

AE-MAESTRO

Integrated Lift Control System

INSTALLATION MANUAL

for Electric Package of Geared Lift Machines



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for Electric Package of Geared Lift Machines.

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Software Version : 2.20u (Lift Control) / 2.20g (Motor Driver)

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A.PREFACE

This document is written to guide installation of the lift controller for pre-wired system. It guides the installation of electric system of the lift. **This document should be used in together with AE-MAESTRO Integrated Lift Controller and Hand Terminal user manuals.**

Pre-Wired system has been designed to make installation easier and faster. All the cables have either plug and play connectors if they are going to be connected to another socket or dummy terminals to avoid any short circuit. There are labels on all free cables and cable groups with their related information written on them. To avoid any wrong connection, check the labels before connecting any socket or terminal.

CAUTION

- * **This document is a quick installation document and does not contain complete information.**
- * **For more detailed information refer to the user manuals of the Integrated Device and Hand Terminal.**
- * **The scope of this manual is limited only to electrical parts.**
- * **Installation must be performed only by authorized persons.**
- * **Check the labels before connecting any socket or terminal.**
- * **Do not leave the lift in normal mode before completing and testing the system properly.**
- * **Disconnect the battery sockets when you have finished with the installation and keep them unplugged until the lift will be opened for normal service.**
- * **This guide is a kind of a technical proposal. Testing and confirming safety parts and functions are under the responsibility of the lift company.**

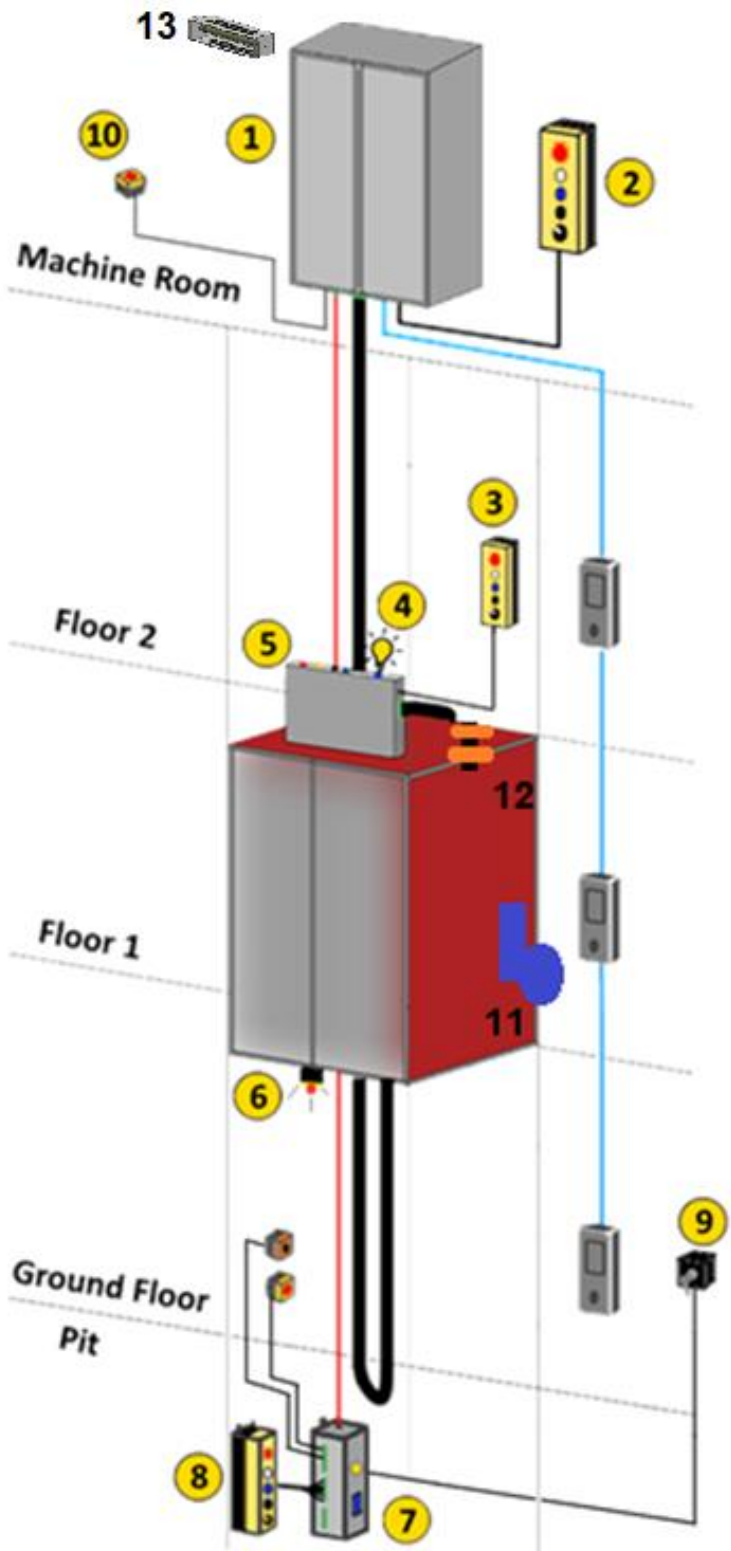
APPENDIXES:

AP01-FLOOR LEVEL ADJUSTMENT

AP02-CAR OPERATING PANEL









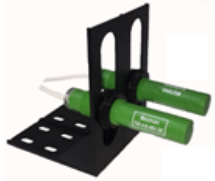
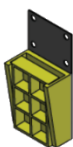
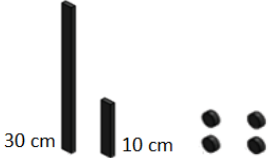

AP03-LANDING OPERATING PANEL

THE ELECTRICAL COMPONENTS IN SHAFT





- 1. Lift Control Panel
- 2. Recall Command Box
- 3. Inspection Command Box
- 4. Cartop Emergency Lighting
- 5. Cartop Box
- 6. Audible and Flashing Device
- 7. Pit Control Unit
- 8. Pit Command Box
- 9. Pit Inspection Reset Switch
- 10. Machine Side Stop Button
- 11. Shaft Limit Switch
- 12. ML1-ML2 Magnetic Switches
- 13. Braking Resistor

THE COMPONENTS USED IN SHAFT AND MACHINE ROOM

<p>Prewired Inspection Box</p>  <p>Controls car circuit</p>	<p>KDM Pit Control Box</p>  <p>Controls pit circuit</p>	<p>Pit Stop, Socket and Alarm Box</p>  <p>Connected to Controller</p>	<p>Inspection and Recall Command Box</p>  <p>In cartop, controller and pit to move the car</p>
<p>Stop Button</p>  <p>Used to stop the lift in machine room</p>	<p>Audible and Visual Alarm</p>  <p>Used under the car</p>	<p>Braking Resistor</p>  <p>Connected to Controller</p>	<p>Pit Leaving Switch</p>  <p>Used at the base landing floor</p>
<p>Magnetic Switches</p>  <p>Used on the cartop</p>	<p>Flex Holder</p>  <p>Used on the car wall</p>	<p>Strip and Round Magnets</p>  <p>Used on the rails</p>	<p>Shaft Limit Switch</p>  <p>Used on the cartop</p>

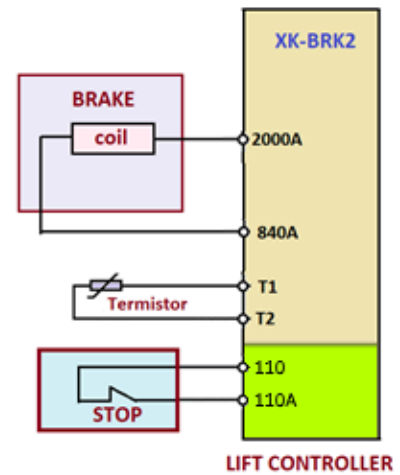
PLACING MR CONTROLLER BOX IN MACHINE ROOM

<ul style="list-style-type: none"> Machine Room (MR) type lift controller box is used for controllers for geared traction machines. Be careful to install control panels so that the ventilation holes are not exposed. Use screws and brackets given to fix the metal box to the wall as shown below. 		

CONNECTING LINE SUPPLY	
<p>Connect power line cables to the terminals L1/R, L2/S, L3/T and N.</p>	
CONNECTING MOTOR POWER	
<ol style="list-style-type: none"> 1. Connect motor power inputs to U, V, W terminals in controller box. 2. Use the given shielded motor cable for this. 3. Connect shielding of the cable to the earth bar in the controller. 	
CONNECTING BRAKING RESISTOR	
<ol style="list-style-type: none"> 1. Fix the braking resistor onto the wall or control panel. 2. Do not put the resistor into the controller box. 3. Be aware that it will be hot and will emit heat to the surroundings during lift operation. Do not touch it during operation. 4. Connect the cables of the braking resistor to the terminals P+, BR in XK-BRK1 group in controller box. 5. Connect the shielding of the cable to the earth bar inside the controller box. 6. Do not run the motor without connecting the appropriate braking resistor. Otherwise the device may be damaged. 	
CONNECTING RECALL COMMAND BOX	
<p>Connect recall command box to the controller on HT-KL terminal board by plugging XK-PREV1 and XK-PREV2 sockets.</p>	

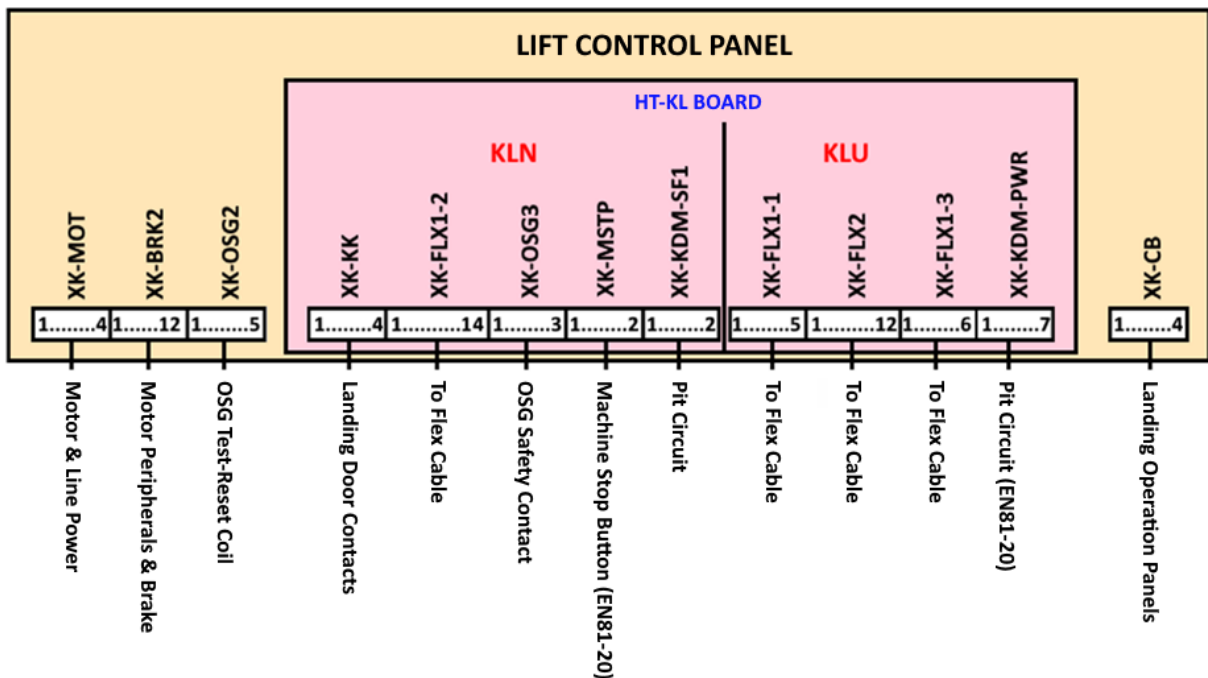
CONNECTING BRAKE, THERMISTOR AND MACHINE SIDE STOP

1. Motor brakes, thermistor and stop are placed in **XK-BRK2** terminal group in controller box.
2. Connect motor thermistor to T1 and T2 terminals in controller box.
3. If there is no thermistor in motor then bridge T1 and T2 terminals in controller
4. Connect brake coils and brake contacts as shown in the figure to the related controller terminals.
5. Connect machine stop to 110 and 110A terminals (EN81-20).



CONTROLLER OUTPUT TERMINALS AND SOCKETS

The system is prewired. Therefore, there are very few direct cable connections to the controller. The connections are mostly done by plugging sockets or connecting external devices to the labelled dummy terminal. The drawing below shows the output terminals of the controller. The sockets have been arranged in groups for specific tasks.

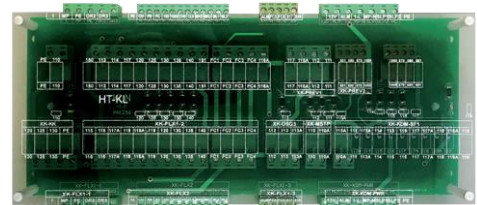


- In order to start with autotuning operation safety line must be closed.
- **If safety line has been already bridged on HT-KL board with first installation cables in control panel, then these cables must be removed after termination of the installation process!**
- If the safety line bridging cables are not available for HT-KL board and the car circuit is not wired yet, you can connect inspection box and flex cable next to the controller box.
- So, the safety circuit will be closed and autotuning operation can be started.

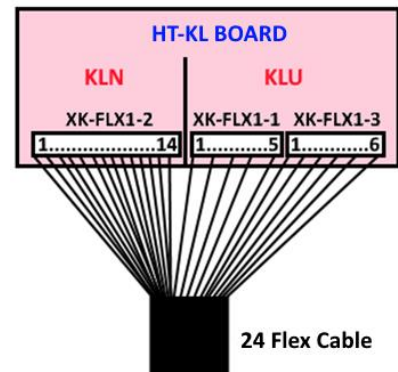
CONNECTING FLEX CABLE

The terminals for the flex cable are on HT-KL board.
There are two pieces flex cables between car and controller, one 12 the other 24 wires.

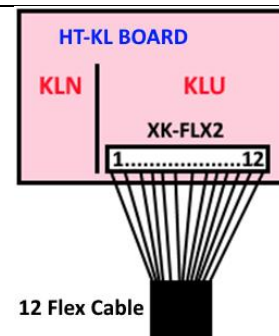
In installation, if the car is not been already installed then you can connect the inspection key in machine room. This is necessary to have the safety contacts closed in order to run motor for autotuning.



- 1- Take 24 wire flex cable and connect its terminals labelled with...
XK-FLX1-1
XK-FLX1-2
XK-FLX1-3
to their corresponding sockets on HT-KL board in the controller box.



- 2- Take 12 wire flex cable and connect its terminals labelled with XK-FLX2 to its corresponding socket on HT-KL board in the controller box.



CAR ELECTRIC INSTALLATION

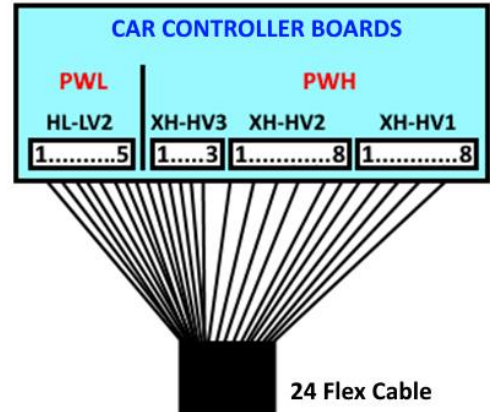
1. Place inspection box onto the cartop.
2. Flexible cable is already equipped with plug in connectors on both ends.
3. There are two boards inside the inspection board PWL and PWH.
4. Connect flex cable to the related terminals in PWL and PWH boards inside the inspection box as shown on the connection diagram on page **C01-FLEXIBLE CABLE CONNECTIONS** presented in project schematics.
5. PWH is the lower board and carries safety line and 220V / 230V signals.
6. PWL is the upper board and it serves as the car controller.



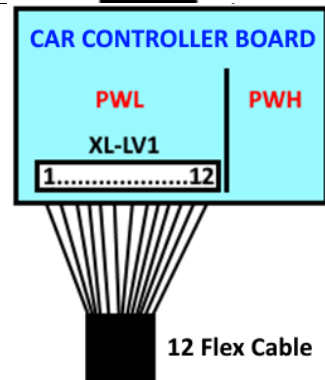
7. Take other end of 24 wire flex cable and connect its terminals labelled with...

- XH-HVT
- XL-LV2
- XH-HV1
- XH-HV2

to their corresponding sockets on PWL and PWH boards in cartop inspection box.



8. Take other end of 12 wire flex cable and connect its terminals labelled with XL-LV1 to its corresponding socket on PWL board in cartop inspection box.



CONNECTION OF CAR PANELS

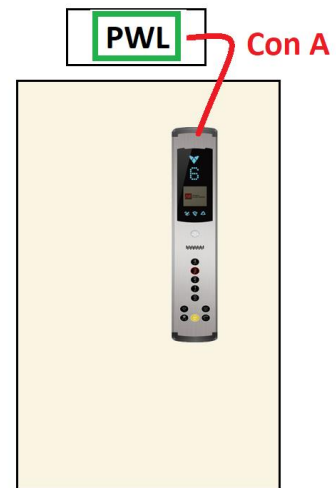
1. For ALYA Series COP

- a) Connect cable labelled **CON(A)** between CON(A) socket in PWL board and CON socket of ALYA car panel.
- b) If you have two COPs inside the cabin, then connect **CON(B)** between PWL board and CON socket of the second ALYA car panel in the cabin. Set door type to B from ALYA car panel dip switch.

2. For other COP Series

- a) Connect cable labelled **CON(A)** between CON(A) socket in PWL board and CON socket of PWS board in car panel.
- b) If you have two COPs inside the cabin, then connect **CON(B)** between PWL board and CON socket of PWS board inside the second car panel in the cabin. Set door type to B from PWS dip switch.

See **AP02-CAR OPERATING PANEL** section in Appendix for mechanical and electrical installation of car panels.



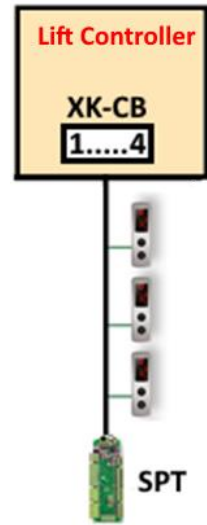
CONNECTIONS OF CAR CIRCUIT

Connect the remaining car devices to the inspection box as shown in the following circuit diagrams presented in schemas of the project on pages:

C02-CAR TOP CONNECTIONS PWH and **C03-CAR TOP CONNECTIONS PWL**

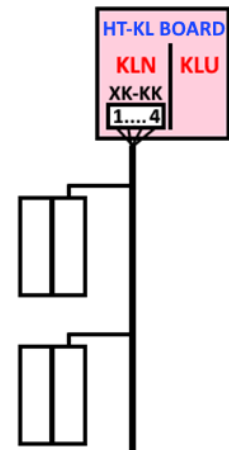
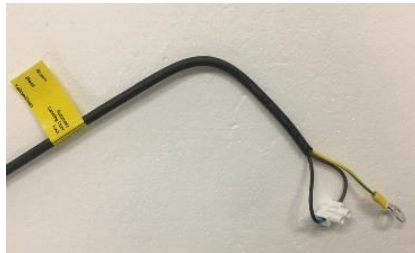
CONNECTING LANDING PANELS

1. Read the manual of landing panels (LOP) in Appendix-3, AP-03.
2. Landing Panels are serially connected and must have a unique floor number id to communicate.
3. All LOPs are delivered as their floor numbers already saved.
4. So, read their floor numbers on their pockets to find their floor.
5. You can set the floor number of any LOP at any time by following the instructions in LOP manual **AP03-LANDING OPERATING PANEL** in Appendix.
6. Fix LOPs to the walls at the landings regarding to the instructions in AP-03.
7. Connect XK-CB socket to the controller.
8. Connect all landing panels to the cable of XK-CB.
9. If the pit board (SPT) is not used in system, a termination resistor must be installed at the end of the line.



CONNECTING LANDING DOORS

1. Connect XK-KK socket to the controller terminals to connect door contacts.
2. At each floor disconnect the dummy white terminal shown below and connect these cables to the door contacts. LKK/A-B is the name of this cable.
3. Connect green-yellow cable to the metal chassis of the door.

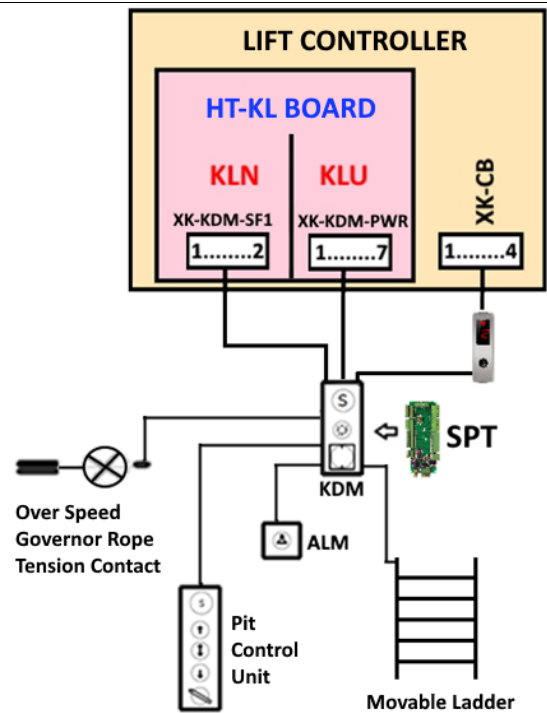


CONNECTING SHAFT PIT (Only for EN81-20 Standard)

- Connect **XK-KDM-SF1** and **XK-KDM-PWR** sockets to the controller to implement shaft pit
- Connect SPT board, which is in shaft pit box **KDM**, to the socket of the LOP in ground floor.
- Connect other shaft pit devices to the terminals of the KDM box as shown on the diagram in the project schemas

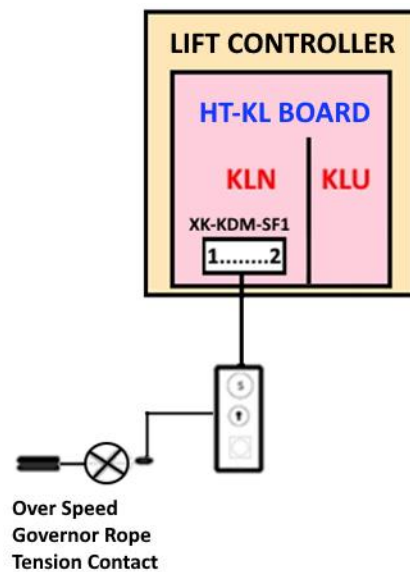
SD02-SHAFT PIT CONNECTIONS

- Place KRR switch at the landing onto door frame or onto a wall near it. It must be located outside of the shaft.
- KRR switch must change its state after an exit from pit inspection. Otherwise the system will not switch to the normal mode.



CONNECTING SHAFT PIT (Only for EN81-1 Standard)

- Connect **XK-KDM-SF1** socket to the controller to implement shaft pit.

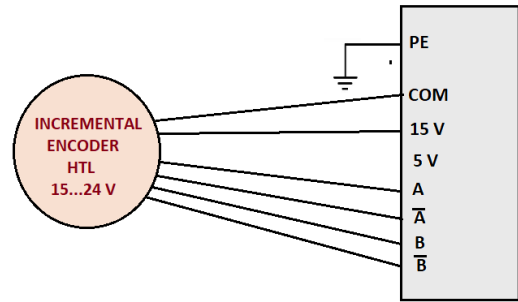


ENCODER CONNECTIONS FOR GEARED MACHINES

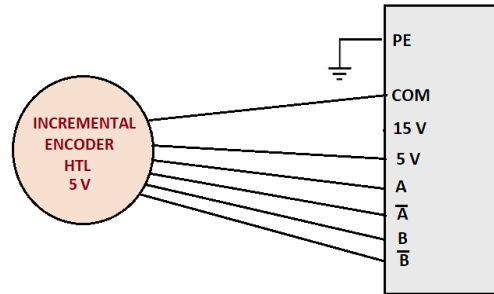
1. Integrated device can work with or without encoder when driving geared machines.
2. If the device will be used without encoder as open loop then you can skip this section.
3. Open the front cover of the device.
4. Connect the wires of the encoder to the device regarding the data sheet of the encoder used in machine.
5. Read the supply voltage information of the encoder on its label or in its data sheet. Connect its power supply wire to 5V or to 15V terminal of the device, regarding to this information.



ENCODERS WITH 15V (24V) SUPPLY VOLTAGE



ENCODERS WITH 5V SUPPLY VOLTAGE

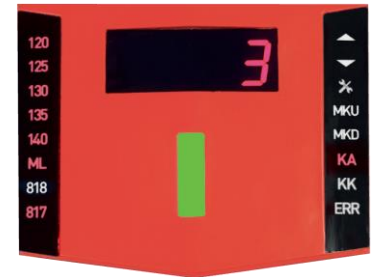


1. The controller must be started in inspection mode due to the position of the switch in recall command box.
2. **Switch on** power to energize the controller.



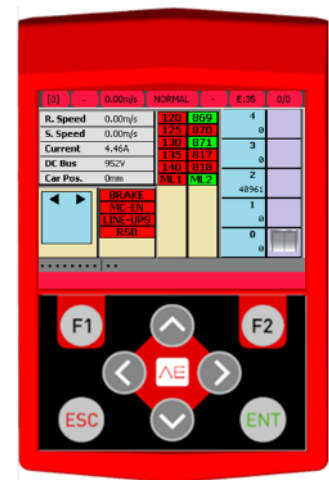
FRONT LED PANEL

- There is a led panel in front cover of the device.
- It gives information about the status of some important variables.
- LED panel is used by default to show current floor number.
- However, it can be used to monitor a number of variables, too. This can be done by adjusting parameter E03- LED DISPLAY.
- There is bar between two LED columns, which shows the state of the system.
- Green means normal mode, yellow inspection mode and red error case.
- In case of any motion the bar flashes
- The safety line 120...140 can be monitored here.



HAND TERMINAL

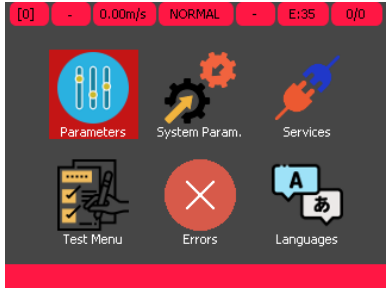
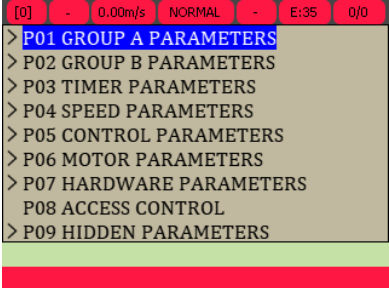
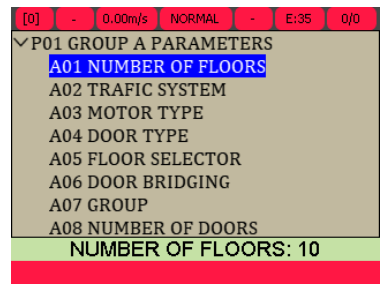
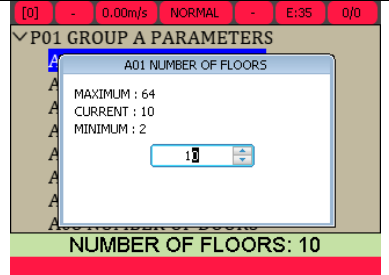
- Hand Terminal should be used to adjust parameters and carry on the services implemented in the device software.
- It must not be present during operation of the lift.
- Hand terminal can be used as plugged onto the device as well as via CAN bus in the shaft and cabin.
- The software of the device can be updated by using hand terminal. Program file is transferred from an SD card.
- Read AE-MAESTRO Hand Terminal manual before going further. You will need it to monitor the lift, edit parameters and performing operations.
- However, as an example how to change the number of floors will be explained below.
- To work with software (Control-2.20u and Motor Driver 2.20g) you need a terminal **software 2.20t** or higher. Please check.



The main screen shows the following values about the lift:

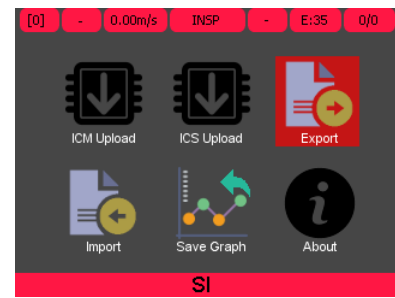
- Real time travel of the car.
- Safety line.
- Car position
- Car speed
- Door state
- Current calls
- A message line about the state of the lift.
- Some of the important inputs and outputs.

[7] - 0.00m/s INSP - E: 0/0	
R. Speed	0.00m/s 120 869 7
S. Speed	0.00m/s 125 870 22000
Current	9.44A 130 871 6
DC Bus	663V 135 817 19000
Car Pos.	29979mm 140 818 5
Car Pos. 29979mm ML1 ML2 16000	
BRK MC 4	
LINE RSB 13000	
ERS G:1 3	
10000	

<ol style="list-style-type: none"> 1. Press ENT button to go to the menu. 2. In this screen you can move by using cursor keys (arrows). 3. In order to enter into an application or sub-menu come to the related icon by using cursor keys on the screen and press ENT when its icon is highlighted. 4. For example select Parameters and press ENT while parameter icon is being highlighted. 5. So you will go into parameter menu. 	
<p>In Parameters menu select Group A by using up and down arrows and press ENT when Group A is highlighted.</p> <p>You can select other parameter groups similarly.</p>	
<p>Then select A01-NUMBER OF FLOORS in order to change number of floors with arrow keys in the list of the Group A parameters as explained above and press ENT.</p>	
<ol style="list-style-type: none"> 1. In the following screen Number of floors will be displayed on the screen. 2. Select the number you want to set as number of floors of the lift by using up and down arrow keys. 3. Then press ENT key to save your selection. 4. So parameter A01 is saved as 2. 5. You can use this method to see and change other parameters. 	

LOADING AND SAVING PARAMETERS

- The parameter set of the device can be saved into the SD card and reloaded from it again.
- So the parameter file can be back-up, transferred to another device or restored from the file in SD card.
- Use IMPORT utility in hand terminal to save parameters into a file in SD card.
- Use EXPORT utility in hand terminal to restore parameters from a file in SD card.
- EXPORT and IMPORT utilities are working only on the device not via CAN-Bus.

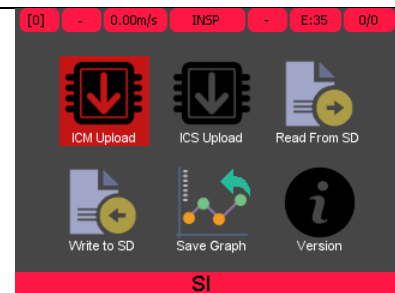


SOFTWARE UPDATE

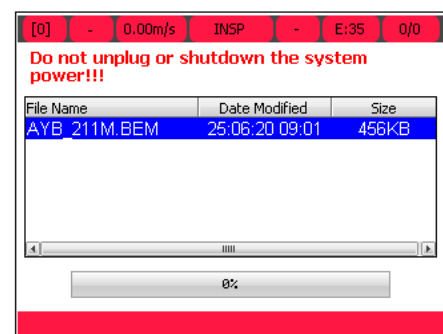
- Software of the device can be updated by using the hand terminal.
- Copy the program file you want to load to the device into the **SD card**.
- Insert SD card into the slot in the hand terminal.
- Place hand terminal onto the device.
- Update operation cannot be performed via CAN-Bus.
- Select **Data-Software** icon.

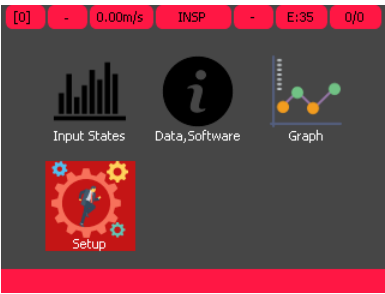
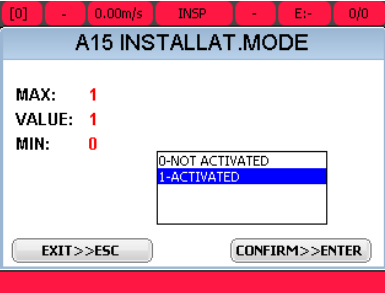
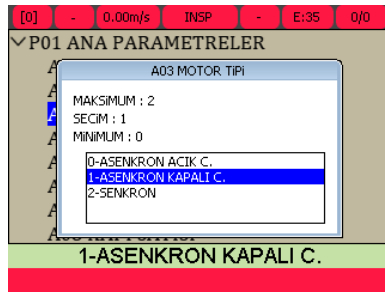
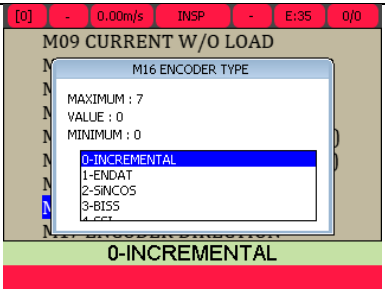


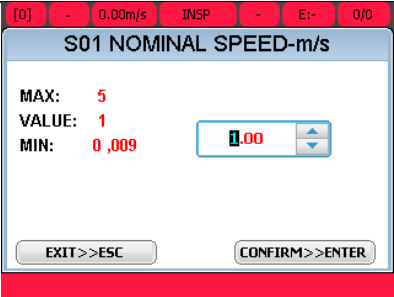

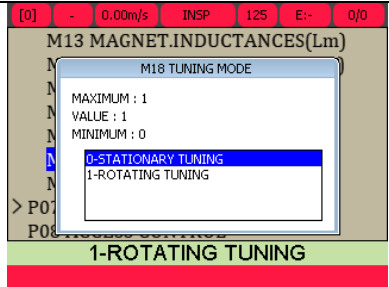
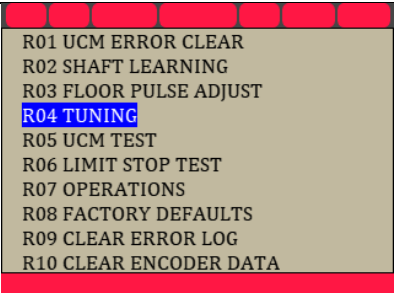
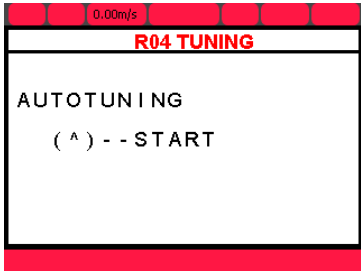
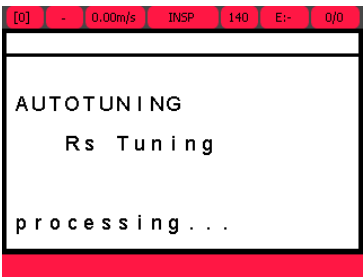
- There are two processors inside the device. Therefore, you should select ICM or ICS Upload icon to upload.
- **To update the hand terminal software**, hold F1 during energizing the hand terminal.
- You can start the update with the ENT button on the selected file from the screen that appears.
- Press STOP button to inhibit any motion.

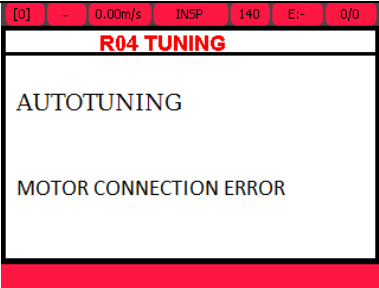
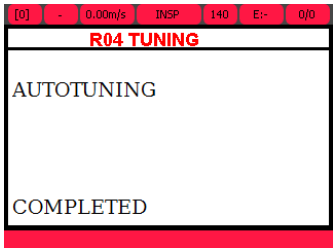


- Before starting any update procedure switch the controller to the inspection mode
- You should select the file you want to upload on the screen by using **UP** and **DOWN** arrow keys.
- Then press **ENT** to select the program file and start uploading.
- Do not switch off the system during operation.
- You must switch off and restart the system after software update.



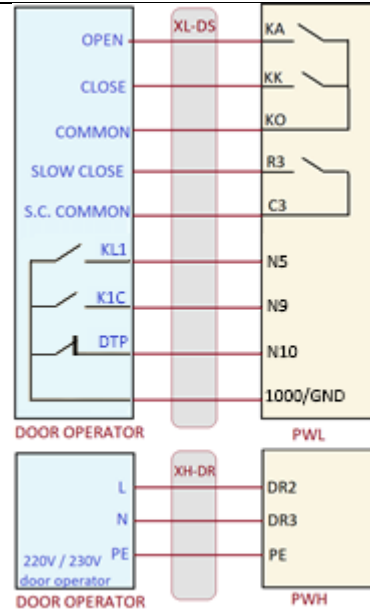
INITIAL PARAMETER SETUP	
<ul style="list-style-type: none"> • AE-MAESTRO has an interactive installation menu which can be used to set most of the general parameters. • Using this menu facilitates setting up the system. • You will be asked to set requested parameters one by one depending on the previous selections. • Firstly, switch to the INSPECTION mode. • Then click on the SETUP icon to start with the installation. 	
<ul style="list-style-type: none"> • Installation menu starts with A15 INSTALLATION MODE parameter. • In order to go to the application, you must select A5=1 to activate installation and initiate setup. • Installation mode bypasses some errors since the system has not been installed properly in the shaft yet. • You will need this facility to place shaft switches, magnets, etc. • Installation Mode is only in inspection mode active. Its value will be switched to 0 as soon as the system is switched to the normal mode. 	
<ul style="list-style-type: none"> • Once setup application has been started, you will be asked for entering a number of parameters related to your system and motor specifications. • You can leave this menu by using ESC button. • When you click on the CONFIRM button the next screen for the next parameter will come. • The type of motors will be displayed on the screen. • Select 1-Open Loop Asynchronous for open loop application (without encoder). • Select 2-Closed Loop Asynchronous for closed loop applications (with incremental encoder). • Then press ENT key while your selection is being highlighted. 	
<ul style="list-style-type: none"> • Select appropriate parameters on each screen. • So, the required parameters to start installation work with the controller and to run the motor will be adjusted. 	

<ul style="list-style-type: none"> Of course, you will need to do some more modifications on parameter related to comfort, timing and special requested functions. You can also change these parameters at any time after completing the setup program, when needed. 	
<h3>AUTOTUNING</h3>	
<ol style="list-style-type: none"> Autotuning operation should be carried out to get encoder offset position and motor characteristics Switch recall switch to position 1 on recall command box. 	
<p>Then you should set the tuning mode as stationary.</p> <p>M18 TUNING MODE</p> <p>0- Stationary Tuning</p> <p>Tuning process should be carried out without any rotation of motor.</p>	
<h3>TUNING IN OPERATION</h3>	
<ol style="list-style-type: none"> The system must stay in inspection mode and safety line must be closed to perform tuning process To start tuning, firstly select SERVICES icon and select line R04 TUNING in the services menu. 	
<p>Operation Stage 1</p> <ol style="list-style-type: none"> Press the blue RUN button on the recall command box and hold it pressed until the end of the tuning process. Press UP arrow button on the hand terminal to start the operation. 	
<p>Operation Stage 2</p> <p>So, tuning operation has been started.</p> <p>Continue pressing onto RUN button on recall command box.</p> <ol style="list-style-type: none"> Since there will be no motion brakes are not activated. However, if the brakes are not adjusted well to hold the machine fixed then the motor rotates and the tuning operation fails. Therefore, the brakes must be checked during operation. 	

<p>Faults in Operation</p> <p>MOTOR CONNECTION ERROR:</p> <ul style="list-style-type: none"> • The device output stage does not sense three motor phase windings. • The wires and connections between motor and the device output should be checked. <p>ENABLE ERROR</p> <ul style="list-style-type: none"> • This error arises if the safety line is cut by any reason during the operation. Releasing RUN button may cause this error. <p>TUNING ERROR</p> <ul style="list-style-type: none"> • Any rotation of the motor in stationary tuning may cause tuning error. 	
<p>Operation Stage 3</p> <ul style="list-style-type: none"> • When the operation has been completed then you will be informed on the screen. • Then stop pressing RUN button. • You can return to the main menu by pressing ESC button. 	
<p>MOTION TEST</p> <ol style="list-style-type: none"> 1. If the system is closed loop then execute this test. In open loop skip it. 2. Give a motion command by pressing RUN and UP or DOWN buttons in recall command box. 3. If you observe a very rapid rotation or no motor rotation, then reverse the value of the parameter M17-ENCODER DIRECTION in MOTOR PARAMETERS. 4. Then try the first step once more. 5. You should observe a normal rotation in both directions. 	
<p>DIRECTION TEST</p> <ul style="list-style-type: none"> • Give a motion command by pressing RUN and UP or DOWN buttons in recall command box. • Observe the motion of the car. • If the car travel direction is opposite to the command direction given, then reverse the value of the parameter M19 MOTOR DIRECTION in MOTOR PARAMETERS. 	
<ul style="list-style-type: none"> • After that, the motor runs at the desired direction with desired speed then tuning operation is successfully completed. • Now you can start the processes to prepare the system for normal operation. • Continue staying in inspection mode. 	

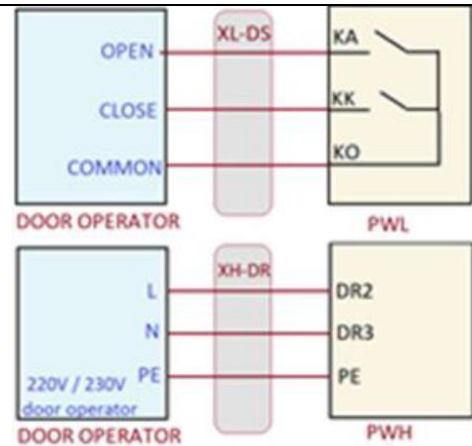
CONNECTION OF DOOR OPERATOR AND SIGNALS (EN81-20)

Door Operator is connected with two cable groups:
XL-DS carries door control signals from PWH. The signals are:
 KA output is Door Open Command
 KK output is Door Close Command.
 KO is the common terminal of KA and KK.
 R3 is the Slow Close Command.
 C3 is common of Slow Close.
 KL1 is the Door Close Limit for Door 1
 DTP is the Door Motor Temperature
 K1C is the Obstruction Contact for Door 1
XH-DR carries power supply for door operator from PWH.
 These are:
 DR2 is Line
 DR3 is Neutral
 PE is Earth



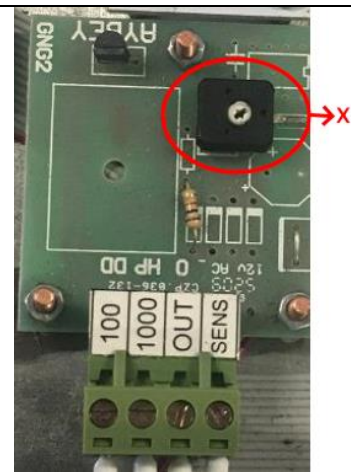
CONNECTION OF DOOR OPERATOR AND SIGNALS (EN81-1)

Door Operator is connected with two cable groups:
XL-DS carries door control signals from PWH. The signals are:
 KA output is Door Open Command
 KK output is Door Close Command.
 KO is the common terminal of KA and KK.
XH-DR carries power supply for door operator from PWH.
 These are:
 DR2 is Line
 DR3 is Neutral
 PE is Earth



CAR ILLUMINATION CONTROL

- There is a detection system for car illumination control inside car operating panel.
- It inhibits the motion of the car if the light inside the cabin goes off, while the car light is on (busy signal on).
- Sensitivity of the light detector system can be adjusted with the potentiometer on GN02 board inside the car panel. It is marked by the red circle in the photo.



BYPASS SWITCH(Only for EN81-20 Standard)

- Bypass switch has 4 positions and bypasses only car or landing doors.
- **Position 0:** No bypass. This is for **NORMAL OPERATION** mode.
- **Position 1: 120 and 125** are bridged. This means:
In systems with two automatic doors, landing door contacts of side B are bridged.
In systems with semiautomatic doors landing door contacts are bridged
- **Position 2: 125-130** are bridged. This means:
In systems with automatic doors, landing door contacts in side A are bridged.
In systems with semiautomatic doors landing door locks are bridged
- **Position 3: 130-140** are bridged, namely car door contacts are bridged (side A and B).

Note: In order to be able to move the car in inspection mode, while door contact are bridged, door limit switches **KL1** (for car door side A) and **KL2** (for car door side B) must have been already installed and defined.



AUDIBLE AND FLASHING DEVICE (Only for EN81-20 Standard)

- When the lift is moved in the bypass mode, it gives an audible and light warning.
- It can be mounted anywhere under the cabin.



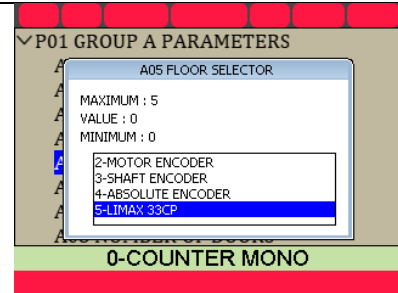
CAR LIMIT SWITCH

- Mount mechanical limit switch with roller by using supplied metal bracket onto the cartop.
- Connect its cable to X-KLSK socket to PWH board in inspection box.
- Move the car to downwards with inspection or recall command to the position where the car is just below the shaft limit.
- Place and fix the lower car limit cam there.
- Move the car to upwards with inspection or recall command to the position where the car is just above the shaft limit.
- Place and fix the upper car limit cam there.



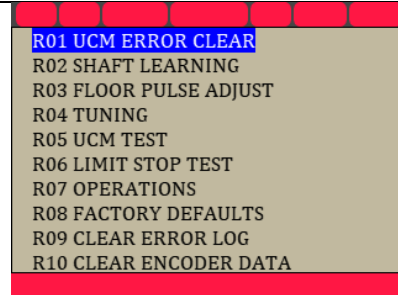
INSTALLATION OF FLOOR SELECTOR AND ADJUSTING FLOORS

- After selecting the floor selector system that you are going to use in parameter **A05** go to the document in **Appendix-1** about floor selector installation.
- Installing shaft switches, teaching floor levels and fine floor adjustments is explained in this manual.



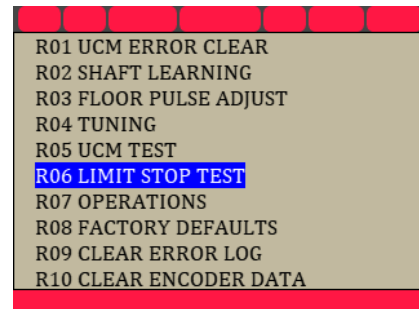
CLEARING PERMANENT ERRORS

- Some critical errors, mainly UCM (unintended car motion) error block the lift and do not allow further operation.
- These errors are even not cleared when the system is switched off.
- The only way to get rid of them is using a special error clearing section.
- Go to SERVICES icon and then select line **R01-UCM-CLEAR ERROR** in services menu.



TESTING SAFETY FUNCTIONS

- There are a number of test routines implemented in software.
- They can be started in SERVICES menu.
- **SHAFT LIMIT TEST**
The performance of the shaft limit switches can be tested by using this test. See section 10.2 in device user manual for detailed explanation of this test.
- **MANUAL UCM TEST**
This test has been implemented to simulate an unintended car motion situation and see the response of the system. See section 7.4 in device user manual for detailed explanation of this test.



LIFT TEST MENU

- There is a special utility for testing the lift in normal operation.
- To activate it select Test Menu icon.
- The doors or calls can be easily cancelled.
- A call to the top or bottom floor can be created.
- Any number of random lift travels can be executed automatically.
- A detailed explanation of Lift Test Menu is presented in user manual in section 10.1.
- After the installation of the lift has been completed run this routine to see if any function fails.
- This facility can be used later for troubleshooting by enabling or disabling some peripherals.

