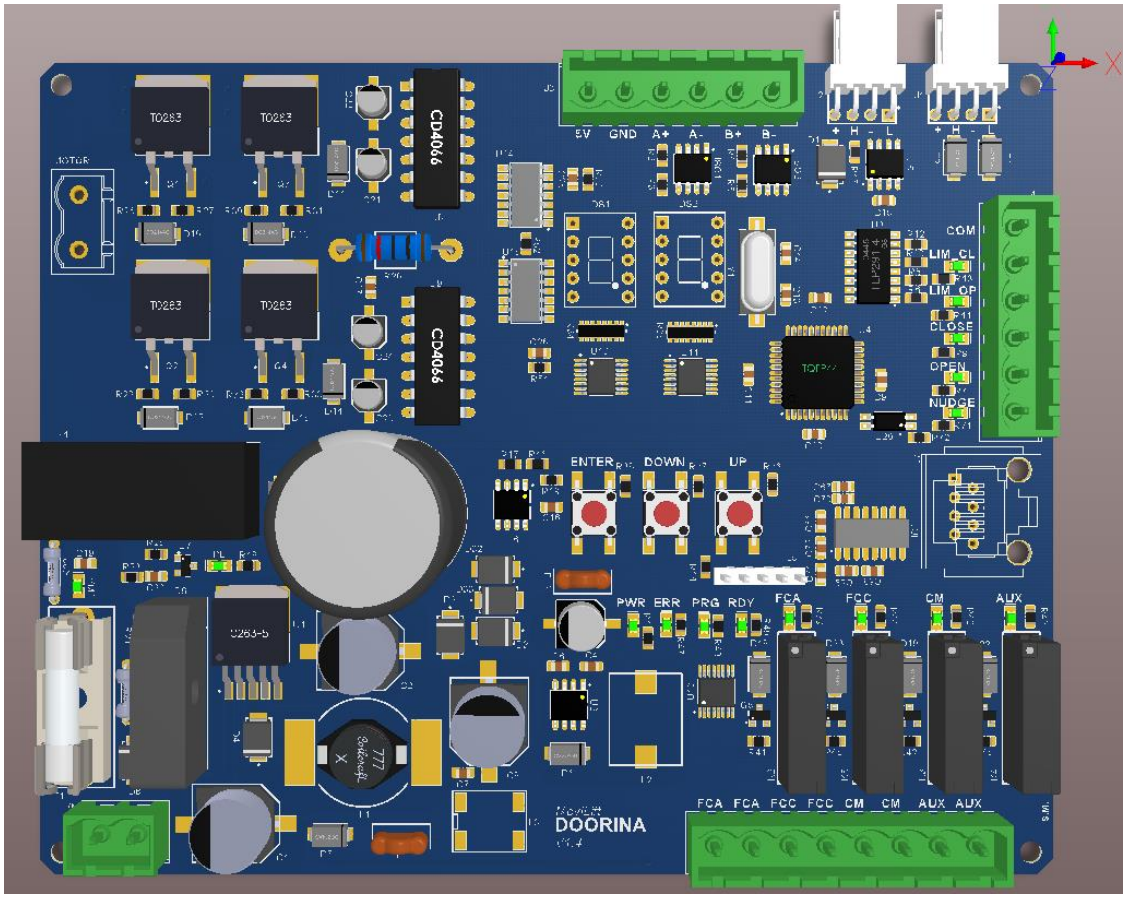
Doorina
v2.3

Electronic door operator



Last modification 27/08/2020

SUMMARY

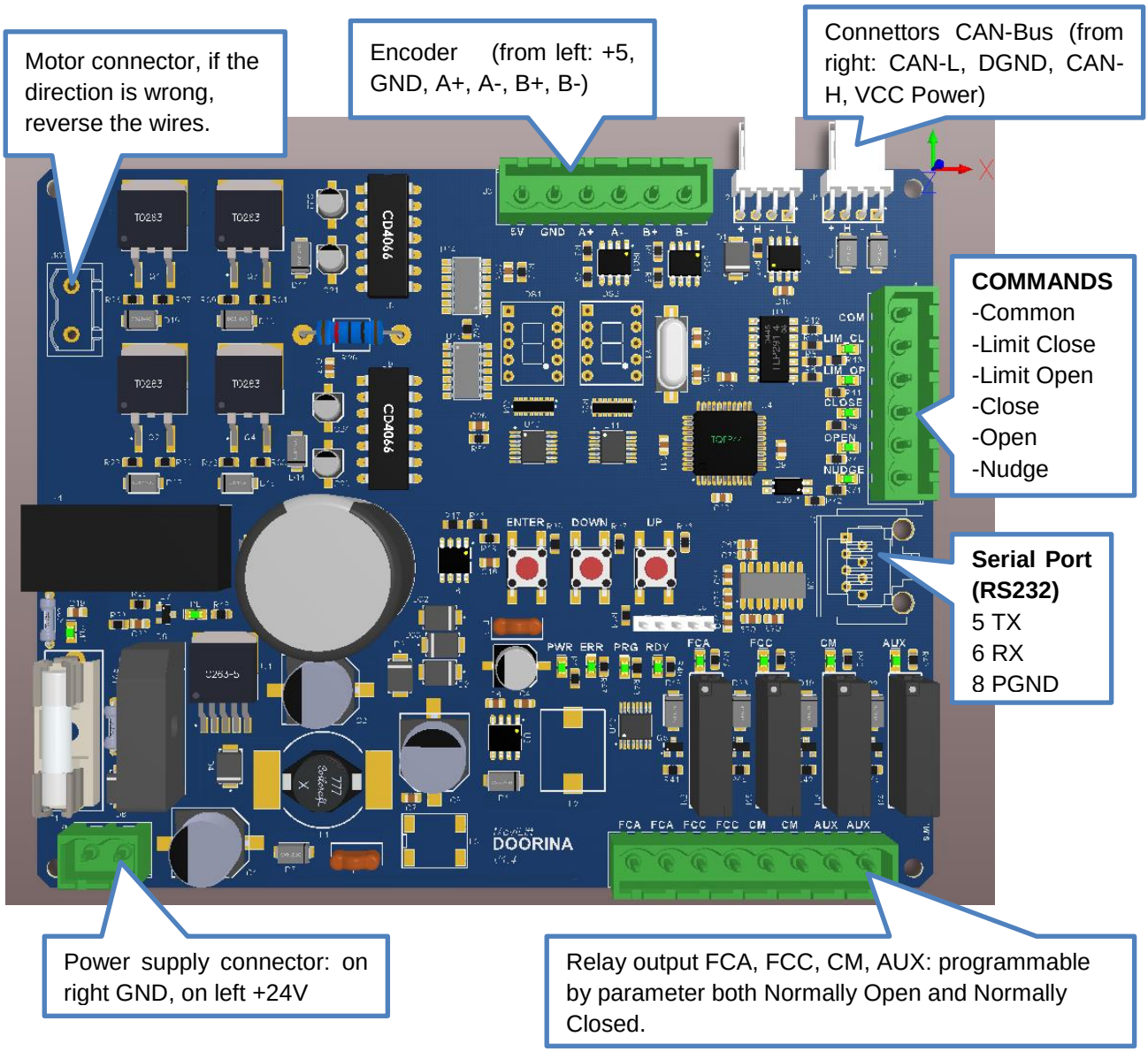
1 PRODUCT INFO

The **Movilift** board **DOORINA** is a product dedicated to control a **DC Motor** in the context of **electronic door operator.**

It receives the commands by control panel and manages opening and closing doors with two different speed profiles. Profiles configuration are made by 3 buttons and 2 displays on board. The control panel commands can be managed both **digital** (always on) and **serial CAN Bus** communication with proprietary protocol.

This manual is for firmware version 'V1.7'.

2 CONNETTORS



N.B. To activate **COMMANDS** is necessary to close the signal with Common.

3 TECHNICAL DETAILS

POWER SUPPLY	24 VDC ± 10%
CURRENT	250mA with no load, 5A with motor running.
PROGRAMMATION	By buttons on board
Fuse on board	6,3A

4 FUNCTIONING

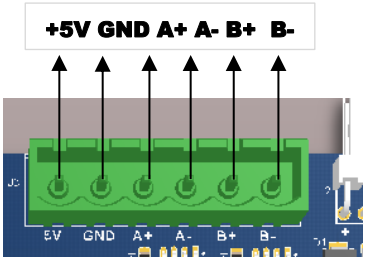
The board **DOORINA** needs an initial phase of **self-learning** to learn the initial position, final position and max speed by encoder. Same thing for limits.

Select the type of operation (encoder, limits, times) by **parameters 33, 34, 35** as shown in this table:

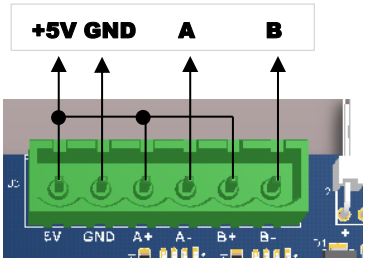
Functioning	Parameter 33	Parameter 34	Parameter 35
Encoder in squaring (whit phases A & B)	1	0	0
Encoder with single phase A	2	0	0
Encoder + End limits opening-closing	1,2	3,4,5,6,7,8	0
Slowdown and acceleration limits	0	1,2	0
Times	0	0	1
Times + End limits opening-closing	0	3,4,5,6,7,8	1

5 FUNCTIONING BY ENCODER

LINE-DRIVE Connection



Push-Pull connection



5.1 Self-learning by Encoder

Self-learning is made automatically when the board power-on the first time when come out from factory, or made by user by appropriate command. Before making self-learning, close the doors manually. The procedure provides:

- Pulses number is reset
- Is set a voltage based on **parameter 37**
- The board make an opening, during which the encoder counter must decrease
- When doors are completely opened the board detects that the encoder count is blocked and that the current rises; the board reset the pulses number.
- After 3 seconds the board make a closing, during which the encoder counter must increase

- When doors are completely closed, the board notes that the encoder counter blocks and the current increase; the board stores in its memory the pulses number like maximum value
- During the opening and closing phase, the board measures the encoder frequency; the greatest value allows to estimate the maximum speed of operator
- Then the parameters 09, 10, 11, 12, 13, 14, 51, 55 are set based on the time taken during opening/closing.

Precautions:

- If user notes that is made a closing before opening, he must reverse the motor polarity on connector (or changing the value of parameter 58) and repeat the procedure
- If board finds an encoder error, the procedure is interrupted and user needs to invert the encoder signals A and B (or changing the value of parameter 39) and repeat the procedure.
- If user notes that doors aren't completely opened or closed, the procedure needs to be repeated after removed any obstacles or after increased the value of parameter 37 "Encoder speed during self-learning".

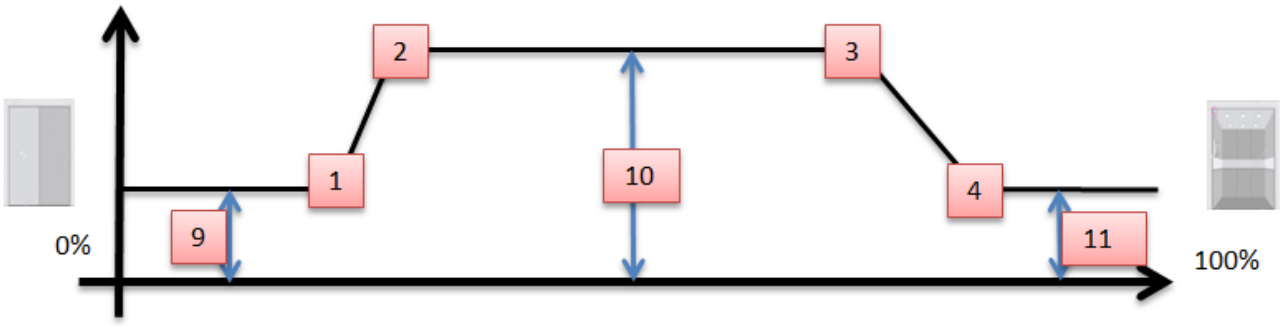
If the procedure is made correctly, the doors must be closed.

5.2 Encoder synchronization

When the self-learning procedure ends successfully, every time the board is turned on it will make a door closing in low speed to synchronize the encoder and set the pulses number with the value stored during self-learning.

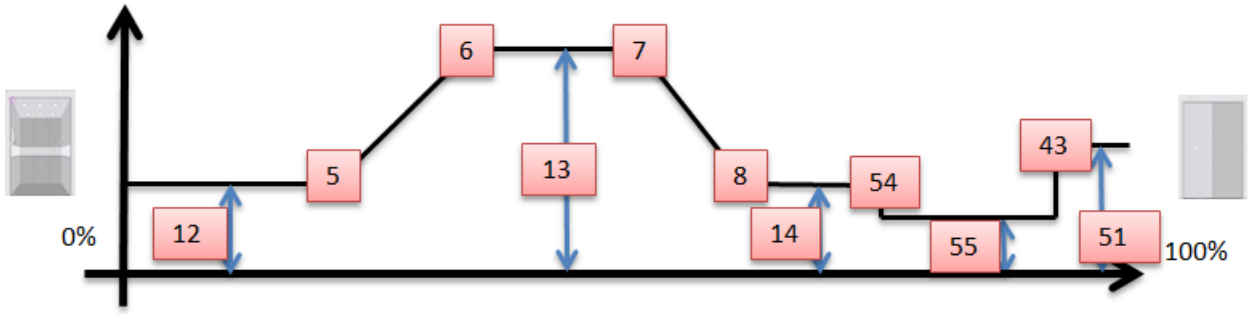
5.3 SPEED PROFILES BY ENCODER

Opening profile with Encoder



In opening, when the board exceeds the pulses of par. 04 it run until the current exceed the value in par. 24; then it is applied the parking torque in par. 25.

Closing profile with Encoder



In closing, when the board exceeds the pulses of par. 43 it finish the Load check and makes the cam closing with the torque of par. 51 until it exceeds the current value in par. 62; then it is appled the parking torque of par. 26.

6 LIMITS FUNCTIONING

In the absence of an encoder it is possible to use the limits. They are two monostable signals in input of the board DOORINA. They are used to check the acceleration and deceleration point. Sometimes it is composed by a magnet on the belt.

6.1 Self-learning by limits

Self-learning is made automatically when the board power-on the first time when come out from factory, or made by user by appropriate command. Before making the self-learning closing the doors manually. The procedure provides:

- is set a voltage based on value of parameter 37
- The board does an opening, during which limit states are checked
- When doors are completely opened the board notice that the current increase
- After 3 seconds, the board does a closing, during which limit states are checked
- When doors are completely closed, the board notice that the current increase
- Then are set the par. 09, 10, 11, 12, 13, 14, 51 based on times that is needed for opening/closing.

Precautions:

- If user notes that is made a closing before opening, he must reverse the motor polarity on connector (or changing the value of parameter 58) and repeat the procedure
- If board finds an encoder error, the procedure is interrupted and user needs to invert the encoder signals A and B (or changing the value of parameter 39) and repeat the procedure)
- If user notes that doors aren't completely opened or closed, the procedure needs to be repeated after removed any obstacles or after increased the value of parameter 37 "Encoder speed during self-learning".

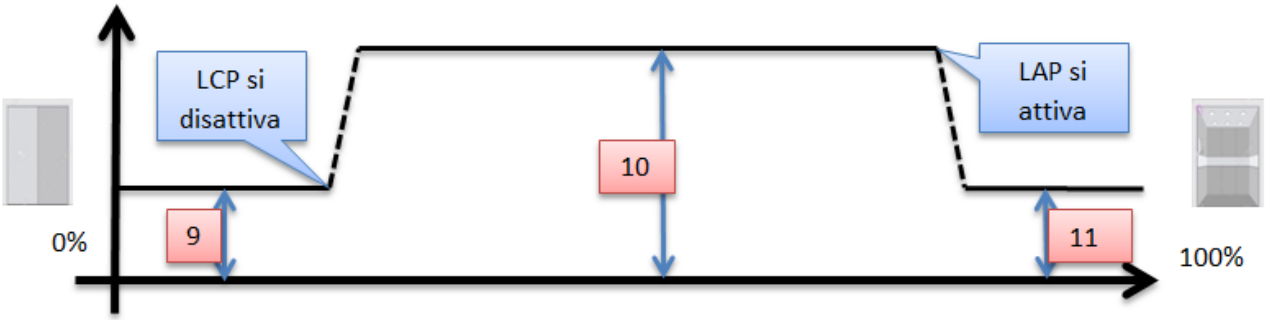
If the procedure is made correctly, the doors must be closed.

6.2 Limits synchronization

When the self-learning procedure ends successfully, every time the board is turned on it will make a door closing in low speed

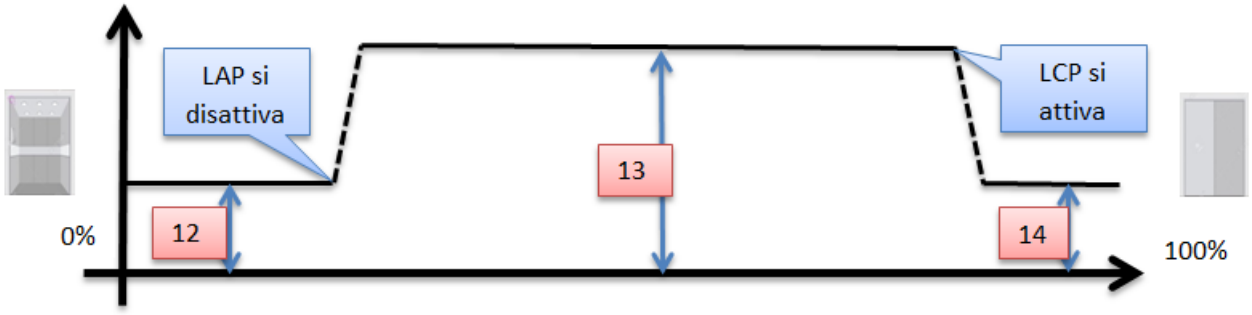
6.3 SPEED PROFILES WITH LIMITS

Opening profile with Limits



In opening, when the board pass the LAP limit, it run until the current exceeds the value in par. 24; then is applied the parking torque of par. 25.

Closing profile with Limits



In closing, when the board pass the LCP limit and the current is more than the current in the par. 62, the board end the load control and make a cam closing for 2 sec. with a torque in par. 26. The slope of the ramps is based on par. 28, 29, 30, 31.

7 TIMES FUNCTIONING

The most common type of operation needs an operator with **Encoder** or **Limits** with slowdown. In case they aren't available or malfunctioning the board can works with **times**.

In the case of an opening or closing command is interrupted before make an open or a closing, at the next command the board run with the selflearning speed.

In the case of an opening or closing command with the doors opened or closed, the command isn't accepted otherwise the partial load signal is activated and the board make the opposite command.

7.1 Self learning by times

Self learning is done automatically the first time it is turned on or by user through appropriate control. Before making the self-learning closing the doors manually. The procedure needs the following points:

- A voltage is set by parameter 37
- The board does an opening
- When the board read that the current exceeds the value in parameter 24, the doors are completely opened.
- After 3 seconds the board made a closing
- When the board read that the current exceeds the value in parameter 62, the doors are completely closed.
- Then are set the par. 09, 10, 11, 12, 13, 14, 51 based on times that is needed for opening/closing.

Precautions:

- If user notes that is made a closing before opening, he must reverse the motor polarity on connector (or changing the value of parameter 58) and repeat the procedure

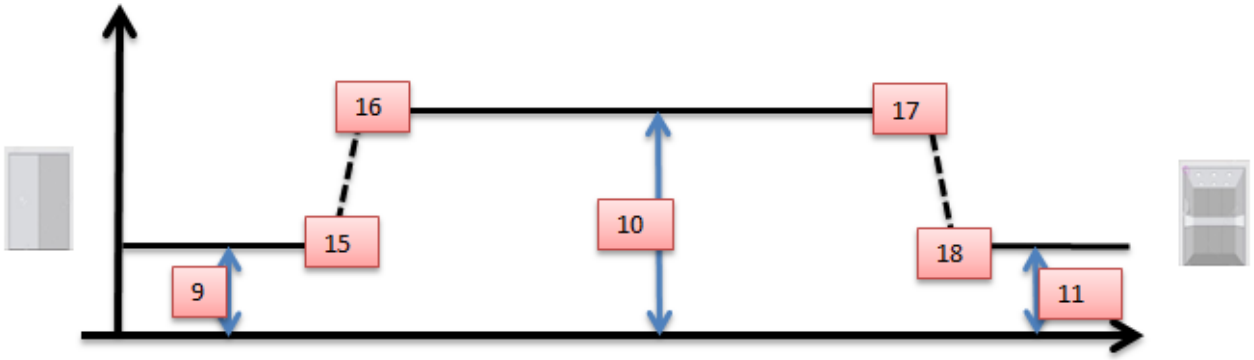
If the procedure is made correctly, the doors must be closed.

7.2 Times synchronization

When the self-learning procedure ends successfully, every time the board is turned on it will make a door closing in low speed until the current exceeds the value in parameter 62.

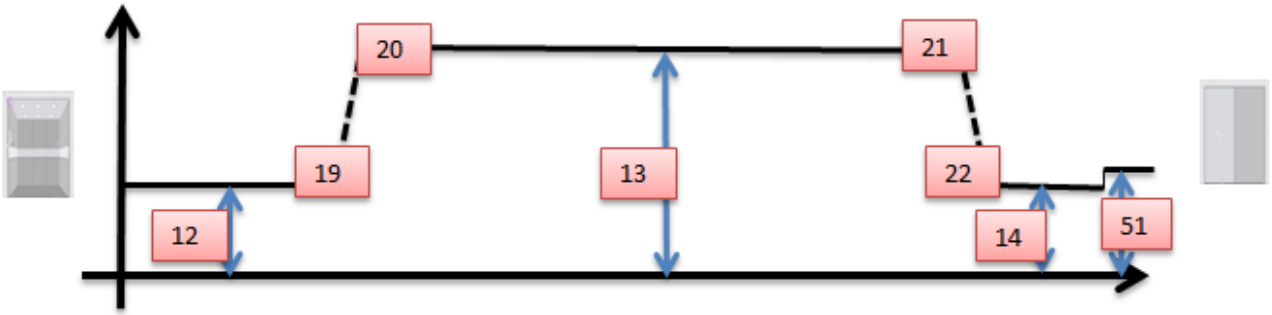
7.3 SPEED PROFILES WITH TIMES

Opening profile with Times



In opening, after the board exceeds the time of par. 18 it run until the current exceeds the value of par. 24; the is applied a parking torque par. 25.

Closing profile with Times



When in closing the board exceeds both the time in par. 22 and the current in par. 62 it stop the load control and make a cam closing for 2 sec. with a torque of par. 51; then is applied a torque fo par.26.

8 FUNCTIONING WITH ENCODER OR TIMES + LIMITS

When Encoder or Times functionings are selected is possible to add another control mechanism based on Limits inputs. In this case they aren't an acceleration or deceleration points. They become the confirmation points of **End opening** and **End closing** after which ends the control of **CM** and starts the **cam** closing. They are priorities instead of encoder information. You can enable only one or both limits, with a signal normally high or low.

9 COSTOLA MOBILE

When the current threshold is over than the **par. 27 'Security torque in closing'** for more than ¼ of second, the closing is interrupted. The control is made from the start of closing until the start of cam closing.

In master mode the closing is interrupted and the doors are automatically opened.

In slave mode the closing is interrupted and the board wait a command. If the closing command remains inserted the board retry another command in 5 seconds. If the command is interrupted and then gave back the board retry instantly.

10 PHOTOCELL

With encoder functioning is possible to enable Photocell input. This input is shared with input '**LIMIT CLOSE'** on **J4 connector**. The enabling is configurable like a "normally opened" or "normally closed" contact. When input is activated, the closing is interrupted and the doors are reopened automatically.

11 CONFIGURATION PARAMETERS

All parameters have a maximum number of 99 because on board are two digit.

Total run space: pulses number measured by encoder during self-learning in maximum closing instead of maximum opening (equal to 0).

Maximum speed: maximum frequency measured by encoder in pulse per second.

Maximum dutycycle value: dutycycle value that allows to apply the entire voltage (24V) on motor.

Number	Meaning	Default 75W	Values
1	**Start ramp acceleration opening**	3	From **0** to **99**, **percentage of the total run space**
2	**End ramp acceleration opening**	30	From **X** to **99**, **percentage of the total run space**
3	**Start ramp deceleration opening**	60	From **X** to **99**, **percentage of the total run space**
4	**End ramp deceleration opening**	97	From **X** to **99**, **percentage of the total run space**
5	**Start ramp acceleration closing**	2	From **0** to **99**, **percentage of the total run space**
6	**End ramp acceleration closing**	35	From **X** to **99**, **percentage of the total run space**
7	**Start ramp deceleration closing**	55	From **X** to **99**, **percentage of the total run space**
8	**End ramp deceleration closing**	90	From **X** to **99**, **percentage of the total run space**
9	**Start speed in opening**	22	From **1** to **99**, **percentage of the maximum speed estimated**
10	**Central speed (Max) in opening**	80	From **1** to **99**, **percentage of the maximum speed estimated**
11	**Final speed in opening**	25	From **1** to **99**, **percentage of the maximum speed estimated**
12	**Start speed in closing**	25	From **1** to **99**, **percentage of the maximum speed estimated**
13	**Central speed (Max) in closing**	60	From **1** to **99**, **percentage of the maximum speed estimated**
14	**Final speed in closing**	25	From **1** to **99**, **percentage of the maximum speed estimated**
15	**Start ramp acceleration opening**		From **1** to **99**, tenths of **seconds.**
16	**End ramp acceleration opening**		From **1** to **99**, tenths of **seconds.**
17	**Start ramp deceleration opening**		From **1** to **99**, tenths of **seconds.**
18	**End ramp deceleration opening**		From **1** to **99**, tenths of **seconds.**
19	**Start ramp acceleration closing**		From **1** to **99**, tenths of **seconds.**
20	**End ramp acceleration closing**		From **1** to **99**, tenths of **seconds.**
21	**Start ramp deceleration closing**		From **1** to **99**, tenths of **seconds.**

22	**End ramp deceleration closing**		From **1** to **99**, tenths of **seconds.**
23	**Max current** Maximum deliverable current to adapt to the required speed profile	50	From **1** to **99**, tenths of **amps.** So default is 5A
24	**Endstop current in Opening** Current threshold that must be overcome to acquire the door status fully open and then pass to stationary currents.	05	From **1** to **99**, tenths of **amps.** So default is 0.5A
25	**Couple stationary open** Allows to set the necessary boost to hold the door open	15	From **1** to **99**, **percentage of the maximum dutycycle value**
26	**Couple stationary close** Allows to set the necessary boost to hold the door close	15	From **1** to **99**, **percentage of the maximum dutycycle value**
27	**Safety pair in closing** Used to control the Obstraction contact in closing.	35	From **1** to **99**, tenths of **amps.** So default is 3.5A
28	**Time between two successive increments ramp during opening**	10	From **1** to **99**, milliseconds needed between two PWM variations. millisecondi richiesti tra due variazioni della PWM. If it is smaller the acceleration is faster.
29	**Time between two successive decrements ramp during opening**	2	From **1** to **99**, milliseconds needed between two PWM variations. millisecondi richiesti tra due variazioni della PWM. If it is smaller the slowdown is faster.
30	**Time between two successive increments ramp during closing**	10	From **1** to **99**, milliseconds needed between two PWM variations. millisecondi richiesti tra due variazioni della PWM. If it is smaller the acceleration is faster.
31	**Time between two successive decrements ramp during closing**	2	From **1** to **99**, milliseconds needed between two PWM variations. millisecondi richiesti tra due variazioni della PWM. If it is smaller the slowdown is faster.
32	**PWM Frequency**	20	From **1** to **XX**, in **Khz**
33	**Enabling Encoder functioning**	1	**0**: encoder disabled **1**: encoder enabled
34	**Enabling Limits functioning**	0	**0**: unmanaged limits **1**: bistable limits– normally closed **2**: bistable limits– normally opened **3**: monostable limits – normally closed **4**: monostable limits – normally opened **5:** only closing limit– normally opened **6**: only closing limit– normally closed **7**: opening/closing limit – normally opened **8**: opening/closing limit – normally closed
35	**Enabling time based functioning**	0	**0**: not managed **1**: managed
36	**Acquisition status**	0	**0**: self-learning not completed correctly **1**: self-learning completed correctly
37	**Speed of Encoder self-**	30	From **1** to **99**, **percentage of the maximum**

	learning		**dutycycle value**
38	**Braking logic**	1	**0**: During the slowdown the motor proceeds by inertia. **1**: During the slowdown the motor is braked.
39	**Encoder rotation direction**	0	**0**: encoder A and B normal **1**: encoder A and B inverted
41	**Enabling Closed Loop**	0	**0**: control of dutycycle **1**: controllo of frequency and current
42	**Automatic run**	0	**0**: Disabled **1**: Enabled
43	**Additional run for closing coupling cam.**	95	From **X** to **99**, **percentage** in tenths of total run space, to be added to **90**. With this default value you get 99.5 percent.
44	**Kp**	10	From **0** to **99**, **thousandths** of PID error.
47	**Obstruction contact in closing**	0	**0: Master** When the threshold of 'Security pair in closing' is outdated, the closing is interrupted and the doors are reopened automatically. **1: Slave** When the threshold of 'Security pair in closing' is outdated, the closing is interrupted and you are waiting for a command.
48	**Commands type**	1	**0: Master** It needs a pulse on inputs to activate the opening and the closing. Though input is no longer active, the operation is completed. **1: Slave** Opening or closing is made only when input is active, when input is no longer active the operation is interrupted. **2: 1line** It uses only opening input. When input is active the opening is activated. When input isn't active the closing is activated. **3: hybrid** Like the slave but during the cam closing it become Master. Useful when the control panel stop the closing command when the closing door security contact is closed.
49	**Obstruction contact in opening**	0	**0: Disabled**: the threshold is not checked **1: Enabled**: when the threshold of "Opening safety pair " is exceeded the opening is interrupted.
50	**Security pair in Opening** It is used like a threshold to control the obstruction contact.	60	From **1** to **99**, tenths of **amps.** So default is 6A
51	**Speed for cam closure**	35	From **1** to **99**, **percentage** of maximum speed estimated.
52	**Relè FCA, FCC state** *(dalla v1.5)*	1	**0**: Normally opened **1**: Normally closed
53	**AUX time activation**	20	**Tenths of secondo** to activate AUX during opening.
54	**Additional deceleration closing point**	99	From **X** to **99**, **percentage** of total run **space**
55	**Additional final speed in**	25	From **1** to **99**, **percentage** of estimated

	closing		maximum **speed**
56	**Enabling CAN interface**	0	**0: Disabled** **1: Enabled**
57	**Port ID** (valid for commands on CAN bus)	1	**1: first door** (door A) **2: second door** (door B)
58	**Motor rotation direction**	0	**0: Forward** **1: Reverse**
59	**Type of keypad commands**	0	**0: Master** It needs a pulse on button to activate opening and closing. Even if the key is released the operation is completed. **1: Slave** Opening or closing is made only when the button is pressed, to release the operation is interrupted.
60	**Display digits** What is shown on two digits when the board isn't in programmation mode or error reporting. *(dalla v1.5)*	01	**00** **..** two dots during the command waiting phase **AP** open, during the opening phase **Co** obstruction contact **CH** close, during closing door **AU** self-learning **01** **Encoder pulses**, two most significant digits **02** **Current**, in mA, two most significant digits **03** **Vbus**, in Volt, two most significant digits **04** Actual speed percentage **05** Encoder Hrz, two most significant digits **06** **Limit zone** **07** **PWM percentage**
61	**Relè CM State** *(dalla v1.5)*	1	**0**: Normally opened **1**: Normally closed
62	**Endstop pair in closing** Current threshold that must be overcome to acquire the completely closed door and pass to stationary currents	5	From **1** to **99**, tenths of **amps.** So default is 0.5A
63	**Enabling Photocell Input**	0	**0: disabled** **1: enabled** – normally closed **2: enabled** – normally opened
64	**Meaning output Relay FCC**	01	**00: Monitoring** **01: Completely closing**

12 BUTTONS AND DISPLAY ON BOARD

The DOORINA board has three buttons, called ENTER, DOWN, UP and two 7-segment LED displays called DS1 and DS2. They allow you to configure and monitor the board without additional external devices.

When the card is turned on, the firmware version, type '2.3', is displayed for a few seconds.

Pressing the UP or DOWN keys will display the two main menus:

- **Pr:** in this menu it will be possible to view/modify the adjustment parameters.

Press **ENTER** to access them. With the **UP** and **DOWN** keys it is possible to navigate through the index of parameters from 1 to 64. By pressing **ENTER** the display will show the current parameter value which can be changed with the UP or **DOWN** keys, then **ENTER** to save. The changes are saved in non-volatile memory and are immediately active, except for par. 33.

- **Co**: Press **ENTER** in this menu to activate three commands:

1. A.C. Press **ENTER** when flashing 'A.C.' is displayed to open and close manually. Pressing 'UP' will execute a manual opening ('AP' flashes), pressing **DOWN** will execute a manual closing ('CH' flashes). Press **ENTER** to return to flashing 'A.C.'.

2. **AU** : Press **ENTER** twice on **'AU'** to start manual teaching.

3. **dE**: Press **ENTER** twice on **'dE'** to load the default configuration.

Note that there is no key with **ESC** function, so to quit it is necessary to wait 10 seconds without pressing buttons.

Press and hold **ENTER** for at least 3 sec. to clear errors.

13 AUTOMATIC RUN

This function allows to execute for an indefinite period of time an opening and closing cycle, with an interval of 3 seconds. When the function is enabled to start a run is necessary that doors are completely closed or completely opened.

14 RELè OUTPUT

The board has 4 relè that show the doors state. **“Enabled”** and **“Disabled”** for relè **FCA, FCC e CM** can be setted like a **“normally closed”** or **“normally opened”** contact based on a parameter. **“Enable”** state on AUX relè is always **“normally closed”**.

FCA	**Opening end stop**: it is active when the doors are opening.
FCC	**Closing end stop**: it is active when the doors are closing.
CM	**Obstruction contact**: it is active when intervenes the reopening phase of the obstruction contact.
AUX	**Auxiliary**: active for a period of time starting from the beginning of the door opening phase. Useful for GONG signal activation. Time can be setted by parameter 53. If the value is 0, the function is off.

If relè FCA and FCC don’t activate when the door is completely open or close, lower the value of parameters 24 an 62.

15 ERRORS

DOORINA board identifies and reports some errors. The presence of at least one error is indicates by from the fixed lighting of the **LED ERR** on board. The error code is visualized on two display, after the word '**Er'**. Errors are shown cyclically every 5 seconds for a second. Errors aren't shown during configuration.

Error code	Meaning
01	**Encoder not working, it doesn't increase or decrease.**
02	**Motor current above the limit for more than 7 seconds**
03	**Opening and closing inputs activated together**
04	**Error during reading EEPROM parameters**
05	**Error during saving parameters in EEPROM**
06	**BUS Voltage error too low** Control the input voltage (24V)
07	**Self-learning not made correctly**
08	**Direction of Encoder rotation wrong** Try to modify parameters 39 and 58
09	**Obstruction contact in closing**
10	**Encoder channel A not working** The board finds no activity on input A but on B is working.
11	**Encoder channel B not working** The board finds no activity on input B but on A is working.
12	**The door was not closed within 30 seconds**
13	**The door was not opened within 30 seconds**
14	**n.a.**
15	**LCP o LAP non-compliant during the opening phase** During opening phase, in self-learning or in function, have been detected the opening/closing limits in a failure state. Try to modify parameter 34.
16	**LCP o LAP non-compliant during the closing phase** During opening phase, in self-learning or in function, have been detected the opening/closing limits in a failure state. Try to modify parameter 34.
17	**Obstruction contact in opening**
18	**LCP e LAP both active** Both the opening and closing limits have been detected active, something inconsistent. Try to modify parameter 34.
19	**Time out during self-learning**
20	**Self-learning values inconsistent** Try to lower parameters 64 and 65
21	**No current during self-learning** Maybe motor not connected
22	**Time out during closing door at the start**
23	**Photocell intervention during door closing phase**
24	**n.a.**
25	**n.a.**
26	**Be careful, the command is interrupted before an opening or a closing**
30	**No CAN bus communication for more than 3 sec.**

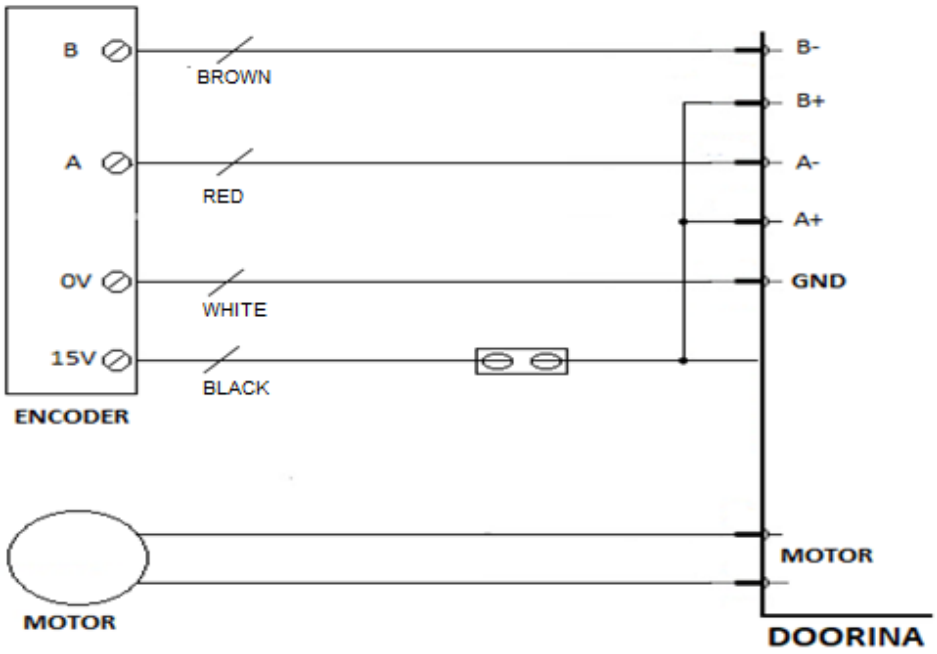
16 SERIAL PORT RS232

On board there is an asynchronous serial communication port RS232. It can be connected on a computer, like as an adapter RS232-USB. A terminal menu is used to access a small menu. The configuration is **9600-N-8-1**.

17 Connection attachments

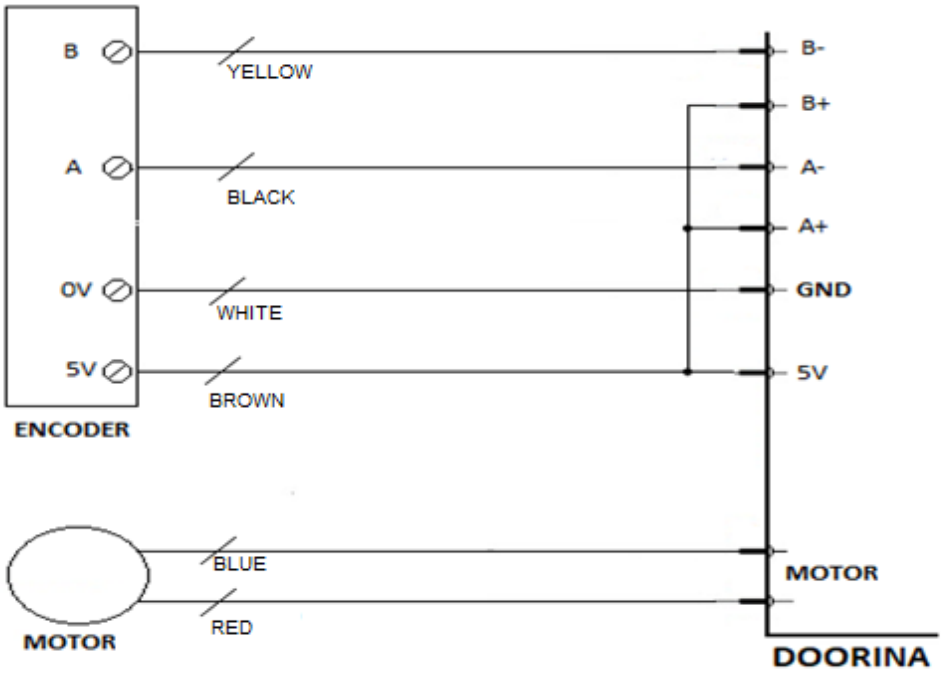
17.1 Victory GMV door operator

Example of connection for Victory GMV door operator with encoder 15Vdc PUSH-PULL



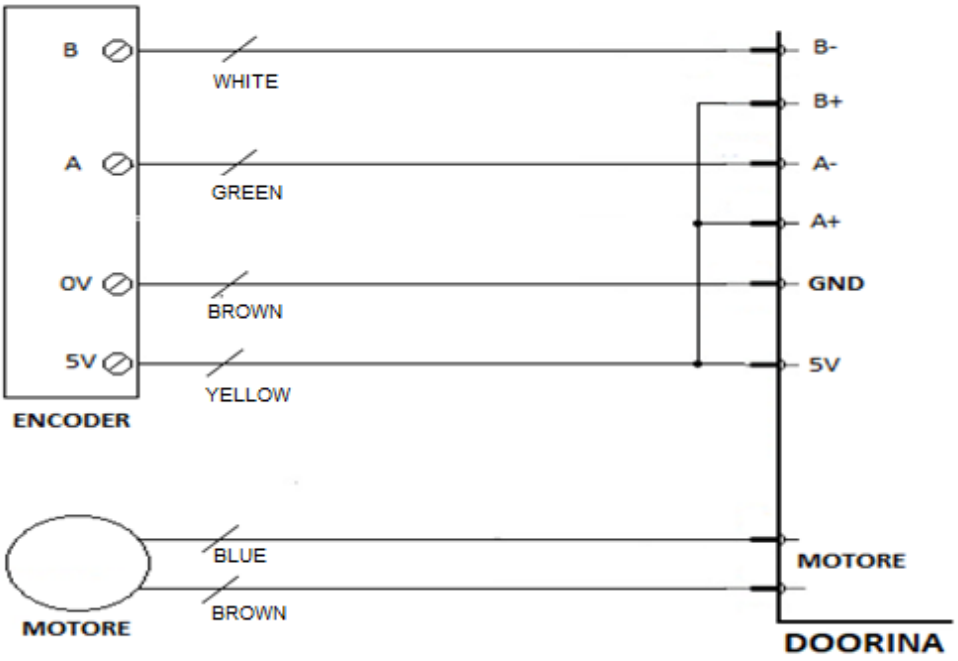
17.2 DAPA – N2S door operatros

Example of connection for DAPA and N2S door operators with encoder 5Vdc PUSH-PULL



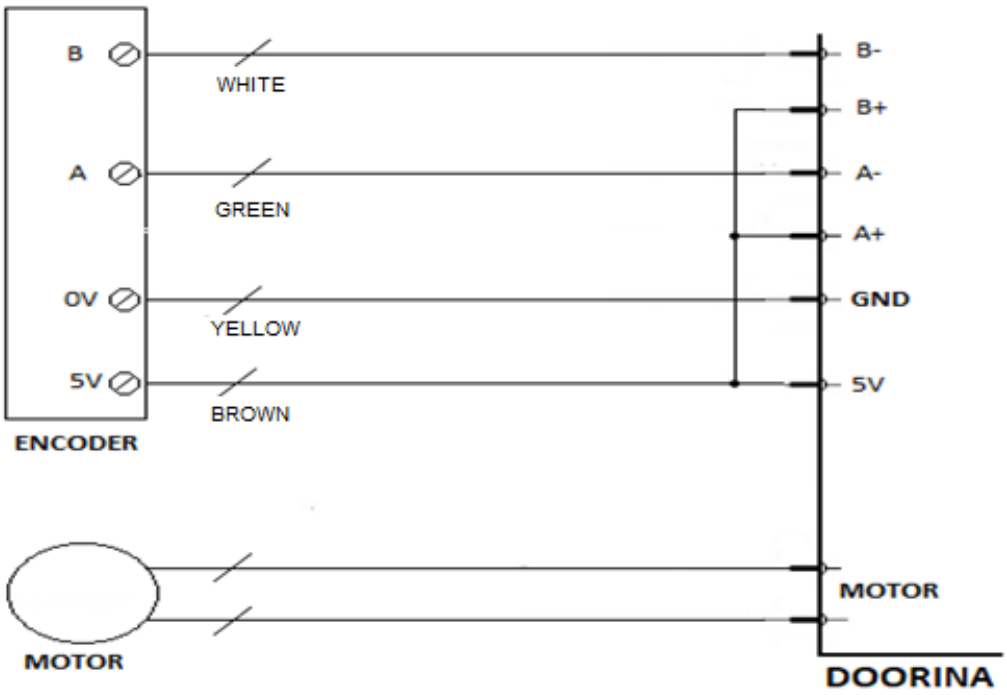
17.3 PRISMA door operator

Example of connection for PRISMA door operator with encoder 5Vdc PUSH-PULL



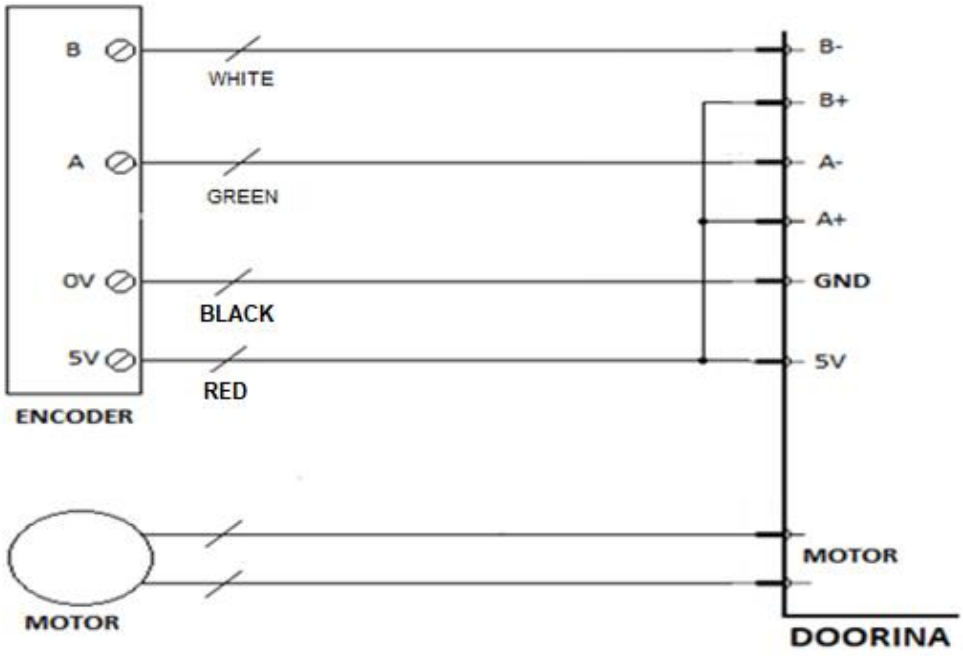
17.4 OTIS AT120 door operator

Example of connection for OTIS AT120 door operator with encoder 5Vdc PUSH-PULL



17.5 OTIS 5001 door operator

Example of connection for OTIS 5001 door operator with encoder 5Vdc PUSH-PULL



IT *Gentile cliente, La ringraziamo per aver acquistato i nostri prodotti. Prima dell'installazione e dell'utilizzo La preghiamo di leggere attentamente questo manuale.*

EN *Dear customer, Thank you for purchasing our products. Before installation and use, please read this manual carefully.*

FR *Cher client, merci d'avoir acheté nos produits. Avant l'installation et l'utilisation, veuillez lire attentivement ce manuel.*

ES *Estimado cliente, Gracias por adquirir nuestros productos. Antes de la instalación y el uso, lea este manual detenidamente.*

PT *Prezado cliente, Obrigado por adquirir nossos produtos. Antes da instalação e uso, leia este manual cuidadosamente.*

DE *Sehr geehrter Kunde, vielen Dank für den Kauf unserer Produkte. Lesen Sie dieses Handbuch vor der Installation und Verwendung sorgfältig durch.*

CS *Vážený zákazníku, děkujeme vám za zakoupení našich produktů. Před instalací a použitím si prosím pečlivě přečtěte tento návod.*

SK *Vážený zákazník, ďakujeme vám za zakúpenie našich výrobkov. Pred inštaláciou a použitím si pozorne prečítajte tento návod.*

RU *Уважаемый покупатель! Благодарим вас за покупку нашей продукции. Перед установкой и использованием внимательно прочтите это руководство.*

RO *Stimate client, Vă mulțumim că ați cumpărat produsele noastre. Înainte de instalare și utilizare, vă rugăm să citiți cu atenție acest manual.*

HU *Kedves vásárló, köszönjük, hogy megvásárolta termékeinket. Telepítés és használat előtt olvassa el figyelmesen ezt a kézikönyvet.*

NL *Beste klant, Bedankt voor het aanschaffen van onze producten. Lees deze handleiding aandachtig voor installatie en gebruik.*

PL *Szanowny Kliencie, dziękujemy za zakup naszych produktów. Przed przystąpieniem do instalacji i użytkowania należy uważnie przeczytać niniejszą instrukcję.*

AR *ال دا يل هذا قـ راءة يـ رجى ، والا سـ تخدام ال تـ ثـ بـ يت قـ بل .م ـ ن تجاتـ نا شراء ع لى ل ك شكرًا ، ال عم يل عزيـ زي .يـ عـ نايـ ة*