MVE5xxx-2-RS

Multiprotocol Network actuator for PICV and Globe Valves with energy and temperature control functions, BACnet and Modbus protocols

MODEL	FORCE [N]	POWER SUPPLY	DESCRIPTION
MVE504-2-RS	400	24 V AC/DC	Long yoke
MVE506-2-RS	600		
MVE510-2-RS	1000		
MVE515-2-RS	1500		
MVE522-2-RS	2200		
MVE504S-2-RS	400	24 V AC/DC	Short yoke
MVE506S-2-RS	600		
MVE510S-2-RS	1000		
MVE515S-2-RS	1500		
MVE522S-2-RS	2200		

APPLICATION AND USE

MVE5xxx-2-RS is a multiprotocol network actuator dedicated for PICVs, allowing direct temperature monitoring and control of supported medium. Together with Libra PICV the MVExxxx-2-RS creates a unique energy calculation solution for heating or cooling coils in air handling units and district heating plants.
Thanks to the RS-485 connectivity with Modbus RTU and BACnet MS/TP the actuator is ready for direct integration with Building Management Systems.
MVExxxx-2-RS series can also work with the standard Globe Valves, but in this configuration the energy calculation functionality is not available.

MVE5xxx-2-RS is equipped with two temperature inputs for direct connection of NTC 10K temperature sensor to allow:
· Temperature monitoring
· DeltaT and Temperature – control and limit
· Energy Calculation with Libra PICV (VLX6P or VLX8P) or with custom PICV (in that case the manual setting of the flow characteristic of the valve is essential).

The actuator can control and limit the temperature and additionally optimize the power consumption of the heating or cooling coil, independently of the controller. That allows not only to reduce the installation and commissioning costs, but also to lower the energy consumption in the building.

When it is installed on PICV valves and both temperature sensors are connected the actuator can calculate the flow rate using the valve characteristics and therefore calculate the energy delivered to the coil.
Furthermore, when it is installed with the PICV it can be used to control the thermal power transferred from the coil or limits the power consumption and estimate the energy consumption.

MVE5xxx-2-RS is not only the network actuator, but can be controlled with standard analog signals.

The installation and commissioning of MVE5xxx-2-RS is quick and easy thanks to the U-Bolt type valve connection and self-diagnostic functions able to ensure correct and error-free installation. It can be mounted on all types of iSMA CONTROLLI flanged valves, while connection kits are available for iSMA CONTROLLI threaded valves and valves from other manufacturers (table on page 7).
The actuator has a very high resolution (0.1% of the control signal) for an accurate control of the fluid temperature and is able to self-calibrate on different strokes without requiring user action. The compact models MVE5xxxS-2-RS are equipped with a short yoke for applications with limited space.
MVE5xxx-2-RS is also equipped with a USB port for local configuration and diagnostics. When USB cable is connected, the actuator cannot be controlled (BLDC motor is disabled).

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

TECHNICAL CHARACTERISTICS

DESCRIPTION	MVE504-2-RS MVE504S-2-RS	MVE506-2-RS MVE506S-2-RS	MVE510-2-RS MVE510S-2-RS	MVE515-2-RS MVE515S-2-RS	MVE522-2-RS MVE522S-2-RS
Supply voltage L1 Ln	AC: 24 V AC ±20% 50-60 Hz DC:22-30 V DC (Reference Ln)				
Power consumption (running)	10 VA/4,5 W	13 VA/6 W	18 VA/8 W	21 VA/11 W	25 VA/11 W
Power consumption (holding)	8 VA/4 W	11 VA/5 W	11 VA/5 W	13 VA/7 W	13 VA/7 W
Running time	16 s @ 45 mm				
Transformer Size [VA]	20	20	30	50	50
Stroke	5-60 mm (limited to 30 mm for MVE.S-2-RS)				
Force	400 N	600 N	1000 N	1500 N	2200 N
Duty cycle	Max 50%/60 minutes				
Analogue input Y M	Voltage 0-10 V DC - impedance > 100 kΩ (range: 0-10 V DC, 2-10 V DC, 0-5/2-6 V DC, 5-10/6-10 V DC) 500 Ω (range 4-20 mA)				
Output V+	Voltage 16 V DC ± 0,5 V DC; max load 25 mA				
Output U	Voltage 2-10 V DC (0-100%); max load 2 mA				
No. of cycles with manual control	6.000				
No. of cycles with automatic control	100.000				
Type of action	Type 1				
Type of movement	Linear or EQM				
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 - 249 V CTI (Comparative Tracking Index) = PTI, Pollution Degree = 2				
Standard	Emission/Immunity EMC 2014/30/UE according to EN 61326-1:2013 standard				
Material	Housing: aluminium - cover: ABS plastic				
Colour	Aluminium / white				
Weight [kg]	1,7 (MVE5xx-2-RS); 1,6 (MVE5xxS-2-RS)				
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).

OPERATION

MVE5xxx-2-RS is equipped with a modern brushless direct current motor that drives a gear train and converts engine revolutions into accurate and repeatable linear movements on the valve stem.
MVE5xxx-2-RS can be controlled by 2 types of signal:
· RS485 command (Modbus RTU or BACnet MS/TP) 0-100%;
· modulating (or proportional) with selectable type (e.g. voltage or current) and range (e.g. 0-10 V DC, 2-10V DC, 0-5 / 2-6 V DC, 5-10 / 6-10 V DC and 4-20 mA).
The control mode can be set via Modbus RTU or BACnet MS/TP, via USB or via the dip-switches (only 0-10 V DC, 2-10 V DC and 4-20 mA are selectable) on the board. All settings and configurations can be done over the RS485 network or USB connection by the free-of-charge software MVE-2-RS Configurator as well as by the BMS over the RS485 network.
Modbus RTU and BACnet MS/TP Registers description is available in Product Manual DMP283en.

Position Control

The actuator receive modulating signal coming from a control loop implemented by BMS and the valve is positioned from 0% to 100% accordingly to the voltage (0...10 V DC) or the current (4...20 mA) or RS485 (Modbus RTU or BACnet MS/TP) Command.

When it is installed with PICV (iC PICV or custom) the control signal represents the desired flow rate that is a % from 0% to 100% of the maximum flow rate.

Actuator position characteristic is normally linear, but MVE5xxx-2-RS allow to set an equal percentage behaviour allowing to make a linear valve working like an equal percentage valve.
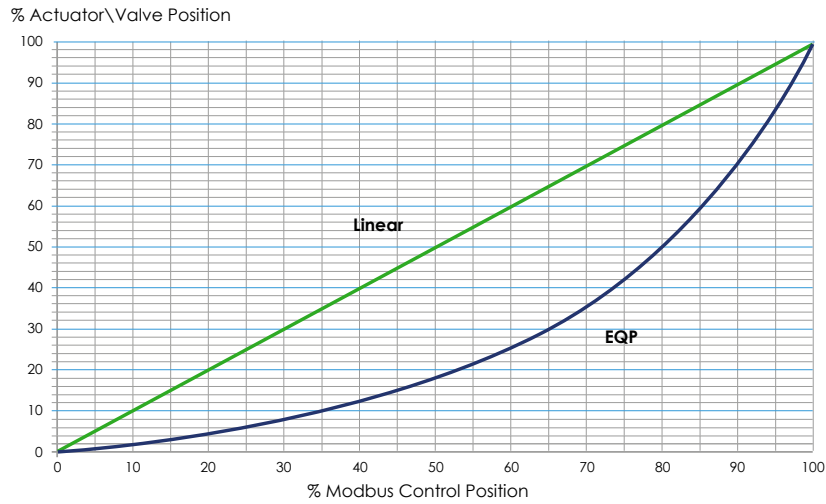
Diagnostics

The actuator is equipped with a self-diagnostic algorithm able to detect the following conditions\anomalies:

- Actuator status (Normal Operation, Calibration, Initialization, Fault, Manual).
- Calibration on a stroke out of range 5-60 mm.
- Unexpected stall (e.g. valve blocked or extra stroke due to actuator not correctly coupled); the number of detected events is stored permanently.
- Supply voltage outside the allowed range; the number of detected events is stored permanently.
- Total number of opening and closing cycles.
- Temperature sensors outside the allowed temperature range (if any).

All the diagnostic information are available through dedicated Modbus RTU or BACnet MS/TP registers and can be read by the BMS and the MVE-2-RS Configurator. Diagnostic data are also available via the USB connection.

Furthermore, the anomaly conditions are locally shown by means of two green and red LEDs on the board which are properly flashing (see table on page 11).
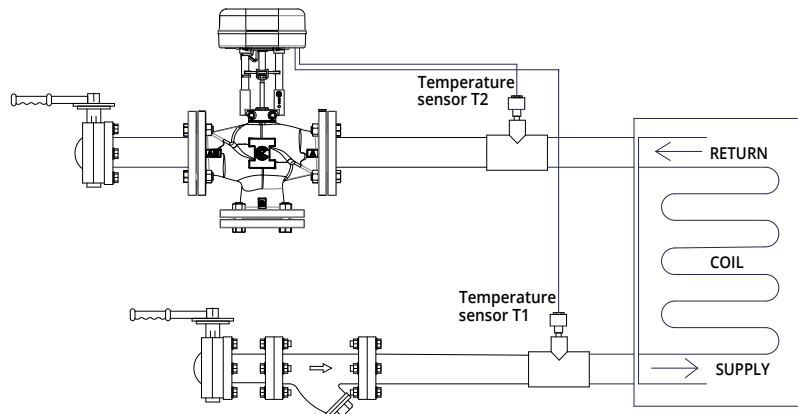
Temperature control loop

MVE5xxx-2-RS can be connected to 2 sensors for measuring the supply and return temperature of a hydraulic circuit for monitoring purposes or for control purposes.
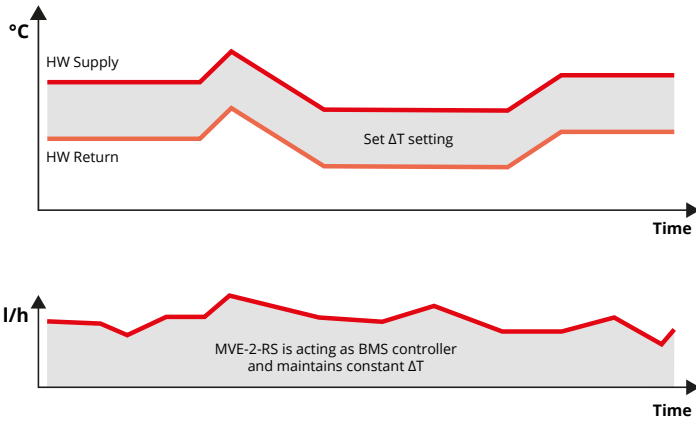
The actuator can implement a temperature control loop (PID): the actuator independently controls the supply or the return temperature or the ΔT according to a set-point provided by the BMS; the BMS only sets the temperature\ΔT setpoint and the actuator works independently even in the absence of the RS485 connection.

If only temperatures monitoring is required, the measured values are made available to the BMS through dedicated Modbus RTU or BACnet MS/TP registers.
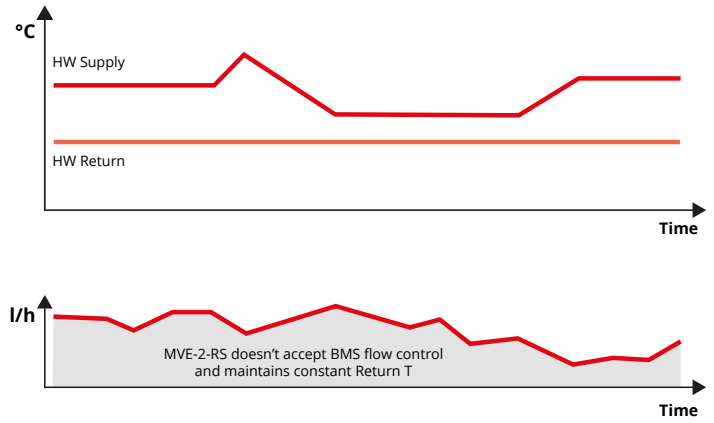
Temperature setpoints, PID control parameters, Heating/Cooling mode can set via Modbus RTU or BACnet MS/TP or via USB by the MVE-2-RS Configurator.

**ΔT control loop (water heating example)**

°C

HW Supply

HW Return

Set ΔT setting

Time

l/h

MVE-2-RS is acting as BMS controller
and maintains constant ΔT

Time

T Return control loop (water heating example)

°C

HW Supply

HW Return

Time

l/h

MVE-2-RS doesn't accept BMS flow control
and maintains constant Return T

Time

ΔT limit function

If a heating or cooling system works with a differential temperature between the supply and return too low, it means that there is no heat exchange between the fluid and the air flow and therefore it is more efficient to reduce the fluid flow as this does not generate any heating or cooling effect. This means that the pumps circulate too much water with unnecessary increase of energy consumption.

The ΔT limit function automatically limits the flow rate to prevent the ΔT level from falling below the desired differential temperature.
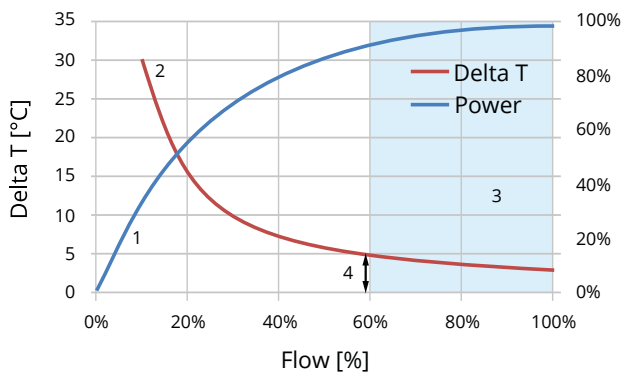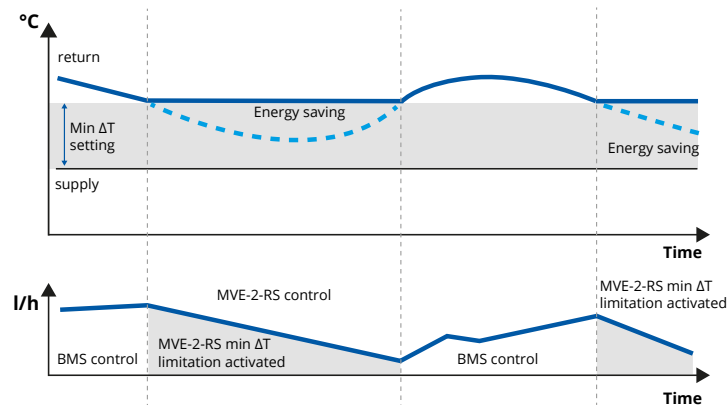

1 – Power output of the heating or cooling coil
2 – Diff. temperature between supply and return
3 – Loss zone (heating or cooling coil saturation)
4 – Adjustable minimum differential temperature

This function overrides the control signal from the BMS when the ΔT is lower than the setpoint; BMS will be again in charge of the valve positioning when the ΔT is higher than the setpoint.
The minimum value of ΔT and the other parameters of the control loop (PID) can set via Modbus RTU or BACnet MS/TP or via USB.

Min ΔT limitation (water cooling example)

°C

return

Min ΔT setting

Energy saving

Energy saving

supply

Time

l/h

MVE-2-RS control

MVE-2-RS min ΔT limitation activated

BMS control

MVE-2-RS min ΔT limitation activated

BMS control

Time

## Supply/Return temperature limit function

MVE5xxx-2-RS can implement a limit control loop on the return or on the supply temperarature in order to override the BMS control when energy efficiency conditions are not respected (e.g. in cooling mode return temperature higher than a setpoint value). The following limiting functions can be implemented:

- Maximum temperature limit control loop: the actuator will override the BMS control signal when the supply \return temperature is higher than the setpoint; the user can select if the loop has to be implemented on the supply or return temperature sensor. For example in a domestic hot water application the actuator can override the bms control signal if the supply temperature exceeded a setpoint value that could be dangerous for the user.
- Minimum temperature limit control loop: the actuator will override the BMS control signal when the supply \return temperature is lower than the setpoint; the user can select if the loop has to be implemented on the supply or return temperature sensor. For example in a cooling application the actuator can override the BMS control signal if the return temperature is lower than a setpoint value in order not to affect the chiller efficiency.
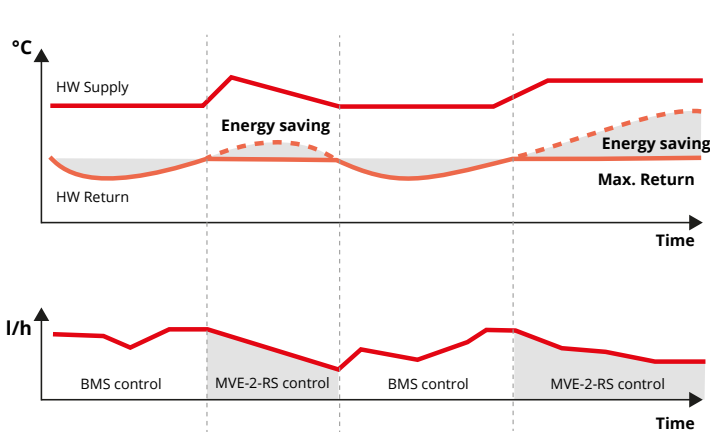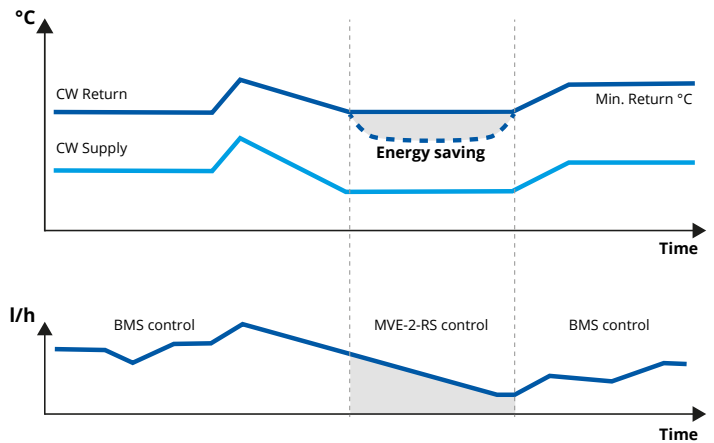
Max T Supply limitation (water heating example)
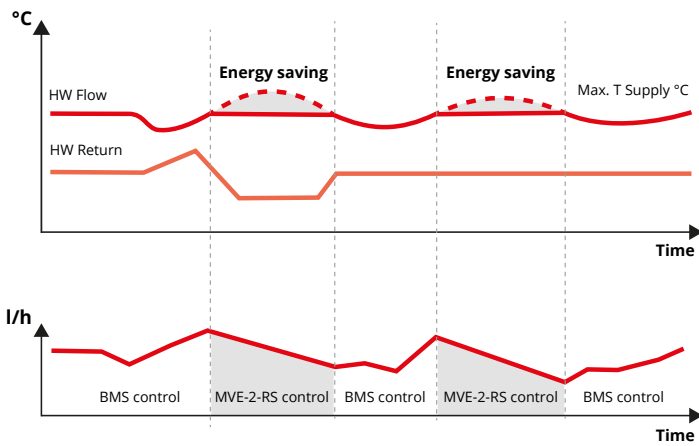
Min T Supply limitation (water cooling example)
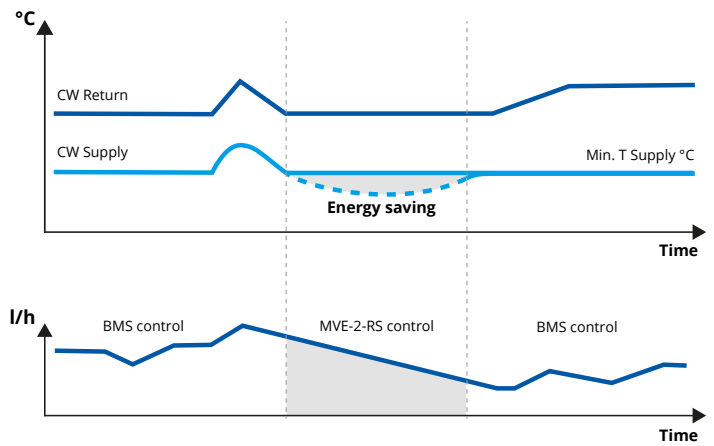
## Max T Return limitation (water heating example)

Min T Return limitation (water cooling example)

Power Control Function

When the actuator is installed with PICV valves (iC or custom) and both temperature sensors are installed, the Power Control function can be enabled and the MVE-2-RS calculates the thermal power transferred from the coil and to control it independently of pressure fluctuations in the systems and other external conditions that could affect the heat transfer process, lowering the overall efficiency. It is possible to set the maximum desired power (Design power Pmax) whose value is between zero and the nominal power values (Pnom) defined for the valve at the various ΔT and shown in the following graphic.
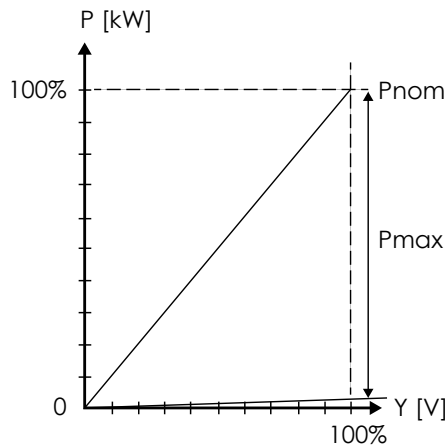
To do this, the configuration tool can be used with the Modbus RTU connection or via USB. For further details refer to the DMP283en manual.

Power limit function

When the actuator is installed on PICV valves (iC or custom) and both temperature sensors are installed, the Power Limit function can be enabled and the MVE-2-RS limits the actuator position when the BMS command is greather than of Set Max Power Limit value (Set Power Limit Set point).

Energy function

When the actuator is installed on PICV valves (iC or custom) and both temperature sensors are installed, the Energy function can be enabled and the MVE-2-RS calculates the instantaneous thermal power and the energy (heating/cooling) delivered by the controlled coil and store cumulative energy and monthly energy values into dedicated registers with the relative month and year. The current data, e.g. temperatures, flow rates, heating/cooling energy consumption etc. can be saved and read at any time by means Modbus RTU, BACnet MS/TP or USB connection.

MVE-2-RS Configurator

A free-of-charge Configuration tool is available from the www.ismacontrolli.com website. The software allows:
· realtime monitoring of the device during commissioning and troubleshooting;
· device configuration (control functions enable, control loop set point, PID parameters, etc);
· visualisation of alarms;
· visualisation of cumulative energy (heating/cooling) and of the last 12 monthly energy consumptions values;
· firmware upgrade.

The configuration tool can be connected to the actuator via USB or via RS485 (two different installation packages are available for the USB or RS485 communication).

Manual Override

There is a manual operation handle on the actuator. When it is low the manual override is engaged and the valve can be manually positioned. The manual override handle stays in position until it is raised again, then board and motor will be powered again. 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 reset function after any alarm occurrence.

Position Feedback

The current position of the actuator is made available via Modbus RTU or BACnet MS/TP (0-100%) as well as via a 2-10 V DC analog signal.

Calibration function

MVE5xxx-2-RS is equipped with an automatic calibration function.
The plug & play function enables the calibration at the first start-up of the actuator and therefore no further calibration operations are required unless maintenance is required on the valve or particular alarm conditions occur. If it is necessary to repeat the calibration, it can be activated by pushing the S2 button on the electronic board or remotely via Modbus RTU or BACnet MS/TP.

End points switches (DMVE accessory)

The end points relays switch when the valve is fully open or closed. These are dry contacts (24 V AC/DC, 4A max). Auxiliary switches can be used to indicate the end position of the valve and for relay control of other devices.

When the actuators are controlled individually or in sequence, it is possible to use the limit switches to indicate the total closing or opening of the valve. The table below indicates the position of the switch based on the 0..10 V DC (Y) command signal.

CONTROL SIGNAL (Y)	RELAY KC1	RELAY KC2
0-0,5 V DC	KC1 to K2	KC2 to K3
0,5-9,5 V DC	KC1 to K1	KC2 to K3
9,5-10 V DC	KC1 to K1	KC2 to K4
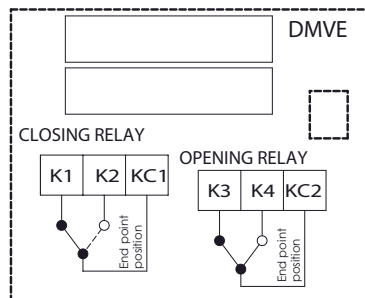
Installation instructions

Position the valve stem at the end of its travel, slide the actuator onto the valve bonnet; adjust the position of the actuator with the manual control so that the square nut on the valve stem fits perfectly with the slot on the connection plate. Slide the U-shaped bolt into the groove of the valve bonnet and secure it with the nuts.
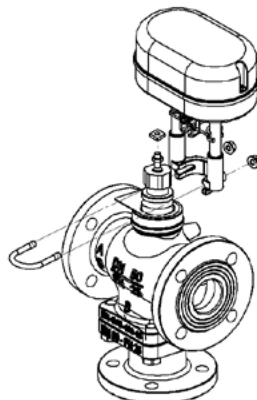
For further details see the Assembly Instructions (MVE5xxx-2-RS_DIM323en).

MAINTENANCE

The actuator is maintenance-free.

ACCESSORIES

DMVE	End point auxiliary switches (electrical rate 24 V AC/DC, 4A max)
GMVE	Thermal insulation for MVE actuators *
GMVES	Thermal insulation for MVE.S actuators *
iSMA-B-CVT-RS485	USB to RS485 Converter, USB 1.0 and 2.0 compatible, built-in: status LEDs, switchable terminating resistor, EEPROM memory. Communication over 3-wire bus. The miniUSB to USB cable is not included.
PA	1/2" M Immersion sensor pocket pair, length 45 mm, internal ø 6 mm
PB	1/2" M Immersion sensor pocket pair, length 85 mm, internal ø 6 mm
SNTC-SL-3	NTC 10K temperature sensor 3 m length (10 m length available on request)
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

iSMA CONTROLLI VALVES	MVE5.-2-RS	MVE5.S-2-RS
Current iSMA CONTROLLI valves	•	-
VSXT09PBP, VSXT10PBP	-	only with MVE504S-2-RS
2-3TGB.F PN16	-	•
iSMA 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 MANUFATURERS VALVES	**MVE5.-2-RS**	**MVE5.S-2-RS**
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

ELECTRICAL CONNECTIONS

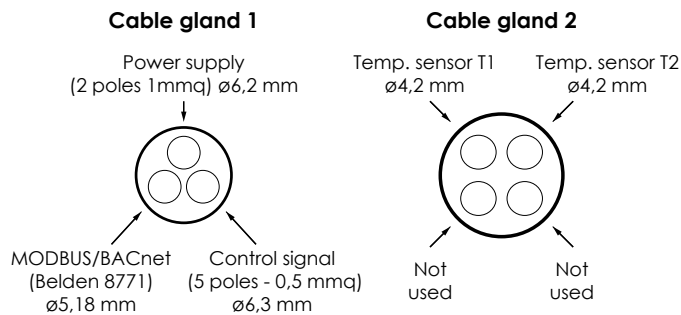Remove the cover screw with a screwdriver and then remove the cover as shown in the picture beside.

The actuator is equipped with 3 removable terminal blocks:
- a removable 8-poles terminal block (T1) with power supply, analog command signal and feedback signal; each terminal pole is clearly marked and the same label is shown on the electronic board. Before turning on the actuator, make sure that the terminal block is correctly connected to the board and that the label on the terminals and board match;
- a removable 6-poles terminal block (T2) dedicated to the RS485 bus connection (Modbus RTU or BACnet MS/TP) - (only 3 poles are used);
- a removable 6-poles terminal block (T3) dedicated to the connections of the temperature sensors (only 4 poles are used).
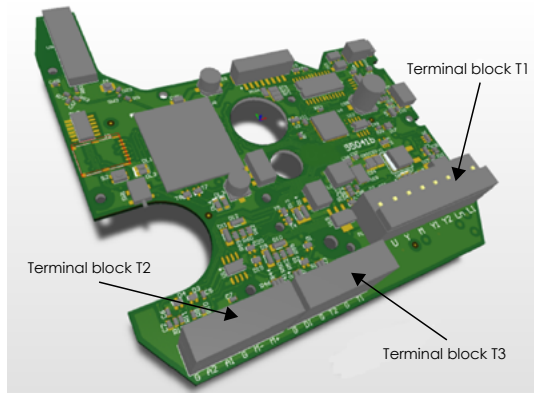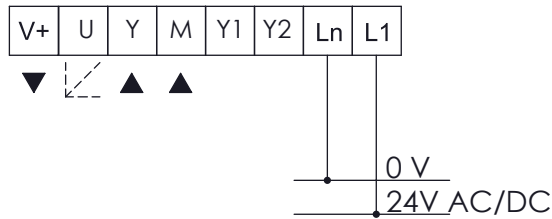
The actuator is supplied with 2 cable glands with die-cut membranes for safe wiring.

- Cable gland 1 for 3 cables: 2-wires cable for power supply; 5-wires cable for control and feedback signals and 3-wires cable for Modbus RTU or BACnet MS/TP;
- Cable gland 2 for 4 cables: 2-wires cable for T1 temperature sensor, 2-wires cable for T2 temperature sensor.

Cable gland 1

Power supply
(2 poles 1mmq) ø6,2 mm

MODBUS/BACnet
(Belden 8771)
ø5,18 mm

Control signal
(5 poles - 0,5 mmq)
ø6,3 mm

Cable gland 2

Temp. sensor T1
ø4,2 mm

Temp. sensor T2
ø4,2 mm

Not used

Not used

Terminal block T1

LABEL	DESCRIPTION	FUNCTION	CABLE TYPE	MAX WIRE LENGTH
L1	24 V AC/DC	Power supply	AWG 16 (min 1 mm² - max 1,5 mm²)	75 m
Ln	0 V			
Y	0-10 V DC	Modulating control input	AWG 20 (min 0,5 mm² - max 1,5 mm²)	200 m
M	0 V (common)			
Y1		Not used		
Y2				
V+	16 V DC	Current output max 25 mA	AWG 20 (min 0,5 mm² - max 1,5 mm²)	200 m
M	0 V (common)			
U	2-10 V DC	Feedback output signal	AWG 20 (min 0,5 mm² - max 1,5 mm²)	200 m
M	0 V (common)			

Terminal block T2
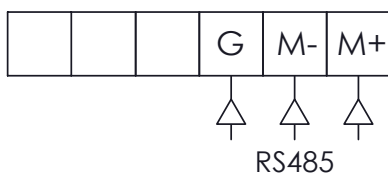
RS485

LABEL	DESCRIPTION	FUNCTION	CABLE TYPE	MAX WIRE LENGTH
M+	Tx	Modbus RTU or BACnet MS/TP connection	Belden 8771	See chapter RS485 connection
M-	Rx			
G	Shield			

Terminal block T3
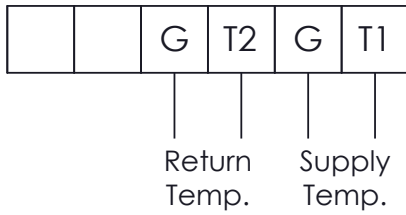
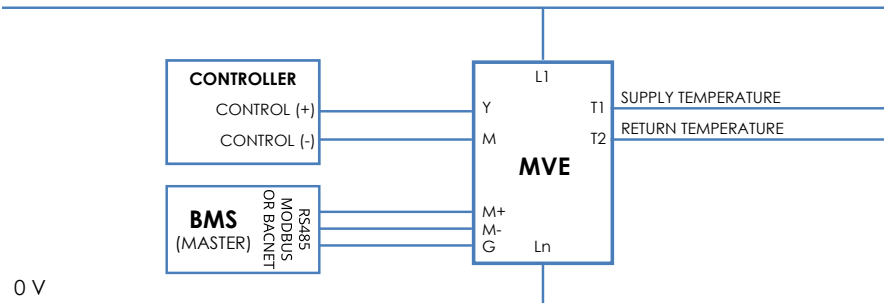| LABEL	DESCRIPTION	FUNCTION	MAX WIRE LENGTH
T1	Supply temp. sensor	Temperature control loop/ΔT limit function, power control/limit function and energy function	10 m
G	Common		
T2	Return temp. sensor		
G	Common		

Wiring diagrams

RS485 control
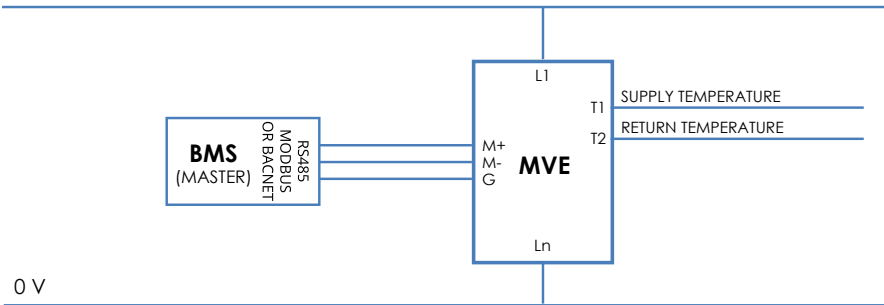
Modulanting Control & Modbus RTU or BACnet MS/TP Supervisory

RS485 connection

RS485 network is made with a 3-wires cable, which will be recognized below with "+" (M+), "-" (M-) and "GND" (pin G). For wiring, we recommend the Belden® cable, model 8771. In particularly "noisy" environments, we recommend the Belden® cable, model 3106A connecting the twisted pair respectively to the "+" and "-" signals, the reference conductor to GND and the screen on the ground.

Alternatively, a cable with the following electrical and mechanical characteristics can be used:
· AWG 20/22;
· characteristic impedance of 120Ω;
· with copper conductors, of the "braid" type, twisted;
· with braided shielding and protective insulation.

The shield must be connected to the GND signal (pin 25) of the actuator.
The network must only be wired according to the following principle, defined as a "daisy chain" (the device consists of a single RS485 port). Star connections are not allowed.
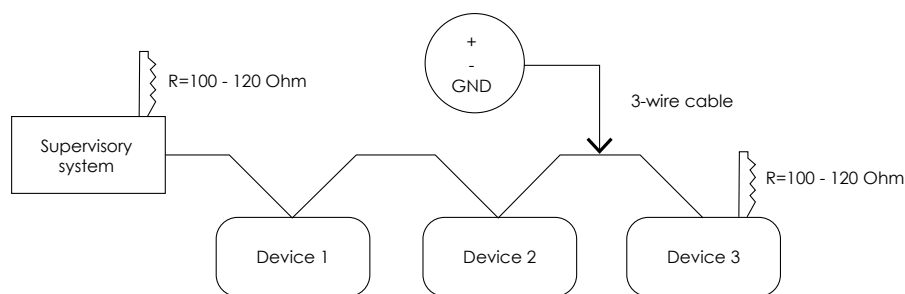

Connection warnings

For correct wiring of the network it is recommended to respect the following warnings:
1. Do not use different types of cable to create the same network, but always and only use the same type of cable;
2. The network cable is crossed by SELV safety voltage signals and must not be wired in channels intended for cables with dangerous voltages (for example 230 V AC) or carriers of high currents, especially if in alternating current. Also avoid parallel paths to these power cables;
3. Wire the cable as straight as possible, avoiding folds with tight bending radius, let alone wrapping it in unnecessary charges;
4. Do not twist the cable around power conductors and, if you have to cross them, provide a 90° cross between the cable and these conductors;
5. Keep away from electromagnetic field sources, in particular from large motors, switchboards, neon ballasts, antennas of all types;
6. Avoid that the pull tension of the cables exceeds 110N (11.3 kg) to prevent ironing;
7. Evaluate the route in advance so as to shorten it as much as possible and take note of the addresses of the instruments connected with particular reference to their location in orderly sequence. This can be very useful in maintenance; We recommend that you take note of the Modbus RTU or BACnet MS/TP address and report it on the product label in the space provided for it.
8. Do not invert the polarity "+" and "-" at the connection terminals;
9. Avoid short pieces of cable in the connection terminals to the instruments, in order to allow a possible maintenance without tearing or pulling of the cable itself;
10. Identify the start and end terminations and avoid "open" segments; Termination resistors and network polarization The slew-rate control, common to all our converters, and the baud rate limited to 9600 baud (bit/sec) make termination resistors unnecessary. The RS485 network requires polarization typically borne by the Master device; the regulator does not have polarization resistors. The tranceiver used by the actuator allows to drive up to 256 knots.

The RS485 standards provide for a maximum length of 1200 m and/or 32 devices on the network. However, it should be noted that the more the "standard" limits are exceeded (maximum limit of 32 devices or cable lengths greater than 1200 m), the higher the probability that communication problems will arise. The phenomenon is not systematic and may not even occur.

Vice versa, if it occurs, and none of the points indicated in this paragraph has allowed to solve the problem, the connection of a repeater (code CONV-RS485-RIP) is suggested, as shown in the figure below:
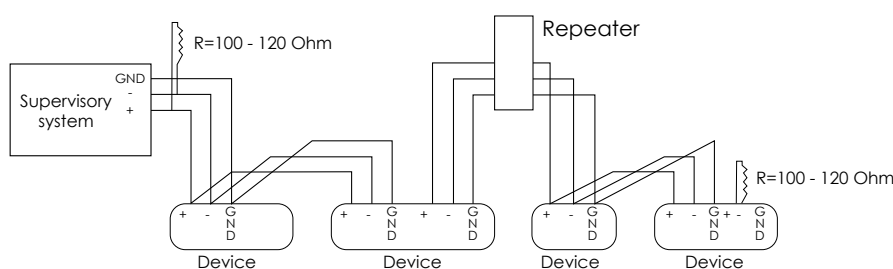
**NOTE** - Use a repeater if the cable length exceeds 1200 m or if there are more than 32 devices.

DIP SWITCH SETTING

DEFAULT SETTINGS

S1 - 6 poles DIPSwitch

S2 - Calibration button
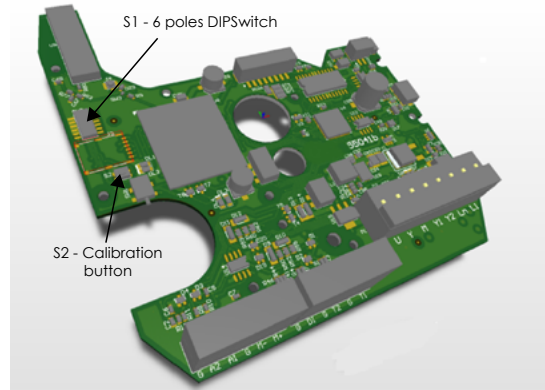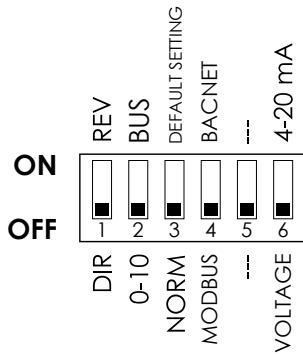
DIP SWITCH	OFF	ON
1	Direct action U = 2V U= feedback U = 10V	Reverse action U = 10V U= feedback U = 2V
2	0-10 V (Input between Y [+] and M [-])	Input signal Bus via Modbus RTU or BACnet MS/TP
3	Normal	Default Setting
4	Modbus RTU	BACnet MS/TP
5	Not used	Not used
6	Voltage Input Signal (input between Y [+] and M [-])	Current Input Signal 4-20mA (input between Y [+] and M [-])

DIAGNOSTIC - ALARM FUNCTIONS

N°	ERROR TYPE	ACTUATOR STATUS	ACTUATOR BEHAVIOR	NOTIFICATION TYPE LEDS	POSSIBLE ANOMALY	RESTORE PROCEDURE
1	Stroke less than 5 mm	Calibration / first installation	The actuator returns to its initial position and does not respond to the command. The actuator keeps the previous stroke or the default stroke	RED ON	Valve with stroke less than 5 mm	Remove power and re-power again
2	Stroke greater than 60 mm	Calibration / first installation	The actuator leaves the maximum range of 60mm and moves to the new extreme. Once the new stroke limit is reached, it returns to the initial position signaling an anomaly. The actuator does not learn the new stroke.	RED fast blinking + GREEN ON	Valve with stroke greater than 60 mm or incorrect coupling	Remove power and re-power again
3	Unexpected collision within the stroke	Normal operation	The actuator checks the stall condition 5 times. At the end of the attempts it signals an anomaly. The actuator does NOT learn the new stroke, but after 60s repeats the attempts to check the blocking conditions	RED fast blinking	Valve blocked	Reverse the control signal
4	Stroke greater than expected	Normal operation	The actuator moves to the new stall position signaling an anomaly. The actuator does NOT learn the new stroke	RED fast blinking	Damaged valve or incorrect coupling	Reverse the control signal
5	Low supply voltage	Normal operation	The actuator continues to operate but performance is not guaranteed..	RED slow blinking	1. Wrong sizing of transformer 2. Unstable power supply	Check and restore power

N°	ERROR TYPE	ACTUATOR STATUS	ACTUATOR BEHAVIOR	NOTIFICATION TYPE LEDS	POSSIBLE ANOMALY	RESTORE PROCEDURE
6	High supply voltage	Normal operation	The actuator continues to operate but performance is not guaranteed.	RED slow blinking	1. Wrong sizing of transformer	Check and restore power
					2. Unstable power supply	
7	Temperature sensors error	Normal operation	Temperature or ΔT control loops not working	RED blinking alternately fast (5sec) and slow (5sec)	1. Incorrect temperature probe connection	Check the connection and the condition of the temperature sensor
					2. Temperature probes damaged	
					3. Temperature detected outside the range of use	

STANDARD LEDS BEHAVIOUR
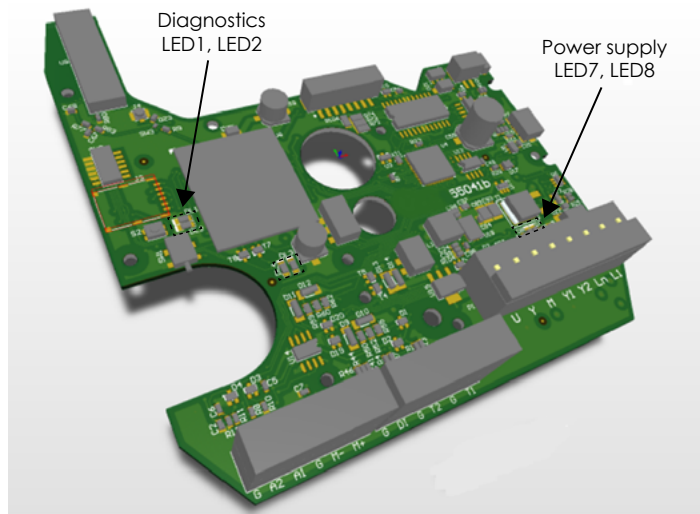
N°	LED 1 AND 2	ACTUATOR STATUS
1	FIXED GREEN	Actuator at end point of the calibrated stroke
2	GREEN SLOW BLINKING	Actuator has arrived or is moving towards an intermediate point of the calibrated stroke
3	RED and GREEN SLOW BLINKING ALTERNATIVELY	Actuator is calibrating the stroke or performing the initial positioning
4	RED and GREEN FIXED	Manual control activated, the actuator ignores the control signal. WARNING! The board is powered
5	RED and GREEN FAST BLINKING ALTERNATIVELY	Actuator is in bootloader mode

N°	LED 7 (RED) AND 8 (RED)	ACTUATOR STATUS
1	LED 7 RED ON; LED 8 RED ON	Stable power supply of the actuator
2	LED 7 RED ON; LED 8 OFF	Unstable actuator power supply; possible hardware problem

DIMENSIONS [mm]

MVE5xx-2-RS

194

122

234

86

MVE5xxS-2-RS

194

122

177