MLDRIVER

VECTOR CONTROL MOTOR DRIVE FOR LIFTS

USER MANUAL

mikrolift

VERSION: v.1.01

CONTENTS:

1. GENERAL DEFINITION

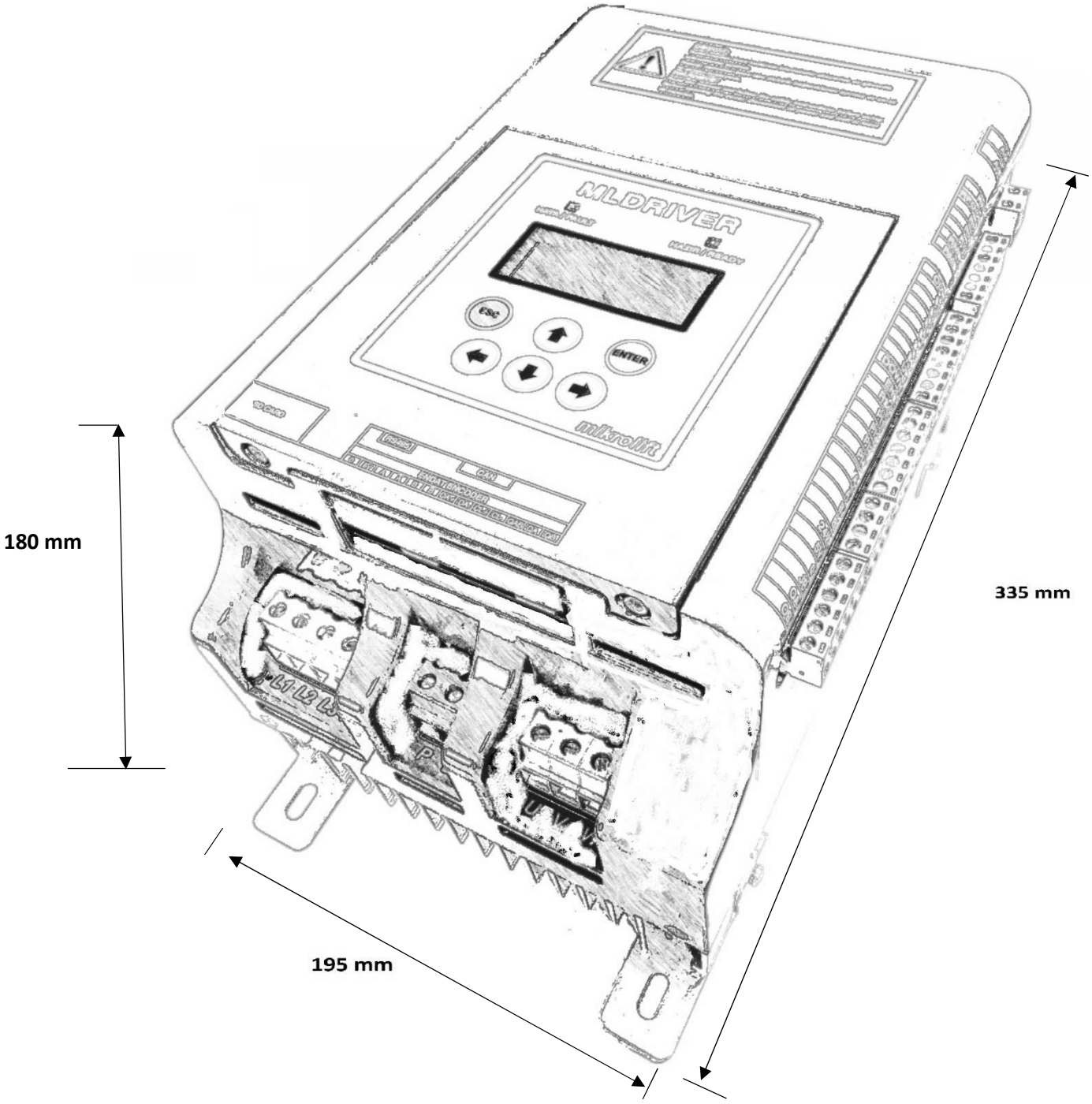
- MLDRIVER is a vector controlled motor driver designed for elevators.
- Can be used for asynchronous and synchronous motors.
- Compatible with all types of encoders.
- In case of main power failure, it can be done rescue process to floor with 5 pieces of 12V batteries or with UPS with driving the motor.
- Deceleration distance parameter to floor and deceleration curves are set automatically.
- It can be direct to floor with easy connection with ML40P_v2 and ML50S cards.

2. TECHNICAL FEATURES

- **Input Voltage :** 3 Phase 380V AC , 50/60 Hz
- **Rated Output Current :** 5.5 kW 14A, 7.5 kW 18A, 11 kW 26A
- **Maximum Output Current:** 2 x Rated Current (maximum 10sec.)
- **Control Logic Supply Voltage :** SINGLE PHASE 220VAC, 50/60 Hz
- **Motor Driving Technique :** Vector Control
- **Encoder :** Incremental Encoder Input for Asynchronous Motor
  the addition of MLENDAT card for Synchronous Motors with
  the working with ENDAT, BISS, SINCOS types Encoder
- **Speed Inputs :** 6 isolated speed inputs
- **User Interface :** 4x20 LCD screen and 6-button keypad
- **Fault Tracing :** The last 64 errors (with Run Time feature)
- **Software Updating :** With SD card
- **Error Recovery :**5 pieces with 12V batteries or with UPS

3. DIMENSIONS AND MONTAGE

The MLDRIVER vertically above and below 10cm space should be remained and the physical dimensions are as follows.



4. CONNECTIONS

4.1. Power Connections

Terminal Definitions:

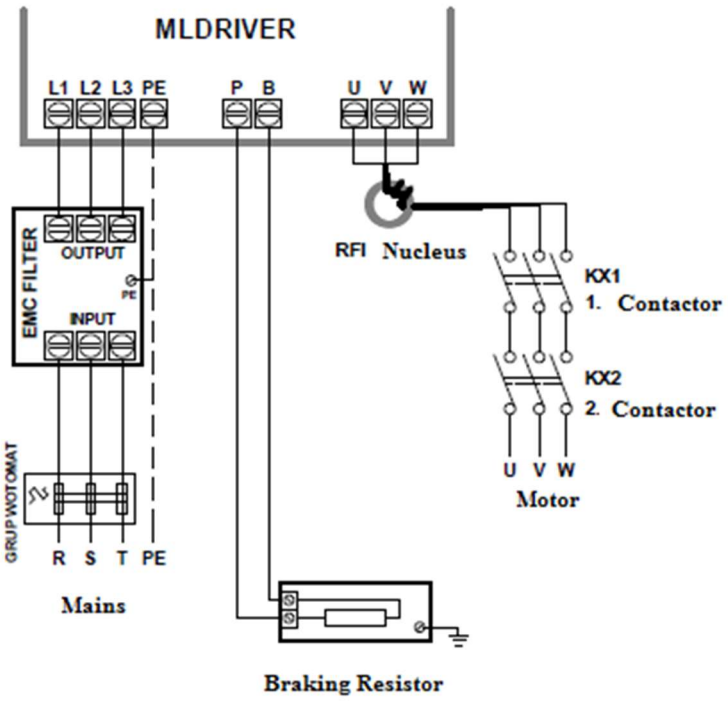
L1- L2 - L3 : 3 PHASE 380V AC main power inputs

PE :Grounding

P - B :Braking Resistance

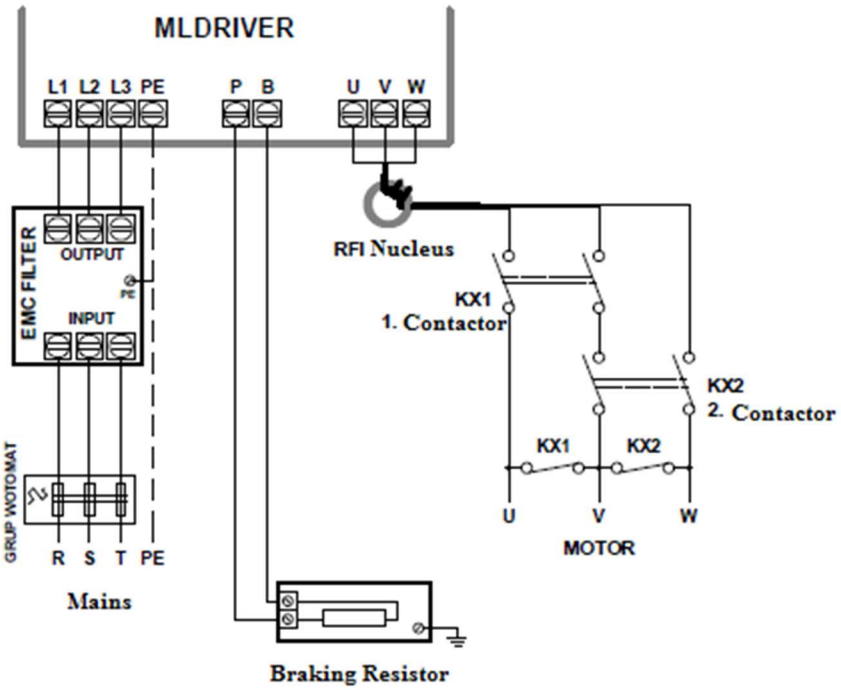
U - V - W : Motor Outputs

4.1.1. Main Power, Motor and Braking Resistance Connections for Asynchronous Motors



Caution: Only 3 phase cables should be rounded through the RFI nucleus. The ground or neutral should not be passed through this nucleus.

4.1.2. Main Power, Motor and Braking Resistance Connections for Synchronous Motors



Caution: Only 3 phase cables should be rounded through the RFI nucleus.The ground or neutral should not be passed through this nucleus.

4.1.3. RFI Nucleus and EMC Filter

TheRFI filter nucleus is giving with MLDRIVER. This nucleus is using with the connections that as shown above. The cables to be connected to the motor output of the device after taking 2 laps from RFI nucleus should be connected to panel motor terminal. For all power level products of MLDRIVER (5.5 kw, 7.5 kw, 11 kw) 30A that the EMC filter with power is suitable.

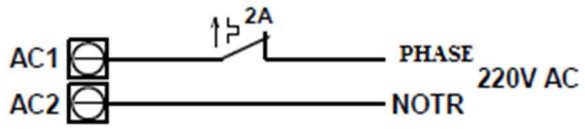
4.1.4. Braking Resistor

The breaking resistor should be connected P and B terminal as shown above connections. 50 ohm/1kw resistor is suitable to be used on 5.5kw and 7.5kw types, 40 ohm/1kw resistor is used on 11kw types.

4.2. Control Terminal Connections

4.2.1. Control Logic Feeding Input

MLDRIVER control logic supply with terminals 220VAC from AC1-AC2 It should be done. The maximum power output is 50 VA.



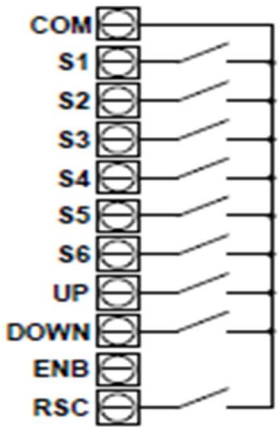
4.2.2. Speed, Reference and Directions Inputs

The MLDRIVER has 6 pieces of speed reference inputs are below ;

- S1 : The speed of levelling
- S2 : Inspection Low Speed
- S3 : Inspection High Speed
- S4 : Middle Speed – 1
- S5 : Middle Speed – 2
- S6 : High Speed

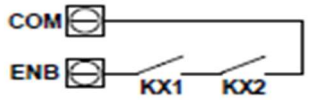
The MLDRIVER does not have low speed inputs. If there are either of UP inputs or DOWN inputs and ENB enable inputs, the motor of device drives in the low speed parameter setted.

The speed and directions inputs should be connected as below;



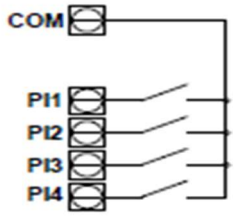
4.2.3. Enable Inputs

ENB input is using for state notification of output contactor. The ENB connection should be as it shown below;



4.2.4. Programmable Inputs

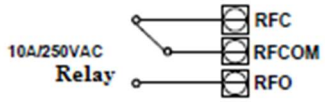
The device has 4 programmable inputs. The connection of inputs should be done as below;



4.3. Relay Connections

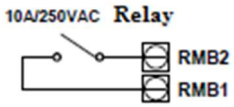
4.3.1. Fault Relay

When the device gives a fault, it can change the situation with fault relay. In the normal working situation, the relay is picked up permanently. This relay closed and open contacts are given to terminal outputs. The connection to the control system must be connected to the common point with the open contact.



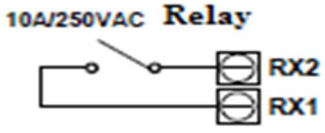
4.3.2. Mechanical Brake Relay

The device has a relay to control the mechanical brake coil.



4.3.3. Programmable Relay

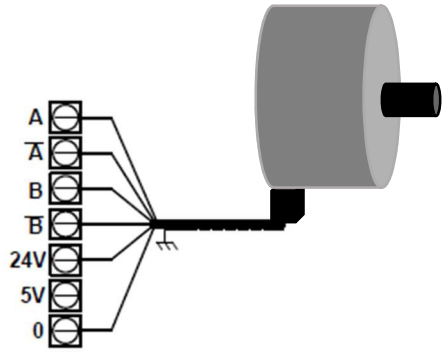
The device has a programmable relay.



4.4. Encoder Connections

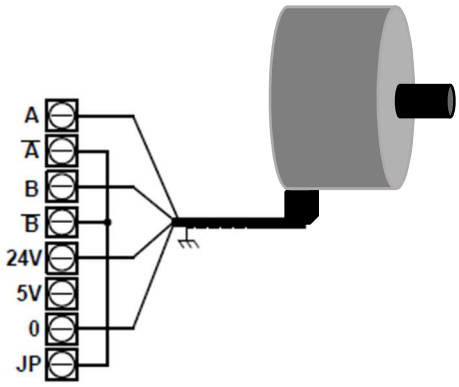
4.4.1. Matched Output Incremental Encoder Connection

The encoder connection with the 5-30V supply is shown as below.



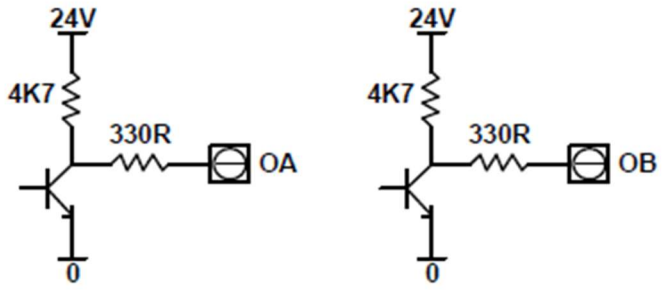
4.4.2. Incremental Encoder Connection with Simple Output

The encoder connection with a 5-30V supply is shown as below.



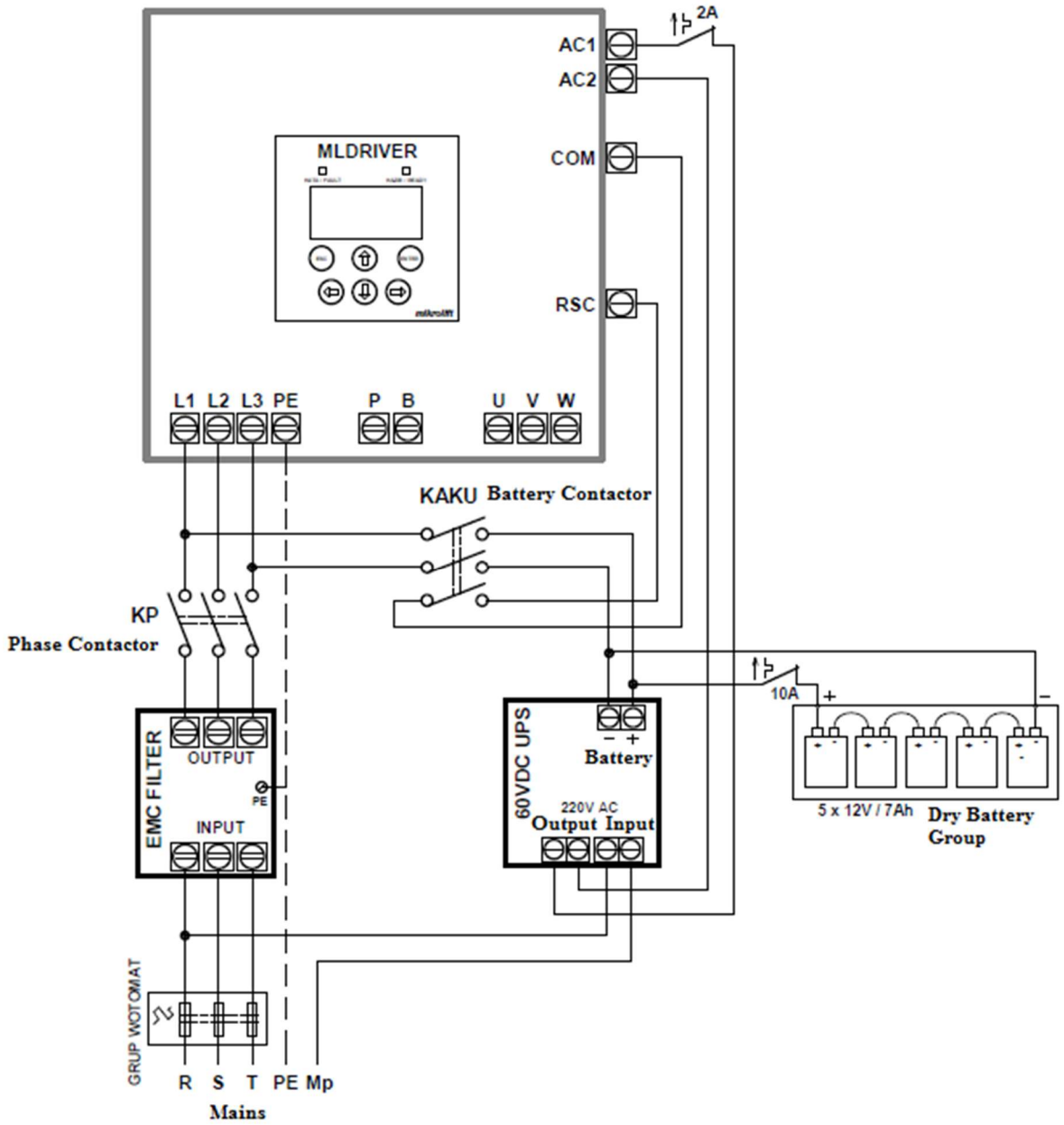
4.4.3. Incremental Encoder Simulation Outputs

In the device, there are simulation outputs that reading well knowledge from encoder. The maximum power output from these outputs should not exceed 10 mA.The maximum and minimum level of the signals are between 0.5V and 23 V.



4.5. Rescue With Battery Connection

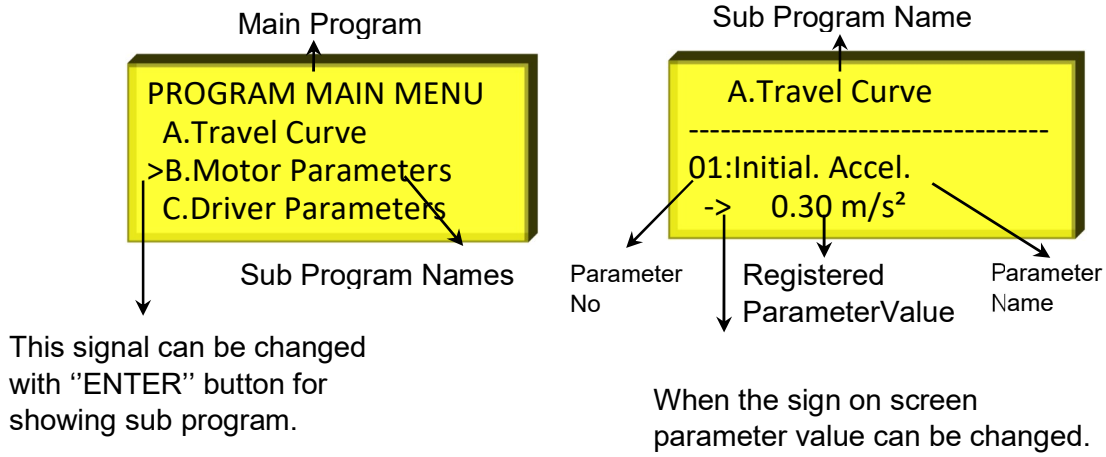
The connection of the device working with the 5-battery 60 VDC UPS should be done as follows. The coil feeds of the KP and KAKU contactors must be done by passing through closed contacts each other. When the network is detected to disappear, the KP contactor must be released and the KAKU contactor must be dropped after a minimum of 5 sec.



5. PROGRAMMING

5.1. USING THE KEYPAD AND CHANGING THE PARAMETER CONTENT

- If ‘’ENTER’’ is pressed while the device motor is not running, programming mode is entered.



- The sub programs in the main menu can be seen with UP or DOWN arrow buttons.
- When ‘’ENTER’’ is pressed, it is entered in the subprogram shown with arrow.
- The UP or DOWN arrow buttons show the parameters in the subprogram.
- ‘’ENTER’’ is pressed in order to switch the parameters.
- If the subprogram is with variable value, an arrow at the top of the fourth row on the LCD appears. Parameter value can be changed with UP arrow and DOWN arrow buttons. When ‘’ENTER’’ is pressed, the value is saved and the subprogram is returned. If ESC button is pressed, the value that registered before is protected and is returned to the subprogram.
- If the parameter value is numerical, the value can be increased and can be reduced with pressing UP or DOWN arrow buttons as well as the value that increasing on the screen. If it is pressed the right arrow, the rightmost digit of the value on the screen starts to flash. From now on, it can be visited between digits with pressing right and left arrow buttons. On flashing digits, UP or DOWN arrow increase or decrease by pressing can be done. When ‘’ENTER’’ button is pressed, the value can be saved and can be returned to the subprogram. If ESC button is pressed, the value registered before is saved and returned to the subprogram.
- Press the ESC button in the main menu to exit the programming mode. On the top line of the LCD screen is seen ‘’ENTER to exit the program’’, On the top line of the LCD screen is seen ‘’ESC to return to the program’’. When the ENTER pressed, the programming mode is exited. If ESC button is pressed, the main menu will be displayed again.

5.2.Parameters

Program	*Factory Setting*	*Parameter Contents / Explanations*
	A.Travel Curve	
01:Initial. Accel.	0,30 m/s²	**0,01…0,99 m/s²** (In the initial movement car the straining of rope and for the regenerating of inertia motor with the acceleration value is be speeded to initial speed. During motor initial starting, it drives with this speed. At the end of the time normal acceleration will be started.)
02:Initial. Speed	0,01 m/s	**0,00…0,10 m/s** (See parameter ‘’01’’ for explanation.)
03:Initial. Time	0,00 s	**0,00…1,00 s** (See parameter ‘’01’’ for explanation.)
04:Low Speed	0,10 m/s	0,01…0,20 m/s (When the device has high speed S6 input,in the event of the failure, it decrease that level from the high speed to this speed. As a result of the either of UP or DOWN inputs, motor continues to drive with this speed.)
05:Re-Lev.SpeedS1	0,03 m/s	**0,01…0,10 m/s** (Selected speed value by “S1” input of device.)
06:Inspec.LowSp. S2	0,25 m/s	**0,15…0,30 m/s** (Selected speed value by “S2” input of device.)
07:Inspec.HighSpS3	0,50 m/s	**0,30…0,65 m/s** (Selected speed value by “S3” input of device.)
08:Mid.Speed -1 S4	0,40 m/s	**2,50…0,01 m/s** (Selected speed value by “S4” input of device.)
09:Mid.Speed-2 S5	0,80 m/s	**2,50…0,01 m/s** (Selected speed value by “S5” input of device.)
10:High Speed S6	1,00 m/s	**2,50…0,01 m/s** (Selected speed value by “S6” input of device.)
11:Acceleration	0,40 m/s²	**1,00…0,01 m/s²** (The speeding acceleration of car. As the value increases, the required value is reached more quickly.)
12:Accel. Jerk Time	1,10 s	**0,01…3,00 s** (Starting acceleration and when required speed is reached stepless acceleration time.)
13:Deceleration	0,50 m/s²	**1,00…0,01 m/s²** (It means car deceleration time. When the value increases, to the required value is reduced more quickly.The stopping type is valid while parameter was selected.)
14:Decel. Jerk Time	1,50 s	**0,01…3,00 s** (The starting of slowing down and while it decreases to the desired velocity stepless acceleration time. The stopping type is valid while parameter was selected.)

Program	*Factory Setting*	*Parameter Contents / Explanations*
15:Stop Jerk Cons.	2,0	**0,10-10,0** (While Stopping type Distance Mode1 (2-3) is selected, stop jerk constant.)
16:Stopping Type	Distance Mode-1	**Parameter, Distant Mode1-2-3** (Selection of whether the car will be moved from high (S6) to low speed and from low speed to zero speed according to distance or parameters.)
17:Slowing Dist.	140 cm	**50-500 cm** (Selecting the distance from which slowdown starts when Distance Mode1 (2-3) is selected.)
18:Stopping Dist.	7,00 cm	**3,00-15,00 cm** (When the stop type ”Distance Mode1 (2-3) is selected, low speed to zero speed transition distance selection.)
19:Brake On Delay	0,50 s	**0,01…5,00 s** (Mechanical brake opening time selection. During this time the motor is hold at zero speed. At the end of the time, the car starts accelerating.)
20:Brake Off Delay	0,50 s	**0,01…5,00 s** (Mechanical brake closing time selection. During this time the engine is driven at zero speed.)
21:Direct to Floor	Passive	**Cancel, Comfort- 1,2,3,4,5** (While the stop type ”Distance Mode1 (2-3) is selected, the selection of the car stopping with decreasing zero speed without sliding with low speed.)
22:Command Input Slc.	Parallel	**Parallel, Serial** (Selection of where to get speed and direction commands. If Parallel is selected, commands from the device terminals are applied. If the series is selected, the information from the RS485 connection is used.)
23:Reserved		
24:Ref. Hold Time	0,10 s	**0,01…3,00 s** (If any one of the speed inputs (S1-S6) is cut before reaching the assigned speed, then after this time, the input is accepted as disappeared.)
B.Motor Parameters		
01:Motor ID	Standard	**Standard,1…999** (Code selection for the motors in the user manual. If the engine code is selected, the motor label values stored in the device memory will be loaded automatically.)
02:Motor Type	Induction	**Asynchronous/Geared,Synchronous/Gearless** (Motor type selection.)
03:Frequency	50,0Hz	**5,0…99,9 Hz** (Indicated frequency value on the motor label.)
04:Number of Poles	4	**4…64** (Number of poles of motor.)
05:Nominal Car Speed	1,0 m/s	**0,4…2,5 m/s** (Nominal speed of the car.)

Program	*Factory Setting*	*Parameter Contents / Explanations*
06:Nominal Speed	1360,0 rpm	**50,0…3600,0 rpm** (Number of period per motor label.)
07:Nominal Voltage	380 V	**100…420 V** (Number of voltage per motor label.)
08:Nominal Current	18 A	**1,0…18,0 A** (Nominal current (In) value indicated on the motor label.)
09:CosQ	0,81	**0,01…0,99** (Indicated CosQ value on the motor label.)
10:Motor Max. Current	18,0 A	**1,0…18,0 A** (Maximum current value selection.)
11:Overload Time	5 s	**1…10 s** (Selection of the time allowed to continuously of the set maximum current value.)
12:NoLoad Current Lim.	40 %	**20…70** (Selection of current level in asynchronous motors out-of-gear. If this value is increased unnecessary, energy consumption will be wasted.)
C.Driver Parameters		
01:Inertia Identif.	No	**No, Yes** (Measurement of inertia and friction coefficient when the motor out-of-gear.)
02:Inertia Value	25,0	**0,1…99,0** (The amount of power required to accelerate the motor. Do not change this parameter value without consulting our technical service.)
03:Friction Value	2,5	**0,1…49,9** (The amount of friction force against the direction of rotation when the motor rotates. Do not change this parameter value without consulting our technical service.)
04:Encoder Type	Incremental	**Incremental** **ENDAT** **BISS** **SINCOS** (Selection of encoder type connected to motor.)
05:Enc. Resolution	1024	**512,1024,2048,4096** (Number of encoder pulses.)
06:Motor Direction	Not Inverted	**Straight Direction, Reverse Direction** (Selecting the direction of rotation of the motor.)
07:Rescue Mode	Rescue with Batt.	**Cancel, Rescue with Battery,Rescue with UPS** (The selection of rescue mode.)
08:Rescue Direction	Easy Direction	**Easy Direction,Command Direction** (In the direction in which the motor direction is detected by the device or selection from the input according to the command direction.)

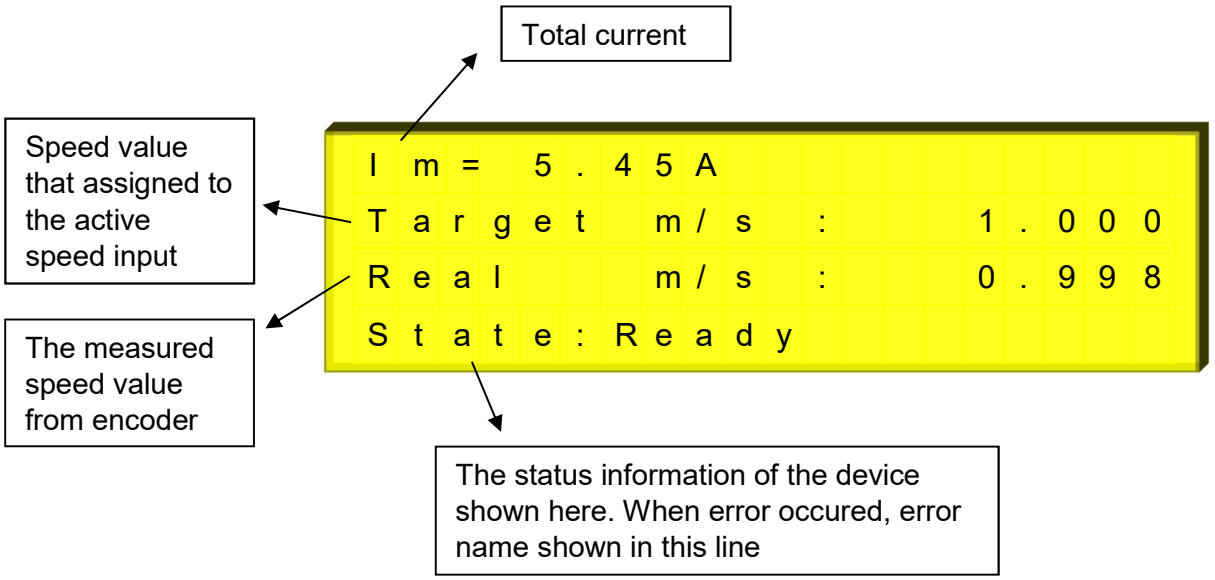
Program	*Factory Setting*	*Parameter Contents / Explanations*
09:Rescue Speed	0,05 m/s	**0,01…0,15 m/s** *(In the rescue mode speed value.)*
10:UPS Power	1,50 kVA	**0,01…99,99** (Selection of used UPS power when rescue mode is selected with UPS rescue.)
11:Control Mode	Closed Loop	**Closed Loop, Open Loop** (Selection of motor control.)
12:Motor Identify	Passive	**Cancel, Active** (Selection of motor identification enable.)
13:Spd.Control Par.1	5,00	**5,00…99,90** (This parameter is the speed control hardness adjustment applied at zero speed. See section 7.4 for a description.)
14:Spd. Control Par.2	20,00	**5,00…99,90** (This parameter is the speed control hardness adjustment before reaching the nominal speed of the motor. See section 7.4 for a description.)
15:Current Control Hard.	5,0	**5,0…10,0** (This parameter is the hardness adjustment of the PI loop in the current control algorithm. When this value increased, intervention to the current will be more frequent.)
16:Motion Direction	Not Inverted	**Straight Direction, Reverse Direction** (How the UP and DOWN inputs rotate the motor.)
D.Advanced Setting		
01:Mech. Brake Tracing	Passive	**Cancel, Active** *(*In synchronous motors, mechanical brake monitoring is performed from PIx inputs.*)*
02:PI1 Setting	Mech.Brake Tracing	(Selection of operation function of input PI1.)
03:PI2 Setting	Thermal Pro.Tracing	*(Selection of operation function of input PI2.)*
04:PI3 Setting	Not Used	*(Selection of operation function of input PI3.)*
05:PI4 Setting	Not Used	*(Selection of operation function of input PI4.)*
06:Extra Relay Setting	Not Used	**Mechanical Brake, Error, Exit Contactor** (Selection of operation of extra relay output.)
07:No Load Current (A)	5,40	**1,00…40,00** *(*Measured value in motor identification process.)
08:Rotor Resistance	1,21 Ohm	**0,01…99,99 Ohm** *(Measured value in motor identification process.)*
09:Leakage Inductance	50,00 mH	**0,01…99,99 mH** *(Measured value in motor identification process.)*
10:Stator Inductance	7,00 mH	**0,01…99,99 mH** *(Measured value in motor identification process.)*
11:Flux Coefficient	6,28 Wb	**1,00…9,99 Wb** *(Measured value in motor identification process.)*
12:Stator Resistance	0,76 Ohm	**0,01…99,99 Ohm** (Measured value in motor identification process.)

Program	*Factory Setting*	*Parameter Contents / Explanations*
13:Thermal Pr. Tracing	Passive	**Cancel, Active** *(*Choice of motor and braking resistor PTC control.*)*
E.General Settings		
01:Language	English	**Turkish, English**
02:Change Password	0000	*(Password Identification and Changing.)*
03:Cancel Password	No	**No, Yes** *(*The password value is canceled with 0000.)
04:SD Card Set1 RD	No	**No, Yes** (In the device memory, the parameter values stored in Set1 are replaced by the current values.)
05:SD Card Set2 RD	No	**No, Yes** (In the device memory, the parameter values stored in Set2 are replaced by the current values.)
06:SD Card Set1 WR	No	**No, Yes** (The current parameter values are stored in the device memory in Set1.)
07:SD Card Set2 WR	No	**No, Yes** (The current parameter values are stored in the device memory in Set2.)
08:Reset Working Time	No	**No, Yes** (The number of runs is reset.)
09:Factory Default	No	**No, Yes** (All parameter values are replaced by the factory settings.)
10:Firmware Update	No	**No, Yes** (The firmware update starts.)
11:Delete Errors	No	**No, Yes** (All registrated errors are deleted.)

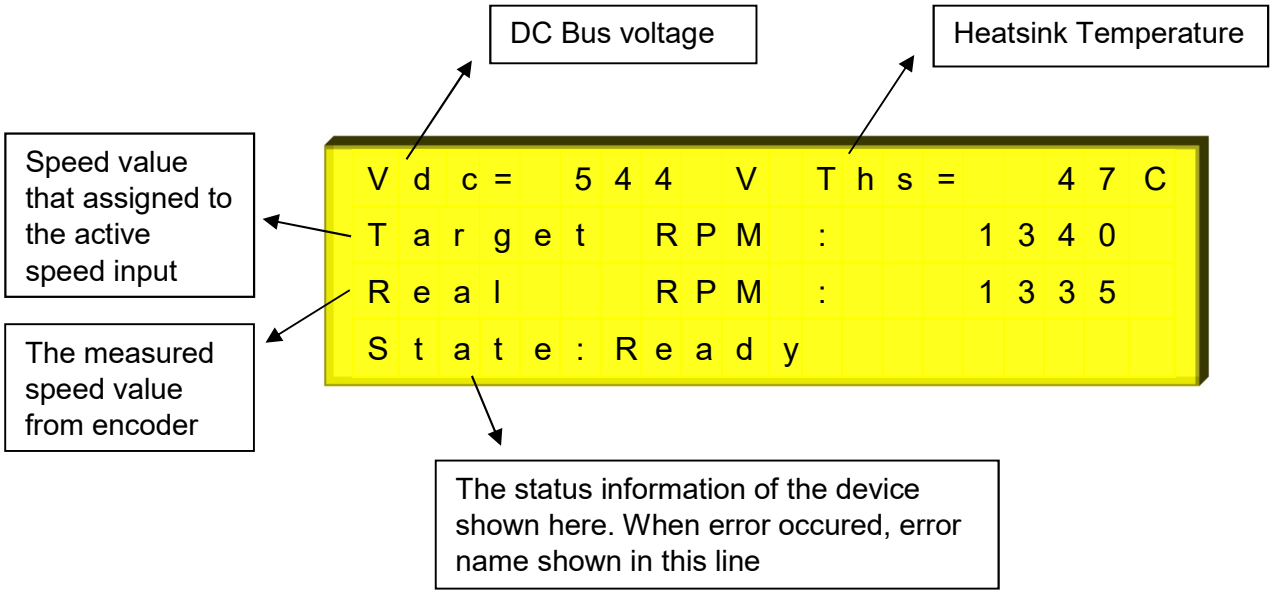
6.TRACING INFORMATION SCREENS

UP or DOWN ok buttons while the device is at rest or while driving and monitoring screens can be passed through. İt can be viewed with these screens current, voltage, driving information, information such as input and output information, total number of works.

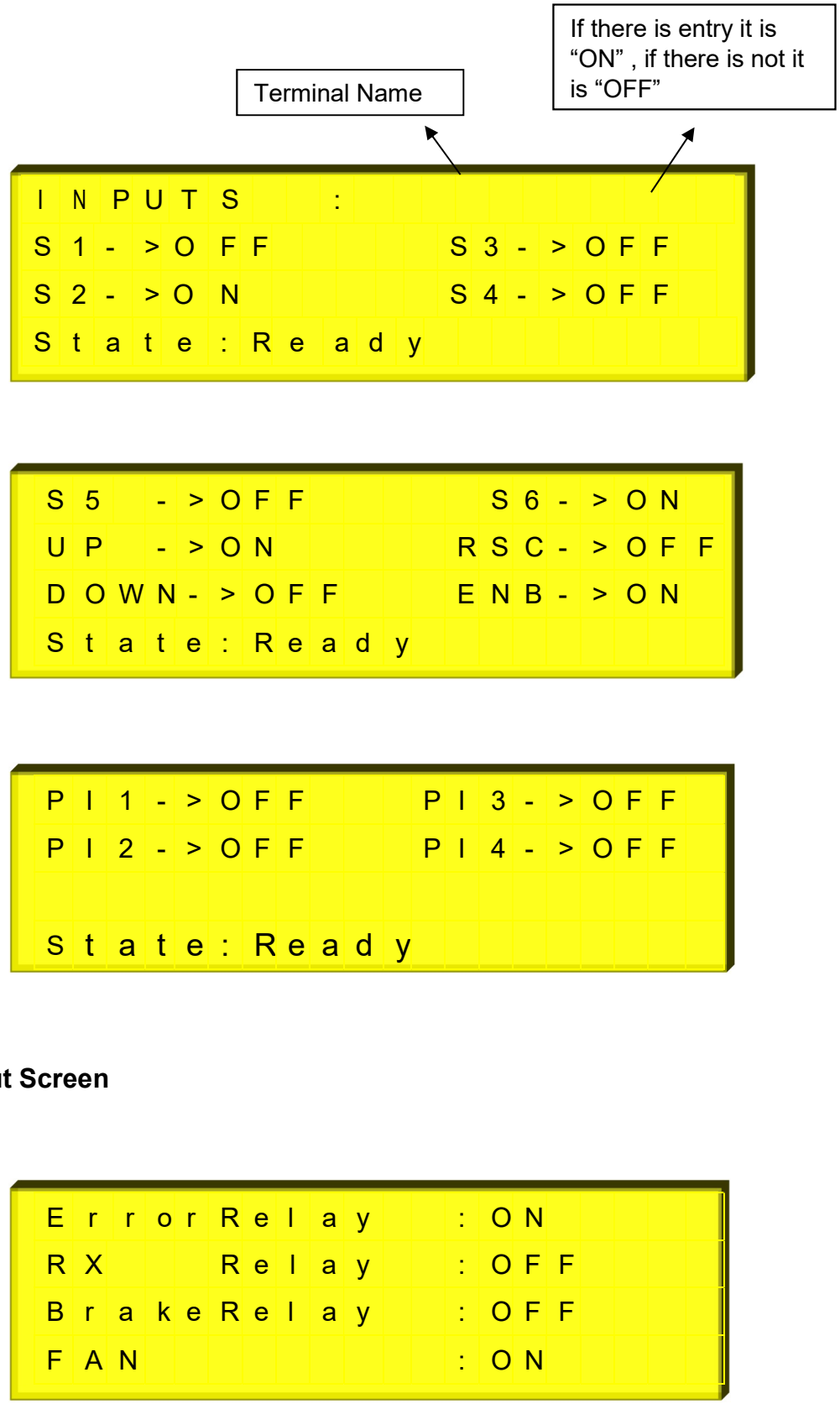
6.1.Motor Current and m/s Speed Screen



6.2. DC Bus, Heatsink Temperature and Rpm Speed Display

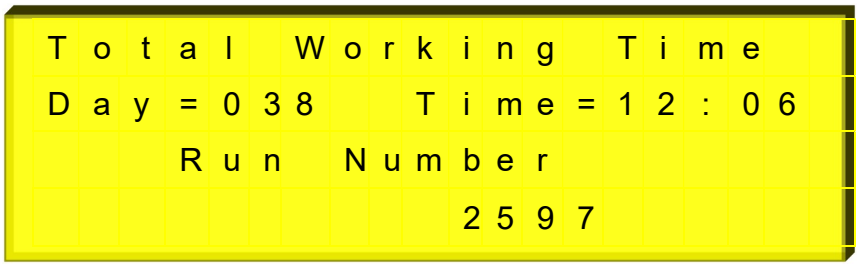


6.3. Input Screens

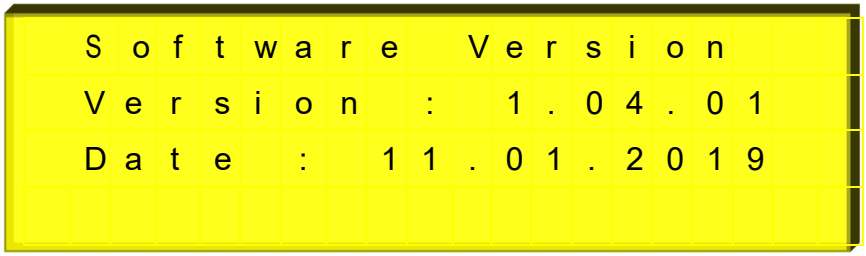


6.4. Output Screen

6.5.Total Working Time and Number



6.6. Software Version



7. ACCELERATION, DECELERATION AND CONTROL PARAMETERS

In this section, it will be mentioned about how the device accelerates and decelerates according to the parameters in parameter programming “A.Travel Curve”.

The description of Control parameter in the ‘’C.Driver Setting’’ will be mentioned now.

7.1. Acceleration

The parameter changing of the device for acceleration is done from "A.Travel Curve" parameters ;

- A01.Initial Acceleration, A02.Initial Speed, A03.Initial Time:
  For the first movement of the car to tighten the rope and defeat the inertia will be speeded to motor initial speed with motor initial acceleration value. Motor is driven by this speed during the preparation starting time. At the end of the period normal acceleration is initiated. This procedure is not applied if the preparation speed is selected zero.
- A04.Low Speed:
  When the device has a high speed (S6) input, in the case of in no situation is be reduced to this speed level from the high speed. Motor is continued to driven by this speed when there are any of the UP and DOWN inputs and ENB inputs.
- A05.Re-Level Speed S1:
  When S1 input of the device is active, the motor will be accelerated to the selected speed value in this parameter content.
- A06.Inspection Low Speed S2:
  When S2 input of the device is active, the motor will be accelerated to the selected speed value in this parameter content.
- A07.Inspection High Speed S3:
  When the S3 input of the device is active, the motor is accelerated to the selected speed value in this parameter content.
- A08.Middle Speed - 1 S4:
  When the S4 input of the device is active, the motor is accelerated to the selected speed value in this parameter content.

- A09.Middle Speed - 2 S5:

  When the S5 input of the device is active, the motor is accelerated to the selected speed value in this parameter content.

- A10.High Speed S6:

  When the S6 input of the device is active, the motor is accelerated to the selected speed value in this parameter content.

- A11.Acceleration:

  The acceleration of the car. As this value is increased to the required speed more quickly will be reached.

- A12.Acceleration Jerk Time:

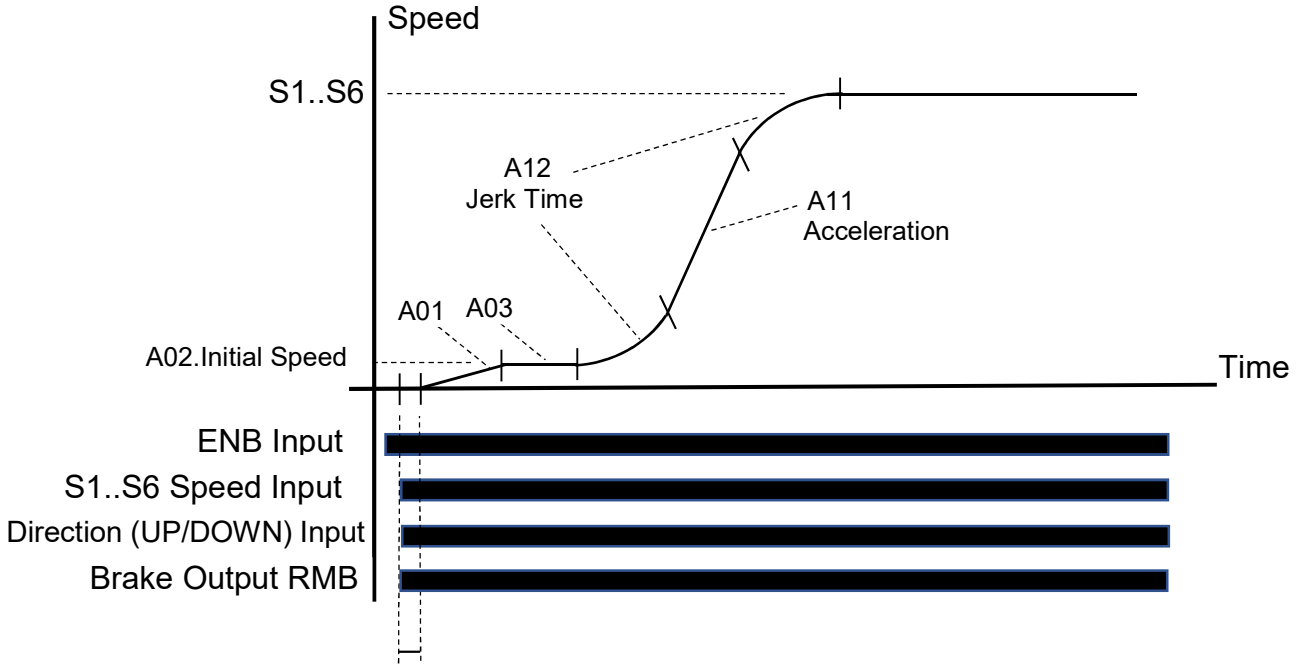
With this parameter, the acceleration is started and the required speed is reached stepless acceleration time is selected.

- A19.Brake On Delay:

  With this parameter, the mechanical brake release time is selected. This time the motor is hold at zero speed. At the end of the time the car is starting to be accelerated .

- A24.Reference Hold Time:

  When to disconnect the speed inputs (S1-S6) before reaching the assigned speed after this time the entry is considered to be absent.



(Speed – Time Graph)

7.2. Slowing and Stopping With Parameter

The stopping type of motor can be changed " A16.Stopping Parameter " on the "A. Travel Curve ". If this parameter content is selected as ”Parameter“, motor driven by a speed input (S2… S6); if this speed input is interrupted or another speed input is active, the following deceleration acceleration and jerk is used. There are jerk and stopping parameters as follows;

- A13.Deceleration:

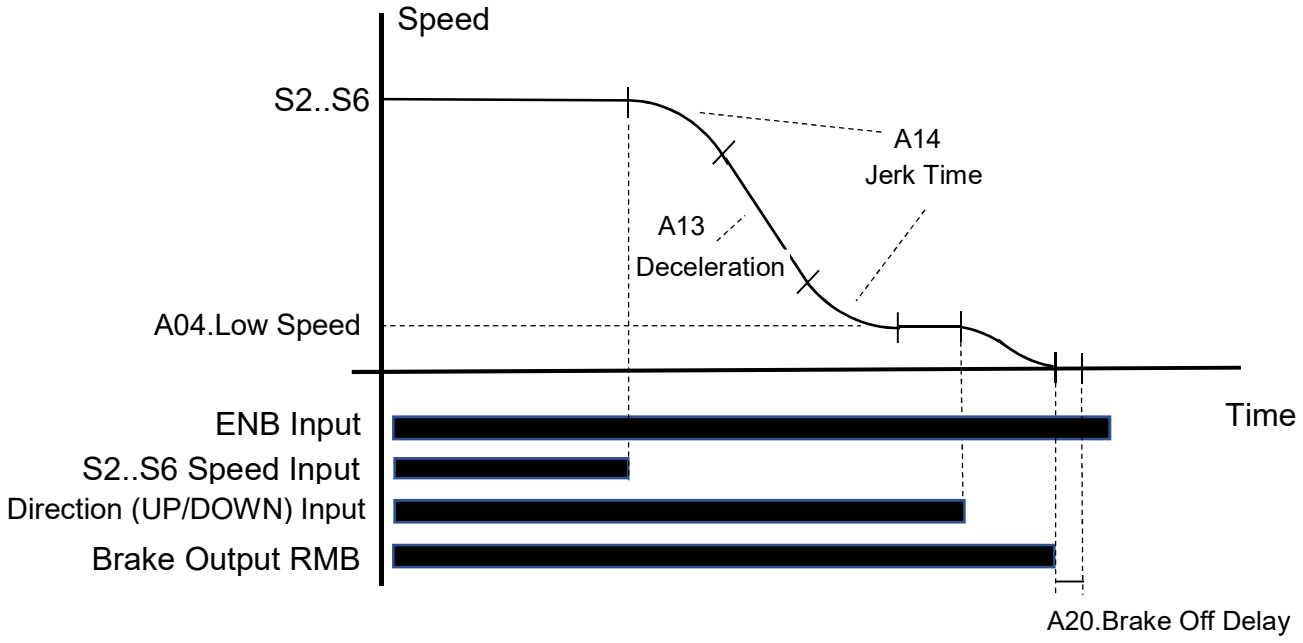
  The deceleration of the cabin is acceleration. This value will be reduced more quickly to the required speed.

- A14.Deceleration Jerk Time:

  When this parameter is started to decelerate and fall to the required speed stepless acceleration time is selected.

- A20.Brake Off Delay:

  With this parameter, mechanical brake closing time is selected. During this time the motor is driven at zero speed.



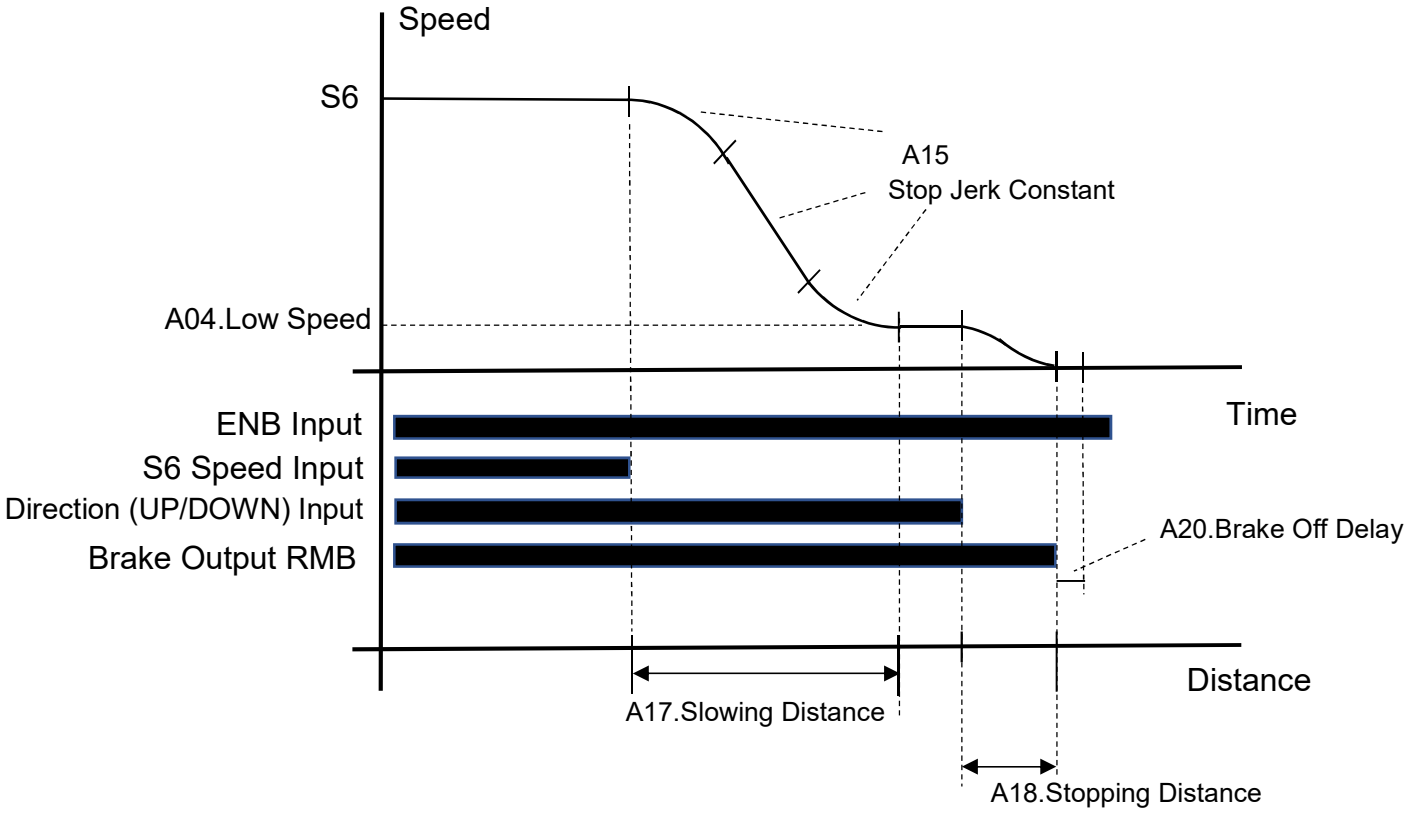
(Speed – Time Graph)

This graph is not shown S1 because the speed value will be selected less than the low speed value. If the input is interrupted while the motor is driven at S1 speed; speed, deceleration acceleration and jerk to zero. Brake closing time is waited.

7.3. Slowing and Stopping With Distance

If “Distance Mode1 (2-3)“ is selected in the content "A16.Stopping Type" is selected parameter in ‘’A Travel Curve Mod’’, speed of the driven motor with speed input S6; if this input is interrupted, it is decelerated to the low speed at the selected deceleration distance. After stopping the direction signals, the speed is reduced to zero at the end of the stopping distance. The parameters are like these about this function:

- A15.Stop Jerk Constant:
  Stop type with this parameter ile with Distance Mode1 (2-3) selected jerk and stopping value selection is done.
- A17.Stopping Distance:
  With this parameter, starting distance of the direct to the floor is selected.
- A18.Slowing Distance:
  With this parameter, the transition distance from low speed to zero speed is selected.
- A20.Brake Off Delay: With this parameter, mechanical brake closing time is selected. During this time the motor is driven at zero speed.



(Speed – Time – Distance Graph)

7.4. Control Parameters:

In this section, the control parameters used in the speed control algorithm of the device will be explained;

7.4.1. C13-Speed Control Parameter 1:

This parameter is the speed control hardness adjustment applied at zero speed.

7.4.2. C14-Speed Control Parameter 2:

The speed control applied when the motor reaches its nominal speed hardness adjustment.

At intermediate speeds the device will switch between these two parameters calculates the speed control parameter hardness according to the current speed. Control parameter 2 should be greater than or equal to control parameter 1. Increasing these parameters will increase the dominance of the device and will allow the application of the required speed curve to be more successful, but this increasing the parameters unnecessary, because of the noice and vibration from the motor increase, please be careful.

7.4.2. C13-Current Control Hardness:

It belongs to the device current control algorithm PI loop hardness adjustment. This as the value increases, the device will react more strongly to reach the reference current. As it is increased, the reference will reach the flow in less time and the margin of error is lower. However, increasing this value too much can cause vibrations and noise in the motor.

7.4.3. C01- Inertia Identify:

While the motor is not connected to any load including car ropes the inertia and friction coefficient values of the MLDRIVER device is a parameter that has been created to measure and save in memory automaticly. When this parameter is selected “Yes”, inertia measurement will be started.

7.4.4. C02- Inertia Value:

It means rotary motion proportional to the mass which is tightly connected to the rotor of the motor resisting size. In order for the motor to accelerate as the inertia grows amount of power to be applied should increase. It is an important parameter for speed control algorithm. It should not be changed unless necessary.

7.4.5. C03-Friction Value:

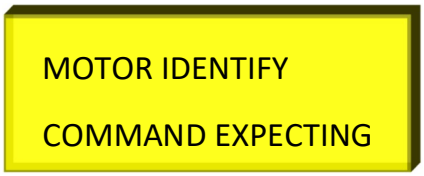
When the rotor of the motor is rotating, expresses the magnitude of the friction force to the reverse direction. It is an important parameter for speed control algorithm. It should not be changed unless necessary.

8. MOTOR IDENTIFICATION

Introducing the engine so that the engine can drive the engine efficiently and comfortably operation must be done as a motor identify. The steps for defining the motor are as follows respectively:

- The motor control board must be connected to the U-V-W outputs. The programming of the device is entered in the ”Motor parameter” section. If the motor code is known, all parameters are provided automatically, by entering the motor code. If unknown, the motor type (Asynchronous or Synchronous) is selected firstly.

- Then, the values on the motor identification label respectively, programming must be entered in '' B. Motor Parameter ”. These values are;
  B.03.Frequency
  B.04.Number of Poles
  B.05.Nominal Car Speed
  B.06.Nominal Speed
  B.07.Nominal Voltage
  B.08.Nominal Current
  B.09.CosQ
- ”C. Driver Parameters'' section after entering motor values C.12.Motor Identify Parameter doing “Active” and exit the programming.
- On the screen ;



- After writing above, the device starts to wait for the command.
- In this case, the control panel is switched to “Maintaining'' from the re-call terminal.

- It will be pressed and hold the UP or DOWN button. On The screen;

then you get the writing above.

- On the screen;

Continue to press the button until this post is on the screen the button is released and the motor identification is completed.

Note: If the device is not identified with a motor," IDENTIFY THE MOTOR, PLEASE" is occurred the bottom of the line screen. In this case the device speed reference inputs of command only S1-S2-S3. The S4-S5-S6 speed inputs are active after the motor identification.

B.12.No Load Current Limit Parameter :

One of the most important parameters in asynchronous motor identification ‘’No-load Current Limit" is. Because the asynchronous motor's no-load current is calculated during the motor identification process. The effect of this current value on the motor is as follows:

- If no-load current amount more than necessary, the motor has the amount of torque to lift the loading, however it may not reach full speed.
- If the amount of no-load current is less than the required amount of torque, the torque of motor' s applied is reduced than the motor may start to vibrate. Can draw excessive current from the grid, the device may enter the overload protection or never lift the load.

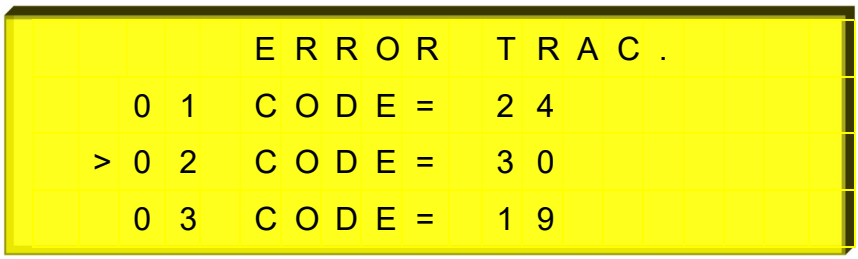
For motors up to 7.5kW, No-Load Current Limit parameter generally 40% of this parameter is sufficient, but above 50% level may be required.

Important note ! If you change this parameter after the motor identification, the motor you must repeat the process.

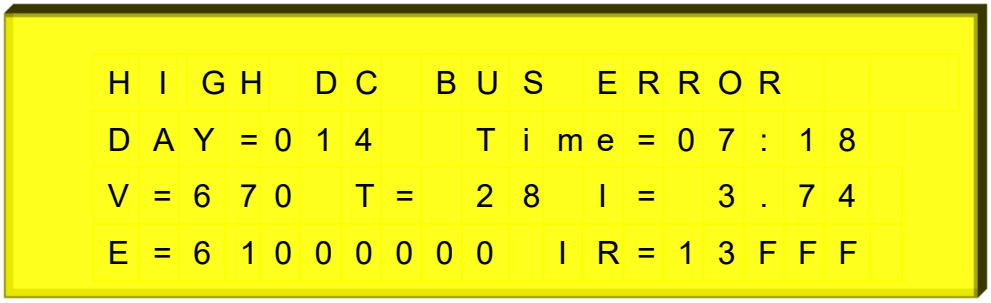
9. REGISTERED ERRORS AND ERROR CODES

9.1. Display of Registered Errors

The device registers the 32 faults that will occur during operation. Pressing ESC buttons is displayed menu is occurred.



Errors that occur in the first monitoring screen are displayed on the screen with their codes in order. Up and with the down buttons, errors can be viewed. Press ENTER and the arrow on the left the detail information of the error indicated by the icon is shown on the display.



The detail information display contains the following information:

- The short description of the error.
- The day and time the error occurred (This value is the time value counted while the device is running.)
- DC bus voltage at the time the fault occurred, coolant temperature and current drawn by the motor.
- “E” ve “IR”values are the some of the data values those used in fault detection.

Pressing ESC to exit the detail information screen. If press the ESC key again exits error display section.

9.2. Error Codes and Descriptions

FAULT CODE	FAULT SCREEN DİSPLAY	DESCRIPTIONS
2	***Communication Error***	When there is a communication problem between the mainboard and the inverter,the motor is stopped and the motor is energy is cut off.The motor will not start for 10 seconds, in this time the error is removed at the end and there are no other errors, the device works according to commands.
3	***Mechanical Brake Error***	Through connection to programmable inputs works. Mechanical brake checking failure. In the event of a mechanical brake failure, the device reduces the brake, the motor is de-energized for 10 sec. The motor is not started, at the end of this time the error is removed, if there are no other errors, the device operates according to the commands.
5	***IPM Error***	If there is an error from the IPM block the device is closed with giving the fault. The motor is not started during the 10 sec, at the end of this time fault is removed and if there is no fault, the device works according to the command.
6	***Low Speed Error***	Although motor current reaches maximum current, device error if speed is below 20% of reference speed and the motor is stopped. Motor for 10 sec is not started, after this time the error is removed and if no other errors, the device operates according to the commands.
7	***Extreme Speed Error***	If the motor speed reference speed has passed by 20%, the device gives the fault then the motor is stopped. Motor for 10 sec the error is removed and if no other errors, the device operates according to the commands.
8	***Speed Limit Exceeded Error***	If the motor speed exceeds 30% of the nominal speed of the motor, the device gives fault and the motor stops. Motor for 10 sec that the motor is not started. After this time the error is removed and if no other errors, the device operates according to the commands.
9	***ML_ENDAT Error***	When communication error between MLENDAT card and main processor,the device will give this error. Motor for 10 sec will not started, after this time the error is removed. If there is no fault other, the device works according to the commands.
10	***Encoder Communication Error***	If there is connection between MLENDAT card and Heidenheim encoder or the communication is in, the device will give this error. The motor will not started for 10 seconds.The fault will be removed, the device will be started.

11	***Encoder Error***	This error is active when the control mode "Off Loop" is selected. If the speed information cannot be read from the encoder, the device will give this error. The motor will not be started in 10 sec. At the end of this time and if there is no fault other, the device works according to the commands. In this case the encoder can be broken encoder feeding cables may not be connected or may be out of place, or the encoder may not be connected at all.
13	***Low Motor Current***	If the motor does not draw any current when the speed command is, if the motor current is too low, the device will give the fault and it will stop. The motor will not be started. After a while the fault will be removed and if no fault, the device will works acording to the commands. In this case the motor connections and check the motor contactor.
14	***Locked Rotor Error***	Although the motor is energized when speed command is given if the motor does not move, the device cuts and gives errors. The motor will not started during the 10 sec, at the end of this time the fault is removed, if there is no fault other , the device is worked.In this situation, check whether there is a mechanical problem with the motor and whether the electromechanical brake is switched on.
15	***Motor Phase Error***	If at least one of the motor phases is not connected to the device interrupts the energy supplied to the motor and switches to fault. The motor will not be worked during 10 sec. After this duration the fault will be removed. If there is no fault other, the device is working according to the command.In this case,please check motor phase connections and motor contactor.
16	***Motor Direction Error***	During the working with encoder, when giving the motor movement command, if motor is going to the reverse direction, the device gives the fault of direction, it stops the motor. The motor will not started during the 10 sec. At the end of this duration the fault will be removed. For this error, enter the "Motor Direction" parameter from the menu that should be done and change the setting of this parameter.
17	***Overload Error***	If the ‘’Max. Current’’ value of the setted motor current passes during the Overload Load Perception Duration, the device will give Overload Error. The motor will be stopped. The motor will not started during the 10 sec. Then, the fault will be removed, the device will be worked according to the commands.
18	***Overcurrent Error***	If motor current will pass the device max. Current capacity during the Overload Load Perception Duration, the device will be given the fault of extreme current. The device will be stopped. The motor will not be started during the 10 sec. Then the fault is removed and the motor works according to the commands.

19	***Contactor Dropped Error***	When the device drives motor, the motor conductor is dropped, ENB signal is cut. The device is passed to the fault. The energy of giving to the motor will be cut. In order for the error to disappear, it is necessary to coming to the ENB signal and error waiting time (10 sec) must be completed.
20	***Contactor Error***	Within 5 seconds after the speed signal coming, if there is no ENB signal, the fault will be given. The energy will be cut to the motor. For removing the fault, ENB signal will be come or it is necessary to be completed error waiting time (10 sec).
21	***Identify Error***	If the fault occurs during the motor identification the energy is cut to the motor. Until the error is removed, the motor will not started. When the identification command comes, the identification procedur will be started.
23	***Thermic Error***	When Thermal Protection Monitoring is active under Advanced Settings, this rescue fonction is working. The programming input will be connected to the motor thermic (bimetal thermic or PTC) or brake resistor (bimetal thermic or PTC), because of the thermic temperature increasing, when open circuit is occurred, if motor is working , it will be stopped and until the error disappears, it will be not worked.
24	***Inconsistent Encoder Error***	This error is active when the control mode "Off Loop" is selected. When the connection is making false or encoder at least one of the cables are be ripped, the device gives this fault. When the fault will be removed, the device will not worked again.
25	***System Error***	If there is a system error in the device software, the device gives the fault. The device will not operate again until the error disappears. In this case, please contact with Mikrolift.
26	***Direction Command Error***	Both if Up and Down direction signs come to the device, the motor is stopped and the error disappears. The motor can not be restarted.
27	***Extreme Warming Error***	If the temperature of the coolant to which the IPM and the bridge diode are connected exceeds 90°C, an error is given and the motor will be stopped. The motor is not restarted before the coolant temperature falls below 70°C.
28	***Feeding Error***	This gives the fault if the voltage at the supply input of the device has been interrupted. The device will not work until the error disappears.

29	***Low DC. Bus Error***	This gives the fault if the DC bus voltage level is below the permissible level (Vdc, min). The motor is not energized until the fault is cleared. Mains Mode: Vdc, min = 400V, UPS mode: Vdc, min = 200V, Battery Mode: Vdc, min = 40V
30	***High DC. Bus Error***	This gives the fault if the DC bus voltage level is above the permissible level (Vdc, max). The motor is not energized until the fault is cleared. Mains Mode: Vdc, max = 715 V, UPS mode: Vdc, max =420V
31	***Parameter Error***	The breakdown in the proccessor memory of setting values in the parameters entered in the menu or memory breakdown or at the end of the wrong registration, if there is wrong value, it gives this fault.

10. FIRMWARE UPDATE, PARAMETER BACKUP AND TRANSFER

10.1. Firmware Updating

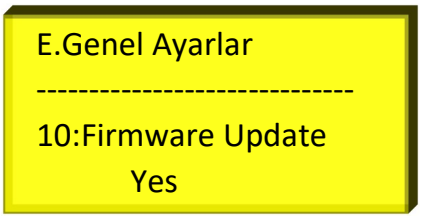
For updating the firmware of the device, the following operations must be performed respectively;

- Update file for DRVxxrxx (example: DRV01r02) via computer

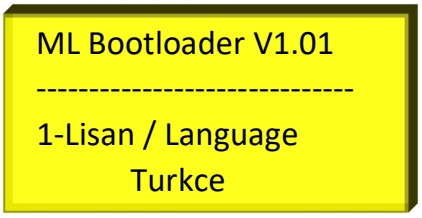
is loaded to the micro SD card. (Update file www.mikrolift.com web

You can download to your computer.)

- The micro SD card is inserted into the slot at the bottom left of the device.
- The programming of the device is entered in ”E.General Settings Device. In this section 10: Software Update ”parameter Yes Firmware will is selected.

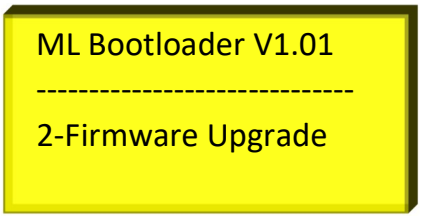


- “Yes’’ is selected, ENTER key is pressed, the device resets itself, switches to Firmware installation position.

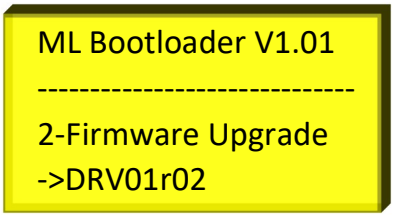


The first parameter is language selection. With this parameter, you can change the language.

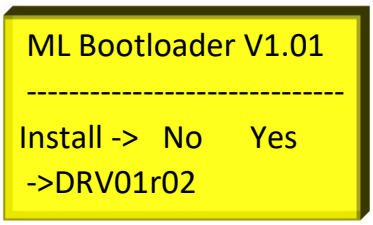
- The second parameter is for seeing the firmware, select and installation and loading process parameter.

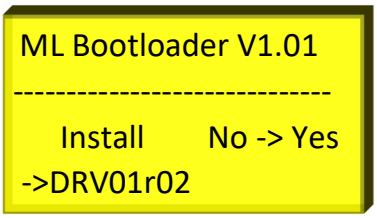


- Press “ENTER button, while this parameter is displayed.
- The first one of on the bottom line of the screen, update files in the SD card is shown.

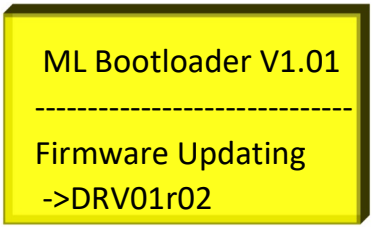


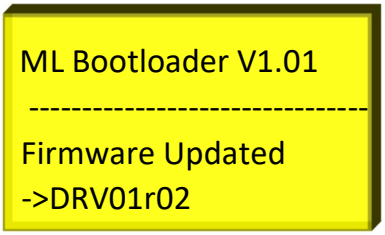
- When up and down keys are pressed, in the SD card have other firmware file, at the bottom row the showing is doing in sequence.
- When upload the file you want to load is at the bottom row, please press to the ‘’ENTER’’ button. It is required to approve loading. Left and right buttons are pressed, the ‘’OK’’ arrow will show the ‘’YES’’ and please press to the ‘’ENTER’’ button.





- The firmware updating process is starting and during the updating ‘’READY’’ led is flashing swiftly. When updating is done, in the screen that you can see the ‘’firmware process is completed’’. After that, the device will be reset itself and returning to the normal working mode.

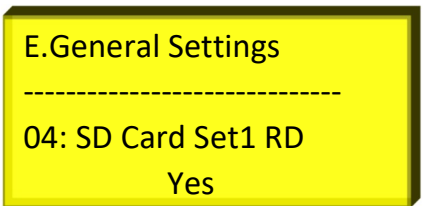


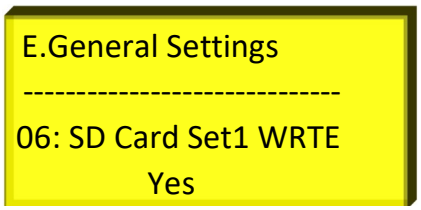


10.2. Parameter Backup and Transfer

All parameters can be backed up to the micro SD card to be inserted into the device or to be transferred to the other card. The backup process as Set-1 ve Set-2 have two area, it can do as separately to the area. For writing process to the any area, it is needed to enter programming ‘’E.General Setting’’. Here, please choose the ‘’06: SD Card Set1 Read’’.

For reading the registered parameter values on the SD card for writing to any zone, Please enter to the programming ‘’E.General Setting’’ and choose ‘’04: SD Card Set1 Read to the ‘’YES’’.





The same operations can be done in SD card set2.