

AYBEY ELEKTRONİK

AC Series Lift Controller Panel

INSTALLATION MANUAL

AC SERIES
LIFT CONTROLLER PANEL
INSTALLATION MANUAL

VERSION: 1.00

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IMPORTANT

- This document is a sample guide for users. All information contained in these materials is subject to change by Aybey Elektronik without notice. Installer shall be careful against any errors or inaccuracies.
- Installer has to know all standards, regulations and directives about lifts and obey them during installation.
- Aybey Elektronik guarantees that control system and control panel are in conformity with Lift Directive 95/16/EC and European standards NEN-EN 81-1 / NEN-EN 81-2. However in case of any change in control panel or any improper installation by installer, Aybey does not guaranty any conformity with the standards and assumes no responsibility.

Important Points For In Conformity With EN-81 Standards

In a lift control system, for a full electrical conformity with EN-81 standards it is required that control system (control boards), control panel and electrical connections must be proper. Aybey Elektronik guarantees that control system and control panel are in conformity with the standards. However external connections of control panel and other electrical connections are under installers' responsibility. In order to guide to installers important points for installation will be explained below according to the EN-81 standards.

1) INSPECTION

1.1) GENERAL RULES

- 1.1.1 The car speed shall not exceed 0,63 m/s.
- 1.1.2 The limits of normal car travel shall be placed to proper positions in well and control panel connections of limits shall be done properly.
- 1.1.3 Emergency stopping and safety circuits shall be connected according to the connection diagrams and shall be active.
- 1.1.4 Car lamp connection shall be done according to the connection diagrams.
- 1.1.5 The contacts of operation switches shall ;
 - Satisfy the requirements of EN 60947-5-1 standard belongs to the class AC-15 in AC circuits and DC-13 in DC circuits.
 - Be provided for a rated insulation voltage of 250 V if the enclosure provides a degree of protection of at least IP 4x, or 500 V if the degree of protection of the enclosure is less than IP 4x.

Aybey Elektronik suggests and supplies SCHNEIDER and ASG brand buttons and switches which satisfy the requirements of EN81-1, EN81-2 article 14.1.2.2.

1.2) INSPECTION ON THE CAR ROOF

- 1.2.1 Car roof inspection switch shall be bi-stable and protected against involuntary operation. The words 'NORMAL' and 'INSPECTION-BAKIM' shall be written on or near the inspection operation switch.
- 1.2.2 The movement of the car shall be dependent on a constant pressure on a push-button protected against accidental operation and with the direction of movement clearly indicated.
- 1.2.3 The control device shall incorporate a stopping device which shall be mounted in an easily accessible position and no more than 1 m from the entry points for inspection or maintenance personal.
- 1.2.4 The control station may also incorporate special switches protected against accidental operation for controlling the mechanism of doors from the car roof.

1.3) EMERGENCY ELECTRICAL OPERATION (Inspection from Control Panel)

- 1.3.1 The Emergency electrical operation switch and its push-button shall be so placed that the machine can readily be observed when using then. In AC control panel this switch is mounted on control panel. Therefore control panel shall be placed in machine room by taking this into consideration.
- 1.3.2 Because of rendering inoperative some electric devices (those mounted on the safety gear, on the buffers, on the ascending car overspeed protection means, those of the overspeed governor and limit switches) connection of this device shall be done exactly according to the connection diagrams.

2) MOTOR RUN TIME LIMITER

2.1) FLOOR PASS PERIOD

AC control system has a time limiter which de-energizes the machine and keeps it de-energized in case of floor pass period is exceed. Set this parameter (M2-PARAMETERS> P3-TIMINGS> C08-FLOOR PASS PERIOD) taking into consideration of maximum travel time for longest adjacent stops distance plus a few seconds tolerance.

2.2) SLOW SPEED PERIOD

AC control system has a time limiter which de-energizes the machine and keeps it de-energized in case of access to floor level in slow speed period is exceed. Set this parameter (M2-PARAMETERS> P3-TIMINGS> C09-SLOW SPEED MAXIMUM PERIOD) taking into consideration of access to floor level in slow speed time distance plus a few seconds tolerance.

2.3) MAXIMUM MOTOR TIME

AC control system has another time limiter which de-energizes the machine and keeps it de-energized in case of floor maximum motor time period is exceed. Set this parameter (M2-PARAMETERS> P3-TIMINGS> C28-MAX. MOTOR TIME) as maximum travel time for full travel plus 10 seconds. This period is limited by the system between 20 and 45 seconds.

In case of exceed any of these periods, system stops the machine and locks itself except inspection and releveling system. The return to normal operation can only be possible by manual resetting.

3) MOTOR PROTECTION

To protect the motor from overheating, motor thermistor terminals shall be connected to T1 and T2 terminals of control panel. In case of overheating, the car is stopped at the next landing such as the passengers can leave the car. After sufficient cooling down, system returns to normal operation.

4) STOPPING DEVICES

A stopping device shall be provided for stopping, and maintaining the lift out of service, including the power operated doors:

- In the lift pit
- In the pulley room
- On the car roof, in an easily accessible position and no more than 1m from the entry point for inspection and maintenance personal. This device may be the one located next to the inspection operation control if this is not placed more than 1 m from the access point
- At the inspection control device

5) EMERGENCY LIGHTING, ALARM and OVERLOAD

5.1) EMERGENCY LIGHTING

In the car, there shall be an automatically rechargeable emergency supply which is capable of feeding at least a 1W lamp for 1 hour case of an interruption of the normal lighting supply. This lighting shall come on automatically upon failure of the normal lighting supply.

5.2) ALARM

In order to call for outside assistance, passengers shall have available in the car an easily recognizable and accessible device for this purpose.

5.2.1 If this device is not connected to a public telephone network then the power of this device shall be either from the emergency lighting supply or from an equivalent supply.

5.2.2 This device shall allow a two-way communication allowing permanent contact with a rescue service. After initiation of the communication system no further action of the trapped person shall be necessary.

5.2.3 An intercom system or a similar device, powered by the emergency supply, shall be installed between inside the car and the machine room if the lift travel exceeds 30 m.

5-3) OVERLOAD

The lift shall be fitted with a device to prevent normal starting, including re-leveling for electrical lifts and excluding re-leveling for hydraulic lifts, in the event of overload in the car. The overload is considered to occur when the rated load is exceeded by 10% with a minimum of 75 kg. Therefore there shall be an overload sensing device at car and output of this device shall be connected to 804 terminal of the control panel.

If the cabin is overloaded;

5.3.1 Passengers in cabin have to be informed with sound and/or visible signal.

5.3.2 Automatic doors have to be completely open.

5.3.3 Manual doors have to be unlocked.

6) INSTALLATION AND CABLING

- The mean value in DC or RMS value in AC of the voltage between conductors or between conductors and earth shall not exceed 250 V for control and safety circuits.
- The neutral conductor and the protection conductor shall always be separate.
- In order to provide mechanical strength the cross-sectional area of conductors to electric safety devices of doors shall not be less than 0,75 mm².
- The electric installation shall be provided with the indications necessary to make it easy to understand.

7) PRE-OPENING, LEVELLING and RELEVELLING

Movement of the car with landing and car doors open for pre-opening, leveling and releveling is only permitted in the unlocking zone under the control of certified pre-opening door circuit (ACH/SLB).

- The unlocking zone shall not extend more than 0,2 m above and below the landing level. In the case of mechanically operated car and landing doors operated simultaneously, the unlocking zone may extend to a maximum of 0,35 m above and below the landing level.
- Floor level switches that detect the unlocking zone must comply with EN81-1, EN81-2 article 14.1.2.5. Aybey Elektronik suggests KPM 206 Series Mono-stable magnetic sensors which satisfy the requirements.

8) INSTALLATION

In this manual the installation process of AYBEY ELEKTRONİK AKTE5000 series lift controllers (AC Series) will be explained. Please carry out all steps exactly as written in this manual.

8-1) UNPACKING

8.1.1 Take the package of the controller out.

8.1.2 Open the front cover of the controller and take the documents from the pocket on the backside of it.

8.1.3 There shall be following documents:

- a) AC Series Lift Controller Systems Installation Manual
- b) EBS Application Specific Electrical Connection Diagrams
- c) AC Lift Controller User Manual
- d) Production Form

If any of these documents are missing, then call AYBEY (AYBEY ELEKTRONİK).

8.1.4 All the technical specifications of the controller are listed on the Production Form. Immediately compare the specifications listed there with your requirements which are given when you ordered the controller. If you find anything different than you ordered please immediately call AYBEY. Never connect a controller with different technical specifications than you ordered without permission from AYBEY.

8.1.5 Read all the technical documents and user instructions carefully before you start to connect the controller. If you have any problem in understanding then consult technical support department of AYBEY. AYBEY is not responsible for any damage caused by improper electrical connection or usage beyond the technical limits of the controller.

8-2) ENVIRONMENTAL CONSIDERATIONS

- 8.2.1** Keep the machine room clean.
- 8.2.2** Do not install the controller in a dusty place.
- 8.2.3** Prevent condensation on the controller.
- 8.2.4** Do not install the controller in an area where excessive amount of vapors or chemical fumes are present.
- 8.2.5** Do not install the controller in a hazardous area.
- 8.2.6** Do not install the controller in an area where excessive vibration is present.
- 8.2.7** Keep the temperature between 5-40 °C where you install the controller.

8-3) MECHANICAL INSTALLATION

- 8.3.1** Install the controller in an upright position.
- 8.3.2** There are 4 holes at the bottom side of the controller box. Use these holes to fix the controller to the ground.
- 8.3.3** Make sure that there is enough free space for the cover of the box to be opened.
- 8.3.4** Try to select the place of the controller such that you can see the machine while you are dealing with the controller.
- 8.3.5** Do not close the air holes at both sides of the controller.

8-4) SAFETY PRECAUTIONS

- 8.4.1** Proper grounding is vitally important for safe and proper operation. Select the ground cable thick enough to minimize the resistance to ground. Try to follow shortest possible route.
- 8.4.2** When there is an motor drive unit (inverter) inside the controller then make sure that the controller and motor is directly connected to ground. Avoid using indirect grounds such as building structure or water pipes which may behave as RFI antenna and radiate RFI noise.
- 8.4.3** When there is an motor drive unit (inverter) inside the controller then the outgoing power cables must be separated and grounded.
- 8.4.4** This equipment contains high voltages. Do not touch any component, circuit board, cable, resistor or power devices if you are not sure that there is no high voltage.

8-5) ELECTRICAL CONNECTIONS

- 8.5.1** You can find all electrical connections necessary for the controller in EBS (Application Specific Electrical Connection Diagrams) dossier. Use these electrical diagrams together with the AC Lift Controller Users Manual in connecting any wires. AYBEY shall not be responsible for any wrong connection.
- 8.5.2** Do not write or mark on the document in EBS. This can lead misunderstanding. Do not draft on these documents.
- 8.5.3** Use cables in connecting the controller to outside devices by considering the cable diameters listed in the table on form ER1 (ELECTRICAL RATINGS) in EBS dossier.
- 8.5.4** Measure line voltages and then compare them with the form ER1 to see if your line voltage is between allowable limits. If not you cannot use the controller.
- 8.5.5** Do not connect any NYAF cable without a core-end sleeve to its end.
- 8.5.6** Connect grounding wire to the grounding terminals on the chassis.
- 8.5.7** Be sure that all of the shalters and circuit breakers are off.
- 8.5.8** Connect incoming line phases to the terminals L1-R, L2-S, L3-T.
- 8.5.9** Connect incoming neutral to the terminal N/Mp.

- 8.5.10** Switch on TMS (Motor Protection Shalter).
- 8.5.11** Power on UPS (Uninterrupted Power Supply) and FUPS fuse. (If exists)
- 8.5.12** Switch on FTR1 and FTR2 circuit breakers. After this 5V led will be on in mainboard and LCD screen will start to show the start-up of the AC system.
- 8.5.13** Leave FWCX circuit breaker in off position and switch all other circuit breakers (F18, FFP, F...).
- 8.5.14** Check if 100 led on mainboard is energized. This led indicates that the signal voltage (24V DC) is present.
- 8.5.15** After that the system is started, namely when you can see the main screen on LCD, switch on the inspection switch on top of the car and also switch on the inspection switch on the right hand side of the AC control box to INSPECTION mode. Be sure you can see “INS” on LCD screen and 39 led is ON. (Only in parallel systems).
- 8.5.16** If you are sure that the system is in inspection mode then switch on the FWCX circuit breaker to on position to energize safety line.
- 8.5.17** When the safety line is energized you can check stop circuit (120), door contacts (130) and door locks (140) by looking the 120, 130 and 140 leds on the mainboard and on the LCD screen as [SDL].
- 8.5.18** Before you energize the motor adjust the current settings of TMS and TR. TMS is the main motor protection shalter and it is responsible from the main windings of the motor. Adjust TMS according to the nominal current of the motor (main windings). TR is the thermic relay for the low speed winding in a two speed machine. Adjust current setting of TR according to the nominal current of second speed (low speed) windings, if any.
- 8.5.19** Turn the inspection switch on the AC mainboard to normal position. Be sure that the system is still in inspection mode.
- 8.5.20** Before starting any motion check all the devices connected to the safety line by opening them one by one and monitoring from the led 120, 130 and 140 or on LCD screen.

8-6) STARTING MOTION

- 8.6.1** Be sure that the inspection switch on top of the car is in inspection position. It means that the input terminal 869 in the controller must be open circuit.
- 8.6.2** In order to make the car move down, 817 (first floor fast limit) terminal must be closed circuit. Similarly, in order to make the car move up 818 (last floor fast limit) terminal must be closed. Check the state of 817 and 818 from the LCD on mainboard.
- 8.6.3** In inspection mode you can move the car upwards by pressing up button which closes 501 terminal provided that 818 is closed. You can move the car downwards by pressing down button which closes 500 terminal provided that 817 is closed.
- 8.6.4** First movement of the car should be very short. Because it is possible the car moves in wrong direction. Be sure that the car movement and the direction on the LCD screen are the same. Otherwise interchange two wires connected to the motor terminals. If there are more than one winding in the motor be sure that you are dealing with the one which is being energized during inspection motion.
- 8.6.5** Be sure that the car speed in inspection motion is not exceeding 0.63 m/sec.
- 8.6.6** Once you managed to move the car in the desired way and direction then you can start to locate shalters and other floor data collecting devices in the shaft. Refer to the shalter maps found in EBS dossier.

- 8.6.7** In case you are using magnet shalter be sure that the distance between magnet and shalter is not less than 6 mm and more than 25 mm. When there is no rail between shalters then there should be a distance of minimum 100 mm.
- 8.6.8** After that you have placed all of the shalters and magnets in the shaft, move the car to the top floor. When the car reaches 818 shalter then it opens this shalter. In this case the car must stop even if you are still pressing on the up inspection button. If 818 is open, the floor number should be top floor. Note that the floor numbers are indicated as 0, 1, 2,... So at the top floor you must see the floor number the data stored in [A01] parameter minus 1. When the car reaches 817 shalter then the floor number must be 0. Note that these floor numbers are for LCD. The displays on landing units or on SWPEX board or landing display units may differ if the ground floor is not indicated as 0 or the floor numbers are not in order.
- 8.6.9** Move the car from ground floor to top floor and observe the changes in floor numbers in ascending order and turn back from top to the ground floor by observing the floor numbers in descending order. If the floor numbers in both travels are correct then floor position system is ready to use.
- 8.6.10** Check again car and shaft stop, door contacts and door locks (locking devices). If you are sure that the safety line is responding properly, then switch inspection shalter on top of the car to normal position.
- 8.6.11** If you are using three speeds (Car speed >1m/sec) then check HU and HD shalters.
- 8.6.12** Move the car in with car top buttons to the middle of the shaft.
- 8.6.13** You should not see "INS" on the screen any more. So you can give calls.
- 8.6.14** Give call to the next floor. If the system accepts this call it will be shown on the LCD screen and the lamp of the pushbutton is illuminated. You should see the position, the direction, the target and the speed of the car on the LCD. The lift should start with fast motion. The direction on the LCD screen and the direction of the car movement should be the same. When the car reaches its target floor then the speed switches to slow. When the stopper shalter MK is reached, the lift stops.
- 8.6.15** When the car stopped then the door opens. On mainboard KA led is on and KK led is off. If there is a retiring cam then S1 is off. Door open command is shown on the LCD screen as [←→] and door close command as [→←].
- 8.6.16** Test and correct at each floor the exact level by giving calls floor by floor in up and down direction. Try to carry on this adjustment with half load in the cabin. Note that this adjustment is influenced from brake strength in one and two speed systems. You can adjust slowing down distance by changing the place of the magnets in M0 and M1 (if used) way. You can adjust brake distance, namely exact floor level at each floor by changing the place of the magnets of MK (or MKU and MKD way in hydraulic lift).
- 8.6.17** When the floor position detection system is working correctly then test call-buttons by giving calls floor by floor. So test all call-buttons and their indicators. Observe signal lamps and floor position displays and check them at all floors if they give the correct information.
- 8.6.18** Test all contacts which are connected to the input terminals such as 804 (overload), K20 (door open), etc. by observing input terminal screen on LCD.
- 8.6.19** If releveling function supported from system (standard in hydraulic system), slide cabin in upwards and downwards at every floor and check releveling function.

8-7) EMERGENCY ELECTRICAL OPERATION

- 8.7.1** In order to start emergency electrical operation, turn the switch on the cover of the metal controller box to inspection position. This function is implemented according to EN-81-1 14.2.1.4. This function bypasses all shaft limit shalters listed in 14.2.1.4.
- 8.7.2** If the switch on top of the car is in inspection position then this function does not work.
- 8.7.3** The machine must be seen from the controller when emergency electrical operation is used.
- 8.7.4** Any movement of the car can only be realized by pressing up and down buttons. When no buttons are pressed there must be no car motion. The direction of the buttons is clearly indicated. Be sure that when any button is pressed to move the car in any direction then the actual movement and the direction shown on LCD must be the same as the direction of the button pressed.
- 8.7.5** Be sure that the speed of the emergency electrical operation does not exceed 0.63 m/sec.
- 8.7.6** Note that this function does not check the limit shalters 817 and 818. So the motion continues even these shalters are passed through. Be careful when using this function.

8-8) ELECTRONIC RESCUE SYSTEM (ERS)

- 8.8.1** ERS Electronic Rescue System is a UPS (Uninterruptible Power Supply) and battery powered system that brings car to a floor when energy is cut-off or any phase problem occurs. ERS is designed to integrate into AC control panel.
- 8.8.2** Connects battery poles red (+) and black (-) and then activate FBAT/AKU fuse to charge batteries.
- 8.8.3** No external battery group in hydraulic systems (ACH). And also no external battery group in completely UPS powered VVVF systems.
- 8.8.4** As the line voltage is normal, ERS is in stand-by mode and charges batteries via APS board.
- 8.8.5** When line voltage is cut, AC phase monitoring circuit sense and deactivates MC contactor. After deactivation, system supplies from UPS and after the defined period in [C37] parameter, system activates KUPS contactor and pass to ERS mode. After that point ERS is in circuit until to the end of rescue process, even if the line turns to normal. UPS also supplies automatic door board, lirpomp and machine brake.
- 8.8.6** Control panel which starts in ERS mode controls safety circuit, location information and automatic door circuits. If car is at floor level (MK open circuit), it activates door open signal. After opening door, when period defined in [C29] parameter is exceed it cuts the KUPS contactor and stays out of work.
- 8.8.7** If car is between floor levels (MK closed circuit), close door signal is activated. If safety circuit (120,130,140) is completed, EMD board is energized or send inverter to run command and then motor inverter runs. R, S, T outputs on EMD board are connected to direction and motion contactors via KUPS contactor.
- 8.8.8** Controller activates UP (RU) and FAST (RH) contactors so that it connects 3-phase outputs of EMD board to motor and opens brake for upward motion. UP TEST is displayed on LCD screen. The system measures the current consumed by motor and compares with halfload current defined in [B29] parameter. If the measured current is less than halfload current, test operation is finished and motor continues to upward motion. RESCUE UP is displayed on LCD.
- 8.8.9** If measured current is more than halfload current, up test is finished and down direction test is started. DOWN (RD) and FAST (RH) contactors activated, motor is energized in downwards.

DOWN TEST is displayed. If measured current is less than the half load current, motor goes on down motion.

- 8.8.10** If measured currents in both directions are more than the half load current, system compares these two currents with each other. The direction at which less current is measured is chosen. If the measured currents in both directions are more than the [B30] parameter, system reports 51-EKS Maximum Current Error and it remains out of work.
- 8.8.11** After choosing direction, car moves until MK is open circuit which means car arrived to floor level. Direction and speed contactors releases, brake holds.
- 8.8.12** Open door operation starts when car is at floor level. System activates KA relay in mainboard and DOOR OPEN is displayed. After the period defined in [C29] parameter, deactivates KUPS contactor and remains out of work.
- 8.8.13** No test function required in hydraulic (ACH) systems. If AC control cards supply is cut during upwards motion, ERS mode activated and change direction to downwards and travel to nearest floor level. If supply is cut during downwards motion, system completes its motion to nearest floor. Then ERS remains out of circuit after the period defined in [C29] parameter.