

VRX•VSX

Electric Actuators for ATEX Explosive Areas

Installation and Operation Manual



25Nm 300Nm	IP68 Enclosure protection	50% Duty cycle	 Anticondensation heater	Battery Backup BBPR	POSI Positioning	3 POSITIONS
----------------------	-------------------------------------	--------------------------	-----------------------------	--------------------------------------	----------------------------	------------------------------



LCIE 06 ATEX 6006 X · II 2 G D Ex db IIB T6 Gb · Ex tb IIIC T80°C Db · T_a = -20 °C à +70 °C

400 V (R00) : II 2 G D Ex db IIB T5 Gb · Ex tb IIIC T95°C Db · T_a = -20 °C à +54 °C
GS6, GPS & GFS : II 2 G D Ex db IIB T6 Gb · Ex tb IIIC T80°C Db · T_a = -10 °C à +40 °C



IECEx LCIE 21.0015X



ITS21UKEX0157X · n° 0359

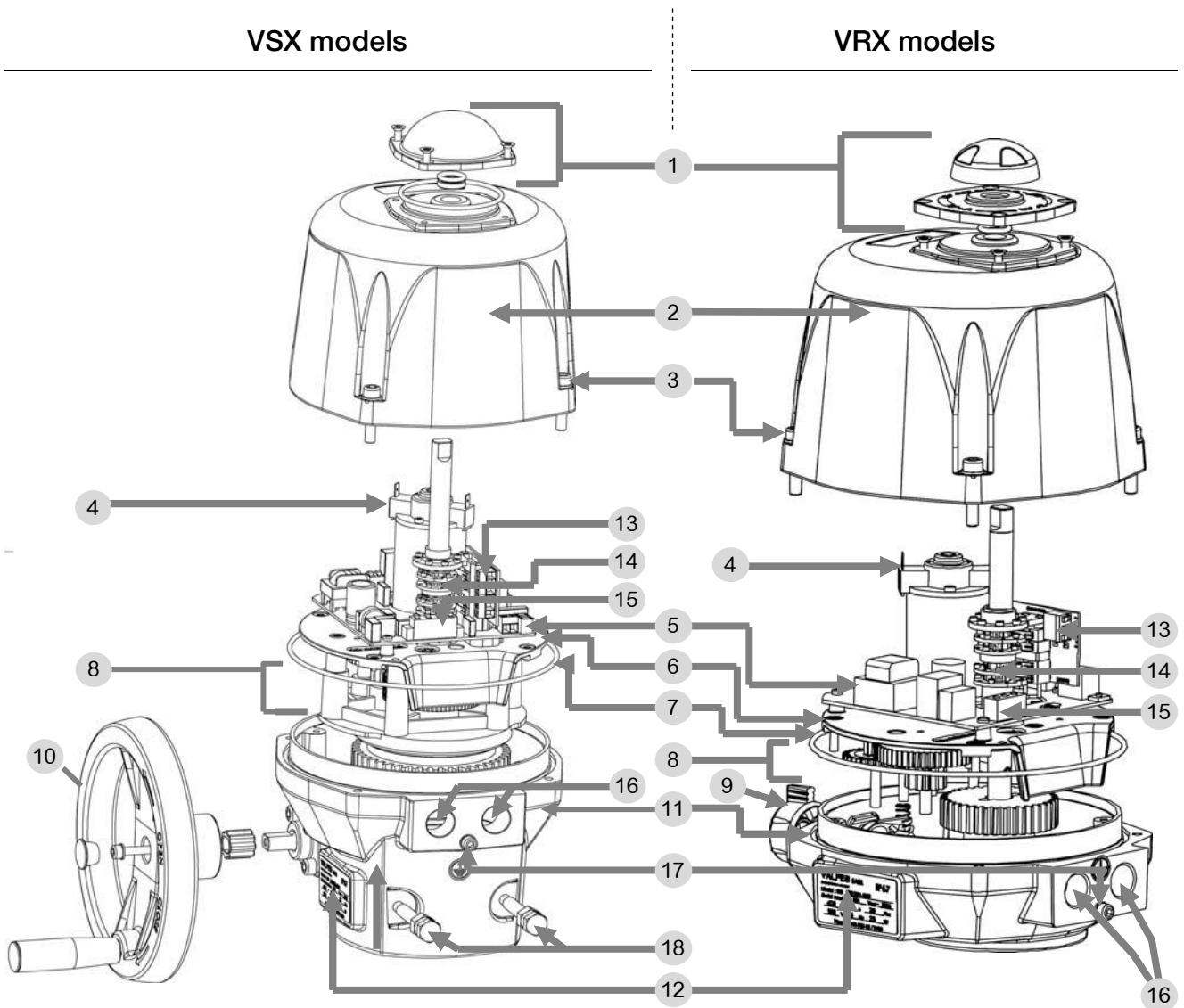
Index

Exploded view	2
General information	3
– Description	
– Transport and storage	
– Maintenance	
Position indicator.....	5
Dimensions	6
Emergency manual override	7
Mounting on valve	7
Electronic boards	8
Electric connection - Warnings.....	9
Standard models	11
– Wiring Instructions	
– Electric diagrams	
POSI (GP5) models	13
– Description	
– Wiring Instructions	
– Electric diagram	
– Parameter selection sequence	
3-POSITION (GF3) model	17
– Description	
– Contacts status	
– Wiring Instructions	
– Electric diagram	
BBPR (GS6) models	19
– Description	
– Meaning of the LEDs	
– Wiring Instructions	
– Electric diagram	
POSI-BBPR (GPS) models	22
– Description	
– Wiring Instructions	
– Electric diagram	
– Parameter selection sequence	
3-POSITION-BBPR (GFS) models	25
– Description	
– Contacts status	
– Wiring Instructions	
– Electric diagram	
Technical data	27

This product meets the European Directive 2012/19/UE about electrical and electronic equipment (DEEE). It mustn't be mixed with common waste. Please, recycle or dispose of them according to your country laws.



Exploded view



Part	Description	Part	Description
1	Position indicator	10	Handwheel
2	Cover	11	Housing
3	CHC M6 x 30 A2 stainless steel screws	12	Identification label
4	Motor	13	Auxiliary limit switch terminal
5	Pilot and power supply board	14	Cams
6	Gear box plate	15	Pilot and power supply terminal
7	O ring	16	M20x1,5 Threaded holes
8	Gear box	17	Earth screw
9	Clutch knob	18	Mechanical end stops

INTRODUCTION

This manual has been designed to guide you through the installation and use of the ATEX and IECEx VRX and VSX electric actuators. Read it carefully before using our products and keep it in a safe place.


DESCRIPTION

The VALVES electric actuators have been designed to allow the piloting of a 1/4 turn valve (or 180° in the case of a 3-position version). We cannot be held responsible for any other use. However, you can consult us for any other application.

TRANSPORT AND STORAGE

- The forwarding agents being held as responsible for damages and delays of the delivered goods, the consignees are obliged to express if applicable their reserves, prior to accept the goods. The goods delivered directly ex works are subject to the same conditions.
- The transport to the place of destination is carried out by using rigid packing material.
- The products must be stored in clean, dry, and ventilated places preferably on appropriate palettes or shelves.




MAINTENANCE

- Maintenance is ensured by our factory. If the supplied unit does not work, please check the wiring according to the electric diagram as well as the power supply of the concerned electric actuator.
- For any question, please contact our after-sales service.
- To clean the outside of the actuator, use a lint and soapy water. **DO NOT USE CLEANING PRODUCT WITH SOLVENT OR ALCOHOL.**
-  Before any intervention on the actuator or around the actuator, to avoid any electrostatic discharge, the apparatus shall be cleaned with a damp cloth

SAFETY INSTRUCTIONS






To be read prior to the installation of the product

-  All information concerning flameproof seals of our products are available on request. Do not hesitate to contact us. It is also a specific condition of use in our certificate
-  The electric power supply must be switched-off before any intervention on the electric actuator (i.e. prior demounting its cover or manipulating the manual override knob). The operator must also be sure that no explosive atmosphere is present around the actuator before any maintenance operation.
-  Heat flow from the valve and pipes: it is the responsibility of the user to consider the influence of radiated heat on the final installation because the electrical actuator is certified for a specific ambient temperature range.
- Any intervention must only be carried out by a qualified electrician or other person instructed in accordance with the regulations of electric engineering, safety, and all other applicable directives.
- Strictly observe the wiring and set-up instructions as described in the manual: otherwise, the proper working of the actuator can not be guaranteed anymore. Verify that the indications given on the identification label of the actuator fully correspond to the characteristics of the electric supply.

MOUNTING INSTRUCTIONS



To be read prior to the installation of the product

- The apparatus shall only be installed in areas of low mechanical impact risk
- Do not mount the actuator less than 30 cm of a electromagnetic disturbances source.
- Do not mount the actuator « upside down ». Risk: possible flow of the grease on the electronic board
- Do not position the equipment so that it is difficult to operate the disconnecting device.
- Respect all safety rules during fitting, dismantling and porting of this apparatus.
- Lifting and carrying through strapping the hand wheel is not allowed.
-  WARNING – DO NOT OPEN WHEN ENERGIZED
-  WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
-  WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

ATTENTION OWNERS AND USERS

Thank you for purchasing the device. This equipment will provide safe and productive operation as long as it is used in accordance with the instructions in this Manual and is properly maintained. Importantly, unless the user is adequately trained and supervised, there is a possibility of death, serious personal injury, property damage or damage to the equipment. Owners and users of this equipment bear the responsibility to make certain that this equipment is used properly and safely. **READ THIS MANUAL** carefully, learn how to use and service this equipment correctly, and strictly follow all of the instructions contained in this Manual and the requirements of local law. Failure to do so could result in death, serious personal injury, property damage or damage to the equipment.

This Manual should be considered a permanent part of your machine and should be kept available for easy reference by any user. Owners should not permit anyone to touch this equipment unless they are over 18 years of age, are adequately trained and supervised, and have read and understand this Manual. Owners should also ensure that no unauthorized personnel come in contact with this equipment. If this equipment, or any of its parts, becomes damaged or needs repair, stop using the equipment and contact an experienced service individual immediately. If the warning labels or this Manual are misplaced, damaged or illegible, or if you require additional copies, please contact us for these items at no charge. Please remember that this Manual and the warning labels do not replace the need to be alert, to properly train and supervise users, and to use common sense when using this equipment.

If you are ever uncertain about a particular task or the proper method of operating this equipment, don't hesitate to contact us.

Position indicators

VRX models

Modular position indicator with three removable position markers (3 yellow + 2 black), adjustable according to the type of valve to be actuated.



Valve	0°	90°	180°
2-way: 0° = closed 90° = open			
3-way (L) :			
3-way (T) : Ex : T1			

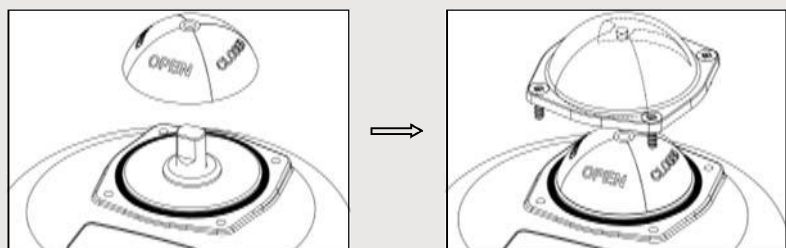
VSX models

2- position spherical indicator

Sense of window for standard mounting:

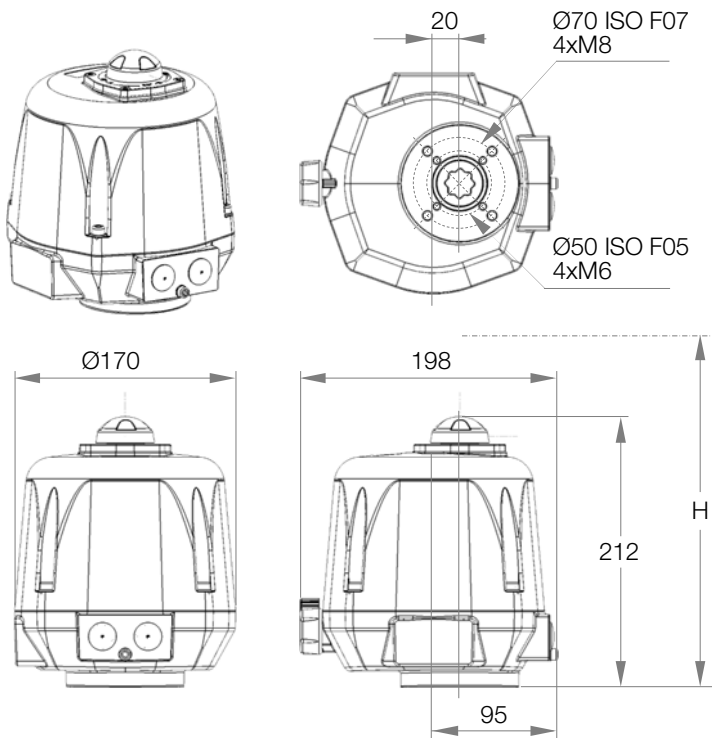


Mounting of the position indicator (appendix p.31 mark 1) : mount the seal ring and the indicator then the window with the 4 screws M4.



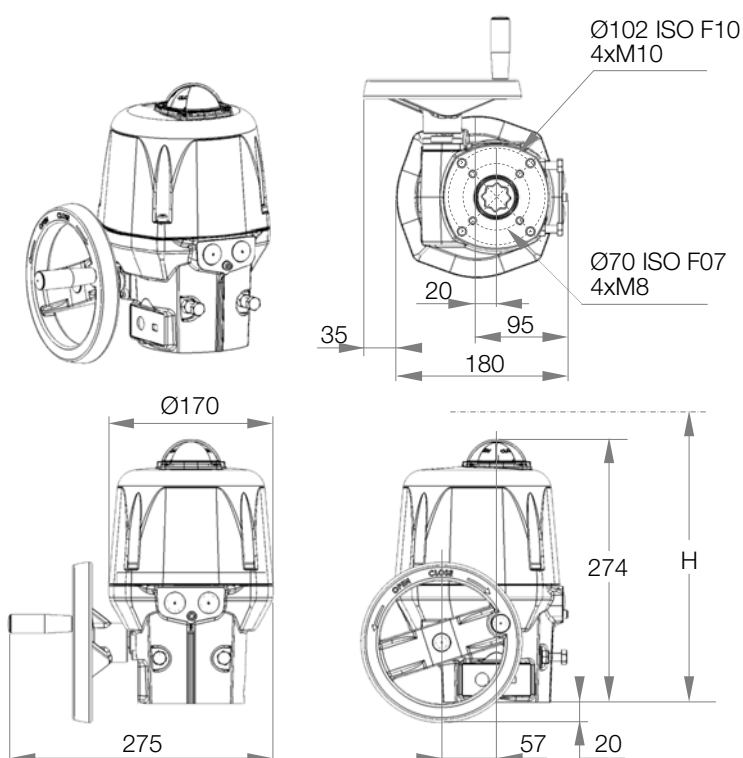
Dimensions

VRX models



Square / Star	17mm	
Drive depth	19mm	
ISO5211 connection	F05	F07
Diameter	50 mm	70 mm
Taraudé M	M6	M8
Depth	15 mm	17 mm
Screw number	4	4
Screws maximal length (+ valve connection plate height)	10 mm	12 mm
Minimum distance above the valve for actuator mounting	H = 311 mm	

VSX models



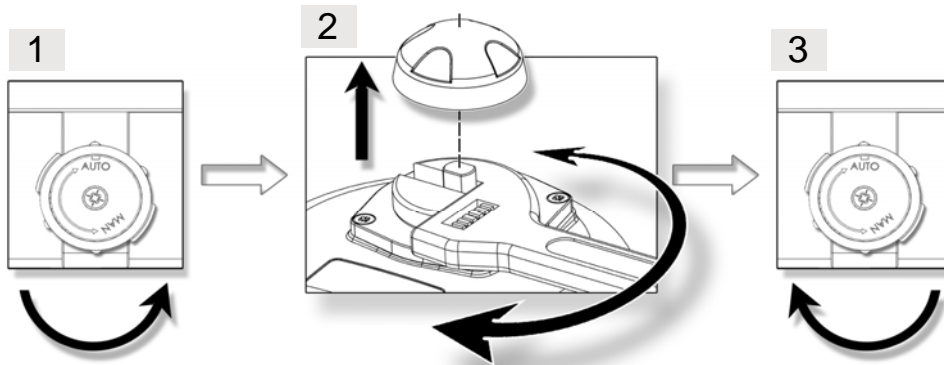
Square / Star	22 mm	
Drive depth	25 mm	
ISO5211 connection	F07	F10
Diameter	70 mm	102 mm
Taraudé M	M8	M10
Depth	19 mm	24 mm
Screw number	4	4
Screws maximal length (+ valve connection plate height)	14 mm	16 mm
Minimum distance above the valve for actuator mounting	H = 375 mm	

Manual override



The priority functioning mode of this actuator is electric. Be sure that the power supply is switched off before using the manual override.

VRX models



1. Turn the knob to position MAN (counter-clockwise) and hold it in position.
2. Turn the outgoing drive shaft of the actuator with the help of an adjusting spanner.
3. In order to re-engage the reduction, release the knob (spring return).

VSX models

No declutching is required, the hand wheel has simply to be turned (appendix p.31 mark 10).



Do not dismantle the mechanical stops.

Mounting on valve



The actuator is set to its closed position in our factory.
Do not mount the actuator « upside down ».
Do not mount the actuator less than 30 cm from an electromagnetic disturbance source.

VRX :

Possible fixations : F05 (4xM6 with Ø50) and F07 (4xM8 with Ø70), star 17, depth 19mm.
Necessary height above the valve for the mounting of the actuator : H=311mm.

VSX :

Possible fixations : F07 (4xM8 with Ø70) and F10 (4xM8 with Ø102), star 22, depth 25mm.
Necessary height above the valve for the mounting of the actuator : H=375mm.

Mounting and dismantling of the cover

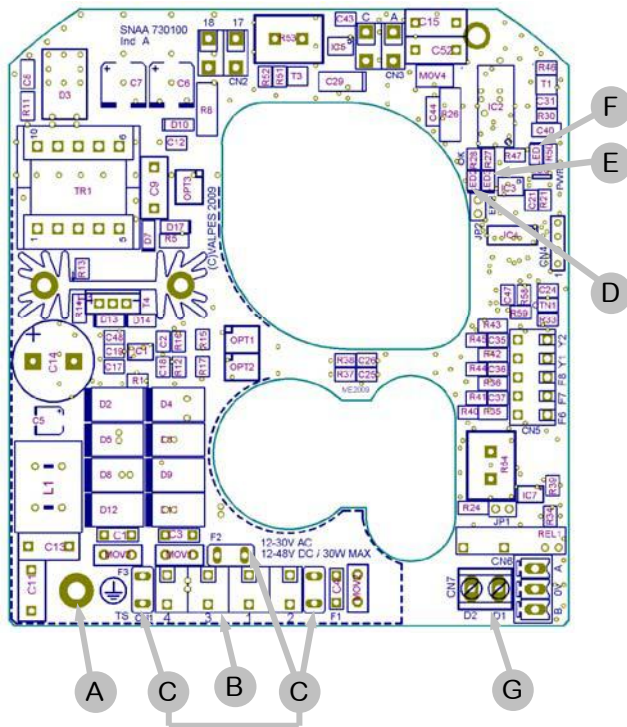
For the wiring and setting of the actuator, it is necessary to remove the cover.
Mounting of the cover (appendix p.31 mark 2) : make sure that the seal ring (appendix p.31 mark 7) is correctly placed in its position, grease of the flame path (Molydal 3790 grease or equivalent), mount the cover and tighten the 4 screws M6 (appendix p.31 mark 3, torque : max. 6Nm).



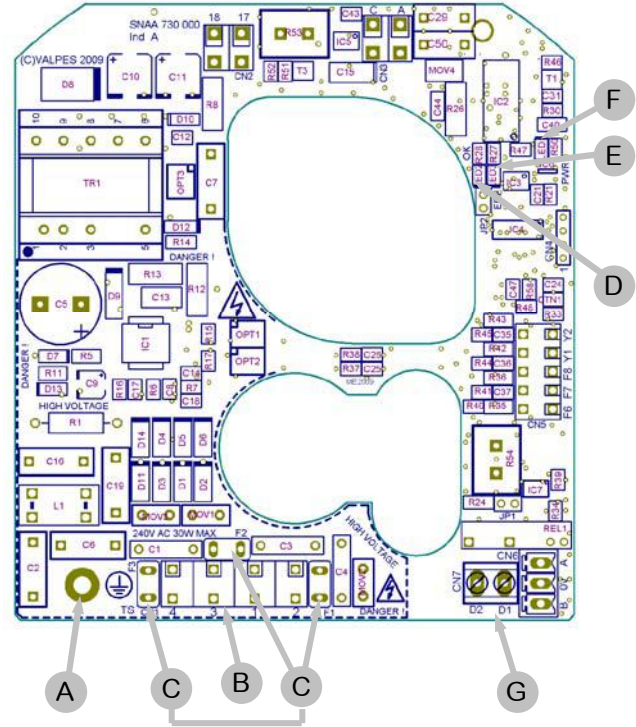
In case of loss and replacement of the screws, see the table p.56-57 for the specifications.

Electronic boards

SNA730100
15 V - 30 V 50/60 Hz (12 V - 48 V DC)



SNA730000
100 V - 240 V 50/60 Hz (100 V - 350 V DC)



	Description		Description
A	Earth screw	E ²⁾	LED 3 : Detected failure
B	Pilot and power supply terminals	F	LED 1 : Power presence
C ¹⁾	Card protection fuses	G	Failure report terminal strip (24V DC / 3A max)
D	LED 2 : microprocessor ok		

1) Fuses for multivolt card :

- Card SNA730100 : 5A / T 125V (Littelfuse 3961500000)
- Card SNA730000 : 3,15A / T 250V (Multicomp MST 3,15A 250V)

2) Possible defects : limitation of current, thermic limitation or program error

- => check that the valve torque is not superior to the maximum torque stand by the actuator
- => check that the actuator do not exceed the duty cycle indicated (possible overheat)
- To re-start the actuator, reverse the sense of rotation or switch the power off and on.

Warning - instructions before electric connection



- Use only one relay for one actuator.
- As stipulated in the applicable regulation, the main board (p.39 mark A) must be connected to earth for devices with working voltages exceeding 42V.
In order to prevent electrostatic discharge, the external the housing must be also connected (see p. 33 rep. 17) to earth The cross-section must be at least 4 mm²
- The actuator is being always under power, it must be connected to a disconnection system (switch, circuit breaker) to ensure the actuator's power cut. The latter must be closed to the actuator, easy to reach and marked as being the disconnecting device for the equipment.
- The temperature of the terminal can reach 90 °C.
- To optimize the installation security, please connect the failure feedback signal (standard: D1/D2, BBPR/GFS : D3/D4 et GPS : 67/68).
- In case of long cables, please note the induction current shall not exceed 1mA.
- The actuator can tolerate temporary overvoltage of the electrical grid up to $\pm 10\%$ of its nominal system operating voltage.
- The selection of the cables and cable glands: the maximal operating temperature of the cables and cable-glands must be at least 110 °C. The cables used must be of category UL 90 V-0.
- It is necessary to connect all actuators to an electrical cabinet. The power supply cables must have the RATED diameter for the maximum current supported by the actuator and comply with IEC 60227 or IEC 60245 standards.
- The auxiliary limit switches must be connected with rigid wires. If the applied voltage is higher than 42V, the user must foresee a fuse in the power supply line and use cables with a cross-section of 1.5 mm².
- The feedback switches must be powered with the same voltage. The reinforced insulation of the motor control allows voltages up to 250V AC.
- Connection to feedback microswitches:
 - 4 to 24 V D and 12 to 250 V AC
 - minimum current 100 mA
 - maximum current 5 A (resistive), 0.5 A (motor), 0.125 A (capacitive loads)

Electric wiring (standard models)



The caps placed on M20x1.5 openings (appendix p.33 mark 16) must be replaced by **ATEX and IP68 metallic certified cable glands**. The unused threaded opening must be closed with ATEX, IECEx and IP68 certified caps.

Power supply and control wiring

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Unscrew the left cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 42 (multivolt) or p.43 (3- phase 400 V).
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Earth wiring

For all voltages above 42 V the connection of the power supply board to earth is mandatory. The cable used must have the same cross-section as the power supply cables and be connected by means of a lug to the earth screw (see p. 9 mark A).



The actuator is pre-set in our factory. Do not touch the two lower cams in order to avoid any malfunctioning or even damage to the actuator.

Position feedback wiring

- Unscrew the right cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 42 (multivolt) or p.43 (3- phase 400 V).
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).
- The reinforced insulation from the motor control, allows voltages up to 250 V AC.

Our actuators are equipped with two simple limit switch contacts normally set either in open position, either in closed position ; see DSBL0470 (multivolt) or DSBL0497&DSBL0498 (400V) wiring diagram inside the cover. the white cam is used to detect the open position (FC1) and the black cam is used to detect the closed position (FC2).

To adjust the position of the auxiliary contacts, make rotate the two superior cams by using the appropriate wrench.

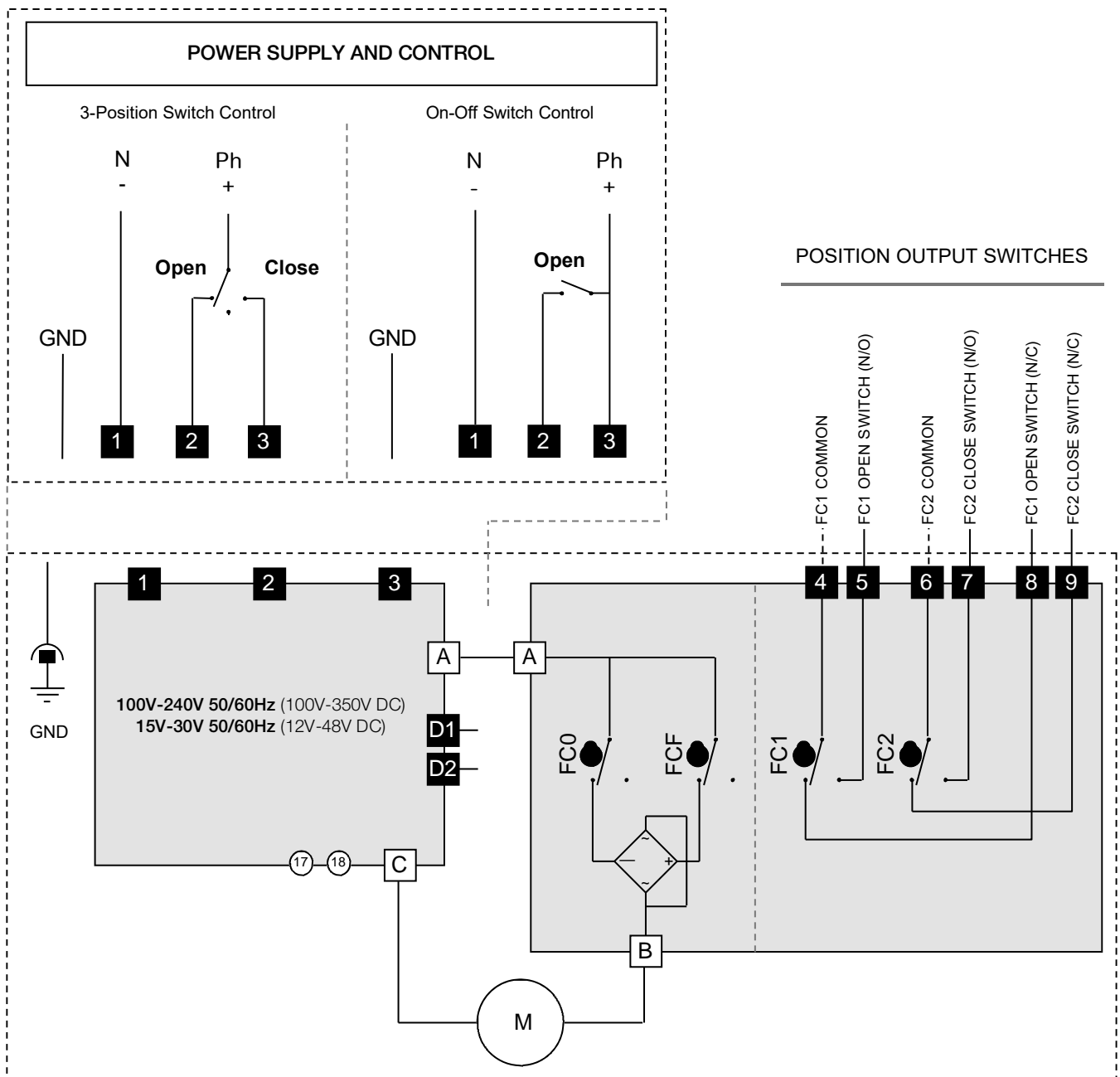
Multi-Volt Wiring diagram

Part	Description	Part	Description
FC0	Open Position Limit Switch	FC1	Open Position Output Switch
FCF	Close Position Limit Switch	FC2	Close Position Output Switch



II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -20 °C to +70 °C

4,5	Auxiliary limit switch 1 NO	1,2,3,4	Power supply terminal
6,7	Auxiliary limit switch 2 NO	D1/D2	Failure report Terminal (24V DC / 3A max)
4,8	Auxiliary limit switch 1 NC		
6,9	Auxiliary limit switch 2 NC		



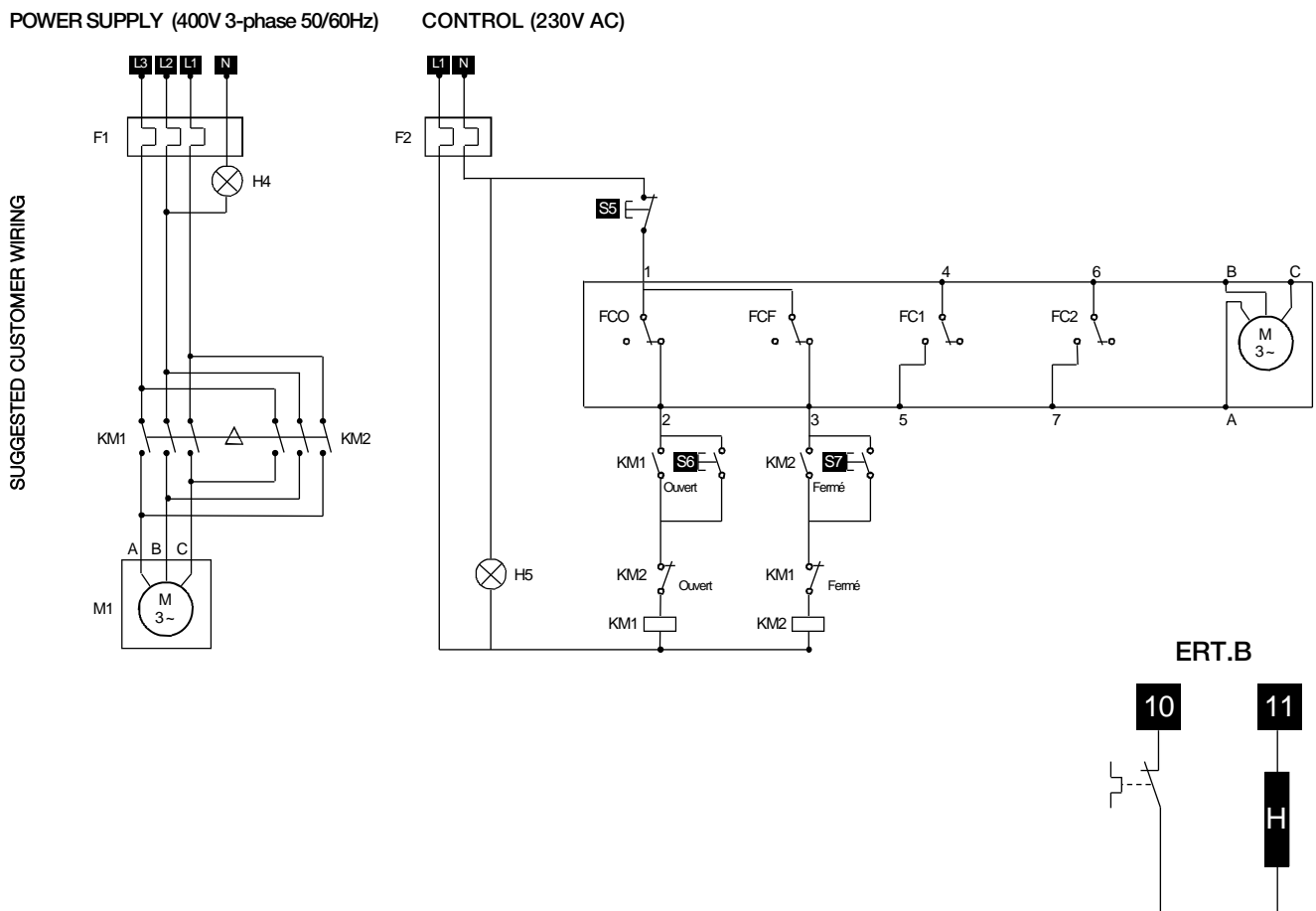
3-phase 400 V electric diagram (standard models)

Part	Description	Part	Description	Part	Description
FC0	Open Position Limit Switch	H4	Motor supply indication	F1 / F2	Thermal switches
FCF	Close Position Limit Switch	H5	Control supply indication	H	Anticondensation resistor
FC1	Open Position Output Switch	KM1	Opening switch		
FC2	Close Position Limit Switch	KM2	Closing switch		



II 2 G D Ex db IIB T5 Gb Ex tb IIIC T95 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -20 °C to +54 °C

S5	Stop pushbutton	S7	Closing pushbutton
S6	Opening pushbutton	10/11	Anticondensation resistor terminal



The motor power supply is wired on bistable three-phase relay (not delivered)
If working inverted, invert 2 phases of motor

POSI (GP5) : description

Various control types (control signal on terminals N°15 and N°16)

On request, our cards can be set in factory. The consign and the feedback signal can have different forms (current or voltage). As standard, the cards are set for current 4-20mA (control + feedback signal).

Control in 0-10 V or 0-20 mA modes:

In case of outside event, absence of control signal (accidental wires cut for example) but in presence of power, the actuator will travel to defined position (open or closed valve).

As standard our actuators will close themselves in absence of control signal but there are other possibilities on request.

Control in 4-20 mA mode:

In case of outside event, absence of control signal (accidental wires cut for example) but in presence of power, the actuator will stay in its position.



The caps placed on M20x1.5 openings (appendix p.44 mark 16) must be replaced by **ATEX and IP68 metallic certified cable glands**. The unused threaded opening must be closed with ATEX, IECEx and IP68 certified caps.

Power supply wiring

Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.

Unscrew the left cable gland and insert the cable.

Remove 25mm of the cable sheath and strip each wire by 8mm.

Connect the wires to the terminal strip in accordance with the diagram p. 15.

Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Setpoint and feedback wiring

Unscrew the right gland and pass the cable.

Connect the input signal between terminals 15 and 16 (attached p.14 mark.B). Terminal 15 is the negative polarity (-) and terminal 16 is the positive polarity (+).

Connect the output signal between terminals 13 and 14.(attached p.14 mark.C). Terminal 13 is the positive polarity (+) and terminal 14 is the negative polarity (-).

Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Factory setting : by default, 4-20mA input and output signals with normal rotation sense.

To proceed to a new setting of the card : please see page 16, "Parameter selection sequence". To check the proper operation of the card : please see page 16, "Normal operating mode".



In order to avoid electromagnetic perturbations, it's mandatory to use shielded cables (cables longer than 3m).



The control voltage must be S.E.L.V. (Safety Extra Low Voltage).



No common earth/ground connexion between the control (input and output signal) and the alimentation. (Type 0-20 or 4-20mA : 5V DC max.)



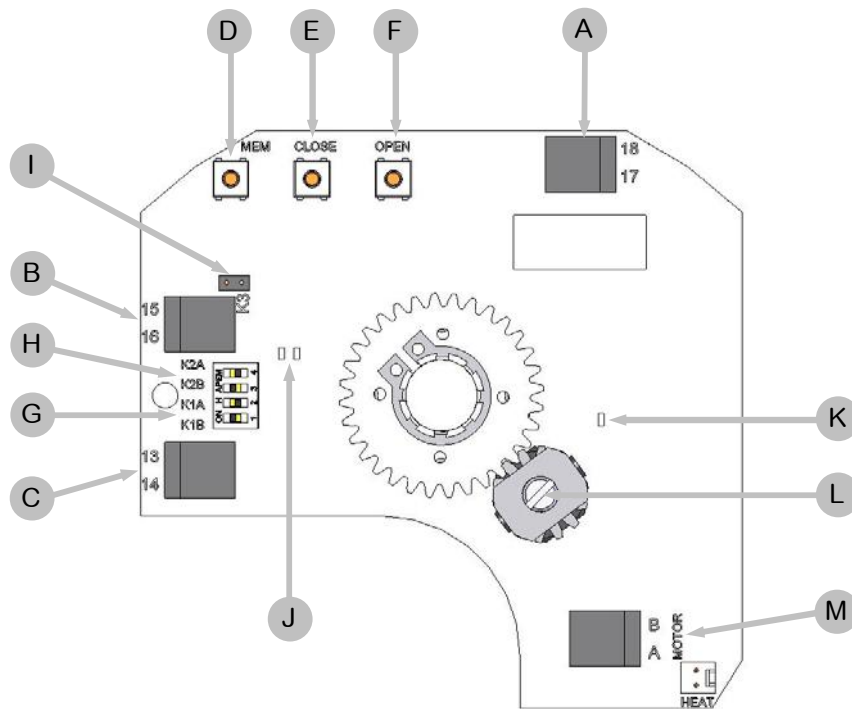
10 kOhm input impedance if control with voltage (0-10 V) and 100 Ohm input impedance if control with current (0-20 mA or 4-20 mA)



The card resolution is 1°

POSI (GP5) : electronic board

P5 positioning board 4-20 mA / 0-10 V



	Description		Description
A	24V AC/DC power supply terminal trip	H	K2 jumper
B	Instruction terminal block	I	K3 jumper
C	Feed back terminal block	J	Green and red LEDs
D	Adjustment button MEM	K	Yellow LED : power supply indication
E	Adjustment button CLOSE	L	Potentiometer
F	Adjustment button OPEN	M	Motor connexion
G	K1 jumper		

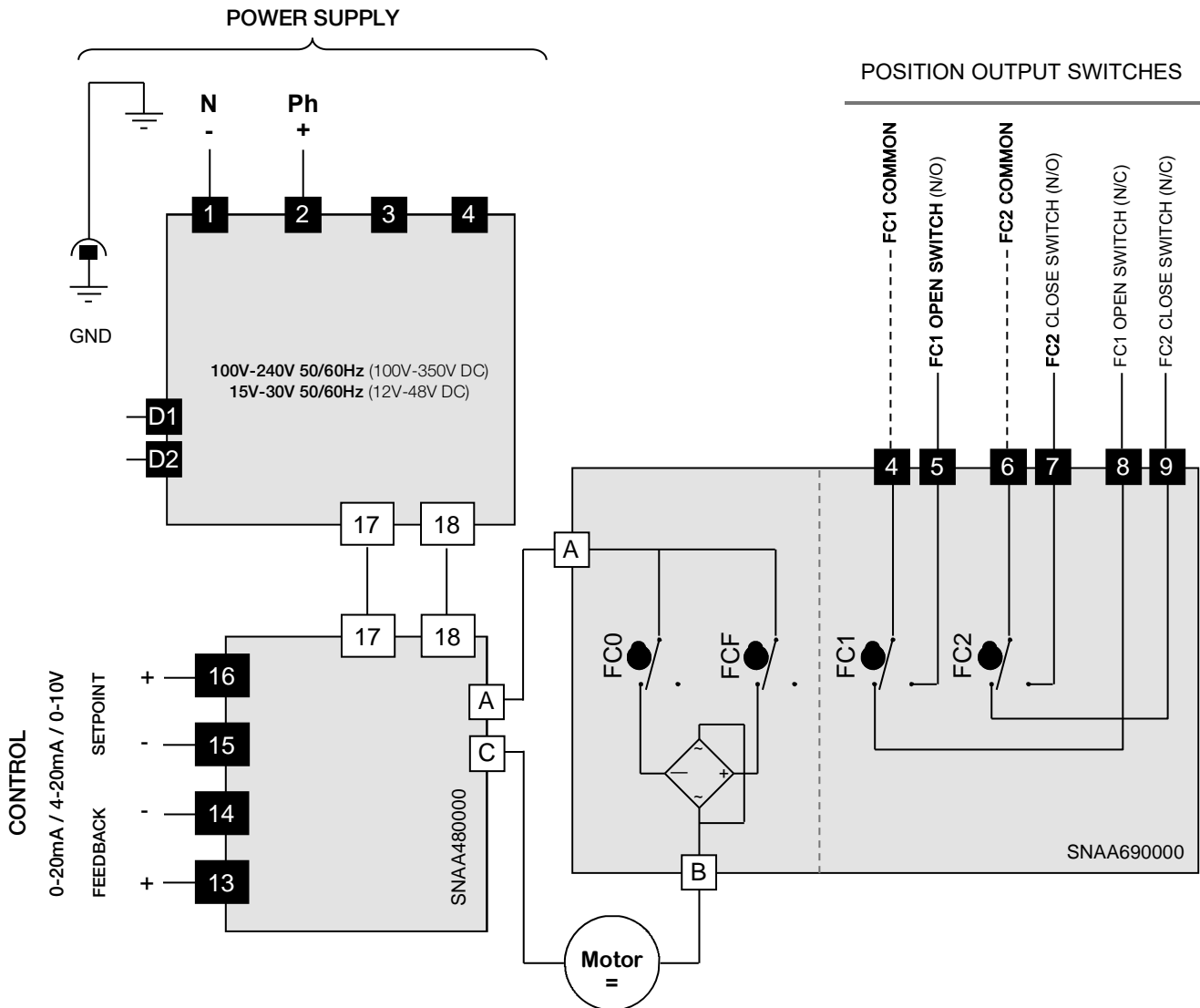
POSI (GP5) : electric diagram

Part	Description	Part	Description
FC0	Open Position Limit Switch	FC1	Open Position Output Switch
FCF	Close Position Limit Switch	FC2	Close Position Output Switch

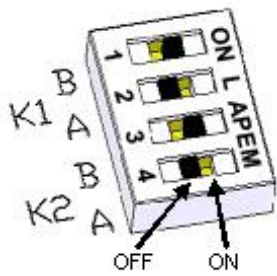


II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -20 °C to +70 °C

4,5	Auxiliary limit switch 1 NO	1,2,3,4	Power supply terminal
6,7	Auxiliary limit switch 2 NO	D1/D2	Failure report Terminal (24V DC / 3A max)
4,8	Auxiliary limit switch 1 NF	13,14	Feedback terminal 4-20 mA ou 0-10 V
6,9	Auxiliary limit switch 2 NF	15,16	Setpoint terminal 4-20 mA ou 0-10 V



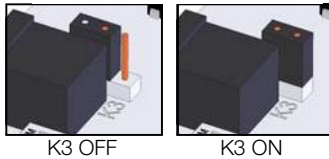
POSI (GP5) : parameter selection sequence



1 Shunts positioning K1, K2 and K3

Position the shunts as follows (before modification, switch off the card):

Setpoint signal	Feedback signal	Schunt K1		Schunt K2		Schunt K3
		A	B	A	B	
0-10V	0-10V	ON	OFF	ON	OFF	OFF
0-10V	0-20mA	ON	OFF	OFF	ON	OFF
0-10V	4-20mA	ON	OFF	OFF	ON	ON
4-20mA	0-10v	OFF	ON	ON	OFF	OFF
4-20mA	0-20mA	OFF	ON	OFF	ON	OFF
4-20mA	4-20mA	OFF	ON	OFF	ON	ON
0-20mA	0-10V	OFF	ON	ON	OFF	OFF
0-20mA	0-20mA	OFF	ON	OFF	ON	OFF
0-20mA	4-20mA	OFF	ON	OFF	ON	ON



Selection of the flow direction of the valve

2.1 Normal flow direction (by default)

- Press the **OPEN** button and apply the operating voltage to the card while keeping this button pressed.
- The **green LED** lights up. Release the OPEN button.
- Disconnect the card.



2.2 Inverse flow direction

- Press the **CLOSE** button and apply the operating voltage to the card while keeping this button pressed.
- The **red LED** lights up. Release the CLOSE button.
- Disconnect the card.



3 Selection of the type of input control signal

3.1 Voltage control signal 0-10V

- Press the **MEM** button and apply the operating voltage to the card while keeping this button pressed.
- The **red LED** will light up 3 times. Release this button.
- Disconnect the card.



3.2 Current control signal 4-20mA (by default)

- Press the **MEM** and **CLOSE** buttons and apply the operating voltage to the card while keeping these buttons pressed.
- The **red LED** will light up 3 times. Release these buttons.
- Disconnect the card.



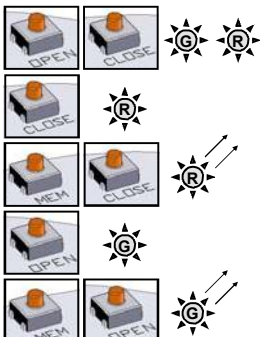
3.3 Current control signal 0-20mA

- Press the **MEM** and **OPEN** buttons and apply the operating voltage to the card while keeping these buttons pressed.
- The **red LED** will light up 3 times. Release these buttons.
- Disconnect the card.



4 Learning mode

- Press the **OPEN** and **CLOSE** buttons and apply the operating voltage to the card while keeping these buttons pressed.
- The **2 LED** will light up. Release these buttons and the **2 LED** will extinguish. The card is now in the learning mode.
- Press the **CLOSE** button to put the valve in its closed position. The **red LED** will light up.
- Store this selected closed position by pushing **MEM + CLOSE**, the **red LED** will light up 2 times as a confirmation of acknowledgement.
- Press the **OPEN** button to put the valve in its open position. The **green LED** will light up.
- Store this selected open position by pushing **MEM + OPEN**, the **green LED** will light up 2 times as a confirmation of acknowledgement.
- Now, the positions selected have been stored. Disconnect the card.



NORMAL OPERATING MODE

- Apply the operating voltage to the card. The **green LED** will light up 3 times.
- Under normal operating conditions, the **green LED** will light up when the drive motor opens the valve, and the **red LED** will light up when the drive motor closes it.
- If **both LED** remain extinguished, it means that the drive motor has not been triggered.
- In the case of an over torque, the motor stops and the **2 LED** lights then together to indicate the action of the torque limiter. To re-start it, you must either reverse the sense of rotation, either switch the power off and on.



3 positions (GF3) : description

Actuator with a third position

GF3 option allow actuator to be drive and stop in 3 positions. These 3 positions could be between 0° to 180°. In standard actuators are setting in our workshop at 0° 90° 180° that's fit with standard 3 ways ball valve. Others positions still available but customer have to price on the order witch position is request.

Electric connection



The caps placed on M20x1.5 openings (appendix p.15 mark 16) must be replaced by **ATEX and IP68 metallic certified cable glands**. The unused threaded opening must be closed with ATEX, IECEx and IP68 certified caps.

Power supply and control wiring

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Unscrew the left cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 18.
- Tighten the cable gland (Ensure that it's well mounted to guaranty the proofness).

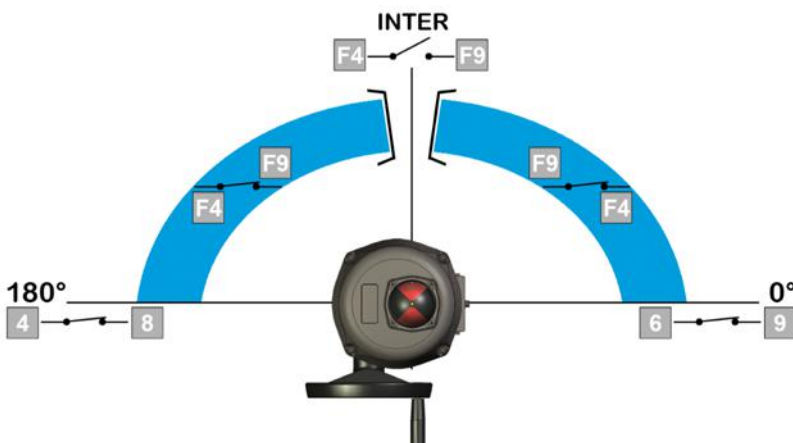
! The actuator is pre-set in our factory. Do not touch the four lower cams in order to avoid any malfunctioning or even damage to the actuator.

Feedback wiring and contact status

- Unscrew the right cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 18.
- Tighten the cable gland (Ensure that it's well mounted to guaranty the proofness).
- The reinforced insulation from the motor control, allows voltages up to 250 V AC.

Our 3-position actuators have 3 auxilliary switches (either normally open or normally closed)
 FC1 (white cam - 5th): open position feedback - NO
 FC2 (black cam - 6th) : closed position feedback - NO
 FC3 (beige cam - 7th) : intermediate position feedback - NC

To adjust the position of the auxiliary contacts, make rotate the 3 superior cams by using the appropriate wrench.



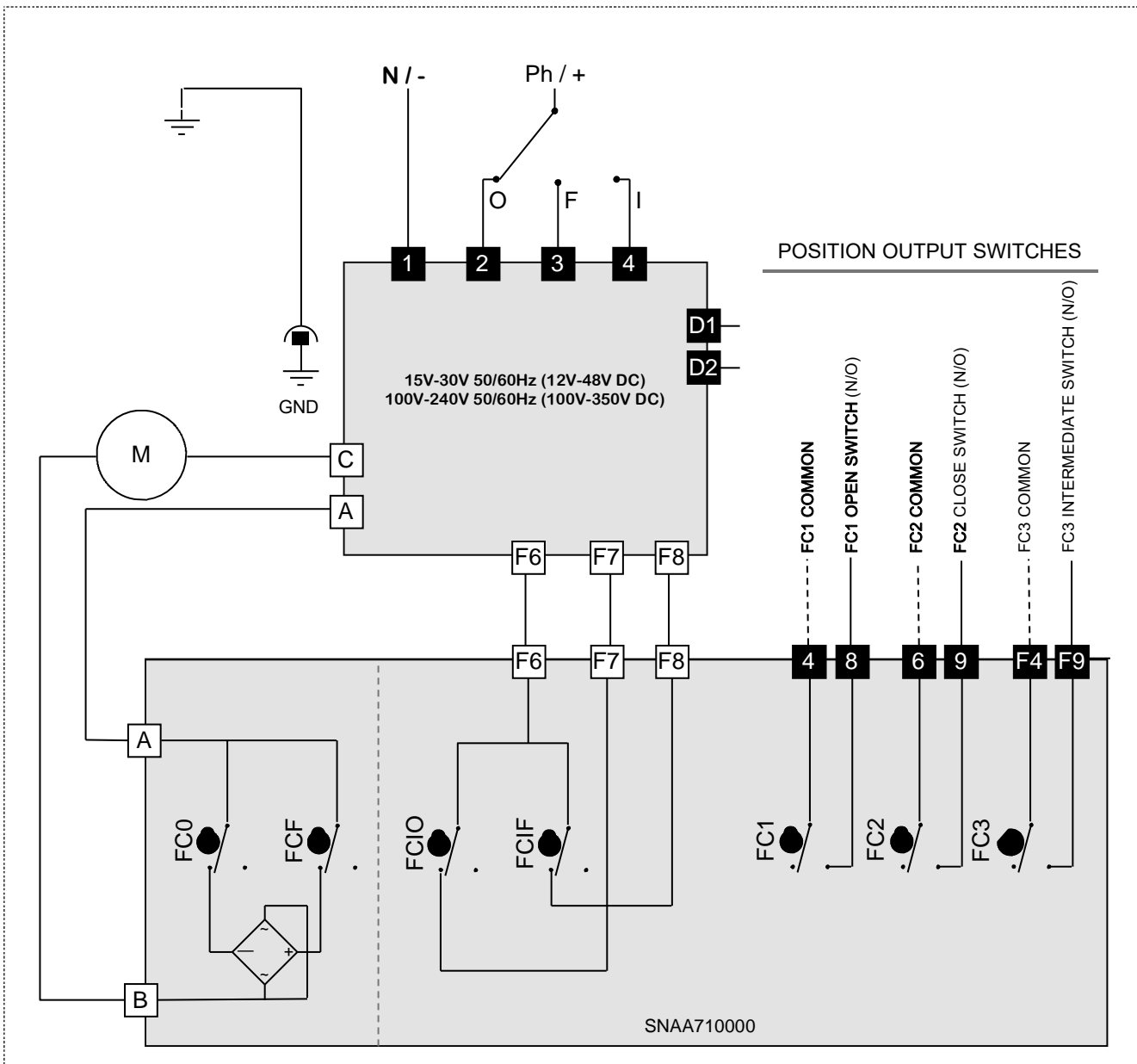
	Terminals		
	6 & 9	4 & 8	F4 & F9
0°	Closed	Open	Closed
inter	Open	Open	Open
180°	Open	Closed	Fermé

3 positions (GF3) : electric diagram

Rep.	Description	Rep.	Description
FC0	Open Position Limit Switch	FC1	Open Position Output Switch
FCF	Close Position Limit Switch	FC2	Close Position Output Switch
FCIO	Intermediate Open Position Limit Switch	FC3	Intermediate Position Output Switch
FCIF	Intermediate Close Position Limit Switch		

Ex II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -20 °C to +70 °C

4,8	Auxiliary limit switch 1 NO	1,2,3,4	Power supply terminal
6,9	Auxiliary limit switch 2 NO	D1/D2	Failure report Terminal (24V DC / 3A max)
F4,F9	Auxiliary limit switch 3 NC		



BBPR models (GS6)

Actuators with battery backup position recovery system (on-off wiring mandatory)

BBPR models integrate a battery pack monitored by an electronic board inside the actuator. Its function is to relay in case of power supply failure on terminal PIN 1,2 and 3 of the actuator. The BBPR system can be set on different position like normally open (NO) or normally closed (NC). It depends on the application.

The electronic board monitors the battery pack and check the status of battery (cycle load and failure)

If a battery failure is detected , a contact on PIN 65 and 66 switch off. It's possible to use this contact to be aware that there is a failure on battery in the actuator without remove cover and plan the replacement.

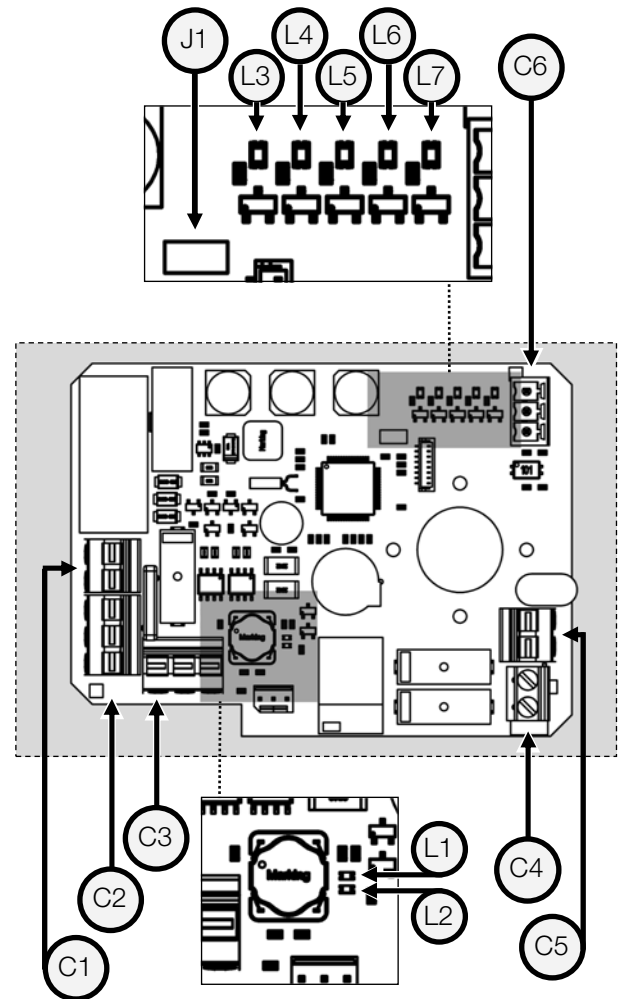
BBPR option requires ON/OFF mode.

Loading electronic board

LED		DESCRIPTION
L1	D19 green	Actuator operating into opening
L2	D18 red	Actuator operating into closing
L3	ACT green	Battery status : -Slow blinking (1s) : battery charged. -Rapid blinking (0.5s) : battery charging
L4	ERROR red	Error detected: -Timestamp memory empty/scheduler selected -Clock failure -Excessive temperature -Excessive torque
L5	HORO Orange	Weekly scheduler functioning mode
L6	MANU Orange	manual / Bluetooth® functioning mode
L7	WIRE Orange	Electric wiring mode

CONNECTEUR		DESCRIPTION
C1	17 (-) · 18 (+)	power supply connector
C2	F (+) · F (-) · T (+)	Battery unit connector
C3	A · B · C	Motor connector
C4 ¹⁾	D3 · D4	Failure feedback connector
C5 ¹⁾	65 · 66	Charging feedback connector
C6	A · 0 · B	RS485 connector
J1	Bluetooth® activation jumper	

1) The auxiliary cables must be connected to inside installation only



Battery voltage	24 V DC
Battery capacity	600 mAh
Charging current	180 mA
initial battery charge duration	3,5 h
Charging status feedback relay	24 V DC - 1 A max
Failure feedback relay (D3/D4)	24 V DC - 3 A max
Temperature	-10 °C to +40 °C



The factory default configuration is "normally closed"

Following a power failure, the BBPR unit will reset after 4 minutes



II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -10 °C to +40 °C

BBPR (GS6) : electric connection



The caps placed on M20x1.5 openings (appendix p.33 mark 16) must be replaced by **ATEX and IP68 metallic certified cable glands**. The unused threaded opening must be closed with ATEX, IECEx and IP68 certified caps.

Power supply and control wiring

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Unscrew the left cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 52.
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Position feedback wiring

- Unscrew the right cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 52.
- Tighten the cable gland ATEX & IP68 (Ensure that it's well mounted to guaranty the proofness).
- The reinforced insulation from the motor control, allows voltages up to 250 V AC.

Our actuators are equipped with two simple limit switch contacts normally set either in open position, either in closed position. As per factory setting, the white cam is used to detect the open position (FC1) and the black cam is used to detect the closed position (FC2).



The actuator is pre-set in our factory. Do not touch the two lower cams in order to avoid any malfunctioning or even damage to the actuator.



The battery charge cycle is automatically managed by the electronic card since the first power up. A CTN in the battery pack and a fuse on the electronic card are present to ensure safety in the event of a short circuit or excessively high temperature in the actuator .

Setting of end limit switches

To adjust the position of the auxiliary contacts, make rotate the two superior cams by using the appropriate wrench.

Thanks to **AXMART®** (via Bluetooth® connection), it's possible to set the Initial security position that the actuator will reach in case of power failure.
it's also possible to access to actuator parameters in real time, to schedule weekly tasks and to control it locally.

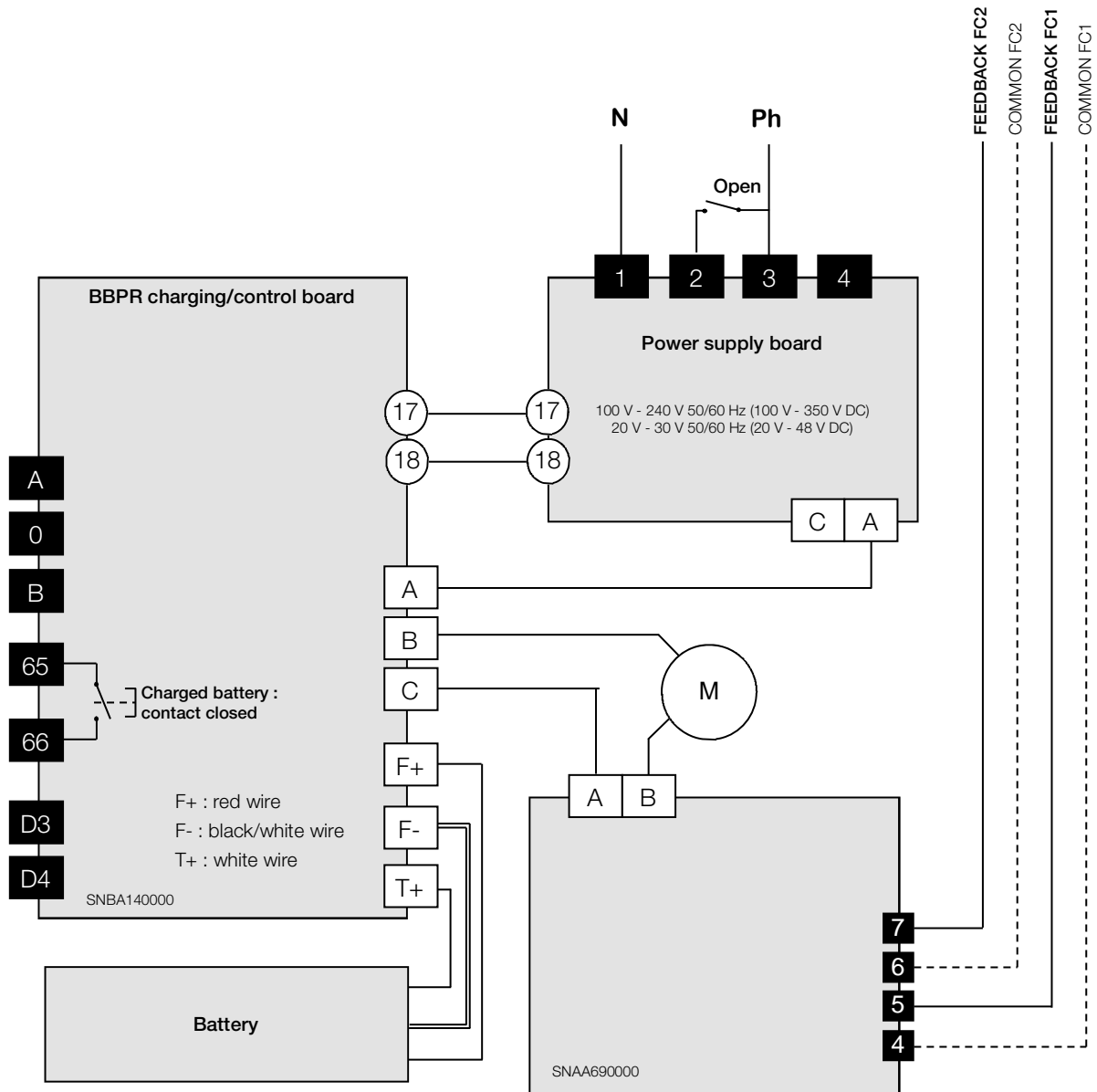
For any further information, refer to the operation manual with the reference **DSBA3304**.



BBPR (GS6) : electric diagram

1,2,3,4	Power supply terminal	4,5	Auxiliary limit switch 1 NO
D3,D4	Failure report Terminal (24V DC / 3A max)	6,7	Auxiliary limit switch 2 NO
A,0,B	RS485 serial connection terminal	65,66	Battery charging feedback terminal

Ex II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -10 °C to +40 °C



POSI-BBPR (GPS) : description

The GPS version includes BBPR and positioning function.

Battery position backup:


This system insure a return to predefined position in case of power failure. The predefined position can be set close (default) or open.

Positioning:

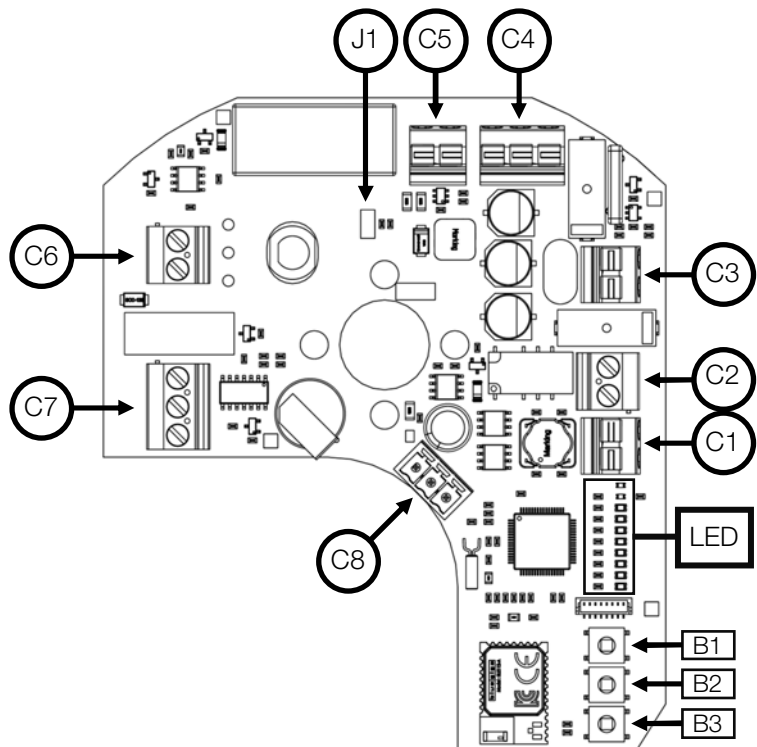
0-10 V: In case of outside event, absence of control signal (accidental wires cut for example) but in the presence of power, the actuator will travel to defined position (open or closed valve). As standard our actuators will close themselves with absence of control signal but there are other possibilities on request.

4-20 mA: In case of outside event, absence of setpoint signal (accidental wires cut for example) but in presence of power, the actuator will stay in its position

! The factory default configuration is "normally closed"

Actuator voltage	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 20 V to 30 V AC 50/60 Hz and 20 V to 48 V DC		
Battery voltage	24 V DC	Charging status feedback relay (65/66)	24 V DC - 1 A max
Battery capacity	600 mAh	Failure feedback relay (67/68)	24 V DC - 3 A max
Charging current	180 mA	Temperature	-10 °C à +40 °C
Maximum battery charge duration	3,5 h		
 II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X Ambient temperature: -10 °C to +40 °C			

Rep	Terminals	Description
B1		« Close » button
B2		« Mem » button
B3		« Open » button
C1	A,C	Motor connector
C2	67,68	Failure feedback relay
C3	65,66	Charging status feedback relay
C4	F (+) F (-) T (+)	Battery connector
C5	17 (-) 18 (+)	power supply connector
C6	15(-) 16(+)	Positioning setpoint signal connector (0-10 V or 4-20 mA)
C7	13A(+) 13B(+) 14(-)	Positioning feedback signal connector. 13A=0-10 V et 13B=4-20 mA
C8	A,0,B	RS485 connector
J1	CV1	Bluetooth® activation jumper



LED	Description		
MANU	manual / Bluetooth® functioning mode	ERROR	Error detected: - Timestamp memory empty/scheduler selected - Clock failure - Excessive temperature - Excessive torque
HORO	Weekly scheduler functioning mode	ACT	Power supply: - Slow blinking (1 s) : charged battery - Rapid blinking (0.5 s) : battery charging
APPR	Learning mode selected	APPR1	Open position stored (confirmation)
POSI	Positioning mode	APPR2	Closed position stored (confirmation)

POSI-BBPR (GPS): electric connection

Power supply wiring

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Unscrew the left cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 24.
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Setpoint and feedback wiring

- Unscrew the right gland and pass the cable.
- Connect the input signal between terminals 15 and 16. Terminal 15 is the negative polarity (-) and terminal 16 is the positive polarity (+).
- Connect the output signal between terminals 13 and 14. Terminal 13 is the positive polarity (+) and terminal 14 is the negative polarity (-).
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Factory setting : by default, 4-20mA input and output signals with normal rotation sense.

Learning mode

- Switch on the actuator
- Press both **OPEN** and **CLOSE** buttons during 2 seconds. The **APPR** led confirms that the learning mode learning mode is activated.
- Press **CLOSE** button. The valve operate into closed position.
- When the valve is closed, press both **CLOSE** and **MEM** buttons during 2 seconds.
- The **APPR2** led blinks rapidly and then lights on. The closed position is stored.
- Press **OPEN** button. The valve operate into open position.
- When the valve is open, press both **OPEN** and **MEM** buttons during 2 seconds.
- The **APPR1** led blinks rapidly and then lights on. The closed position is stored
- Press both **OPEN** and **CLOSE** buttons during 2 seconds. The APPR led lights off. The learning mode is unselected

The both positions open and closed are now stored, so switch into positioning mode.

Thanks to **AXMART**[®] (via Bluetooth[®] connection), it's possible to set the Initial security position that the actuator will reach in case of power failure (BBPR function) as well as setpoint and feedback signal type (positioning function).
it's also possible to access to actuator parameters in real time, to schedule weekly tasks and to control it locally.



For any further information, refer to the operation manual (**DSBA3304**).



Be sure you connect the terminal 15 (-) before the terminal 16 (+)

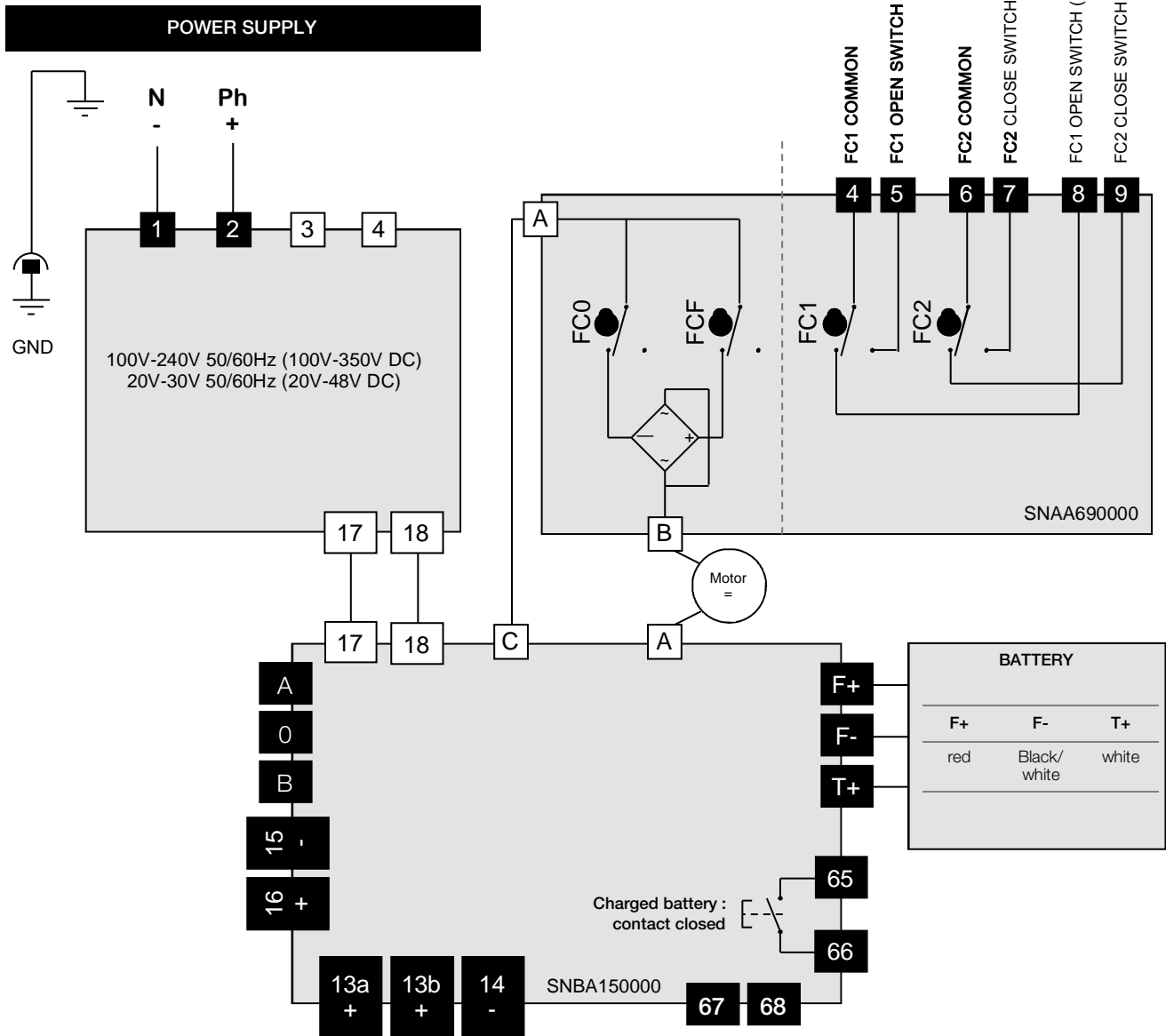


The battery charge cycle is automatically managed by the electronic card since the first power up. A CTN in the battery pack and a fuse on the electronic card are present to ensure safety in the event of a short circuit or excessively high temperature in the actuator .



Following a power failure, the BBPR unit will reset after 4 minutes.

POSI-BBPR (GPS): electric diagram



1,2,3,4	Power supply terminal	4,5	Auxiliary limit switch 1 NO
67,68	Failure report Terminal (24V DC / 3A max)	6,7	Auxiliary limit switch 2 NO
A,0,B	RS485 terminal	65,66	Battery charging feedback terminal
13a,13b,14	Feedback signal terminal 4-20 mA (13b) or 0-10 V (13a)	15,16	Setpoint signal terminal 4-20 mA or 0-10 V



II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -10 °C to +40 °C



In order to avoid electromagnetic perturbations, it's mandatory to use shielded cables (cables longer than 3m).



The control voltage must be S.E.L.V. (Safety Extra Low Voltage).



No common earth/ground connexion between the control (input and output signal) and the alimentation. (Type 0-20 or 4-20mA : 5V DC max.)



10 kOhm input impedance if control with voltage (0-10 V) and 100 Ohm input impedance if control with current (0-20 mA or 4-20 mA)



The card resolution is 1°

3-POSITION-BBPR (GFS) : descripti

The GFS version includes BBPR battery backup and 3-position versions.


BBPR battery backup:

This system insure a return to predefined position in case of power failure. The predefined position can be set close (default) or open.

GF3 option allow actuator to be drive and stop in 3 positions. These 3 positions could be between 0° to 180°. In standard actuators are setting in our workshop at 0° 90° 180° that's fit with standard 3 ways ball valve. Others positions still available but customer have to price on the order witch position is request.



Par défaut, la configuration en sortie d'usine est "normalement fermé"

Actuator voltage	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 20 V to 30 V AC 50/60 Hz and 20 V to 48 V DC		
Battery voltage	24 V DC	Charging status feedback relay (65/66)	24 V DC - 1 A max
Battery capacity	600 mAh	Failure feedback relay (D3/D4)	24 V DC - 3 A max
Charging current	180 mA	Temperature	-10 °C to +40 °C
battery charge maximum duration	3,5 h		
 II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X Ambient temperature: -10 °C to +40 °C			

Electric connection



The caps placed on M20x1.5 openings (appendix p.33 mark 16) must be replaced by **ATEX and IP68 metallic certified cable glands**. The unused threaded opening must be closed with ATEX, IECEx and IP68 certified caps.

Power supply and control wiring

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Unscrew the left cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 57.
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).

Feedback wiring and contacts state

- Unscrew the right cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram p. 57.
- Tighten the ATEX & IP68 cable gland (Ensure that it's well mounted to guaranty the proofness).
- The reinforced insulation from the motor control, allows voltages up to 250 V AC.

Our 3-position actuators have 3 auxiliary switches

FC1 (white cam - 5th): open position feedback - NO

FC2 (black cam - 6th) : closed position feedback - NO

FC3 (beige cam - 7th) : intermediate position feedback - NF

To adjust the position of the auxiliary contacts, make rotate the 3 superior cams by using the appropriate wrench.



	Terminals		
	6 & 9	4 & 8	F4 & F9
0°	Closed		Closed
inter	Open		Open
180°	Open	Clo	Fermé

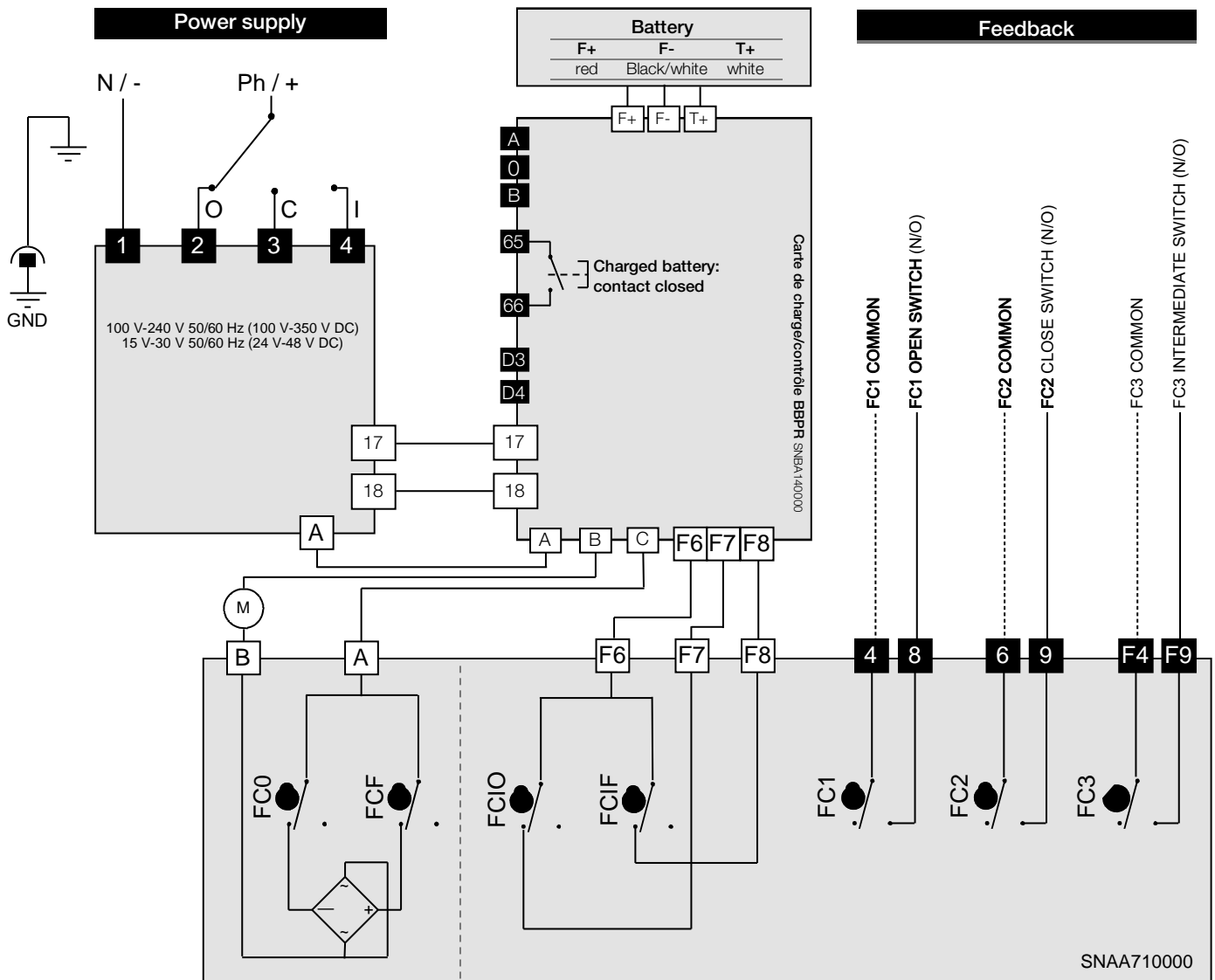


The actuator is pre-set in our factory. Do not touch the two lower cams in order to avoid any malfunctioning or even damage to the actuator.



The battery charge cycle is automatically managed by the electronic card since the first power up. A CTN in the battery pack and a fuse on the electronic card are present to ensure safety in the event of a short circuit or excessively high temperature in the actuator .

3 POSITION-BBPR (GFS) : electric diagram



Rep.	Description	Rep.	Description
FC0	Open limit switch	FC1	Auxiliary limit switch 1
FCF	Close limit switch	FC2	Auxiliary limit switch 2
FCIO	Intermediate open limit switch	FC3	Auxiliary limit switch 3
FCIF	Intermediate close limit switch		



II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006X / IECEx 21.0015X
Ambient temperature: -10 °C to +40 °C

4,8	Auxiliary limit switch 1 NO	1,2,3,4	Power supply terminal
6,9	Auxiliary limit switch 2 NO	D3/D4	Failure report Terminal (24V DC / 3A max)
F4,F9	Auxiliary limit switch 3 NC	65,66	Charging status feedback terminal
A,0,B	RS485 connection terminal		



Following a power failure, the BBPR unit will reset after 4 minutes

Technical specifications

	VRX25	VRX45	VRX75
Installation			
Proofness	IP68 (5 m 72 h)		
ATEX / IECEx	II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006 X / LCIE 21.0015x		
Temperatures (G00, GP5, GF3)	T _a = -20 °C to +70 °C		
Temperatures (400 V models)	T _a = -20 °C to +54 °C		
Temperatures (GS6, GPS, GFS)	T _a = -10 °C to +40 °C		
Corrosion resistance (outdoor and indoor use)	Housing: aluminium + epoxy coating (« marine » high durability coating on request) Drive : Steel + Zn treatment / Axles and screws : Stainless steel		
Extended environmental conditions	Outdoor use and in WET LOCATION		
Altitude	altitude up to 2 000 m		
Hygrometry	maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C		
Pollution degree	Applicable POLLUTION DEGREE of the intended environment 2 (in most cases)		
Weight	4Kg to 4,4kg		
Mechanical specifications			
Nominal torque	20 Nm	35 Nm	60 Nm
Maximum torque	25 Nm	45 Nm	75 Nm
Operating time (90°)	7s 400 V : 10 s • POSI : 15 s	15 s 400 V : 10 s	20 s 400 V : 15 s
Rotation angle	90° (180°- 270° on request)		
Drive ISO5211	star 17mm (depth 19mm) F05 (depth 15 mm) • F07 (depth 17 mm)		
Screws maximal length	F05 : valve connection plate height + 10mm F07 : valve connection plate height + 12mm		
Manual override	Axe sortant		
Electrical specifications			
Voltage ¹⁾ (standard)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 15 V to 30 V AC 50/60 Hz and 12 V to 48 V DC 3-phase 400 V 50/60 Hz		
Voltage ¹⁾ (GP5 and GF3)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 15 V to 30 V AC 50/60 Hz and 12 V to 48 V DC		
Voltage ¹⁾ (GP6, GPS and GFS)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 24 V to 30 V AC 50/60 Hz and 24 V to 48 V DC		
Overvoltage category ²⁾	TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II TEMPORARY OVERVOLTAGES occurring on the MAINS supply.		
Power consumption	45 W (400 V : 52 W)		
Insulation motor class	Class B 400V motors and class F for the others		
Torque limiter (except 400 V)	Electronical		
Operating factor	50 %		
Number of feedback switches	2 (4 optional)		
Limit switches maximal voltage	4 to 250V AC and 24V DC (Overvoltage category II)		
Limit switches maximal current	1mA to 5A max		
Inrush current	Circuit breaker type D, nominal current according the number of actuators		
Anticondensation resistor	10 W		

¹⁾ The actuator tolerates voltage fluctuation of the electrical grid up to ± 10 % of its nominal system operating voltage

²⁾ The actuator tolerates temporary overvoltages of the electrical grid.

Technical specifications

	VSX100	VSX150	VSX300
Installation			
Proofness	IP68 (5 m 72 h)		
ATEX / IECEx	II 2 G D Ex db IIB T6 Gb Ex tb IIIC T80 °C Db LCIE 06 ATEX 6006 X / LCIE 21.0015x		
Temperatures (G00, GP5, GF3)	T _a = -20 °C to +70 °C		
Temperatures (400 V models)	T _a = -20 °C to +54 °C		
Temperatures (GS6, GPS, GFS)	T _a = -10 °C to +40 °C		
Corrosion resistance (outdoor and indoor use)	Housing: aluminium + epoxy coating (« marine » high durability coating on request) Drive : Steel + Zn treatment / Axles and screws : Stainless steel		
Extended environmental conditions	Outdoor use and in WET LOCATION		
Altitude	altitude up to 2 000 m		
Hygrometry	maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C		
Pollution degree	Applicable POLLUTION DEGREE of the intended environment 2 (in most cases)		
Weight	6Kg to 6,4kg		
Mechanical specifications			
Nominal torque	75 Nm	125 Nm	250 Nm
Maximum torque	100 Nm	150 Nm	300 Nm
Operating time (90°)	15 s 400 V : 10 s	30 s 400 V : 20 s	60 s 400 V : 35 s
Rotation angle	90° (180°- 270° on request)		
Drive ISO5211	Star 22 mm (depth 25 mm) F07 (depth 19 mm) • F10 (depth 24 mm)		
Screws maximal length	F07 : valve connection plate height + 14 mm F10 : valve connection plate height + 16 mm		
Manual override	Handweel		
Electrical specifications			
Voltage ¹⁾ (standard)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 15 V to 30 V AC 50/60 Hz and 12 V to 48 V DC 3-phase 400 V 50/60 Hz		
Voltage ¹⁾ (GP5 and GF3)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 15 V to 30 V AC 50/60 Hz and 12 V to 48 V DC		
Voltage ¹⁾ (GP6, GPS and GFS)	100 V to 240 V AC 50/60 Hz and 100 V to 350 V DC 24 V to 30 V AC 50/60 Hz and 24 V to 48 V DC		
Overvoltage category ²⁾	TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II TEMPORARY OVERVOLTAGES occurring on the MAINS supply.		
Power consumption	45 W (400 V : 135 W)		
Insulation motor class	Class B 400V motors and class F for the others		
Torque limiter (except 400 V)	Electronical		
Operating factor	50 %		
Number of feedback switches	2 (4 optional)		
Limit switches maximal voltage	4 to 250V AC and 24V DC (Overvoltage category II)		
Limit switches maximal current	1mA to 5A max		
Inrush current	Circuit breaker type D, nominal current according the number of actuators		
Anticondensation resistor	10 W		

¹⁾ The actuator tolerates voltage fluctuation of the electrical grid up to ± 10 % of its nominal system operating voltage

²⁾ The actuator tolerates temporary overvoltages of the electrical grid.



CR-TEC Engineering Inc.

CR-TEC Engineering Inc.

15 Orchard Park Road, Unit 18
Telephone 203-318-9500 • Fax 203-245-2575
info@crtec.com • www.crtec.com