

ELECTRIC ACTUATORS 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 mm ²
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	

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

UL listed file number	NMMTR.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.2General features of the electric actuator for UL standard

Product in conformity with the EuropeanCommunity 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

Technical characteristics of Valbia electric actuators:

- heater: all actuators are standard equipped with heater to avoid condensation into the actuator (paragraph 6.4);
- a safety system detects when the actuator supplies a torque higher than expected (torque limiter); the device makes three triggering attempts. In case of negative results, it makes a short rotation in the opposite direction to relieve the mechanical tension to the gears. The torque limiter intervention is indicated by a red color LED (paragraph 6.5) and by the opening of the remote signal an auxiliary contact (paragraph 6.2);
- a safety system intervenes blocking the actuator in case the motor operates for a time longer than the allowable operation time value (the value depends on the actuator models). The excess of the allowable operation time value is advised by a red color LED (paragraph 6.5) and by the opening of the remote signal's auxiliary contact (paragraph 6.2);
- duty cycle: the electric actuator is designed to operate with a duty of 75% 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 a higher dutycycle 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	

6.0 Installation instruction



Fig.1 External view of the actuator

WARNING: the actuator should be properly grounded and wired in accordance with local electrical code.

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

WARNING: make sure that the power supply is set between the values indicated as indicated on the label on the side of the actuator.

WARNING: Valbia electric actuators may be mounted in many positions, however, we do not suggest using it with the cable glands positioned upright, since it cannot guarantee a perfect wiring tightness. We also recommend to avoid using it with the indicator facing down. If the actuator assembly and the respective electrical connection are provided in different moments, make sure that the cable entries are hermetically sealed.

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

For the wiring, it is necessary to open the upper cover "A" in order to locate the terminal block on the power supply board.

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

To remove the upper cover "A" untighten the screws "B" and make sure to avoid collisions with the internal electrical parts. Insert the power supply cables inside the lower enclosure entries "C", tighten by the user. The terminal block "F" is composed by two parts, one of which removable. To simplify the procedure, it is possible to remove the removable part, wiring it and insert it once the wiring is done. Proceed to the cable connections in the appropriate terminal block "F" following the wiring diagram (paragraph 6.1 or wiring diagram 10.0)

WARNING: please pay attention during the wiring and setting phases of the electromechanical limit switches, in order to avoid fluids or other substance from getting on or around any electronic components. Moreover, 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 be found also inside the upper cover. Please follow the maximum allowed electrical rating values. The terminal block "F" in the 100-240Vac models is showed in Fig.3, in 12Vac/dc and 24Vac/dc models in Fig.2. The cable must be of the proper size.

- The signal cable of "closing" (clockwise rotation) (positive supply +12Vdc / +24Vdc or phase 12Vac / 24Vac/ 100-240Vac) must be connected to the terminal "1" of the terminal-block "F";
 - the signal cable of "opening" (counter-clockwise rotation)" (positive supply +12Vdc / +24Vdc or phase 12Vac / 24Vac / 100-240Vac) must be connected to the terminal "3" of the terminal-block "F";
 - the signal cable "common" (0V / neutral) must be connected to the terminal "2" of the terminal-block "F";
 - The grounding cable must be connected to the "faston" on the metallic body of the actuator;
- The actuator can be wired both in 3 and 2 point of command mode.

WARNING: the ground wiring system is mandatory (see faston Fig.2).

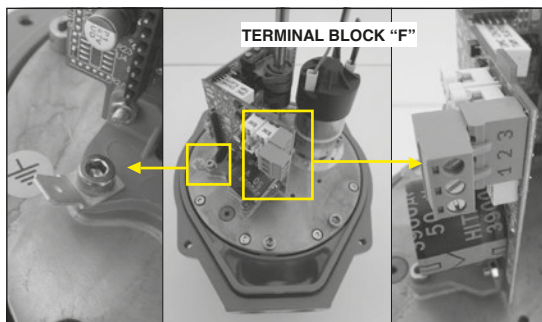


Fig.2 Board for the low voltage supply and particular of terminal block "F"

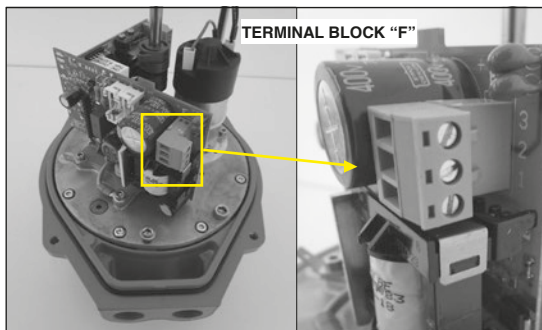


Fig.3 Board for the high voltage supply and particular of terminal block "F"

6.2 Auxiliary switches wirings (Fig.4)

The "G" terminal block is connected to two auxiliary and independent limit switches (SPDT free contacts), FCU1 and FCU2, which indicate the position of the actuator to the final user. The terminal block "G" is composed by two parts, one of which removable for easier wiring. To simplify the procedure, it is possible to remove the removable part, wiring it and insert it once the wiring is done.

Connect to the terminal block "G" between the following terminals:

- "B" and "C" to obtain the signal of closing position.
- "E" and "H" to obtain the signal of opening position.

The opening or closing signal comes when the blue cams push the auxiliary electromechanical limit switch on the logic board. The cams adjustment procedure is described on Paragraph 6.6.

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

The "R" terminal block 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. The terminal block "R" is composed by two parts, one of which removable for easier wiring. To simplify the procedure, it is possible to remove the removable part, wiring it and insert it once the wiring is done.

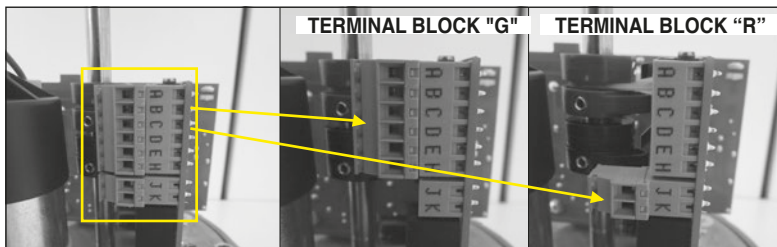


Fig.4 Control/logic board and particular of terminal blocks "G" and "R"

6.3 Potentiometer wirings (optional) (Fig.5)

The actuator with potentiometer includes an extra terminal block "POT" (Fig.5) which grants the possibility to use the resistive information concerning the actuator position. Wiring instruction presented at paragraph 10.0. When the actuator is at 45°, the resistance value of the potentiometer is 2,5KΩ.

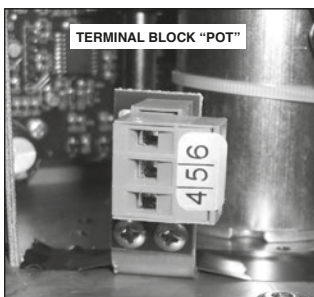


Fig.5 Electric actuator particular of the terminal block "POT"

6.4 Heater (Fig.6)

All the actuators are equipped with "RIS" heating resistor which work only if the actuator is connected to the power supply, when the motor is not rotating and the temperature inside the actuator goes down to 25°C / 77°F. It protect the actuator from the formation of condensation due to temperature changes. The resistor is part of the electronics, it does not require additional wiring and it is disabled when the internal temperature exceed 25°C / 77° F.

WARNING: to guarantee the normal operation of the heater, it is necessary to keep the actuator connected to the power supply at all times even in the open/close positions.

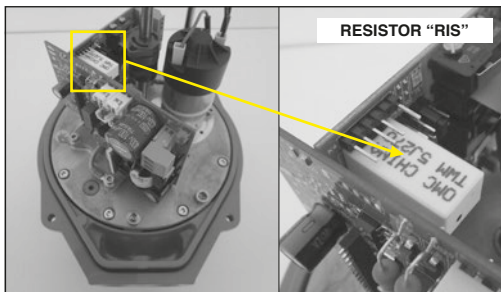


Fig.6 Electric actuator particular of the heating resistor "RIS"

6.5 Signal lamp unit

On the power supply board there is a green LED indicating that the power is on.

On the logic board there is a multicolor LED which indicates the following actuator modes.

WORKING STATE	LED COLOR	FLASHING DURATION (SEC)	PAUSE BETWEEN FLASHES (SEC)
FC powered actuator	green	0.1	0.9
Rotating powered actuator	green	0.6	0.4
Power supply shut-off in FC	yellow	0.1	0.9
Power supply shut-off in rotation	yellow	0.6	0.4

Every anomaly has a different number of flashes of the RED LED on the logic board.

ANOMALY	EFFECT	NO. OF FLASHES	FLASHING DURATION (SEC)	PAUSE BETWEEN FLASHES (SEC)	PAUSE BETWEEN FLASHES CYCLES (SEC)
Torquer limiter alert	Actuator block	1	0.1	0.3	1
Max torque alert	Actuator block	2			
Below minimum threshold voltage alert	Re-enable	3			
Time-out operation intervention alert	Actuator block	4			
Fault driver alert	Actuator block	5			

WARNING: to reset the anomalies it is recommended to shut off the power supply for more than 10 seconds to ensure the full discharge of the capacitors on the electronic boards.

6.6 Setting actuator stop positions (Fig.7)

The opening or closing operation of the electric actuator is reached when the black cams push the electromechanical limit switches on the logic board (POS1 for closing position and POS2 for opening position). The signal of opening and closing operation is obtained when the blue cams push the electromechanical limit switches on the logic board.

The procedure necessary to adjust the actuator stroke is the following:

1. make sure that the power supply is off;
2. remove the upper cover of the actuator (paragraph 6.0);
3. to simplify the operation it is recommended to remove the removable parts of the terminal block "G" and "R";
4. make sure that the automated device (for instance the valve) is in the "OPEN" position. For a more accurate and precise adjustment, use the manual override "H" or the square for manual override "Q" (paragraph 7.0);
5. loosen the set screw in the cam 1 (black color), and rotate the cam until it pushes the limit switch POS2 and until the "click" of the electromechanical micro switch. Then tighten the set cam screws;
6. loosen the set screw in the cam 3 (blue color), and rotate the cam until it pushes the limit switch FCU2 and until the "click" of the electromechanical micro switch). Then tighten the set cam screws;
7. power on the actuator and carry out the closing operation;
8. wait for the completion of the operation, then shut off the power supply;
9. make sure that the automated device (for instance the valve) is in the "CLOSED" position. For a more accurate and precise adjustment, use the manual override "H" or the square for manual override "Q" (paragraph 7.0);
10. loosen the set screw in the cam 2 (black color) and rotate the cam until it pushes the limit switch POS1 and until the "click" of the electromechanical micro switch. Then tighten the set cam screws;
11. loosen the set screw in the cam 4 (blue color) and rotate the cam until it pushes the limit switch FCU1 and until the "click" of the electromechanical micro switch. Then tighten the set cam screws.

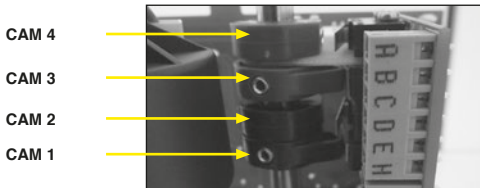


Fig.7 Particular of the cams of limit switches

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).

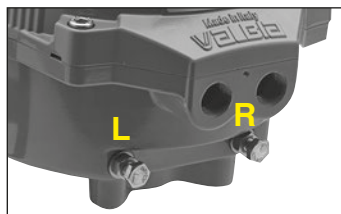


Fig.8 Mechanical stops on the VB190M

6.7 Actuator cover assembly (Fig.1)

- After the wiring, proceed with assembling the cover "A", make sure to assemble the cover without damaging any internal electrical components;
- secure the cable tightening by screwing the electrical connector;
- complete the closure of cover "A" by tightening the captive screws "B".

In case of difficulties in assembling the upper cover, it is recommended to:

- untighten the four dome indicator screws "D" and remove the dome transparent cover;
- remove the open/closed plastic insert;
- mount the upper cover "A" making sure the shaft is properly positioned in the hole;
- reposition the indicator "D" in the proper position on the shaft, place the transparent dome and 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 and vice versa. To manually move the actuator, it is sufficient to remove the supply voltage and to rotate the square by means of a special tool. The direction of rotation of the square is clockwise for the opening and counter clockwise for the closing;

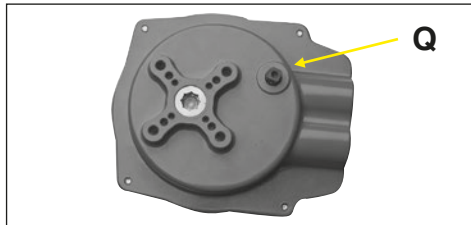


Fig.9 Square for manual override models VB030M / VB060M

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

WARNING: during the operation of the actuator, the square "Q" is always rotating.

WARNING: if the actuator, exceeds the stroke range by the manual override, to reset it is necessary to power the actuator until it returns to the limit switch position.

7.2 VB110M / VB190M / VB270M / VB350M models

The VB110M / VB190M / VB270M / VB350M models are supplied with an external handwheel "H" (Fig.10), to manually perform the opening and closing operation. These models have also an AUTO/MAN selector switch "S" (Fig. 11) which allows to select the functioning mode.

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: when switching to "AUTO" before power the actuator, perform a short rotation of the handwheel to make sure the pin is released.

The manual override must be used only after turning off the power.

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.



Fig.10 Handwheel for manual override models VB110M / VB190M / VB270M / VB350M



Fig.11 Particular of the "S" selector in "MAN" 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 touches the travel stops/limit switches.
- 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.

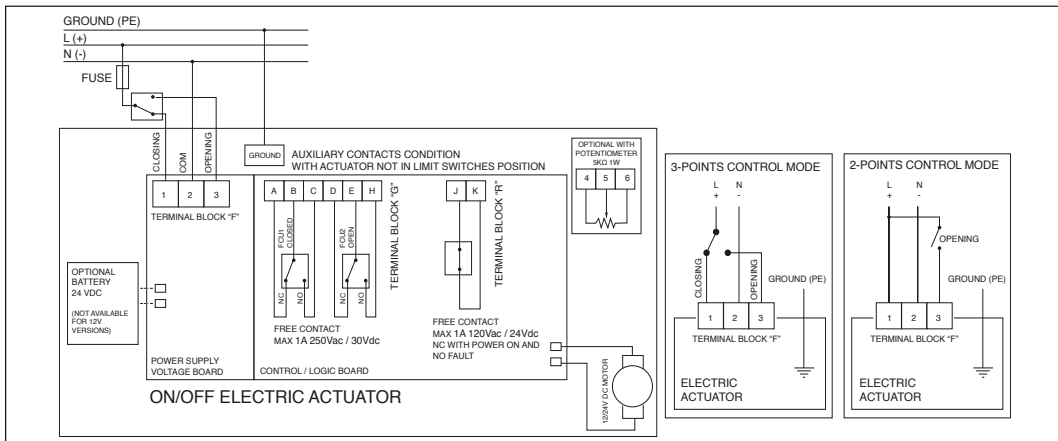
The battery is a component that guarantees a limited number of charge / discharge cycles (over 500), therefore its life is inversely proportional to the number of interventions.

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.
The actuator can also be used in "solenoid" mode (wiring with two wires). To use this mode it is mandatory to follow the warnings above.

9.0 Maintenance

The electric actuator does not need any kind of maintenance. The internal lubrication of the gears is sufficient for the device life. 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.