VEGA®

ITALIAN STYLE FOR LIFTS

DOOR
OPERATOR
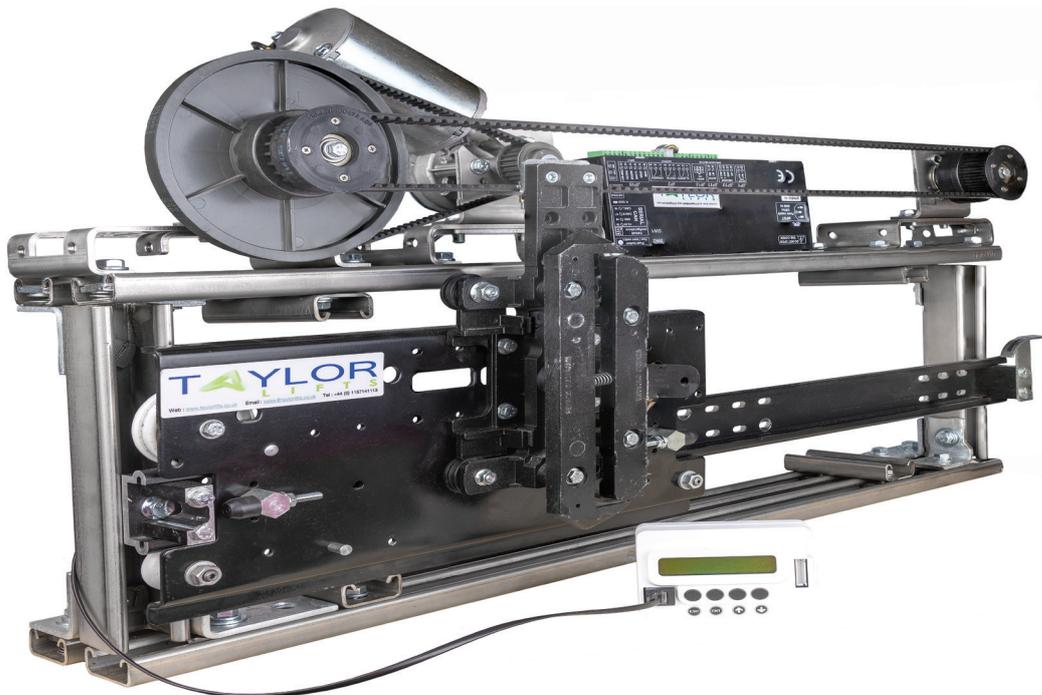
DOOR OPERATOR MANUAL

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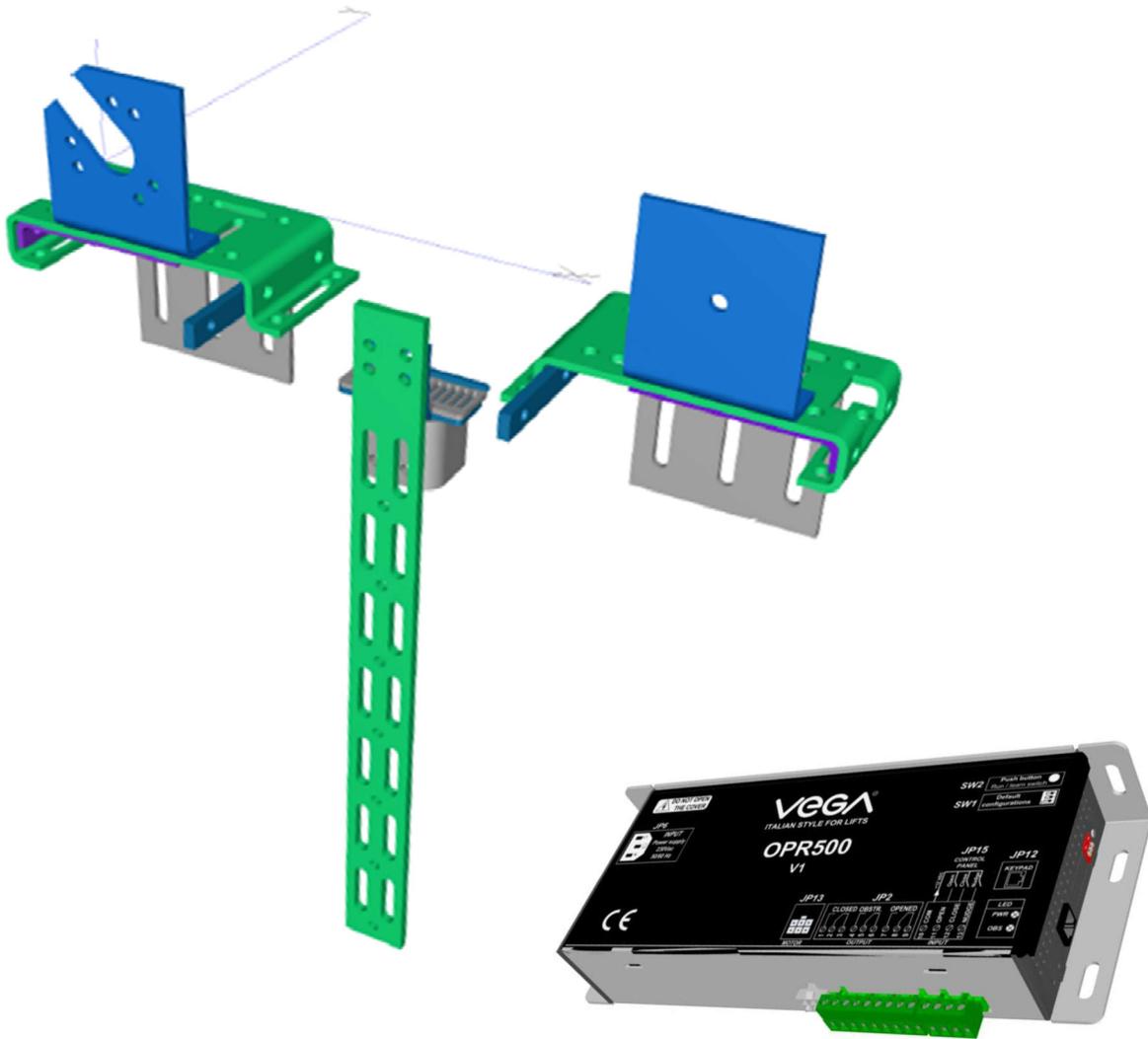
CONTENTS

1.1 PARTS OVERVIEW

		Part Name	TL Part Number	Quantity
1.1		Motor bracket	TL MOTORBRACKET	1
2.1		Mounting bracket	TL MOUNTBRACKET1	2
2.2		Mounting add-on bracket	TL MOUNTBRACKET2	2
3		Stop limit bracket	TL LIMITBRACKET	2
5		Tension bracket	TL TENSIONBRACKET	2
6		Return pulley bracket	TL PULLEYBRACKET	1
7.1		Belt bracket	TL BELTBRACKET	1
7.2		Belt clamp	TL BELTCLAMP	1
8		Door arm	TL DOORCONBRACKET	1
9		Stop connect bracket	TL STOPBRACKET	1
		5mm Toothed belt	TL TOOTHEDBELT	5m
	Motor	ELVI 52W 210RPM (Left or right) KORMAS 100W 230RPM (Left or right) BRUSHLESS 157W 300RPM	TL ELVI52WL **or** TL EL152WR TL KOR100WL **or** TL KOR100R TL BRUSHLESS157W	1
		Control box	TL CONTROLBOX	1
		Keypad	TL KEYPADDO	1

1.2 FIXTURES

Part	Quantity	Part	Quantity
M8x20 FLANGED	12	M6x16 FLANGED	8
M8x16 FLANGED	20	M6 FLANGED NUT	5
M8 FLANGED NUT	14	M6x38	1
M8 NUT	4	M6 FLAT	1
M8x100 BOLT	2	M5x15	1
M8x35 BOLT	1	M5 SPRING	1
M8 STUD CONNECTOR	2	M5 FLAT	1
M8 RUBBER BUFFERS	2		
M8 REPAIR WASHER	8		

1.3 DIMENSIONS

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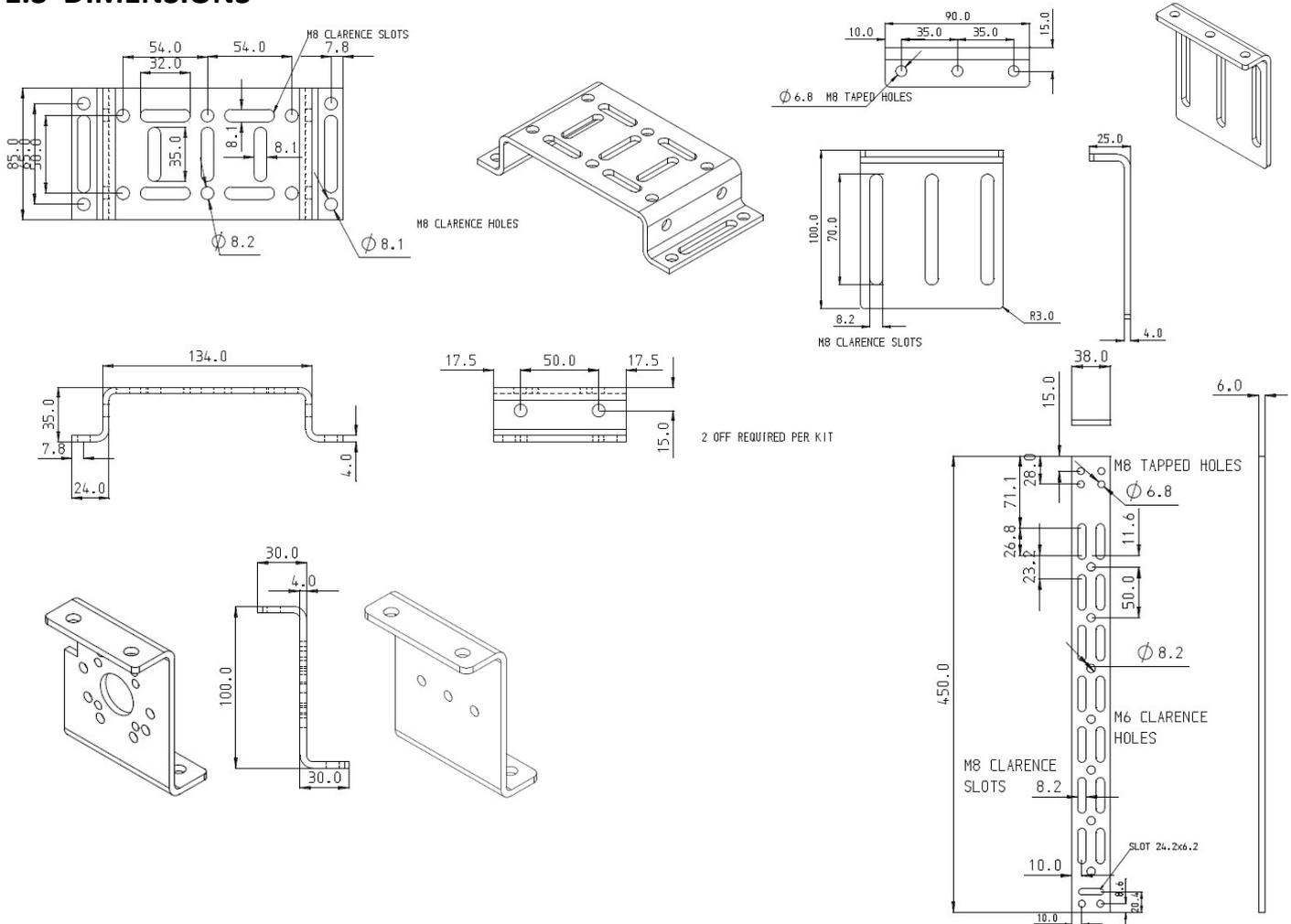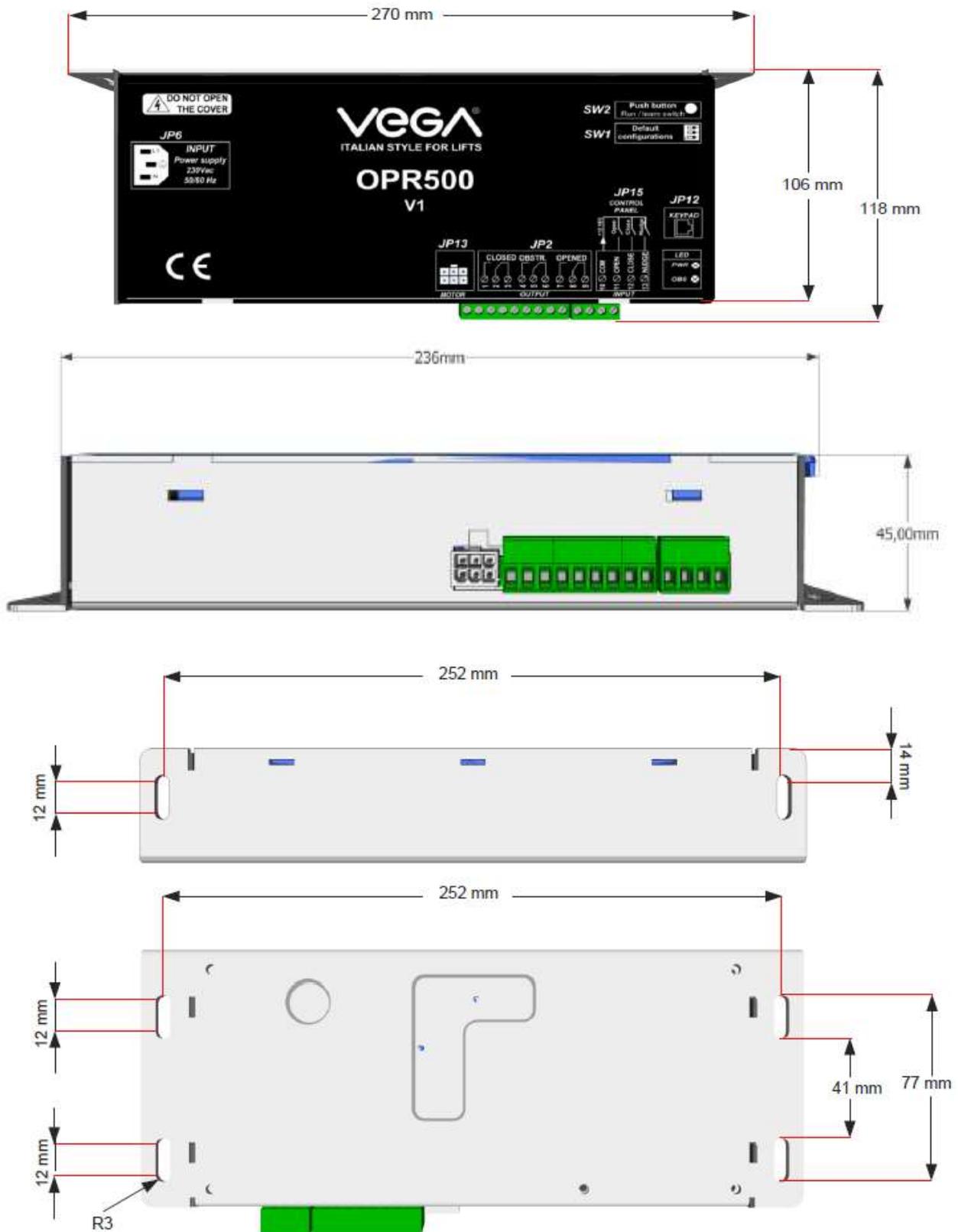
1.4 ASSEMBLY

1. Fix **Mounting brackets** on the car header, making use on the **Mounting add-on bracket** to reinforce if necessary.

2. Fix the **Motor bracket** and **Return pulley bracket** using the **Tension brackets**, one end should be fixed in holes and the other using the slots, allowing for belt tensioning.

3. Fit and tension the **Toothed belt.** (See Belt tensioning)

4. Mount the **Door arm** and **Belt Bracket & Clamp**

5. If there are no permanent existing stops on car door assembly, the **Stop limit bracket** and **Rubber stops** should be fitted to the **Mounting brackets**. The Stop connect bracket should then be fixed to the **Door arm** in the same plane.

6. Fix the **Control box** on top of the car within reach of the **Motor** cabling.

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1.5 TOOTHED BELT

Toothed belts must be tensioned to a defined tension. This will ensure optimum force transfer and extend the service life of the belt and pulley bearings.

At a distance of 1m **(a)**, the deflection should be 16mm **(e)** with an applied force of 18.5N **(F)**
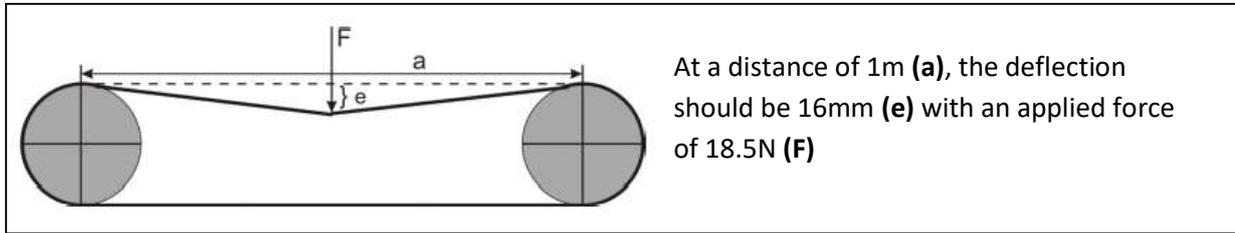
NOTE
A TOOTHED BELT WITH LOW TENSION WILL CAUSE IT TO JUMP FROM THE PULLEY
IF THE TENSION IS TOO HIGH IT WILL REDUCE THE PERFORMANCE OF THE MOTOR

The Toothed belt must also be properly aligned. Check to ensure the pulleys are parallel. The deviation must not exceed an angle of 0.7 °
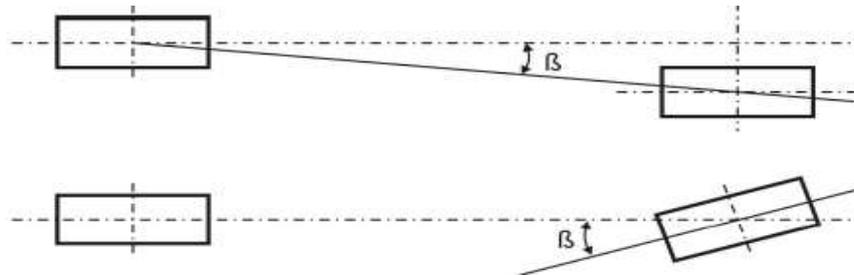
NOTE
IF THE ANGULAR DEVIATION IS EXCEEDED THE PULLEYS MAY BECOME DAMAGED AND THE TOOTHED BELT WILL WEAR PREMATURLY.

2 GENERAL INFORMATION

Power supply	230Vac ±10% (50-60Hz)
Dimension	270mm x 106mm x 45mm
Weight	0,7Kg
Degree of protection	IP20
On board protection	8A
Output relay switching capacity	24VDC 3A
Certification	EN60950
EMC Test	EN12015 and EN12016

PINOUT	
JP1	Connector for emergency power to 24Vdc (battery)
JP2	Connector for output signal ➤ CLOSED ➤ OPENED ➤ OBSTRUCTED
JP6	Mains connection 230V (50/60 Hz)
JP8	NOT USED
JP10	Encoder connector
JP11	Motor connector
JP12	Keyboard plug
JP13	Motor plug
JP15	Connector for input (ONLY CLEAN CONTACT, without voltage) ➤ OPEN ➤ CLOSE ➤ NUDGE
SW1	Dipswitch for default configuration
SW2	Push button: -learn (press for 3 seconds) -Run (open / close) (quick press).
PWR(led)	Normal work◻ GREEN Error➔Red
OBS(led)	Obstruction➔Yellow

3 CONNECTIONS

SW1 PARAMETER DEFAULTS			
3	**2**	**1**	**SETTING**
0	0	0	General
0	0	1	x
0	1	0	x
0	1	1	x
1	0	0	x
1	0	1	x
1	1	0	x
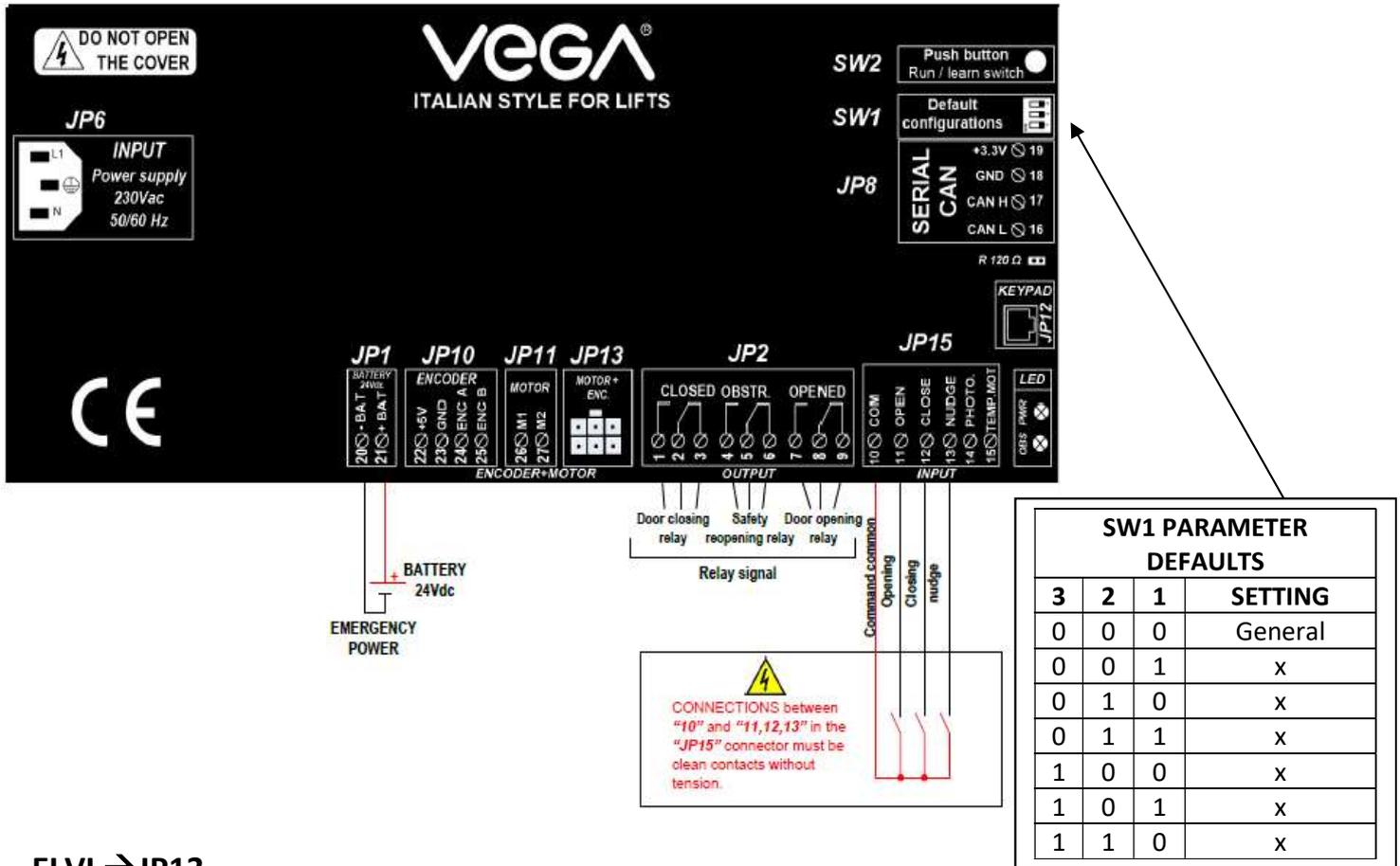
ELVI →JP13

Rated voltage	24 VDC
Maximum speed	220 rpm
Gear ratio	1:26
Encoder resolution (Encoder integrated in GM)	3
Degree protection	IP20
Rated torque	1.5 Nm (2.5 A)
Max. Payload	120KG

KORMAS →JP10-11

Rated voltage	24 VDC
Maximum speed	220 rpm
Gear ratio	1:15
Encoder resolution (Encoder integrated in GM)	100
Degree protection	IP20
Rated torque	5 Nm
Max. Payload	200KG

4 START-UP

1. Leave the motor and encoder disconnected and power up the board (JP6)

2. Set the motor type to suit the motor being used. ELVI70W is standard supplied

3. Power down and Connect the motor and encoder (JP10/ JP11/JP13) then power up. The doors should go in the **closing direction.** If when powering on, the doors go in the opening direction, enter the "OPTIONS" menu on the programmer and set "Motor rotation" to "Reverse". Then turn off the door gear and restart.

4. Check that at the power on, the doors will have to go in **closing direction**. If when powering on, the doors go in the opening direction, enter the "OPTIONS" menu on the programmer and set "Motor rotation" to "Reverse". Then turn off the door gear and restart point 2.
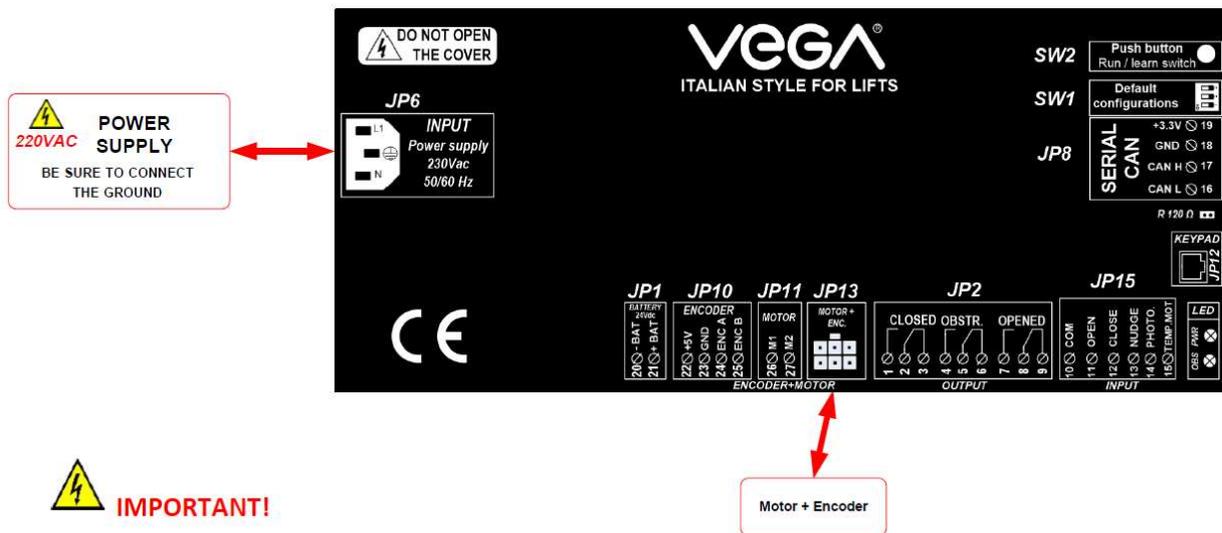
3. Detection of the Point 0 and self-learning

DURING THIS PHASE, VERIFY THAT THE TRAVEL OF THE DOOR IS FREE FROM ANY OBSTACLES AND THAT THE DETECTED POINT 0 ACTUALLY CORRESPONDS TO FULLY CLOSED DOORS. In case of operator with retractable cam, the door can be considered as completely closed, when the retractable cam is closed.

4. SELF-LEARNING

The Self-learning function must be set-up by the installer after the REPHASING process. This is required in order to have the drive memorize the number of encoder pulses corresponding to the door clear opening.

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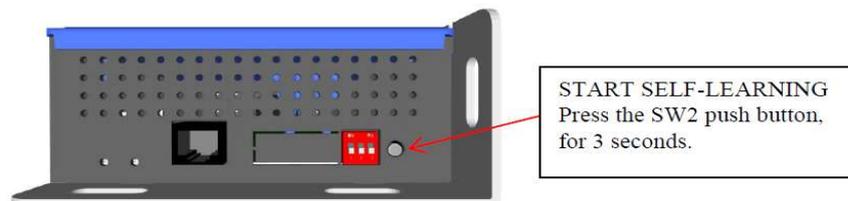
Self-learning procedure must be performed with completely closed doors. During this phase, make sure that the doors travel is free from obstruction. Otherwise, repeat the operation. Once completed the door remains open, waiting for a command. If the learning button is pressed briefly the doors should close or open depending on their position. This can also be done from the commands menu.

5. Setting the resolution

Resolution(pulse/cm) = $Encoder\ pulses$ / Door opening (cm)

The encoder pulses is shown on the home screen when the doors are fully open and the door opening is the full opening distance in cm.

6. The door open and close profiles can now be adjusted to suit.

5 COMMANDS FROM THE CONTROL BOARD OF THE ELEVATOR

5.1 Open

The door opening can be controlled by the elevator control board through the closing of terminals **(10-11) in JP15**, or through the control on the user interface or by pushbutton SW2.

The opening command is ignored in the following cases:

- Searching of Point 0;
- Self-learning phase;
- When the door closing command is active. (in order to accept the open command during the closing phase it is necessary to first interrupt the door close command);
- Alarm on;
- Door closing with Nudge;
- Door closing command from the user interface.

5.2 Close

Door closing can be controlled by the elevator control board through the closing of terminals **(10-12)** in **JP15** or by the command on the user interface or through pushbutton SW2.

The closing command is ignored in the following cases:

- Searching of Point 0;
- Self-learning phase;
- When the door opening command is active.(in order to accept the door closing command during the opening phase it is necessary to first interrupt the door open command).
- Alarm On;
- Door closing with Nudge;
- Door opening command from the programming pad (user interface);
- Safety reopening system is activated;
- Re-opening command from the photocell.

5.3 Nudge

In this mode, the drive performs a forced closing of the door with a safety torque corresponding to the parameter of the safety reopening system (EN 81.1/2 compliance) and at very low speed. Nudge function is optional and, if required, must be controlled from by control board of the elevator, after a certain number of closing doors failed attempts. Normally, along with the nudge function, should be activated an audible signal that warns the passengers in the car of the forced door closing. The function is controlled by closing terminals **(10-13)** in **JP15** and remains active only while the command stays on. Nudge can be enabled during the opening state and while the door is in movement as well. If the command is interrupted before to complete the door closing, the drive performs the opening or closing command from the elevator control board. Without this command, the door remain waiting.

5.4 Safety reopening system

An obstacle between the closing doors will cause a rise in the current. Exceeding the level of the set torque limit causes the doors reopening following the set speed profile. (relay "OBSTR").

OPTIONS→SEC. CL TORQUE→MASTER

When an obstacle is present during the door closing, the door automatically re-opens. If the close command persists, the door will close again and if the obstacle has not been removed then the cycle repeats to infinity unless the door completes the closing operation. The safety reopening is not active in the last 20mm of travel, so if there is an obstacle in this part, the door stops automatically without re-open, signalling the opening limit switch.

OPTIONS→SEC. CL TORQUE→SLAVE

The door stops activating the safety-reopening (relay "OBSTR") and waits for a command from control panel.

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6 KEYPAD

The user interface consists of 4 buttons (ESC, ENTER, ↑and↓) and an alphanumeric display to 16 characters, in two lines.
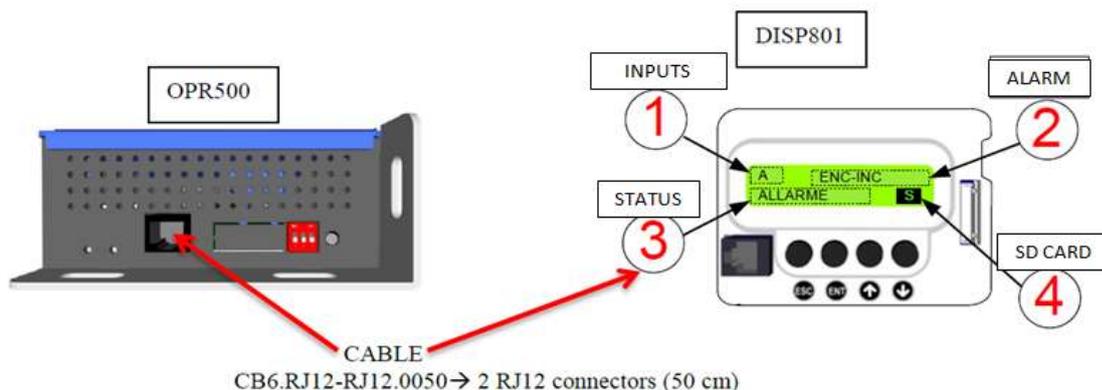
Using the buttons "↑" and "↓" you can select the commands that you want to give and confirm by pressing the ENTER key.

Code	Description	Display position
O	"11 OPEN" input active	1
C	"12 CLOSE" input active	1
N	"13 NUDGE" input active	1
ALARM	Door in fault	2
IXT-PROT	Ixt protection	2
ENC-INC	Incoherence encoder pulses	2
ENC-KO	Encoder connection interrupted	2
OVERTEMP	Current protection engine (C°>90°)	2
OVER-CURR	Overload current	2
ENC:xxxxx	Encoder position	2
REPHASING	Rephrasing to close position to zero encoder count	3
WAITING	Door stopped in open/close cycle, waiting for new command	3
RUNNING	Door in running	3
LEARNING	Self-learning	3
DOOR OPENED	"OPENED" relay activation (JP2→7-8-9)	3
OBSTRUCTION	"OBSTRUCTION" relay activation (JP2→4-5-6)	3
DOOR CLOSED	"CLOSED" relay activation (JP2→1-2-3)	3
S	SD-CARD presence (S=unlocked)	4
E	Error or reading (micro sd card)	4
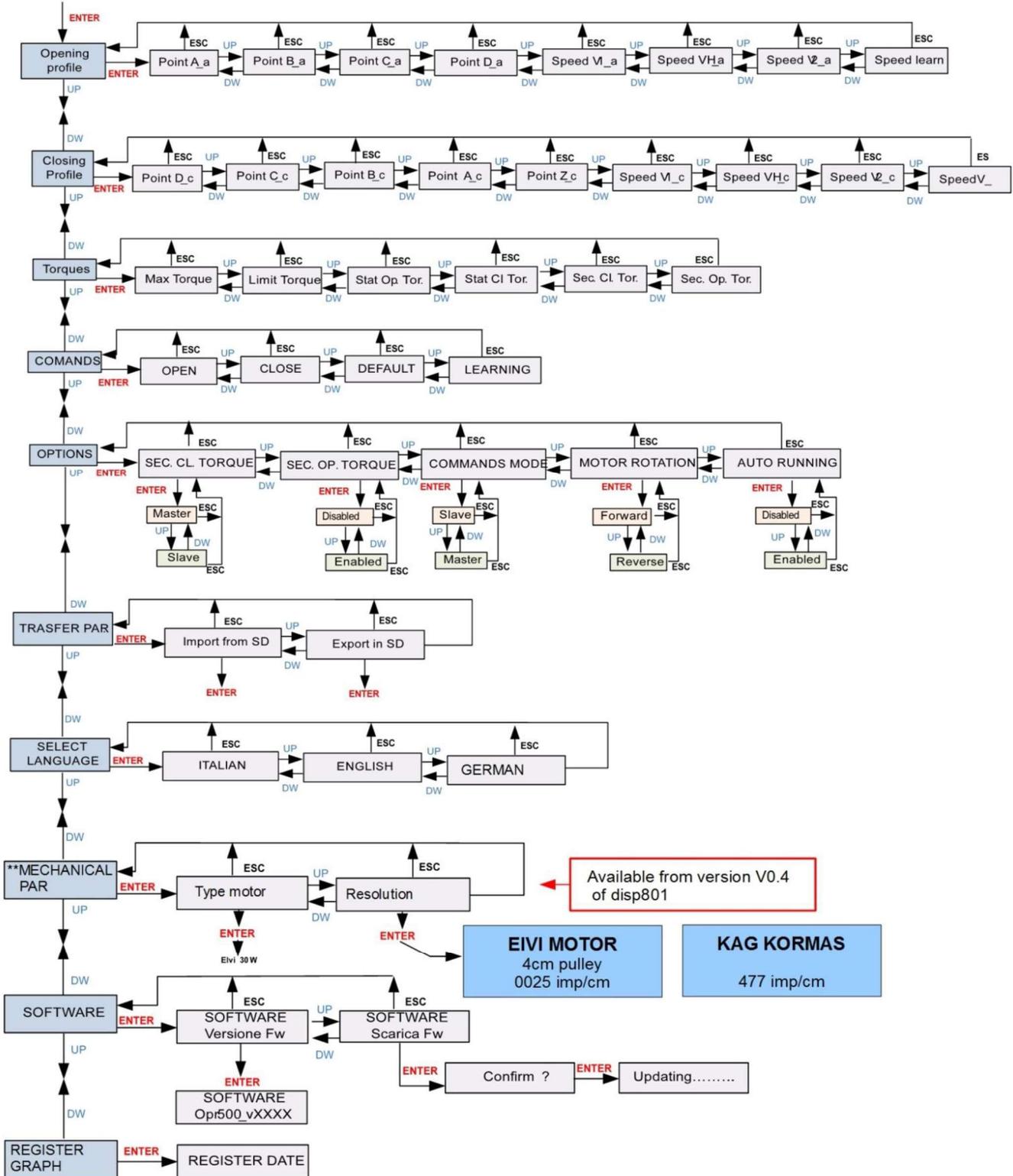
7.1 PROGRAMMING MENU

7.2 OPENING AND CLOSING PROFILE

The value of each parameter is a percentage of the maximum value, scaled from 0-100 in the open and 100-0 in the close.

- The position parameters *A_a, B_a, C_a, D_a, D_c, C_c, B_c, A_c, Z_c* correspond to the points on the diagram below. The values can be altered to change the speed and acceleration of the open and close cycles.
- The speed parameters *v1_a, vH_a, v2_a, v_learn, v1_c, vH_c, v2_c, v_rif* are a percentage of the maximum value, this is 0.4 m/s (calculated for a pulley wheel diameter of 35 mm).
- For torque parameters (Max Torque, Limit Torque, Stat Op. Tor., Stat Cl. Tor., Sec. Cl. Tor., Sec. Op. Tor.) the maximum value is 8A equivalent to a force of 340 N (calculated for a pulley wheel diameter of 35 mm).

For Min. and Max. values please see 9 DEFAULT PARAMETERS
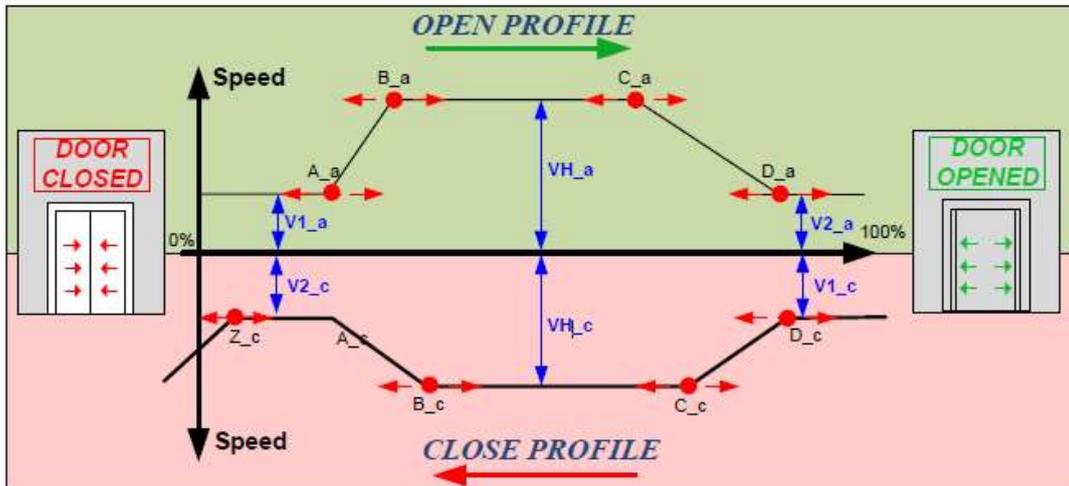
OPENING PROFILE		
Parameters	**Description**	**Default**
Point A_a	Start opening acceleration ramp	008
Point B_a	End opening acceleration ramp	018
Point C_a	Start opening deceleration ramp	075
Point D_a	End opening deceleration ramp	099
Speed V1_a	Coupling cam opening speed	007
Speed VH_a	Maximum opening speed	060
Speed V2_a	End opening speed	004
Speed learn	Learning speed	015

CLOSING PROFILE		
Parameters	**Description**	**Default**
Point D_c	Start closing acceleration ramp	099
Point C_c	End closing acceleration ramp	085
Point B_c	Start closing deceleration ramp	030
Point A_c	End closing deceleration ramp	008
Point Z_c	Additional run closing for mobile coupling cam	005
Speed V1_c	Starting closing speed	005
Speed VH_c	Maximum closing speed	050
Speed V2_c	End closing speed	003
Speed rif	Speed during the initial synchronization	015

7.3 AUXILIARIES ("TORQUES")

Represented by five references of current expressed in percent of the maximum value. The maximum value of the couple's 8 A (Max Force = 340 N).

Maximum Torque default value=095)
This represents the maximum torque that the drive can supply according to the requested speed profile.
Limit Torque (default value=070)
This represents the level of current that must be exceeded in order to acquire the status of completely open or completely closed door, so that the drive will set itself.
Stationary opening torque (default value=020)
It sets the pushing force needed to keep the door open.
Stationary closing torque (default value=005)
It sets the pushing force needed to keep the door closed. Sets the pushing force.
Security Torque in closing ("default value=070)
The security torque is used as a limit level for the safety reopening system in closing. The programmed value is expressed as a percentage of the maximum value that is 10 A.
Security Torque in opening (default value=080)
The security torque is used as a limit level for the safety reopening system in opening. The programmed value is expressed as a percentage of the maximum value that is 10 A.

7.4 COMMANDS

Open and **Close:** Door opening and closing. They have priority over the elevator control board commands.
Save: all interface data is stored in the permanent memory
Default: restore all original settings. The recalled default parameters will be saved in the permanent memory of the microprocessor (Eeprom) only by SAVE.
Self-learning: it allows memorizing the number of encoder impulses corresponding to the door clear opening.#

7.5 OPTIONS

Safety reopening system in closing ("SEC. CL TORQUE")
You can program the working type for the input of safety reopening system in closing:
-Slave: the board indicates the safety reopening system (relay OBSTR) to the control panel and waits for a new command from the control panel.
-Master: the board indicates the safety reopening system (relay OBSTR) to the control panel and reopens automatically.
Safety reopening system in opening ("SEC. OP. TORQUE")
You can enable or disable the reopening system in opening:
ENABLED: If it encounters an obstacle stops signalling the signalling end opening (relay OPENED).
DISABLED: If it encounters an obstacle continues to force the opening until it reaches the limit switch or until the 'activation of IxT protection. 10
Command type ("COMMAND MODE")
This parameter works on opening and closing inputs (11 and 12);
MASTER: a pulse command suffices for opening and closing door operations;
SLAVE: the board need a continuous command to complete opening and closing door operations.

Motor rotation ("ENGINE ROTATION")
This parameter allows you to rotate the engine spin.
Auto-racing ("AUTO RUNNING")
The board will simulate automatically door opening and closing. The inputs are disabled.

7.6 TRANSFER PARAMETERS

You can export and import board parameters on to a micro sd card to either program more than one unit with the same parameters, or view all parameters on as a text file on a pc in Notepad.
IMPORT FROM SD: Transfer the parameters from micro sd card to OPR500 using the keypad.
TRANSFER PAR.→IMPORT FROM SD
 (If present the "par.txt" file).
EXPORT TO SD: Transfer the parameters of the OPR500 to micro sd card of keypad, generating "par.txt" file.
TRANSFER PAR.→EXPORT IN SD

7.7 LANGUAGE

It's possible choose the language at parameter: SELECT LANGUAGE (Italian, English, German)

7.8 SOFTWARE

Once inside the menu, you can see the current firmware version of the board that is currently programmed.
FIRMWARE UPGRADE (OPR500):
1) Insert the "Opr500.hex" file in the Micro SD-CARD (FAT-32 formatted).
2) Insert the micro SD-CARD in the keypad (DISP801) connected to the operator;
3) Enter the Software menu;
4) Press the ENTER key twice (quickly) to enter the Boot menu;
5) Press ENTER to start the update process
6) The update procedure has been completed.
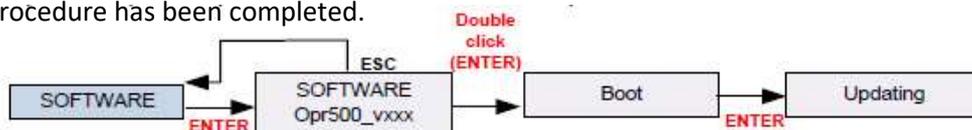
7.9 GRAPHIC RECORDER

Data from the last full open-close cycle can be exported to excel. (grf.cvs file type) Insert the keypad with a micro sd card to export the file.

8 MOTOR HEAT PROTECTION IXT

This function is always active and protects the motor from overloads due to mechanical hardening or obstacles hindering the normal door travel. If the current absorbed by the motor is higher than the set level (5A) for more than 7 sec., the driver is disabled and stands by for 15 sec. , it will then close the door in low speed mode. If closing fails and the current is higher than 5A again, the above described cycle will be repeated. After a third failed attempt, the driver will enter the fault state. If the obstacle is removed, after one regular cycle the counter resets itself.

9 DEFAULT PARAMETRS

OPENING PROFILE				
Parameters	Description	Default	Min.val	Max val
Point A_a	Start opening acceleration ramp	003	000	(B_a) - 3
Point B_a	End opening acceleration ramp	030	(A_a) + 3	(C_a) - 3
Point C_a	Start opening deceleration ramp	070	(B_a) + 3	(D_a) - 3
Point D_a	End opening deceleration ramp	097	(C_a) + 3	100
Speed V1_a	Coupling cam opening speed	005	001	(VH_a) - 3
Speed VH_a	Maximum opening speed	050	V1_a + 3	100
Speed V2_a	End opening speed	005	001	(VH_a) - 3
Speed learn	Learning speed	010	001	025

CLOSING PROFILE				
Parameters	Description	Default	Min.val	Max val
Point D_c	Start closing acceleration ramp	097	(C_c) + 3	100
Point C_c	End closing acceleration ramp	070	(B_c) + 3	(D_c) - 3
Point B_c	Start closing deceleration ramp	030	(A_c) + 3	(C_c) - 3
Point A_c	End closing deceleration ramp	003	(Z_c) + 3	(B_c) - 3
Point Z_c	Additional run closing for mobile coupling cam	000	000	(A_c)-1
Speed V1_c	Starting closing speed	005	001	(VH_a) - 3
Speed VH_c	Maximum closing speed	050	V1_a + 3	100
Speed V2_c	End closing speed	005	001	(VH_a) - 3
Speed rif	Speed during the initial synchronization	005	001	025

TORQUES			
Parameters	Description	Default	Max val
Limit Torque Op.	Limit Torque in opening	050	95
Limit Torque Cl.	Limit Torque in closing	050	95
Stat Op. Tor.	Stationary opening torque	020	95
Stat Cl. Tor.	Stationary closing torque	010	95
Sec. Cl. Tor.	Security Torque in closing	040	95
Sec. Op. Tor.	Security Torque in opening	080	95

OPTIONS		
Parameters	Description	Default
SEC. CL. TORQUE	Safety reopening system in closing	Slave
SEC. OP. TORQUE	Safety reopening system in opening	Disabled
COMMANDS MODE	Command type (Master/slave)	Slave
ENGINE ROTATION	Engine rotation (forward/reverse)	Forward
AUTO RUNNING	Auto racing	Disabled
PHOTO MODE	-	Disabled
BATTERY CHARGER	-	Disabled
NOF CL. RIF-ENC	-	0000

MECHANICAL		
Parameters	Description	Default
MOTOR TYPE	Motor type and size	ELVI 52W
RESOLUTION	Resolution = Encoder pulses/Door opening (cm)	****

10.1 LED DIAGNOSTIC
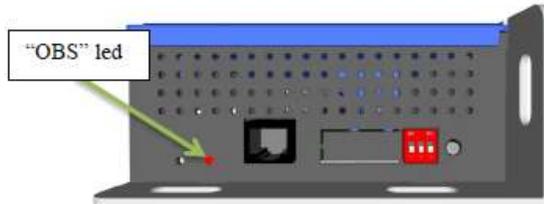
Normal work: PWR→   Green: normal work
Error: PWR→RED: error
Flash code: 3 sec. ON + flash code

```
FLASH CODES
1: ERROR EPROM
2: OVERCURRENT
3: ENGINE NOT CONNECTED
4: ENCODER ERROR
5: IXT ERROR
6: ENGINE IN OVER TEMPERATURE
```

10.2 TROUBLESHOOTING

PROBLEM	SOLUTION
The doors not move / the doors are moving fast and out of control / ENC-KO error on display / Led "PWR" (red), 3 flashes.	Check that the box is powered by 220 Vac ± 10%
	Check the connections between the board and the motor (JP 1-13).
The doors move slowly / ENC-INC error on display / Led "PWR" (red), 4 flashes.	Repeat the self-learning procedure (Chapter 3).
The door not open	Check if the doors are opened through the appropriate command from keypad (Menu→COMMAND→OPEN).
	Make sure the first row of the display if there is a letter "O" that indicates the activation of the opening. (JP15→11 OPEN).
The door not close	Check if the doors are closed through the appropriate command from keypad (Menu→COMMAND→CLOSE).
	Make sure the first row of the display if there is a letter "C" that indicates the activation of the closing (JP15→12 CLOSE).
The doors move in the opposite direction/ At power move in opening	Enter the menu and reverse the direction of rotation changing the parameter **MOTOR ROTATION:** MENU→OPTIONS→ MOTOR ROTAT.→**REVERSE/FORWARD**
The doors slow down late and slam it in opening	Repeat the self-learning procedure (Chapter 3).
	Enter the menu on the item **OPENING PROFILE** and decrease the parameter **C_a** and **D_a**.
	Verify that the belt is not too slow.
The doors slow down late and slam it in closing	Repeat the self-learning procedure (Chapter 3).
	Enter the menu on the item **CLOSING PROFILE** and increase the parameter **B_C** and **A_c**.
	Verify that the belt is not too slow.
The doors often reveal an obstacle (OBSTR.)	Check that the doors haven't defect /locks mechanical in closing.
	Increase the "Sec. CL. Tor" parameter (Menu Torques)
	Repeat the self-learning procedure (Chapter 3).
Ixt PROT error on display/ Led "PWR" (red), 5 flashes.	Check that the doors haven't defect /locks mechanical in opening.
	Increase the "Sec. OP. Tor" parameter (Menu Torques)
	Repeat the self-learning procedure (Chapter 3).

Document History	Date
First draft	12/11/2018
REV 2.0	19/03/19
REV 3.0	02/10/2019

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