ONDRIVE ED07

Automatic Door Controller

User Manual

Model	**:**	ED07
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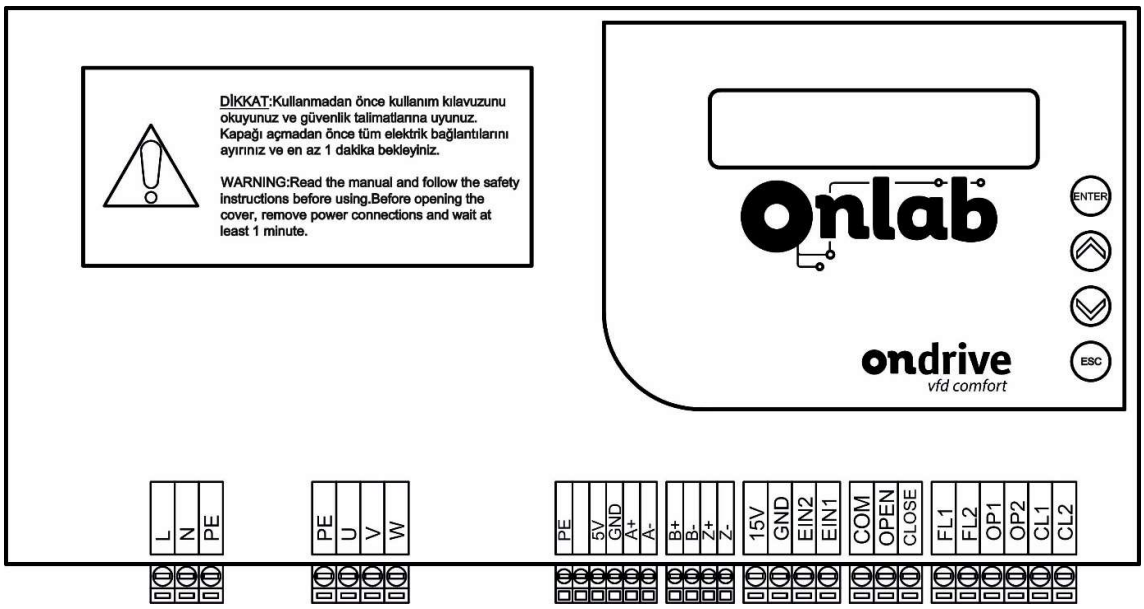
GENERAL VIEW



Connector Descriptions

GRID	**L:**	220Vac Line
	N:	220V AC Neutral
	PE:	Earth
MOTOR	**PE:**	Earth
	U:	U Phase
	V:	V Phase
	W:	W Phase
ENCODER	**PE:**	Earth
	5V:	(+) supply for encoder
	GND:	(-) supply for encoder
	A+:	A+ channel of encoder
	A-:	A- channel of encoder
	B+:	B+ channel of encoder
	B-:	B- channel of encoder
	Z+:	Z+ channel of encoder
	Z-:	Z- channel of encoder

	15V:	15V supply (+) terminal for input signals
	GND	15V supply (-) terminal for input signals
INPUT	**EIN2:**	Programmable input 2
	EIN1:	Programmable input 1
	COM:	Common terminal for open/close signals
	OPEN:	Open signal input
	CLOSE:	Close signal input
OUTPUT	**FL1:**	Common terminal of fault relay
	FL2:	NO terminal of fault relay
	OP1:	Common terminal of “door opened” relay
	OP2:	NO terminal of “door opened” relay
	CL1:	Common terminal of “door closed” relay
	CL2:	NO terminal of “door closed” relay

**Mechanical dimensions of the product are given in another document on Onlab website.*

TECHNICAL SPECIFICATIONS

GRID	**Nominal Voltage**	220 V_{ac}
	Voltage Tolerance	170 -264 V_{ac}
	Frequency Tolerance	50/60 Hz ±%5
	Internal Fuse	2 A
MOTOR	**Type**	PMSM
	Maximum Output Power	150 W
	Nominal Current	0,7 A_{rms}
	Output Frequency	0 – 120.0 Hz
	Control Method	Vector control
	Short Circuit Protection	Yes
ENCODER	**Encoder Type**	3 channels incremental
	Encoder Resolution	100-2048 ppr
	Encoder Voltage	5 V_{dc}
USER INTERFACE	**Language Options**	Turkish / English
	Screen	2x16 Character LCD
	Button	4 buttons
	Warning Sound	Buzzer
INPUTS	Open the door	
	Close the door	
	Programmable input 1 (Nudging / Photocell)	
	Programmable input 2 (Photocell / Nudging)	
OUTPUTS	Fault relay (5A @ 250V_{ac} or 30V_{dc})	
	Door opened relay (5A @ 250V_{ac} or 30V_{dc})	
	Door closed relay (5A @ 250V_{ac} or 30V_{dc})	
ERROR TYPES	Press detected	
	Module error	
	Encoder V_{CC} error	
	High V_{dc} error	
	Low V_{dc} error	
Maximum door speed		80 cm/s
Operating Temperature		-20 ~ +60 °C
EMC Approval		EN 12015 / EN 12016

CABLE CONNECTIONS AND PROPERTIES

It is recommended to use 3x0,3mm^2 stranded wire to connect GRID connector.

Cable that will be used to connect MOTOR connector should be 3x0,5 mm^2 stranded wire and cable length should be smaller than or equal to 1,75m.

Motor cable connection must be done with the correct order according to the colors given below. Otherwise, the device will give an error and cannot move the door.

Colors of Motor Cable		
U	:	Blue
V	:	Red
W	:	Brown

Cable that will be used to connect ENCODER should be 8x0,22mm^2 stranded wire and cable length should be smaller than or equal to 1,75m. It is strongly advised to use shielded cable for encoder connection and shield of this cable can be connected to PE terminal if it is needed.

Encoder cable connection must be done with the correct order according to the colors given below. Otherwise, the device will give an error and cannot move the door.

Colors of Encoder Cable		
+5V	:	Red
GND	:	Brown
A+	:	Yellow
A-	:	Green
B+	:	White
B-	:	Blue
Z+	:	Grey
Z-	:	Pink

Cable that will be connected to the INPUT and OUTPUT terminals can be in various lengths that can be adjusted according to the application and place it is mounted.

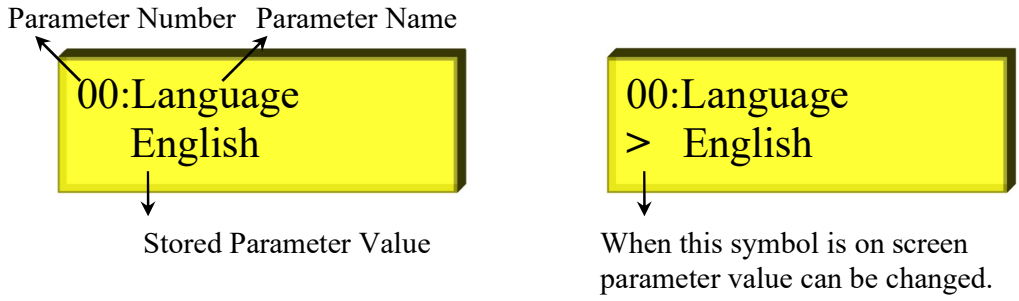
BUTTON DEFINITIONS IN INSPECTION MODE AND USAGE INFORMATION

- Upper line of LCD screen shows the status of the door. Door speed (V=XX cm/s) is shown in the left of lower line and position of the door (P=XXX cm) is shown in the right side of the lower line.
- After initial power-up of the device, door moves with learning speed to the opening direction if there is no CLOSE signal and it moves to the closing direction if there is a CLOSE signal. In the meantime, position info is not known, so it is written as "---" to the LCD screen.
- Device will get into "Inspection" mode by pressing the ENTER button. At that mode motor is deenergized and door waits at its current position. This will enable the operator to adjust mechanical settings of the door without cutting out the electricity of the device. At that mode there are some functionalities of ENTER, UP and DOWN buttons. Those functionalities of the buttons are described below. Please press the ESC button to get out of "Inspection" mode.
- Device gets into "Manual Motion" mode if ESC button is pressed. At that mode door moves to closing direction if the UP button is hold as pressed and door moves to opening direction if the DOWN button is hold as pressed. It is needed to press ENTER button to get out from "Manual Motion" mode.

ENTER	= By holding this button pressed for 2 seconds, "Programming Mode" will be active.
UP	= If this button is pressed, Total Run number of the door is shown on the LCD screen for 5 seconds.
DOWN	= If this button is pressed, learning process starts. Firstly, the door moves to opening direction. After it reaches to completely opened position, door moves in closing direction. During learning process, encoder value is displayed on upper right part of the LCD screen.
ESC	= When this button is pressed, device gets out of "Inspection" position.

PROGRAMMING (Ver:1.01)

For getting into "Programming" mode of ONDRIVE board, firstly it needs to be pressed to ENTER button and take the device into "Inspection" mode. Then, holding the ENTER button pressed programming can be started.



- Desired parameter can be selected using DOWN and UP buttons.
- For getting out "Programming Mode", ESC button should be pressed in main menu. Then LCD screen shows "Exit ->ENTER" "Return ->ESC". When ENTER button is pressed, device

gets out from “Programming Mode”. Otherwise, if ESC button is pressed, device returns into previous menu.

- Pressing ENTER button in main menu, displayed program can be started.
- If the program has a parameter value, an arrow is displayed at the beginning of lower LCD line. Parameter value can be changed via DOWN and UP buttons. When ENTER button is pressed, displayed value is stored. Otherwise, if ESC button is pressed previously stored value is stored again.

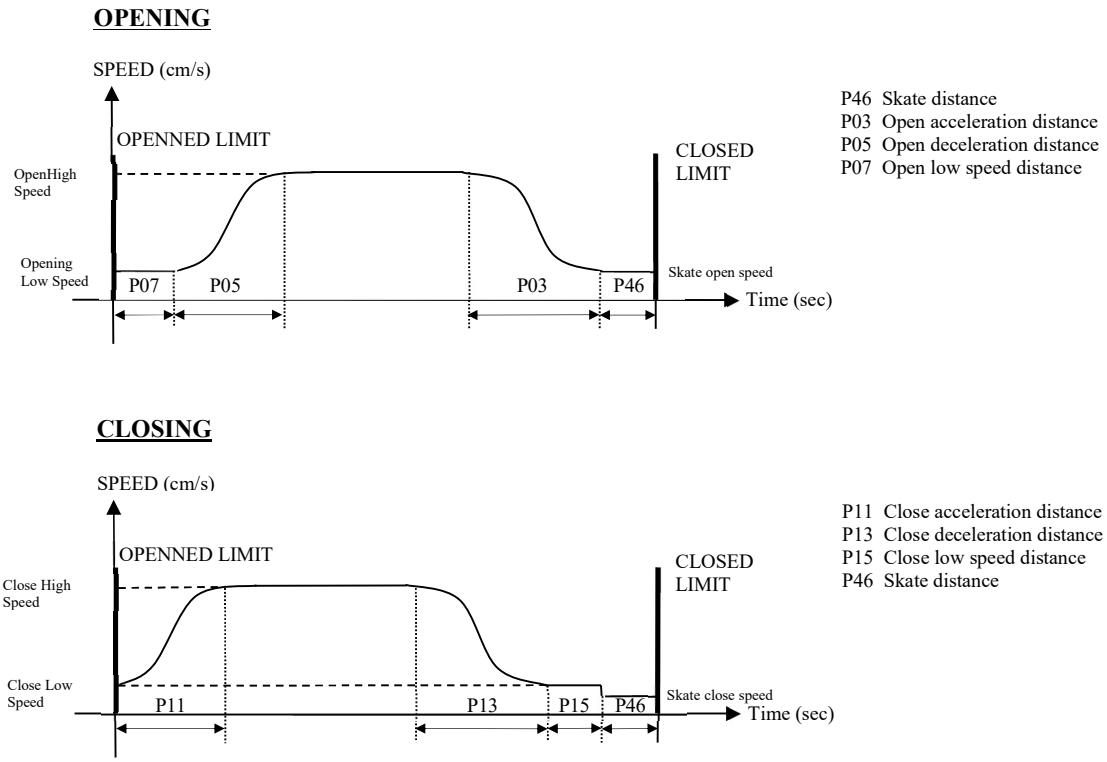
Program	**Factory Settings**	**Parameters / Explanations**
00: Language	Turkce	Turkce – English
01: Open HighSpeed	35 cm/s	20-80 (High speed level while opening)
02: Open LowSpeed	5 cm/s	2-19 (Low speed level while opening)
03: Op. Acc. Dist.	20 cm	5-90 (Total distance of acceleration region while opening)
04: Op. Acc. Jerk	5 cm	1-40 (Distance of acceleration jerk region while opening)
05: Op. Dec. Dist.	15 cm	5-90 (Total distance of deceleration region while opening)
06: Op. Dec. Jerk	5 cm	1-40 (Distance of deceleration jerk region while opening)
07: Op.LowSpdDist	2 cm	1-90 (Distance of low speed region while opening)
08: Op.Pres.Level	% 60	20-100 (Pressure level while opening. % of motor nominal current)
09: Cl.High Speed	25 cm/s	20-80 (High speed level while closing)
10: Cl.Low Speed	5 cm/s	2-19 (Low speed level while closing)
11: Cl.Acc.Dist.	20 cm	5-90 (Total distance of acceleration region while closing)
12: Cl.Acc.Jerk	5 cm	1-40 (Distance of acceleration jerk region while closing)
13: Cl.Dec.Dist.	15 cm	5-90 (Total distance of deceleration region while closing)
14: Cl.Dec.Jerk	5 cm	1-40 (Distance of deceleration jerk region while closing)
15: Cl.LowSpdDist	5 cm	1-90 (Distance of low speed region while closing)
16: Cl.Pres.Level	% 45	20-100 (Pressure level during closing. % of motor nominal current)
17: Run InputType	Open - Close	Open - Close, Close (Selection of door operation with inputs.)
18: Limit Relays	Open Contact	Open Contact, Close Contact (Selection of limit relay operation when reached to limit)
19: Fault Relay	Open Contact	Open Contact, Close Contact (Fault relay operation if an error or photocell signal is detected)
20: Demo Mode	0 s	0 – 30 (Time for demo operation. 0 means demo is cancelled. Any value other than 0 runs the door in demo mode in which door opens and closes consecutively whatever the input signals are. At opened limit and closed limit door waits for selected time.)
21: SetUserPassw.		(User password can be set.)
22: CancelU.Pass?		(User password is changed with 0000 and cancelled)
23: Cl.LowSpdPres	% 45	20-100 (Pressure level at closing low speed region. % of motor nominal current)
24: EIN1 Input	Nudging	Nudging / Photocell
25: EIN2 Input	Photocell	Nudging / Photocell
26: Door Type	Telescopic	Telescopic-Central-Internal
27: Motor Type		Motor 1-Motor 2- Motor 3 (This parameter cannot be modified, preprogrammed by Onlab according to the motor type the driver is matched at the production)
28: Working Mode	NORMAL	NORMAL / SOFT CLOSE (If this parameter is selected as SOFT CLOSE, door press level does not exceed 150 N during closing operation)
29: Encoder Match	Passive	Active-Passive (After the serial production in Onlab, encoder matching process is done. Drivers are sent to the customer after this operation.)
Manufact. Set.		CAUTION! Only the door manufacturer can reach those parameters.
99: Factory Set ?		(If this parameter is set, all of the parameter values will be reset to factory settings.)

**Factory Setting values can be different in customer specific software.*

USER PASSWORD SETTINGS

The user can set a password for accessing to the “Programming” mode of ONDRIVE board. The user password is not active initially. The password can be set in menu 21 and can be cancelled in menu 22. After 5 consecutive failed attempts, “Programming” mode of ONDRIVE board will be blocked. To unlock the “Programming” mode of ONDRIVE board, the user needs to enter 6 digits PUK code. This PUK code is generated from the serial number of the ONDRIVE board. The manufacturer and user PUK codes are different. The user should contact the Onlab technical service team to get the PUK code.

MOTION PROFILES



Motor Types :

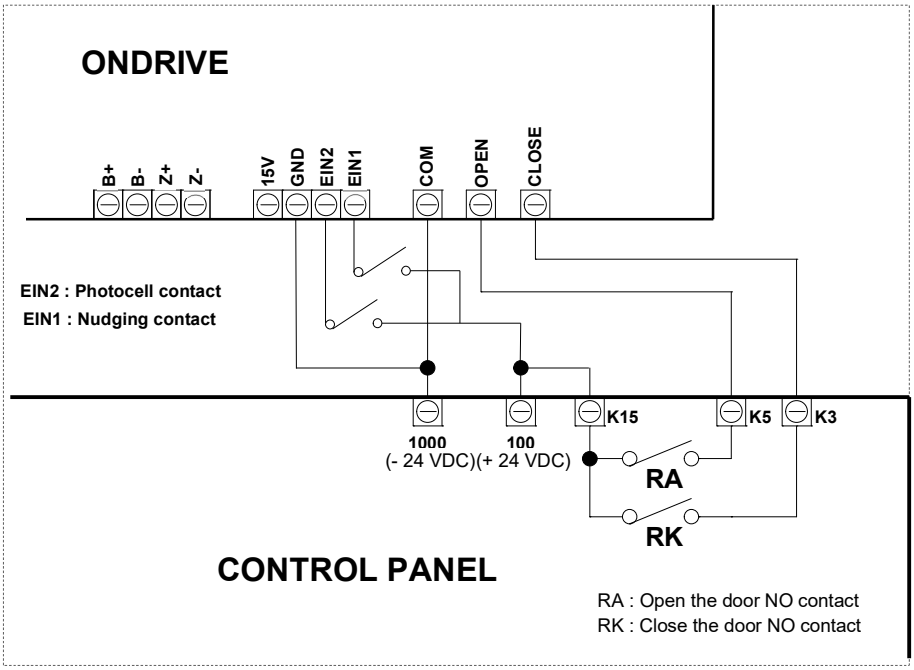
Ondrive device has 3 different PM synchronous motor options from different motor manufacturers. When ordered, Ondrive device will be preprogrammed with the appropriate motor type according to the desired motor option and will be sent to the user with that setting.

Motor 1, Motor 2, Motor 3

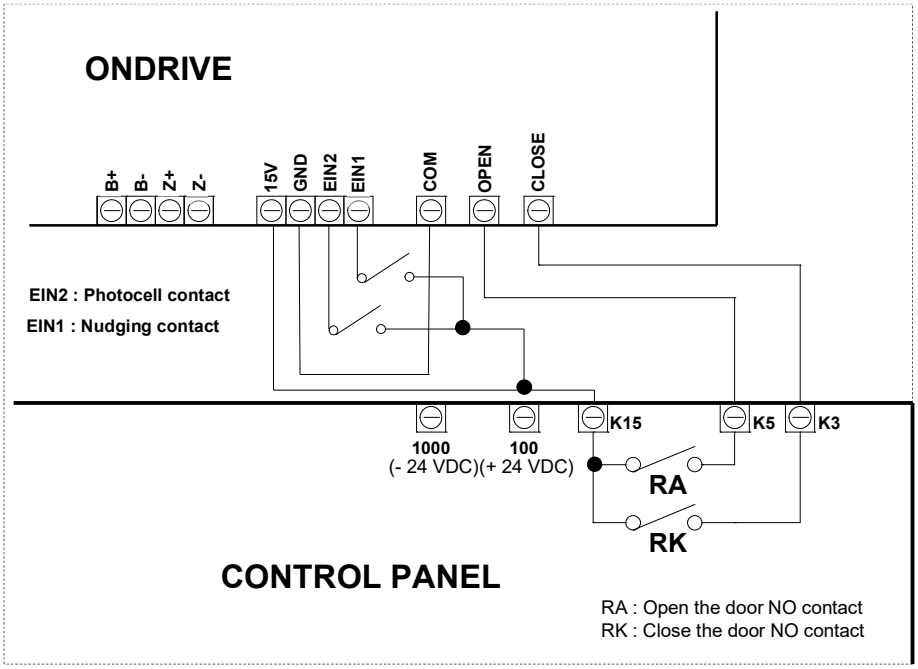
Detailed mechanical and electrical parameters of the motors can be reached from Onlab website.

CONNECTION TO ELEVATOR CONTROL PANEL

1) Connection with 24Vdc Supply Output of Control Panel (Recommended)



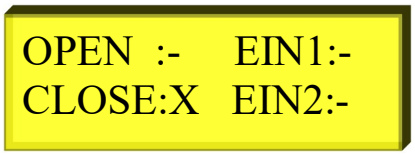
2) Connection with Internal 15V Supply



OUTPUT RELAYS AND INPUT SIGNALS MONITORING MENU

Status of the input signals and output relays can be monitored via using up and down buttons in normal operation menu.

“-” symbol means no signal for input signals and “X” symbol means active for input signals. Below an example of LCD screen view for input signals is given:



Similarly, “-” symbol means released for output relays and “X” symbol means operated for output relays. Below an example of LCD screen view for output relays is given:

LEARNING THE DOOR

After initial power-up of the Ondrive device at the first time, “Learn the door” warning will be seen on LCD screen in Inspection mode and it will not be possible to operate the device to open or close the door without the completion of “door learning” process.

To learn the door, it is enough to press “DOWN” button in Inspection mode after setting the parameters given in previous chapters. At that case, firstly the door will move to opening direction and then it will move to closing direction. After the completion of skate closing, door learning process will end. After this, by pressing ESC button, the device will enter to Normal Operation Mode.

In door learning process, firstly the door should move to opening direction and then it should move to closing direction. If in door learning process, the door starts to move closing direction firstly, please navigate the menu to “Manufacturer Settings” and change the value of “Motion Direction” parameter in menu 41 to “Inverted”. Then press ESC and ENTER buttons consecutively and return to Inspection mode. At that mode start learning process again by pressing DOWN button.

ENCODER MATCHING

In PM synchronous motor applications, encoder offset value is the angle difference between absolute encoder zero point and motor's magnetic axis. It is crucial to obtain the true offset value to drive the motor with the right angle and to reach higher efficiency.

Parameter 29 in settings menu is called as "Encoder Match" item and has two values: Passive and Active. To set this parameter, navigate the menu to parameter 29 and press the ENTER button for 3 seconds, it is possible to adjust the desired value when → symbol is seen on the screen.

After setting the value of this parameter as "Active", press ESC and ENTER buttons consecutively. Then, in Inspection mode "Match Encoder" warning will appear on LCD screen.

Encoder matching process will begin if UP button is pressed in Inspection mode. Firstly "Encoder Matching Started" will be written on screen. After the completion of the process, "Encoder Matching Completed" will be written on screen.

Note: During encoder matching process, the belt driven by the motor should be removed if it is possible. If it is not possible, the door should not be in the limit regions of door opening and closing, it should be in a point somewhere in the middle.

If encoder matching parameter is set as "Active", even if door learning process is completed before, all of the measurements of the door will be reset. Thus, after the completion of encoder matching process, "Needs to learn" warning will appear on screen again in Inspection Mode. AT that stage, please follow the instructions that are described in LEARNING THE DOOR section.

During the production, motor and driver are made as a set and "Encoder Matching" process is done by Onlab. Therefore, users do not need to perform "Encoder Matching" process until they change motor and/or driver electronics.

MANUFACTURER SETTINGS

Constructional settings of the door mechanism used with Ondrive are encrypted under "Manufacturer Settings" section for disabling users to reach those parameters. After the parameter 29 in menu, when "Manufacturer Settings" is displayed on screen, press the ENTER button and a 4-digit password will be asked by Ondrive. By entering the password, following parameters will be displayed. Those parameters can be visualized until the power of the device is OFF and ON again. Default password for manufacturing settings is "1 2 3 4". Every manufacturer can assign a new password using parameter 51, but this password cannot be cancelled. If this password is entered as false for 5 times, a 6-digit PUK code will be needed. This PUK code is generated from the serial number of Ondrive board. Manufacturer and user PUK codes are different from each other.

Program	**Factory Settings***	**Parameters / Explanations**
40: LearningSpeed	6 cm/s	2-19 (Learning speed level)
41: Motion Direc.	NOT INVERTED	NOT INVERTED / INVERTED (In door learning process, if the door goes to closing direction firstly, change this parameter to INVERTED.
42: OpenHoldForce	% 100	1-100(Open hold force setting. % of motor nominal current)
43: Cls.HoldForce	% 100	1-100 (Close hold force setting. % of motor nominal current)
44: SkateOpenSpe.	7 cm/s	1-20 (Speed level while opening the skate)
45: SkateCloseSpe.	7 cm/s	1-20 (Speed level while closing the skate)
46: Skate Distan.	6 cm	1-199 (Skate length)
47: Wheel Circum.	80 mm	30-999 (Circuimference of the wheel on the motor shaft)
48: Spd.Cnt.Level	16	1-20 Speed control sensitivity of the motor (Increasing this parameter decreases the error and oscillations in speed, but increasing this parameter more than required will result to noise and vibrations on the motor)
49: Cur.Cnt.Level	4	1-20 Current control sensitivity of the motor (Decreasing this parameter will decrease the response time to torque change requirements but noise and vibration of the motor will increase)
50: Reset Counter		(Toplam Çalışma Sayacını Sıfırlama)
51: SetMan.Passw.		(Used for changing manufacturer password.)
52: LearnPressLev	% 100	20-100(Pressure level at learning operation)
53: Op.Limit Dist	15 mm	5-50
54: Cl.Limit Dist	10 mm	1-10
55: PressDet.Time	1000 ms	20-2000
56: Standard Type	EN 81-20	EN_81_1_2_A3_1, EN_81_1_2_A3_2, EN_81_20 (There are 3 modes that are given above. At door closed position, those modes will lead to different results in operation if there is no OPEN and CLOSE signal. EN_81_1_2_A3_1: Motor is deenergized. EN_81_1_2_A3_2: Close hold force is applied to the motor. EN_81_20: Door is opened until the skate is opened completely and it will be stopped. Then, motor is deenergized.
99. Factory Set ?		(If this parameter is set, all of the parameter values will be reset to factory settings.)

**Factory Setting values can be different in customer specific software.*

ERROR MESSAGES

There are 5 error types that can be detected by ONDRIVE motor driver. Possible reasons and recommended solutions for those errors are listed below:

Error Message	Description	Possible Reasons and Solutions
Pressure Fault	An overload situation has been detected in the door due to a mechanical blockage, an obstacle prevention or any problem due to connection faults.	1) Check if the door has a mechanical problem or not. 2) Check the encoder connections. Are the color codes correct and connected to the right pin? 3) Check motor phase cables. Are the color codes for each phase correct? One or more of them can be disconnected from connector. Or there can be any broken or damaged cable. 4) Check the encoder, it can be damaged.
Module Error	Circuit that includes IGBT inverter detected a fault due to overcurrent or overvoltage.	1) Motor can draw a huge current due to a fault in connectors, windings or cables. 2) Grid voltage can be high. 3) Deceleration ramps of the door can be very short and steep. 4) One or more of the IGBTs can be damaged. 5) Current or voltage detection circuit can be damaged.
Encoder VCC Error	Encoder board draws more than allowed current limit.	1) Check the encoder connections and cables. 2) Encoder can be damaged.
High Vdc Error	DC bus voltage increased above allowed voltage limit.	1) Grid voltage can be high. 2) Deceleration ramps of the door can be very short and steep.
Low Vdc Error	DC bus voltage decreased below allowed voltage limit.	1) Measure the DC bus voltage.