

VALBIA ELECTRIC ACTUATORS WITH POSITIONER SERIES 86 (VB030M - 350M) INSTALLATION AND MAINTENANCE INSTRUCTIONS MANUAL

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1.0 Warning

- Please read the following instructions before making any installation of the actuator. The damages caused from the non-observance of these instructions are not covered in the warranty.
- This documentation must be kept in dry place and available for use.
- The actuator is an electronic device and during its working operations some parts are live components. The installation and maintenance of electric actuator must be made only by qualified personnel, in accordance with current electrical engineering and safety standards and all other applicable directives.
- Valbia s.r.l. reserves the right to change the data and the characteristics of this manual at any time and with no notice in the scope of a constant updating and technological improvement.

WARNING: The mechanical and electronic parts, according to which the device has been designed, are not eligible for modifications.

2.0 Transportation and storage

VALBIA electric actuators are supplied in paperboard boxes which are of solid construction for a normal transport. Handle with care and keep the cover until the moment of the installation of the actuator. The storage of the actuators requires a covered, dry and ventilated environment, protected from temperature changes. The device must be stored with the cover mounted. Prior to installation, visual inspection is recommended to detect any anomalies caused by transport or storage.

WARNING: do not lift or move the actuator by the manual hand-wheel.

3.0 Applications

VALBIA electric actuators have been designed and tested to ball and butterfly valves and dampers for the industrial sector. Actuators are available in standard version with rotation 0°-90°. On request we can supply actuators with rotation 0°-180° or 0°-270°. For applications other than that above are needed please contact VALBIA sales department.

4.0 Actuator Mounting

The mechanical assembling between the electric actuator and the item to be automated (for example: the valve) can be done by direct mounting or by a mounting kit. Both the cases you can verify the right alignment and the correct dimensions of the part to transmit the power in order to avoid axial stress which can damage valve and actuator.

All Valbia electric actuators are in conformity of norm EN ISO 5211 (DIN 3337).

In order to have a right automation of the valve, is necessary to use a Valbia electric actuators whose range has a torque of at least 25% over the valve maximum torque. Verify the actuator duty rating suitability with the application.

WARNING: do not raise up or moved the motorized valve by using the electric actuator as point of grip or hold. Do not grab the actuator by the manual hand-wheel.

5.0 Specifications and technical information (Tab.1-2)

TECHNICAL INFORMATION	DATA	
Object of device	Electric actuator	
Enclosure	Aluminum alloy	
Coating	Standard polyester powder coating	
Enclosure rating	IP68	
Duty Cycle	75%	
Duty Cycle 12V version	50%	
Ambient temperature range	-20 °C ÷ +55 °C	-4 °F ÷ +131 °F
Auxiliary limit switches	1A @ 250Vac - 1A @ 30 Vdc (resistive load)	
Contatto ausiliario segnalazione anomalia a remoto	1A @ 120Vac- 1A @24Vdc (resistive load)	
Terminal block type	Plug in connector	
Section of terminal block	14 ÷ 22 AWG	2.08 ÷ 0.32 mm2
Minimum conductors temperature	85 °C	185 °F
Protection class against electric shock	Class I	
Restriction of continue operation time (time out)	Standard	
Power supply voltage tolerance	±10%	
Multiple parallel actuators wiring	Standard (*)	
Cable entries	2 x M20 x 1.5	2 x 1/2" NPT
Standard stroke	90° ± 5°	
Position indicator	Dome indicator	
Manual override	Standard	
End mechanical stops (only for the models VB110M - VB190M - VB270M - VB350 with 0° - 90° stroke)	2 external	
Positioning tolerance	<1% (referred to the maximum run of the potentiometer)	
Dead band	1.44% of analogue control signal (± 0.23 mA / ± 1.44 V)	

Tab.1 General features of the electric actuator

(*) It is important to verify that the application and its components are properly sized with the actuator characteristics and requirements

UL listed file number	NMTR.E303174	
Enclosure Type	Type 4X (*)	
Connection conductor/wires	Listed flexible cord (ZJCZ) minimum SW or SJW 6÷12mm diameter	
Green terminal block screws maximum tightening capacity of model 100-240 Vac	0.56 Nm	5 Lbln
Black terminal block screws maximum tightening capacity of model 100-240 Vac	0.50 Nm	4.50 Lbln
Terminal block screws maximum tightening capacity of model 12-24 Vac/dc	0.50 Nm	4.50 Lbln
Enclosure screws maximum tightening capacity of models VB030M and VB060M	11.30 Nm	100Lbln
Enclosure screws maximum tightening capacity of models VB110M – VB190M - VB270M - VB350M	27.60 Nm	244.20 Lbln
External pollution degree	3	
Internal pollution degree	2	
Overvoltage category	2	

Tab.2 General features of the electric actuator for UL standard

Product in conformity with the European Community norms
 LOW VOLTAGE 2014/35/UE (LVD)
 ELECTROMAGNETIC COMPATIBILITY 2014/30/UE (EMC)
 MACHINERY 2006/42/CE
 ROHS 2011/65/UE
 REGULATION No 1907/2006 (REACH)
 Use copper (CU) conductor

(*) In order to guarantee the declared "Type", the following models of electric connectors should be used: HSK-M (1.609.1200.70) or HSK-K (1.209.1202.70) produced by Hummel AG (E103997). On request the cable glands can be supplied by Valbia.

5.1 Features

Here below some technical characteristics of Valbia electric actuators:

- heater: all actuators are standard equipped with heater to avoid condensation into the actuator (paragraph 6.3);
- a safety system detects when the actuator supplies a torque higher than expected (torque limiter). In this case the safety system blocks the actuator. The torque limiter intervention is indicated by a red color LED (paragraph 6.4) and by the opening of the remote signal an auxiliary contact (paragraph 6.2);
- a safety system intervenes to shut off the actuator in case the motor works past over the allowable operation time value (the time value depends on the actuator models). The maximum working time fault is indicated by a red color LED (paragraph 6.4) and by the opening of the auxiliary contact of the remote signal (paragraph 6.2);
- duty cycle: the electric actuator is designed to operate with a duty of 75% (or 50% in the models with 12Vac/dc power supply), related to the working time and to the nominal load. This parameter defines the rest times after an operation. The use of the actuator with an higher duty cycle or with a nominal temperature over 55°C (131° F) can cause premature failure of the electronic components and the improper intervention of the torque limiter;
- "captive" cover screws are permanently attached to the cover and simplify installation in awkward locations;

5.2 Power requirements and current draw information (Tab.3)

MODELS	VB030M		VB060M		VB110M		VB190M		VB270M		VB350M	
Nominal torque [Nm]	30		60		110		190		270		350	
Nominal torque [Lbin]	266		530		975		1680		2390		3100	
Nominal voltage (H Version)	100 – 240 Vac											
Absorbed current (H Version) [A]	0.4 - 0.2		0.6 - 0.3		0.4 - 0.2		0.6 - 0.3		0.6 - 0.3		0.75 - 0.4	
Absorbed power (H Version) [VA]	40 - 48		60 - 72		40 - 48		60 - 72		60 - 72		75 - 96	
Nominal voltage (L Version)	12Vac/dc	24Vac/dc	12Vac/dc	24Vac/dc	12Vac/dc	24Vac/dc	12Vac/dc	24Vac/dc	12Vac/dc	24Vac/dc	12Vac/dc	24Vac/dc
Absorbed current (L Version) [A]	2.2 - 1.8	1 - 0.7	3.8 - 2.85	1.8 - 1.2	2.2 - 1.8	1 - 0.7	3.8 - 2.85	1.8 - 1.2	3.8 - 2.85	1.8 - 1.2	4.75 - 3.65	1.95 - 1.65
Absorbed power (L Version) [VA]	26.5 - 22	24 - 17	46 - 34	43 - 29	26.5 - 22	24 - 17	46 - 34	43 - 29	46 - 34	43 - 29	57 - 44	47 - 40
Frequency [Hz]	50/60											
Rotation time 0° - 90° [sec]	8		9		27		27		50		50	

Tab.3 Electrical rating of the actuators

6.0 Installation instruction



Fig.1 External view of the actuator

WARNING: before performing any maintenance on the actuator, always make sure to shut off the power supply first. Failure to shut off the power could cause damage to the actuator.

WARNING: make sure to connect the power supply to the proper terminals as indicated on the wiring label. Verify the actuator nameplate to ensure correct model number, torque, operating speed, voltage and enclosure type before installation or use.

WARNING: Valbia electric actuators may be mounted in many positions, however, we do not suggest using it positioned upside-down or with the cable glands positioned upright, since it cannot guarantee a perfect wiring tightness. If the actuator is mechanically installed but waiting for electrical connections, please ensure that suitable cable entry blanking plugs are fitted.

WARNING: please ensure suitably rated cable glands and protection plug are used, according to IP protection rating. Seal properly the cable glands. Make sure that the cable glands are correctly tightened. Warranty is voided if this warning is not respected.

WARNING: if the device is used not respecting the manufacturer specifications, the provided protection may be impaired.

The connection should be done directly into the internal part of the actuator, by mounting suitable connectors in the lower enclosure entries "C" where a cable, properly sized and rated, should be pushed through. It is then necessary to open the upper cover "A" in order to locate the terminal block "F" and the correct electronic supply (paragraph 6.1). The terminal block "F" is removable for easier wiring.

WARNING: shut down the power supply voltage before opening the upper cover.

WARNING: please pay attention during the wiring and setting phases in order to avoid fluids or other substance getting on or around any of the electronic components. Before assembling the upper cover please make sure that the o-ring is seated in the proper groove and there are no impediments that could compromised the enclosure sealing.

6.1 Electrical connection

The wiring diagram, which should be followed for proper wiring of the actuators, is shown in paragraph 10.0 and it can also be found inside the upper cover.

The signal cable of "positive supply" (+12Vdc / +24Vdc) or "phase" (12Vac / 24Vac / 100-240Vac) can be connected to the pin "1" or to the pin "3" of the terminal block "F";

- the signal cable "Common" (0V) or "neutral" has to be connected to the pin "2" of the terminal block "F";

- the cable of "ground" must be connected to the "faston" put on metallic plate of the actuator;

WARNING: the ground wiring system is mandatory.

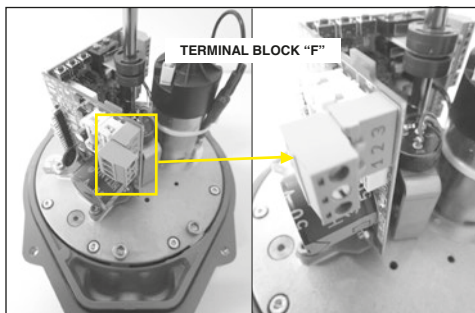


Fig.2 Board for the low voltage supply and particular of terminal block "F"

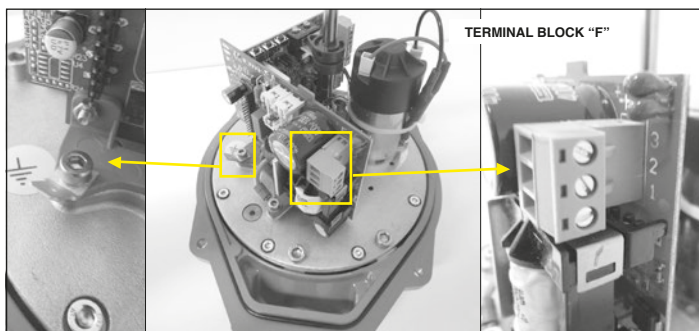


Fig.3 Board for the high voltage supply and particular of terminal block "F"

WARNING: to guarantee the proper operation of the device and to avoid damage to the components it is recommended that:

- the ground/neutral signal of the power supply (negative terminal), connected to pin "2" of terminal block "F", is at the same electrical potential of the ground of the control

- signal (negative terminal) connected to pin "M" of the terminal block "CMD IN" or the ground of the signal output connected to the pin "Q" of the terminal block "CMD OUT".

Or:

- the ground connection / neutrals are isolated from each other

6.2 Auxiliary switches wirings (Fig.4)

The "G" terminal block is connected to two auxiliary limit switches (SPDT free contacts), which indicate the position of the actuator. The terminal block "G" is removable for easier wiring. Connect to the terminal block "G" between the following terminals:

- "B" and "C" for closing.

- "E" and "H" for opening.

The opening or closing signal comes when the blue cams push the auxiliary electromechanical limit switch on the logic board. The adjustment of the signaling cam is obtained by loosening the fixing grain of the same and causing it to rotate until it presses the corresponding end-stop to fix the cam; the grain must be tightened.

WARNING: during the installation it is recommended to verify the alignment of the auxiliary limit switches by using a multimeter/tester.

The terminal block "R" is connected to a free contact NO which closes in case of powered actuator and no detected anomaly.

In case of anomalies or not powered actuator the contact is open

To simplify the procedure, it is possible to remove the removable part, wiring it and insert it once the wiring is done.

2. "Reverse" mode: 20 mA (closed) ÷ 4 mA (open) or 10V (closed) ÷ 0V (open).

The "Standard" mode is the default condition.

This setting between the operating modes is done using the buttons on the control PCB card:

- to enter the programming mode hold down the "M" button for 5 seconds;
- to change modes, simultaneously press the OPEN and CLOSE buttons for more than 2 seconds.
- the lamp of yellow LED indicates that the switching is on;
- to exit the programming mode hold down the "M" button for 5 seconds;

The yellow LED flashing displays which working mode is activated:

- slow flashing (light on every 0.5sec): "Standard" mode is activated;
- fast flashing (light on every 0.1sec): "Reverse" mode is activated;

It is not necessary to set any preset to choose which input to use: just connect the signal to the appropriate input, leaving the other unplugged. The selection is automatic. It is not possible to apply the voltage signal and the current signal simultaneously.

ONLY ON REQUEST: A useful feature of the board is the availability of an output on which the 10V fixed voltage is present. This output is available for the user, it can be used to connect the end of a potentiometer with which to move the valve (terminal block diagram "CMD IN", Fig.6). To use the 10V output to control the valve via a potentiometer, this must have a value between 1 kΩ and 4.7 kΩ (the recommended value is 1 kΩ).

Signal outputs (Tab.4)

There are two analog signal outputs for full range position feedback. The signal output is at the lowest when the actuator is in closed position and is maximum when the actuator is in opened position, regardless of the activated mode (Standard/Reverse). The correspondence between the positions of the valve and the signal of output is proportional. Two signals are available on the two outputs: one voltage signal from 0 to 10 V, another current signal from 4 to 20mA. Both of the outputs can be used simultaneously. The input in voltage should not be loaded with a resistance lower than 1 kΩ and, for proper current output, make sure the resistance is not higher than 500 Ω.

Procedures to programming

The open and closed positions can be set using the three buttons on the electronic board (Fig.6):

Button M (memory) - Button CLOSE (closing) - Button OPEN (opening)

The open and closed positions may be programmed in any position desired; however the minimum angle between positions must be greater than 45°.

The maximum angle must not exceed 320°.

1. To enter programming mode, press the M button for 5 seconds. The yellow LED turns on and the analog input signal is deactivated. If no key is pressed for 30 seconds, the board exits programming mode (the green LED flashes) and the actuator follows the value of the analog input.

2. Use the OPEN and CLOSE buttons to move the actuator to the desired CLOSED position. Please keep in mind the 45° minimum angle.

3. Simultaneously hold the CLOSE and M buttons for more than two seconds (to avoid movement press the "M" button slightly before the "CLOSE" button). The yellow LED flashes three times indicating that the lock position has been stored.

WARNING: if the opening position is too close (or over) to the new closing position not respecting the minimum stroke of 45°, the new closing position is not stored (red LED flashes three times).

4. Use the OPEN and CLOSE buttons to move the actuator to the desired OPEN position. Please keep in mind the 320° maximum angle.

5. Simultaneously hold the OPEN and M buttons for more than two seconds (to avoid movement press the "M" button slightly before the "OPEN" button). The yellow LED flashes three times indicating that the lock position has been stored.

WARNING: if the closing position is too close (or over) to the new opening position not respecting the minimum stroke of 45°, the new opening position is not stored. (red LED flashes three times).

6. To exit the programming mode, hold down the "M" button for 5 seconds (if you press no buttons for 30 seconds the actuator will exit the programming mode and return to the current analog signal position).

WARNING: a special condition must also be taken into account. If you try to program an unsuitable position, such as a close position close to the maximum stroke limit (less than 45° from the virtual opening limit switch), it will not be possible to store that position. This is indicated by the fact that while the memory button are pressed, the yellow LED will not flash.

Connections

The "CMD IN" terminal for analog input and the "CMD OUT" terminal for analog feedback are described in Tab.4.

TERMINAL BLOCK	PIN	SIGNAL TYPE	DESCRIPTION
CMD IN	L	IN 4 ÷ 20 mA +	Analog input of control in current, from 4 to 20mA
	M	IN -	Negative reference for both the analog inputs
	O	IN 0 ÷ 10 V +	Analog input of control in voltage, from 0 to 10V
	P	10 V_AUX	Fixed voltage at 10 V (for external potentiometer) (only on request)
CMD OUT	Q	OUT -	Negative reference for both the analog outputs
	S	OUT 0 ÷ 10 V +	Actuator position (voltage feedback, from 0 to 10 V)
	T	OUT 4 ÷ 20 mA +	Actuator position (current feedback, from 4 to 20mA)

Tab.4 "CMD IN" and "CMD OUT" connections

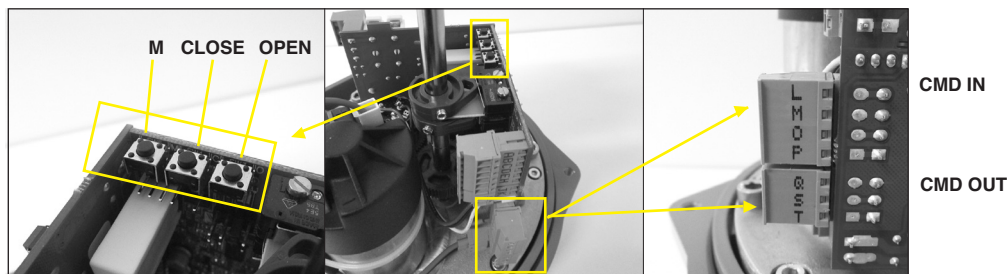


Fig.6 Buttons for the manual planning and terminal block "CMD IN" and "CMD OUT"

The procedure for the mechanical stops adjustment for models from VB110M to VB350M is the following:

The mechanical travel stops are for proper positioning during manual operation and for valve protection in the case of a limit switch failure. Turn off the power. Loosen both travel stop stud bolt nuts. Manually operate towards the CLOSE position (Paragraph 7.0) until the closed limit switch trips. Forward adjust the "R" travel stop stud bolt until it contacts the internal cam. Adjust the travel stop bolt back one turn and tighten the lock nut. Repeat the same operation for the "L" open mechanical stop.

WARNING: in the versions with a run longer than 90° (0°-120°, 0°-180°, 0°-270° etc) the cam for the mechanical stops is not present (they do not need any type of adjustment on the screws) .

6.6 Actuator cover assembly (Fig.1)

- After the wiring, proceed with assembling the cover "A". Make sure to assemble the cover without damaging any electrical or mechanical components.
- complete the closure of cover "A" by tightening the captive screws "B".

In case the operator is encountering some difficulties in assembling the cover, it is recommended to:

- Untighten the four dome indicator screws and remove the dome clear cover;
- Remove the open/closed plastic insert;
- Mount the cover making sure the shaft is properly positioned;
- Reposition the open/closed plastic insert in its original position and the dome clear cover. Tighten the four screws.

7.0 Manual override

7.1 VB030M / VB060M models

The VB030M and VB060M actuators are supplied with a 10mm (0.39In) square "Q" manual override located on the bottom cover (Fig.9). There are no selectors to switch from automatic to manual mode. In order to manually move the actuator it is sufficient to turn off the power supply and rotate the square "Q": clockwise for opening operation and counterclockwise for closing;

WARNING: the usage of manual override can damage the device, when the actuator is powered.

WARNING: during the operation of the actuator "Q" is always in rotation.

7.2 VB110M / VB190M / VB270M / VB350M models

The VB110M / VB190M / VB270M / VB350M models are supplied with an external handwheel "H" (Fig.1), to manually perform the opening and closing operation. These models have also an AUTO/MAN selector switch that needs to be set according to the operation that needs to be accomplished, (manual operations or automatic operations).

WARNING: the handwheel is supplied disassembled. The assembly is responsibility of the end user/customer.

The manual override must be used only after turning the power off, by moving the selector "S" to "MAN" position. The direction of the handwheel is counterclockwise for opening and clockwise for closing.

WARNING: during the commutation in "AUTO" before power the actuator, the operator must give a little rotation to the handwell to ensure the release of the shaft.

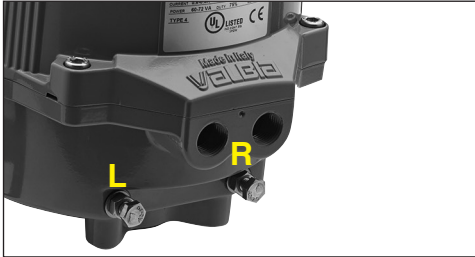


Fig.7 Mechanical stops on the VB190M

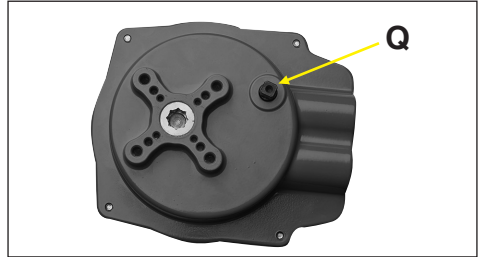


Fig.8 Square for manual override models VB030M / VB060M



Fig.9 Handwheel for manual override models VB110M / VB190M / VB270M / VB350M



Fig.10 Particular of the "S" selector in "MAN" position and on "H" handwheel

WARNING: do not operate the manual override while the actuator rotating.

To restore the automatic operation of the actuator it is necessary to turn off the power, and move the selector "S" to the AUTO position.

8.0 Fail-Safe Operation with battery backup (optional)

The versions with battery of Valbia electric actuator use battery packs with series of cells in NiMH technology and nominal voltage on terminals at 24Vdc. For the actuators with battery back-up, VALBIA can set up the actuator to automatically carry out one of the following actions in the event of power outage:

- Opening: the in-progress/current operation is interrupted.
- Closing: the in-progress/current operation is interrupted.
- Completes the in-progress operation: the motor continues the in progress action until it reaches the set point position commanded by the analogue input.

Battery operation is enabled after a delay of about 1 sec, it is instantaneous only if the emergency operation is consistent with the operation in progress (for example, when the actuator is closing, the supply voltage is lost and the battery set to NC intervenes).

The action in progress with the battery power supply is interrupted by a possible mains voltage recovery.

A yellow light (LED) mounted on the power supply board indicates that the board is charging the battery in TRICKLE mode.

When the battery is fully charged the LED light turn off.

The LED signal is reliable if the battery back-up has not been damaged.

The battery is a component that guarantees a limited number of charge / discharge cycles (over 500), therefore its life is inversely proportional to the number of interventions.

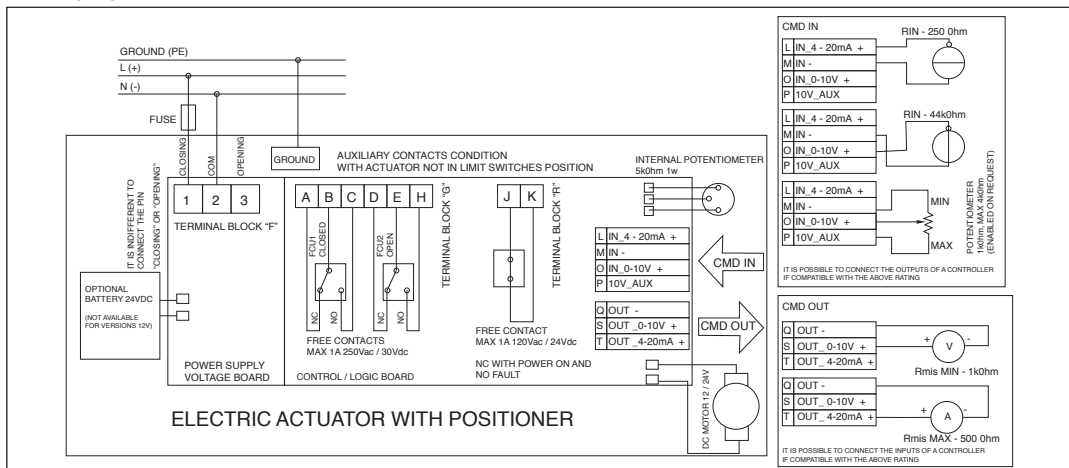
WARNING: to guarantee the emergency battery intervention, it is necessary that the actuator remains powered for more than 3 hours.

WARNING: for the version with battery it is recommended to power the actuator within 3 months from the purchase date

9.0 Maintenance

These electric actuators do not need any kind of maintenance. All rotating train components are permanently lubricated. Additional lubrication is not required in normal operation. For enclosure cleaning, use a light non aggressive detergent. In case of damages or operation issues, we suggest sending the actuators back to Valbia for inspection. Valbia s.r.l. declines responsibility and warranty on our actuators repaired from any third party.

10.0 Wiring diagrams



11.0 Disposal of the electrical actuators at the end of their life cycle

According to the provisions of the European directives 2011/65/UE and 2012/19/UE, concerning the restriction of the use of hazardous substances in electrical and electronic equipment as well as waste management, all the VALBIA electric actuators are designed in order to be completely disassembled when they arrive at the end of their life cycle, separating the different materials for the proper disposal and/or recovery.



The crossed-out rubbish bin symbol indicates that the product, at the end of its life cycle, becomes WEEE (Waste Electrical and Electronic Equipment) and must be collected separately from the other waste.

The device must not be disposed as a mixed urban waste, it must be recycled through the proper collection system for disposal and for its subsequent correct recycling.

The collection system of the equipment at the end of its life is guaranteed on the national territory through the national consortia for the eco-sustainable management of WEEE. For all the information contact Valbia s.r.l.

At the end of the life cycle of the device, for its removal, a series of precaution must be followed:

- the structure and the various components, if not usable, must be demolished and divided up according to the type of product. All this helps collection, disposal and recycling centers and minimizes the environmental impact that this operation requires;
- appropriate separate waste collection for subsequent sending of the disused equipment for recycling, treatment and compatible environmental disposal contributes to preventing possible negative effects on the environment and favors recycling of the materials of which the equipment is composed;
- the illegal disposal of the product by the user involves the application of the penalties provided by the current regulations regarding such subject.

The product at the end of its life, if properly disposed, is not potentially dangerous for human health and the environment, on the contrary, if improperly abandoned, it could have a negative impact on the ecosystem.