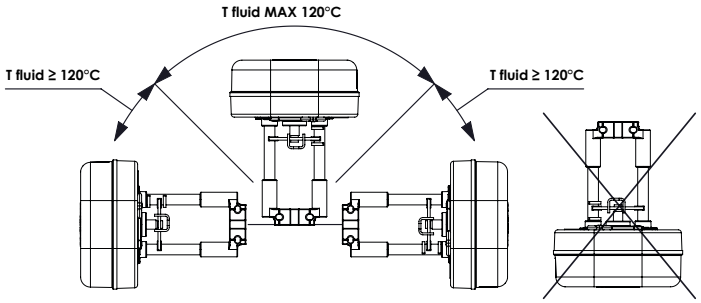
- use flexible metal conduit (not supplied);
- Push the listed conduit fitting device (PG13,5 - not supplied) over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuators input wiring with listed flexible conduit. Properly terminate the conduit in a suitable junction box.

****To guarantee IP54 protection**

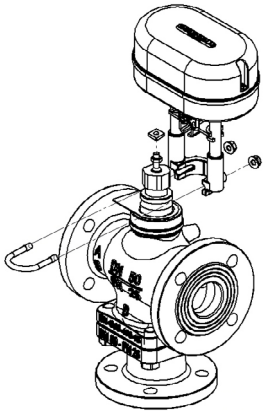
- Insert the actuator cable in the PG13,5 cable gland (not supplied)

ASSEMBLING

The actuator can be mounted with any orientation but never up-side down. When the fluid temperature exceed 120°C the actuator shall be mounted leaning 45°.



To mount the actuator on to a valve, position the valve stem to the bottom of its travel, slide the actuator onto the valve neck, adjusting with the manual override the screw jack position so the square nut on the valve spindle fits into the groove on the cross bar. Then slide the brace into the groove on the valve neck and secure the nuts.



See mounting instructions for full details (MVE_DIM223).

MAINTENANCE

The actuator is free of maintenance.

ACCESSORIES

DMVE	End point auxiliary switches (electrical rate 24V AC/DC, 4A max)
GMVE	Thermal insulation for MVE actuators *
GMVES	Thermal insulation for MVE.S actuators *
KIT-P13.5	10 cable glands kit (nuts and gaskets included)
KIT-T13.5	Kit 10 caps for cable glands hole (nuts and gaskets included)
248	Stem heater (suggested when the fluid temperature is below 0°C) *

** It is not possible to install both thermal insulation (Gxxxx) and stem heaters.*

COMPATIBLE VALVES AND ACTUATORS

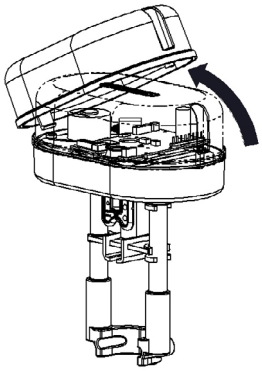
CONTROLLI VALVES	MVE5xx	MVE5xxS
Current Controlli valves (except for 2-3TGB.F PN16)	•	-
VSXT09PBP, VSXT10PBP	-	only with MVE504S
2-3TGB.F PN16	-	•
Controlli valves with threaded M40 connections (except for VSB-VMB, VSB.F-VMB.F PN16)	with AG51	-
VSB-VMB, VSB.F-VMB.F PN16	with AG52	with AG63
OTHER MANUFACTURERS VALVES	**MVE5xx**	**MVE5xxS**
Belimo H2..X-S e H3..X-S	with AG82	with AG82
Siemens *	with AG70-10 with AG70-14	-
Danfoss (VR/VF (S) models)	with AG60-07	-
TAC DN15-V298	with AG60-08	-
TAC DN15-V2XX/V3XX	with AG60-09	-
Honeywell **	with AG60-10	-
Airtek	with AG60-11 with AG60-12	-
Johnson Controls VB7816-2111	with AG66	-
Johnson Controls BM-3018-3300	with AG67	-
MUT MK DN50-150	with AG69	-
Tac Venta	•	-

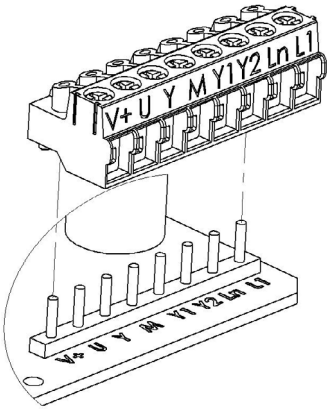
* AG70-10 for valves having stem Ø 10mm
AG70-14 for valves having stem Ø 14mm

** valid for the following models
M6: V176A,B, V538C
1/4": V5011A

ELECTRIC CONNECTIONS

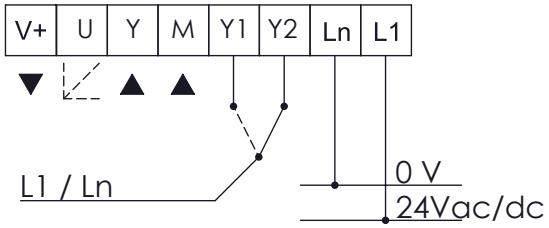
Remove the cover screw with a screwdriver and then remove the cover as shown in the picture beside.
The actuator is equipped with a 8 poles removable terminal block; the each pole of the plug is clearly marked and the same label are reported on the electronic board. Before powering up the actuator make sure the plug is properly connected to the board and the label on the plugs and on the board match.





Use PG13,5 cable gland (not supplied).

TERMINAL BLOCK



Label	Description	Function	Cable type	Max wire length
L1	24 Vac/dc	Power supply	AWG 16 (min 1mm² - max 1,5mm²)	75m
Ln	0V			
Y	0-10 Vdc	Modulating control input	AWG 20 (min 0,5mm² - max 1,5mm²)	200m
M	0V (common)			
Y1	Open	Floating control input	AWG 20 (min 0,5mm² - max 1,5mm²)	200m
Y2	Close			
V+	16 Vdc	Voltage output max 25mA	AWG 20 (min 0,5mm² - max 1,5mm²)	200m
M	0V (common)			
U	2-10 Vdc	Feedback output signal	AWG 20 (min 0,5mm² - max 1,5mm²)	200m
M	0V (common)			

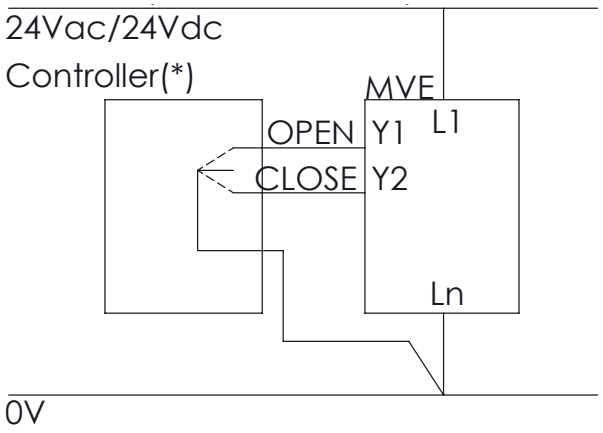
Note: To avoid damages to electronic components caused by the PCB bending, do not press too much while fixing the terminal block.

Matching between MVE terminal block and others Controlli actuators

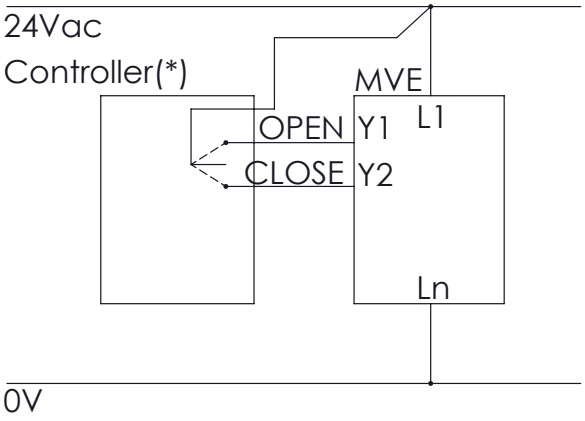
1	2	3	4	5	
L1	L2	M	V+	Y	MVB5-MVL5-MDL5
G	G0	MX	G1	X1	MVF-MVH5-MVL5-F
L1	LN	M	V+	Y	MVE

WIRING DIAGRAMS

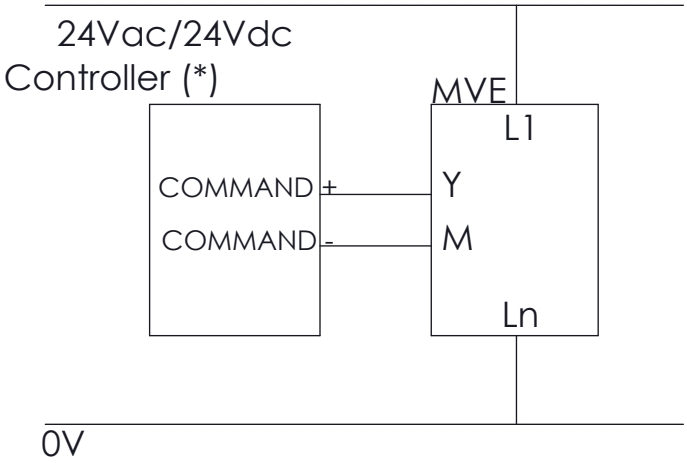
3 point floating control (sink connection)



3 point floating control (source connection)



Modulating control (0-10Vcc)



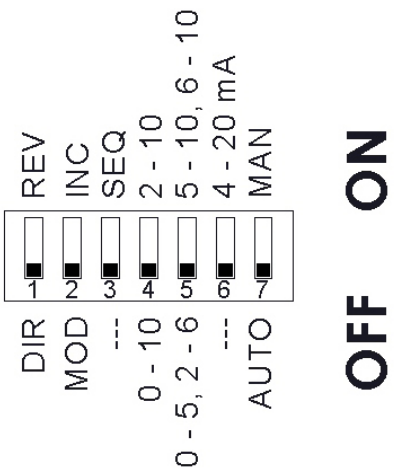
N.B.: M and Ln signals are internally connected.

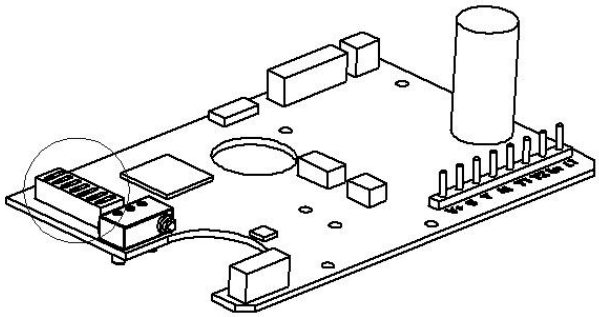
(*) MVE contain a single half-wave rectifier power supply. They must not be powered with transformers that are used to power other devices using not isolated double half-wave rectifier power supply.

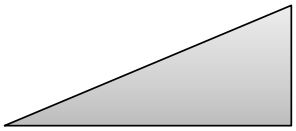
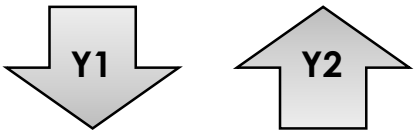
DIP SWITCHES SETTINGS

Set the DIP switches according to the tables here below. Power down and power up again the actuator or act on the manual over-ride to be sure that settings will be recognized.

Factory settings





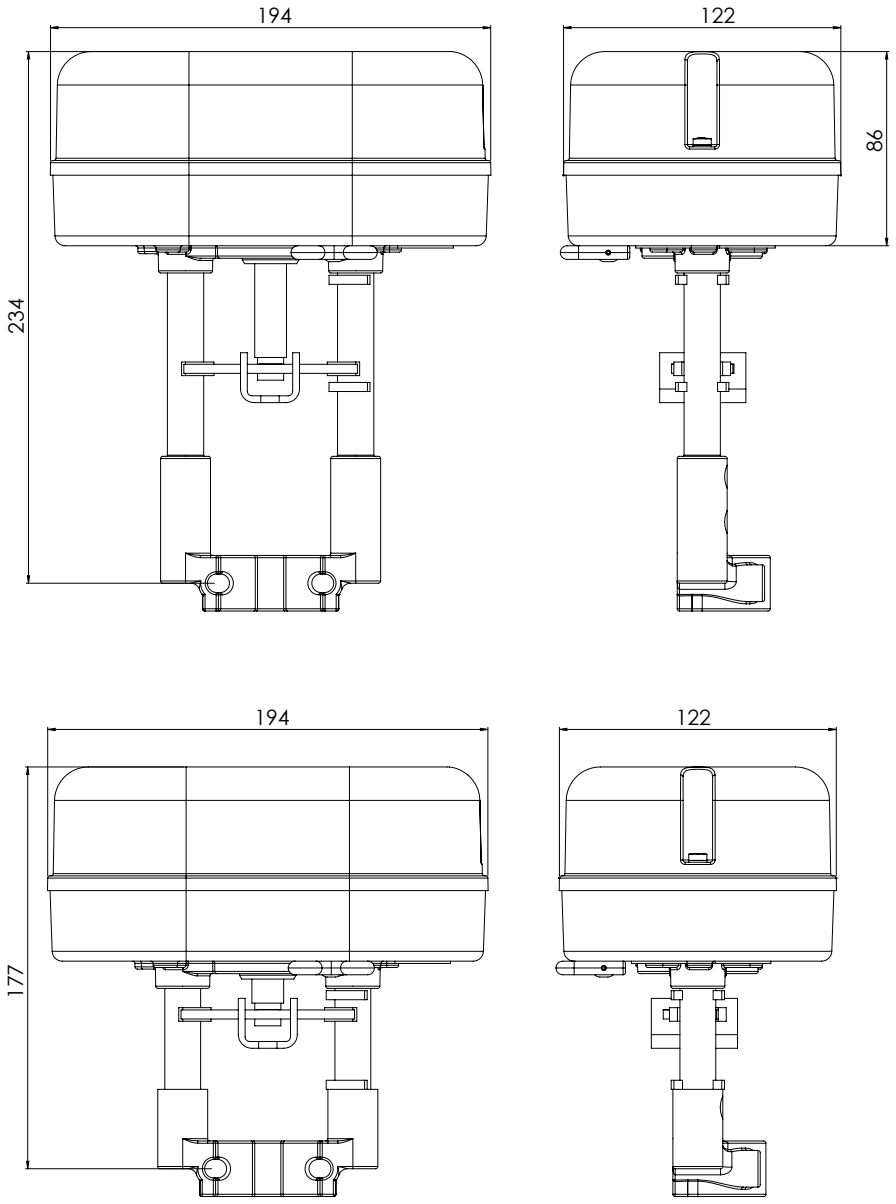
DIP switch	OFF	ON
1	Direct Action U = 2V U= feedback U = 10V	Reverse Action U=10V U= feedback U = 2V
2	Modulating Control (MOD) (Input between Y [+] and M [-]) 	3 point floating (INC) (Y1 open-extend , Y2 close-retract connected L1 or Ln if powered in Vac; if powered in Vdc connected necessarily to Ln) 
3	-	Selection of sequence mode, control range defined by DIP n. 5
4	Modulating Control 0-10Vdc (DIP n. 2 OFF only)	Modulating Control 2-10Vdc (DIP n. 2 OFF only)
5	Sequence Control 0-5Vdc with DIP n. 4 OFF only Sequence Control 2-6Vdc with DIP n. 4 ON only (DIP n. 3 ON only)	Sequence Control 5-10Vdc with DIP n. 4 OFF only Sequence Control 6-10Vdc with DIP n. 4 ON only (DIP n. 3 ON only)
6	Voltage Input Signal (input between Y [+] and M [-])	Current Input Signal 4-20mA (input between Y [+] and M [-]). In this case DIP n. 4 must be set to ON.
7	Automatic Calibration: the actuator updates the stroke range every time an unexpected mechanical stop is detected for at least 10s	Manual Calibration: the actuator calibration is started moving the DIP from OFF to ON or vice versa. With DIP in ON in case of extra stroke or if an unexpected endpoint is detected, the actuator will never update the stroke

N°	LEDs behaviour	Error	Actuator use	Actuator behaviour		Typical trouble shooting condition	Reset procedure
				Automatic calibration (DIP N. 7 OFF)	**Manual calibration (DIP N. 7 ON)**		
1	**RED ON**	Valve stroke less than 5mm	Calibration/ first installation	The actuator pushes/pulls 2 times (unexpected stall) trying to remove the possible obstacle. After 2 tries an alarm is signalled and the actuator moves to initial position and does not respond to control signal. Stroke value is not updated because out of range	The actuator pushes/pulls 2 times against endpoint during calibration and the actuator moves to the initial position and then it does not respond to the control signal. The actuator keeps the previous stroke	Valve with a stroke length lower than 5mm	Remove power and power up again
2	**RED quick blinking + GREEN ON**	Stroke longer than 60mm	Calibration/ first installation	The actuator exits the 60mm stroke range and it moves toward the new stroke limit signalling an anomaly. The actuator pushes/pulls 2 times against the new stroke limit, then it goes back to the initial position still signalling the anomaly until it is not within 60mm. The actuator does not calibrate the stroke after 10s (wrong range)	The actuator exits the 60mm stroke range and it moves toward the new stroke limit signalling an anomaly. The actuator pushes/pulls 2 times against the new stroke limit, then it goes back to the initial position still signalling the anomaly until it is not within 60mm. The actuator does not calibrate the stroke after 10s (wrong range)	Valve with a stroke length longer than 60mm	Remove power and power up again
3	**RED Quick Blinking**	Unexpected stall within the calibrated stroke range	normal operation	The actuator tries 5 times against the new stall condition and then after 10s the actuator updates the new stroke length	The actuator tries 5 times against the new stall condition. At the end of the attempts the fault will be signalled. The actuator does not update the new stroke length, but after 60s makes other attempts to verify the stall condition	Valve stuck	Inverted control signal
4	**RED Quick Blinking**	Stroke longer than expected	Normal operation	The actuator moves toward the new stall condition with a lower speed; after 10s the actuator updates the new stroke value	The actuator moves toward the new stall condition with a lower speed; after 10s the actuator does not update the new stroke value	Stem connection loose or valve damaged	Inverted control signal
5	**RED slow Blinking**	Low Power Voltage	Normal operation	The actuator is still working but performance cannot be guaranteed	The actuator is still working but performance cannot be guaranteed	1. Wrong transformer size 2. Unstable power	Correct Voltage Power
6	**RED slow Blinking**	High Power Voltage	Normal operation	The actuator is still working but performance cannot be guaranteed	The actuator is still working but performance cannot be guaranteed	1. Wrong transformer size 2. Unstable power	Correct Voltage Power

STANDARD LEDs BEHAVIOUR

N°	LED behaviour	Actuator status
1	GREEN ON	The actuator arrived at the extreme point of the stroke read
2	GREEN BLINKING	The actuator arrived at the intermediate point of the stroke read
3	RED GREEN BLINKING	The actuator is reading the stroke or it is going to initial position
4	RED GREEN ON	Manual control ON, the actuators ignores the control signal. ATTENTION! The electronic board is electrically supplied

DIMENSIONS [mm]



The performances stated in this sheet can be modified without any prior notice