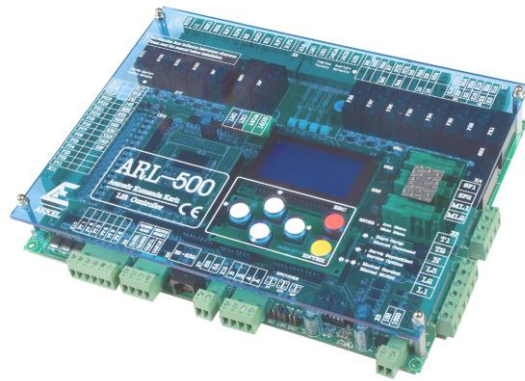




ARL-500

LIFT CONTROL SYSTEM



Installation & Operation Manual

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Before the control panel installation, wiring, commissioning and inspection, read this instruction manual carefully.

Keep the manual in a safe place and available to engineering and installation personnel during the control panel functioning period.

ARKEL is not responsible for those mistakes that may be found in this manual and for the damages that they may cause.

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1. GENERAL

1.1. APPLICABLE STANDARDS

The ARL-500 Lift Controller complies with:

Lift Directive 95/16/EC

- European standards EN 81-1, EN 81-2

1.2. ELECTROMAGNETIC COMPATIBILITY (EMC)

The ARL-500 Lift Controller and its components comply with the standards according to:

Directives of electro magnetic compatibility 2004/108/EC

- EN 55011 Issue 2007
- EN 61000-6-4 Issue 2007
- EN 61000-6-2 Issue 2005

1.3. MANUAL DESCRIPTION

Please read this manual carefully before installing the ARL-500 Lift Controller System. This manual will help you during installation of the ARL-500 controller and its components.

In case of any problems, users are advised to contact manufacturer without any delay giving details of the problem.

1.3.1. This manual describes


- the installation overview of ARL-500 controller
- the functions of ARL-500 components
- the startup installation of control panel and car top
- the startup driving of car
- the installation of car position sensing components
- the installation of car operating panel
- the installation of landing call/indicator panels
- the basic configuration of the ARL-500 controller
- the door bridging safety circuit in case of door pre-opening and relevelling
- the shaft learning and fine tuning with incremental encoder positioning
- the remote operation of the ARL-500 and ADrive by HS500 hand terminal
- the group operation


1.3.2. Symbols used in this manual

+ Press keys together

- An activity during an operation progress

 Important points

 Warning messages indicate that failure to take a specified action could result in harm to the system

 Caution messages indicate that failure to take a specified action could result in physical harm to the user.

2. INTRODUCTION

ARL-500 LIFT CONTROL SYSTEM, that we present you, our valued customers, under the “Advanced Solution” heading, is a completely plug-and-run elevator electronics and control system.

ARL-500 is universal. With just a few parameter changes; it can be used for rope traction or hydraulic elevators, with two-speed or VVVF, up to 48 stops, and for groups of up to 8 elevators.

ARL-500 is customizable. Freely programmable inputs and outputs located on the main board, car boards and landing boards enable you to adjust your settings according to your needs.

With its special plug-in cables and connectors, it facilitates the commissioning process. You’ll get surprised how easily and quickly you will install the complete system.

The ARL-500 main board has most of the functions needed for any elevator system. Mains supply phase protection, motor temperature monitoring, door-bridging safety relays for door pre-opening and re-leveling, dual-door support adjustable for each floor are all on board of ARL-500.

Car and shaft connections are made easily with sockets. Also, inside-car and car-top board connections are made with ready-made, socketed cables. Spare terminals add to the flexibility of the system.

One of the most powerful features of ARL-500 is its large graphic LCD display and its user-friendly interface that you will get used to in no time. Instead of using 2 or 4 line text displays that are usually too small and simple, we’ve made use of graphics LCD technology to maximize ease-of-use and legibility of the menu and status screens.

The HS500 hand terminal which can be connected to the system from any point on the CANbus (in the cabin, on the cabin or on landings), in a way, enables you to carry the controller board in your pocket.

We are doing our best to improve the quality of our products. You, our worthy customers, are our biggest support in our studies.

Thank you for purchasing ARL-500.

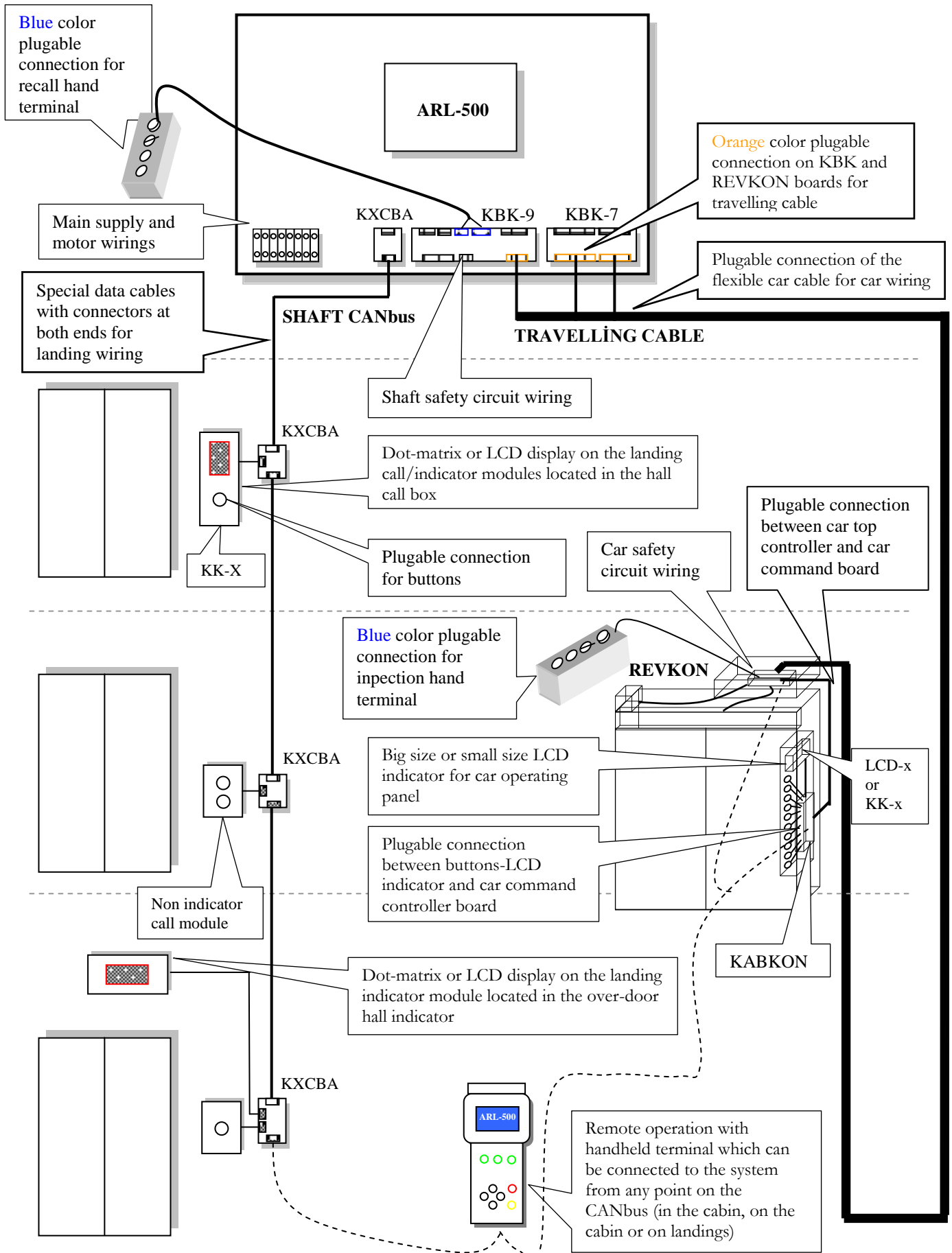
ARKEL

3. ARL-500 LIFT CONTROL SYSTEM OVERVIEW

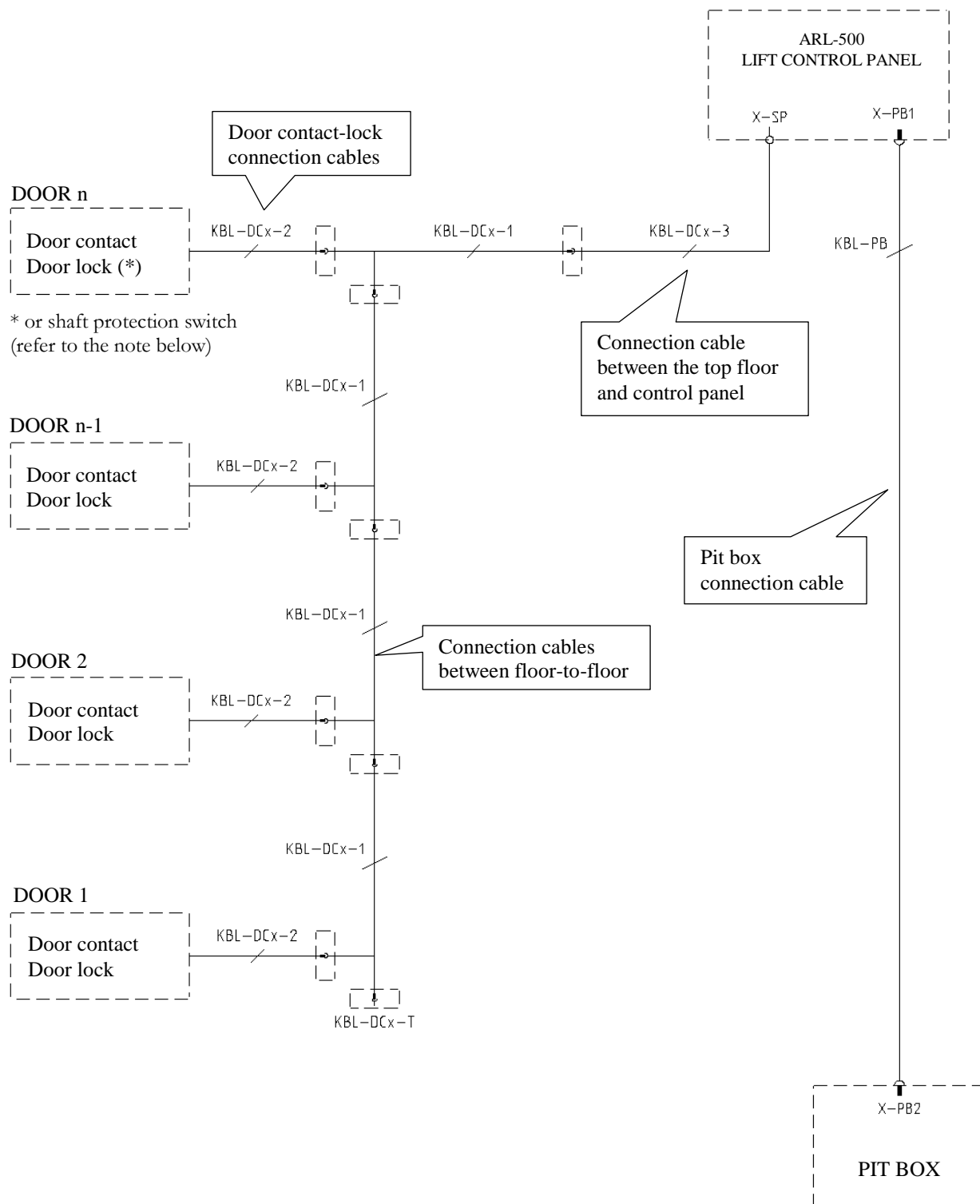
ARL-500 lift control system is fully decentralized with various controller, modules and cables.

- The main controller of the system is placed in the control panel.
- Car top controller is placed in the inspection box and car modules are placed in the car operating panel. Car controller and modules are connected to the car CANbus.
- Landing call/indicator modules are placed on each floor and connected to the shaft CANbus over connector modules via plugable CANbus cables.
- Landing door contacts and shaft protection contacts are connected via plugable cables.
- Pit box is connected to control panel via plugable cable.

3.1. ARL-500 PRE-WIRED BUS INSTALLATION OVERVIEW



3.2. ARL-500 PREWIRED SHAFT & PIT INSTALLATION OVERVIEW



Door safety circuits and pit box wiring

Note

4-wire cable is used for door safety circuit installation in compliance with EN 81-1/2.
5-wire cable is used for door safety circuit installation in compliance with PUBEL with shaft protection switches.

4. ARL-500 COMPONENTS

ARL-500: The main controller of the system. Controls the cabinet and operates the accessories on the elevator system. User can configure the system with graphic LCD and 6-key keypad on main board. On main board, there are constant relays according to drive type, free programmable inputs and outputs (relays and transistors), door bridging safety relays, phase/motor protection, safety circuit monitoring inputs. CANbus terminals for shaft and car serial communication, RS-485 terminal for group operation, inputs for position sensing with encoder, RS-232 socket for PC/Modem connection.

REVKON: Car top controller board. It makes the connection between car and the control panel. Controls car units. On board, there are special terminals for pluggable travelling cable connection, outputs with additional terminals for car wiring. A socket for car operating panel connection, socket for car CANbus communication, inputs for car safety circuits ve connectors for inspection hand terminal, inputs for magnetic switches. Besides, free programmable inputs and relay outputs, car light, emergency car light, car fan output, battery and gong connection.

KABKON: Car command controller board. Collects commands from car operating panel and sends them to the inspection box controller (REVKON). On board, there is a socket for car top controller connection, sockets for car CANbus serial communication. Pluggable connection for car command buttons, door open, door close, fan and alarm buttons, car priority switch, emergency light, intercom and gong connection and a free programmable input. Second KABKON board is used for systems more than 24 stops to increase the number of stops up to 48.

KK-x and LCD-x: Indicator/call modules for car and landing panels (Different types of dot-matrix or LCD indicators or non-indicator). On boards, there are sockets for shaft CANbus serial communication, sockets for up and down call buttons, 1 free programmable input/output and gong connection. Floor name, direction/collection arrows and out of service signals are indicated on modules with displays. 2-key keypad is used for floor settings on modules with indicator. Dipswitches are used for floor settings on modules non indicator. These are options for call/indicator modules:

- KK2X3057/KK3X3057 as a dot-matrix display (car and landings),
- KKLCD-A/KKLCD-B/KKLCD-C as a LCD indicator (car and landings),
- LCD-240X128A as a LCD indicator (car and over-door landings),
- KKBTT as a non-indicator (landings)

KBK-x: The connection boards in control panel. These boards are used as a connector in control panel instead of rail terminals except from main supply and motor wirings. By this way the connection of car and shaft units are made separately and easily with sockets. The orange color terminal strips on KBK-7 and of KBK-9 boards are specially used for car travelling cable connection. And also there are terminal blocks on KBK-9 board used for shaft safety circuit and there are sockets for recall hand terminal connection. Shaft CANbus connection socket are located on KXCBA connector board.

HS500 Hand Terminal: Handheld terminal for remote operation. It can be connected to the system from any point on the CANbus (in the cabin, on the cabin or on landings), in a way, enables you to see and manage the menu of ARL-500 main controller and ADrive motor driver.

5. INSTALLATION OF ARL-500 CONTROLLER

In this section the procedures for startup installation, configuration and settings of ARL-500 lift control system are summarized.

5.1. DELIVERY CONTENTS

ARL-500 controller system consists of various modules and cables. The controller is only operational with all modules and cables. Check the delivery contents using the wiring diagrams before you start any installation work. Report missing or wrong parts immediately to avoid delaying the commissioning procedure.

Control panel, boards and modules

- Control panel with integrated ARL-500 main controller
- Inspection box with integrated REVKON car top controller
- Car operating panel with integrated KABKON car command controller and indicator module
- Landing call panels with integrated KK-x landing call/indicator modules
- Pit box

Plug-in cables

- Prefabricated travelling cable according to bus plan
- Prefabricated cable used between inspection box and car operating panel (10-pin)
- Prefabricated landing CANbus cables according to bus plan (4-pin)
- Prefabricated door contact cables (5-pin)
- Prefabricated pit panel cable (12-pin)
- Prefabricated group operation cable/cables (4-pin)

Other components

- Magnetic switches and magnets according to car position sensing
- Inspection hand terminal and recall hand terminal with 2m portable cable

Optional products

- HS500 with 2meters portable cable
- GeVeZe voice announcement system

5.2. CHECKING THE DELIVERY CONTENTS

Check if the ARL-500 components are completely using the shipping note, the wiring diagram and the bus plan. At the same time visually inspect the delivery for damage.

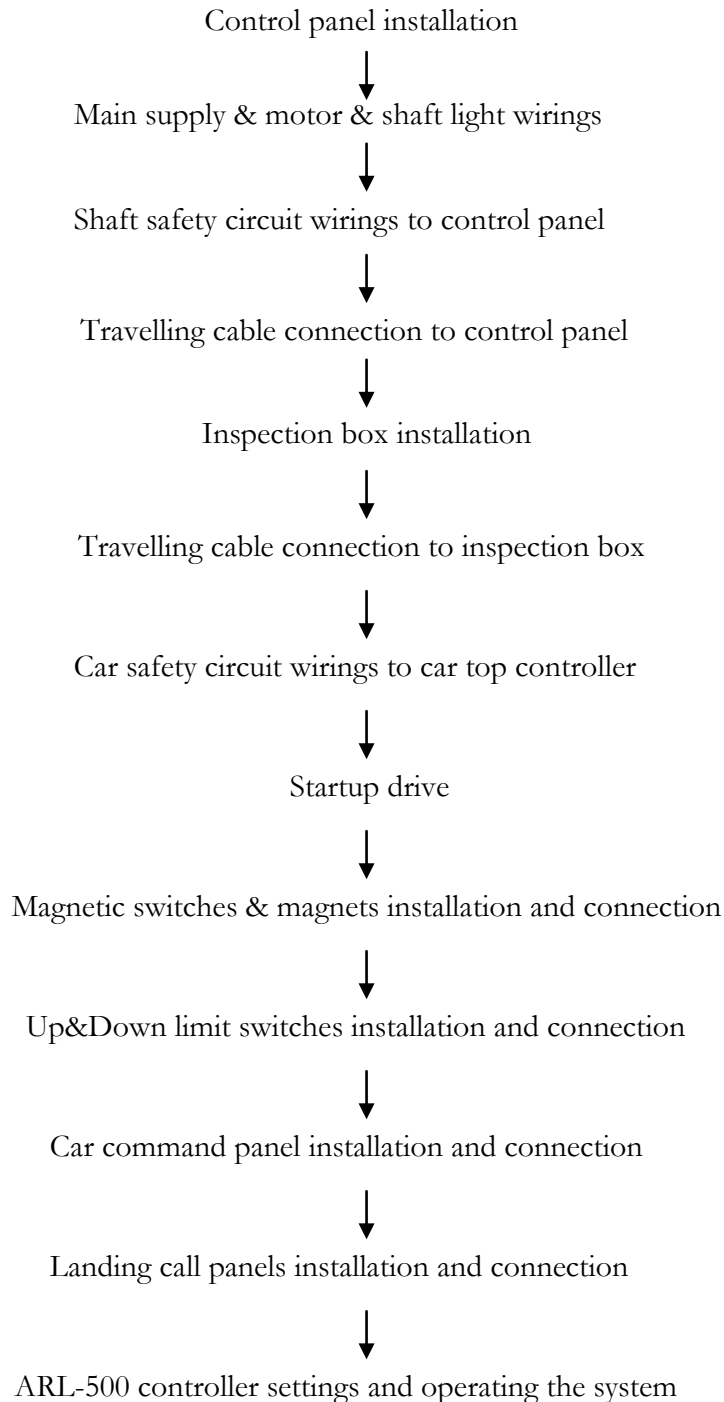
- is any mechanical damage visible on the ARL-500 components?
- does the labelling of the ARL-500 electronic assemblies correspond to the bus diagram?
- do the bus cables and the travelling cable have the length?

If any ARL-500 electronic assemblies or cables are missing contact us immediately. If any damage occurred during transport it must immediately be reported to the carrier.

5.3. STARTUP INSTALLATION PROCEDURE

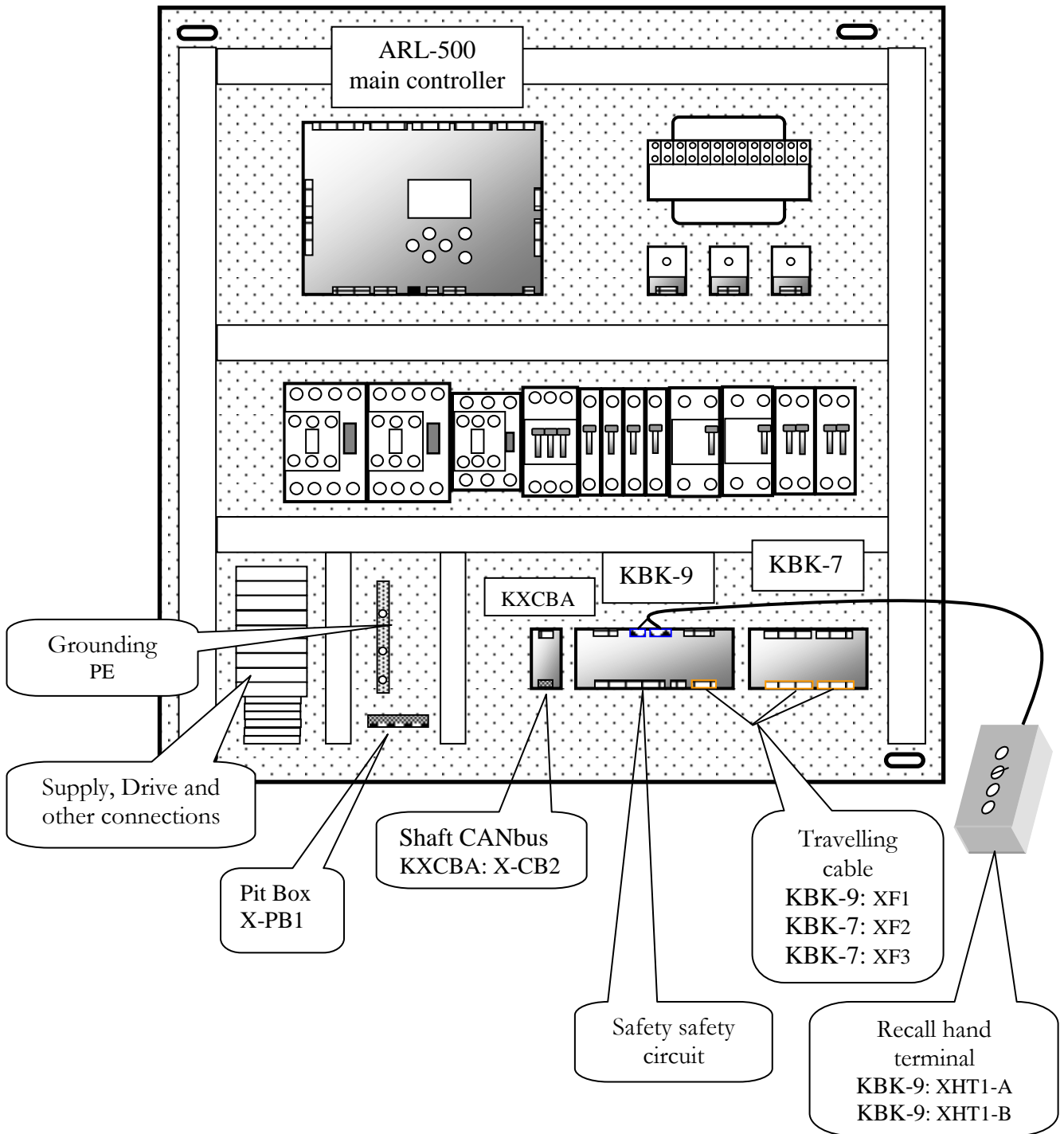
First, install and wire all ARL-500 control panel and components which are necessary for “startup drive”. Startup drives are made with the car to mount the ARL-500 components located in the shaft such as up & down limit switches, magnetic switches and magnets. Make sure that your technicians who will install the panel are aware of latest EN 81-1/2 standarts. After finishing startup installation, car and landing bus units are installed and wired according to bus plan. Finally adjust ARL-500 settings and operate the complete system.

The recommended installation procedure is summarized below:



5.4. INSTALLATION & CONNECTION OF CONTROL PANEL

First, install the control panel then make connections according to wiring diagram. The following installation and connections are explained for a standard control panel.



Control panel connections

5.4.1. INSTALLATION OF CONTROL PANEL

Move the control cabinet to the planned location and install it. The type of mounting brackets to be used depends on the location of installation and the weight and is selected by user.



Caution

Make sure no supply lines are in the area of installation before starting any installation work.

5.4.2. CONNECTION OF CONTROL PANEL

The cable diameter of the supply, drive and ground lines depends on the power rating of the control cabinet and must be obtained from the included wiring documentation.



Caution

All installation work on electrical parts must be carried out with the system shut down and off circuit.

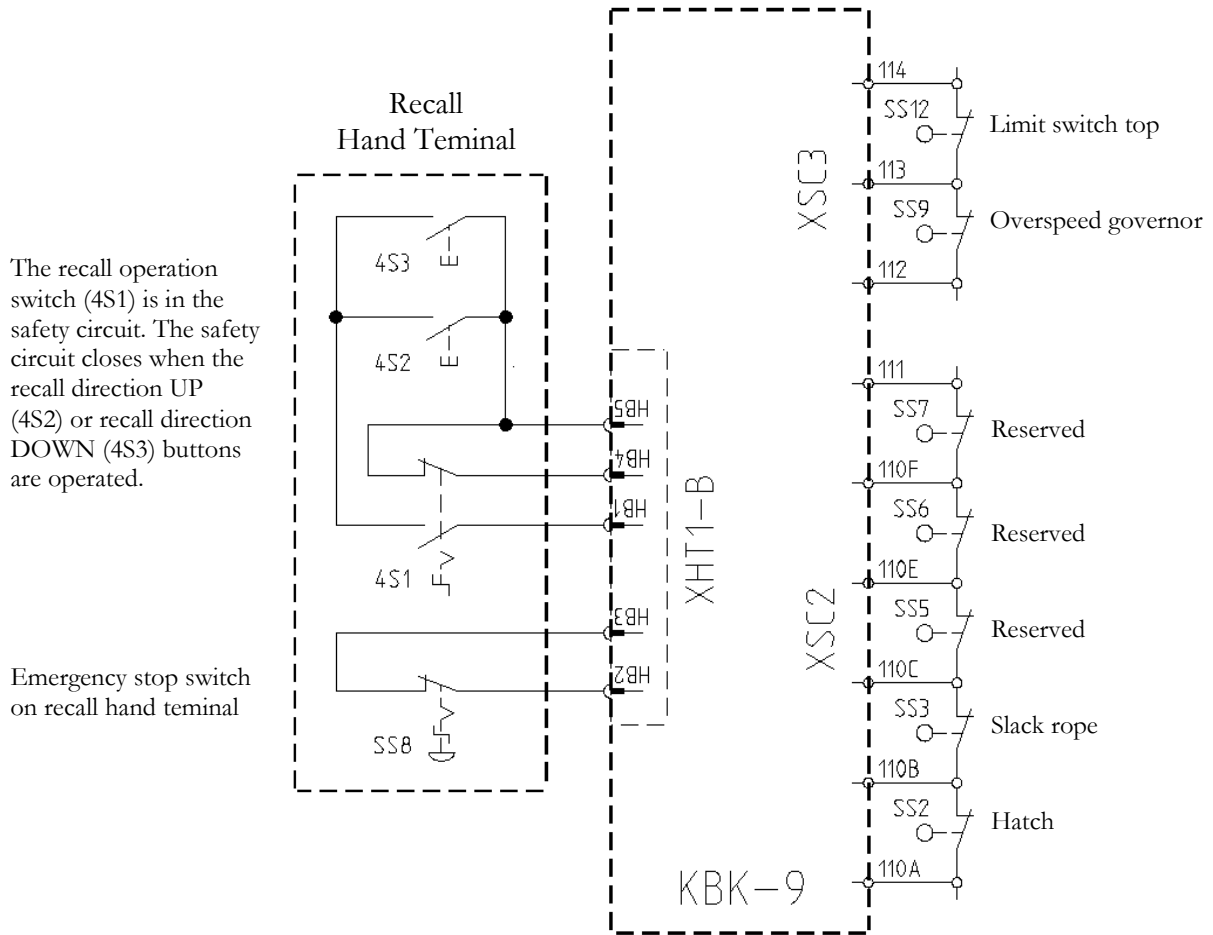
- Wiring connections of external distribution panel, supply and shaft wirings to the control panel must be made carefully according to wiring diagram (see sheet 2).
- Neutral and grounding cables must be wired separately. All cables and wires must be secured with sufficient strain relief.
- The control panel body must be connected to ground line suitably
- All stopping mechanisms mentioned in standard of EN 81-1/2 must exist in the lift and the contacts of these mechanisms must be connected to the control panel carefully.

5.5. CONNECTION OF SHAFT SAFETY CIRCUITS

The contacts of shaft safety circuit are connected to KBK-9 board using XSC1, XSC2 and XSC3 sockets. These connections must be made suitably for safety contact connections according to wiring diagrams (see sheet 5)

⚠ Note

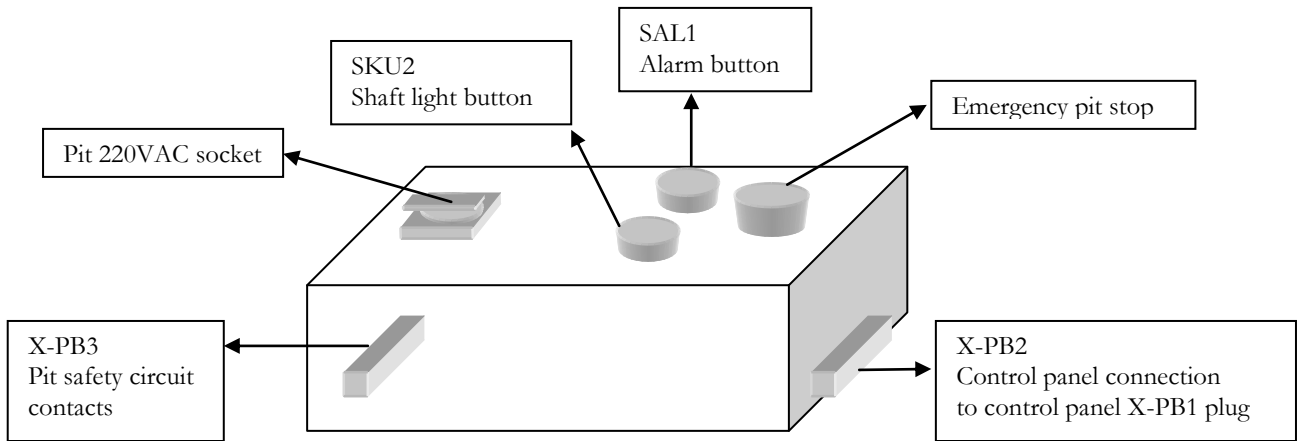
Safety contacts not in use must be bridged at KBK-9 connection board.



Control panel safety circuit connections

5.6. INSTALLATION & CONNECTION OF PIT PANEL

First, install the pit panel then make connections according to wiring diagram. The following installation and connections are explained below.



Pitbox connections

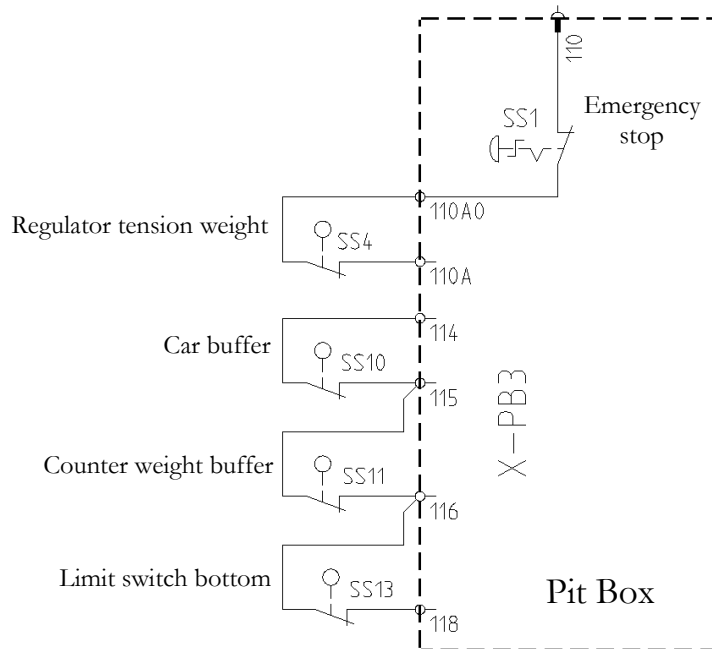


Caution

Make sure no supply lines are in the area of installation before starting any installation work.

5.7. CONNECTION OF PIT SAFETY CIRCUITS

The contacts of pit safety circuit are connected to pit using X-PB3 (8-pin) socket. These connections must be made suitably for safety contact connections according to wiring diagrams (see sheet 5)

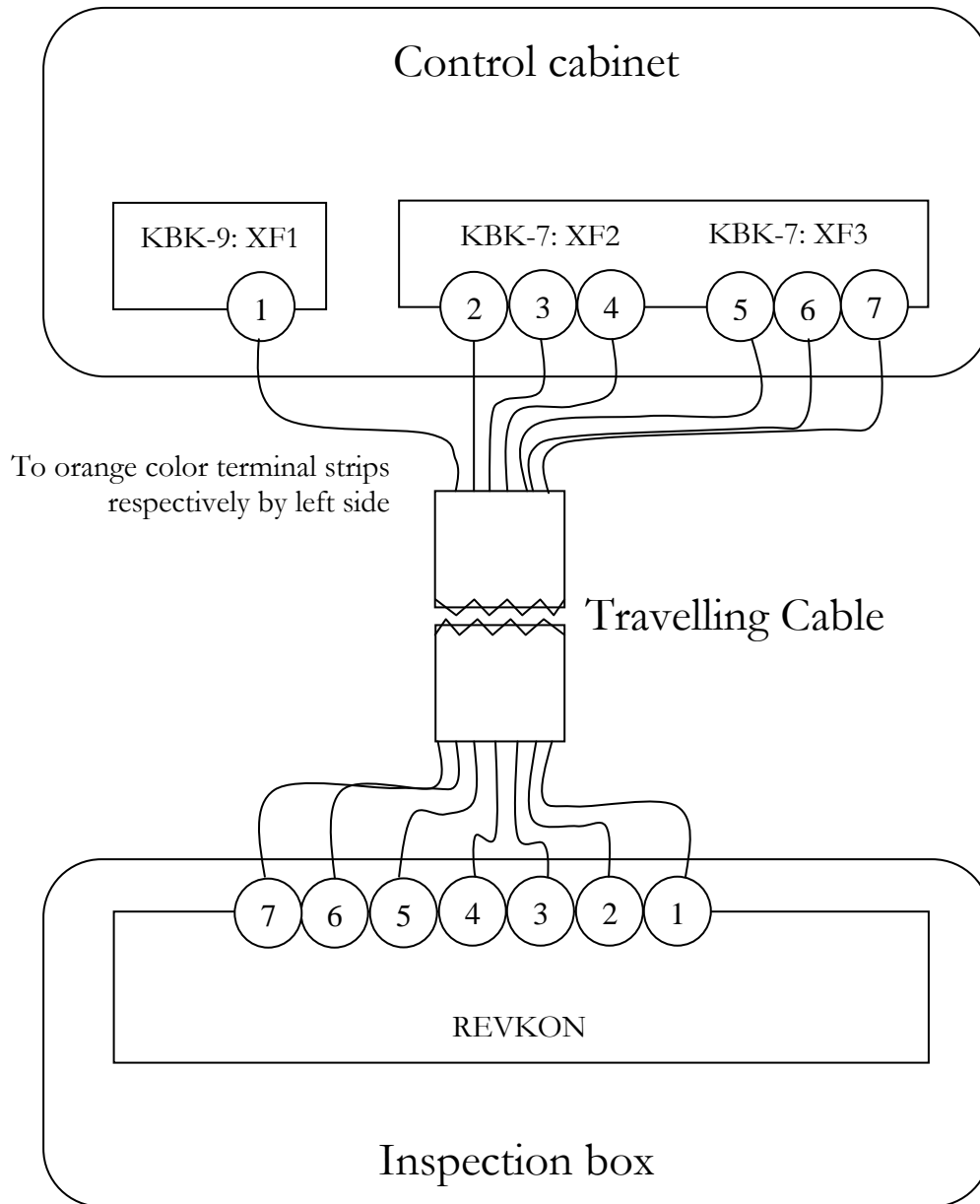


Note

Safety contacts not in use must be bridged on the X-PB3 plug.

5.8. CONNECTION OF TRAVELLING CABLE

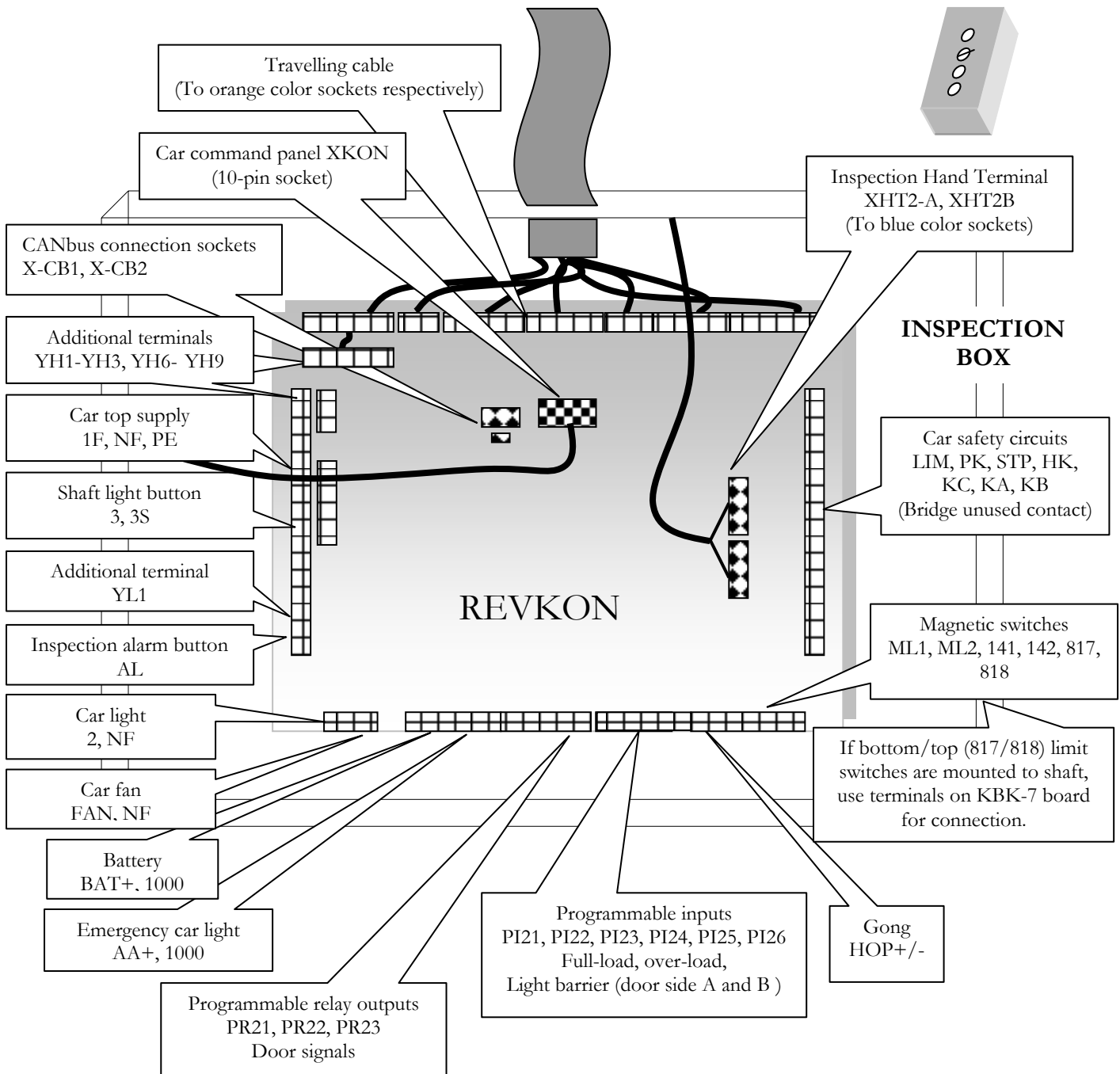
ARL-500 controller system uses a travelling cable with connectors at both ends and separately connected to its sockets on boards. In control panel the travelling cable is connected to plugs XF1 on KBK-9 and connected to plugs XF2&XF3 on KBK-7 connection boards. In inspection box the travelling cable is connected to orange color plugs on REVKON board.



The explanation of terminals which are used for fixed connections (869, ML1, ...) on KBK boards in control panel are already labelled on boards. But the auxiliary terminals are labelled as YHx and YLx. These auxiliary terminals YH1-YH3 and YH6-YH9 used for high voltage and the auxiliary terminal YL1 used for low voltage can be modified according to user's needs. For example YH1 can be used for A-K5 (door open signal) and YH2 can be used for A-K3 (door close signal). Each connection can be obtained from wiring diagrams of control panel.

5.9. CONNECTION OF INSPECTION BOX

The REVKON car top controller is mounted in the inspection box. REVKON car top controller is either supplied as a separate component for on-site installation in the inspection box or the car command panel or it is supplied pre-installed in the car panel.



- The car body must be connected to ground line suitably
- All 220VAC and 24VDC car components must be connected to the provided terminal rails in the inspection box according to the wiring diagram (see sheet 8).

⚠ Warning

After switching off the main switch in control panel, following plugs of the car top controller are still live:

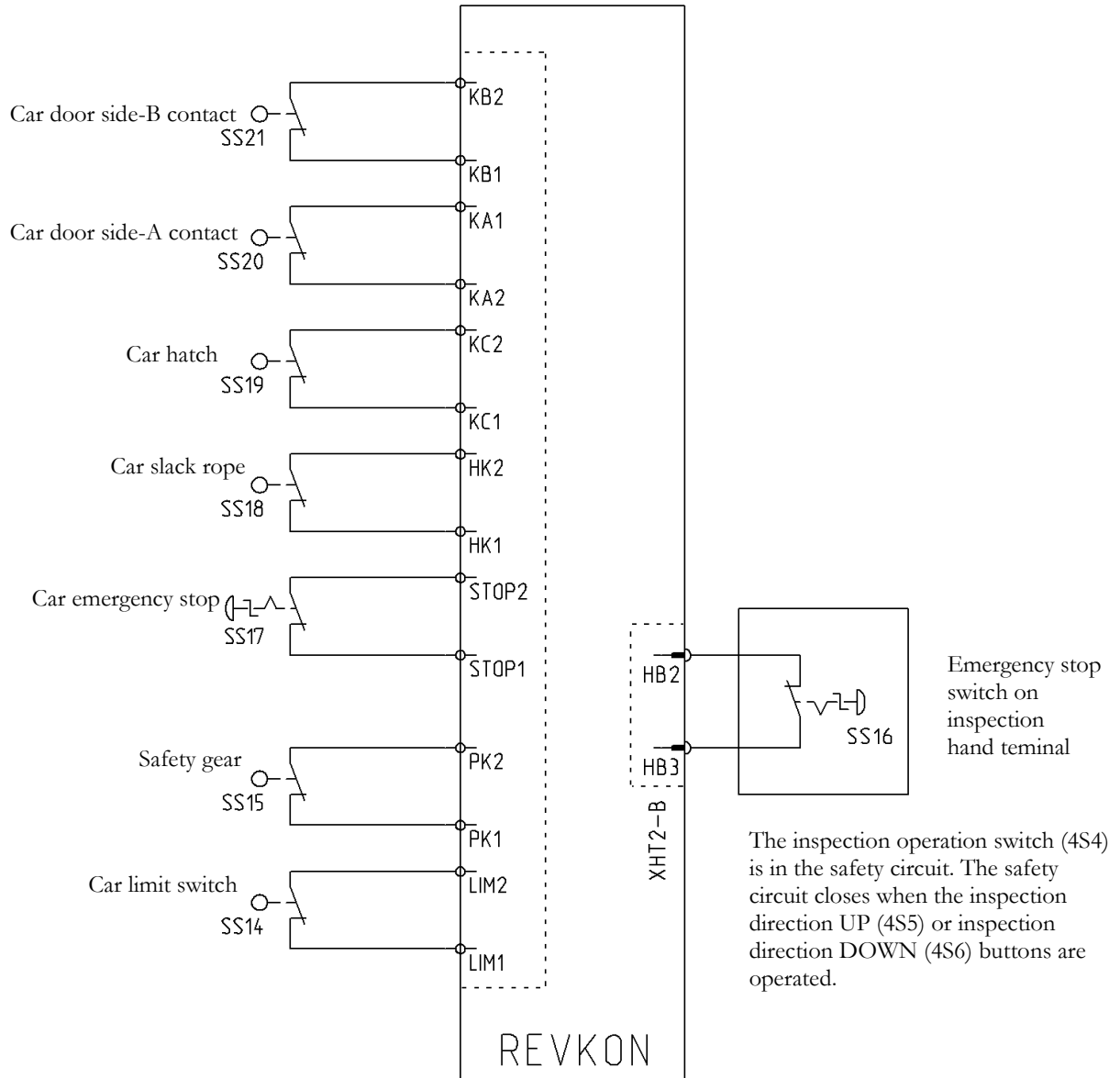
- Plugs of car light (1, NF) is only off circuit after the car light fuse on control panel (FKL) has been switched off
- Plugs of emergency light (AA+, 1000) is only off circuit after the the battery plugs (BAT+, 1000) unplugged.

5.10. CONNECTION OF CAR SAFETY CIRCUITS

The contacts of car safety circuit are connected to REVKON car top controller. These connections must be made suitably for safety contact connections according to wiring diagrams (see sheet 5).

⚠ Note

Safety contacts not in use must be bridged at REVKON car top controller



The inspection operation switch (4S4) is in the safety circuit. The safety circuit closes when the inspection direction UP (4S5) or inspection direction DOWN (4S6) buttons are operated.

Car safety wiring connections

6. STARTUP RUNNING

Before operating the control cabinet, the following connections must be made properly according to the wiring diagram:

- Supply
- Drive
- Safety circuits
- Shaft Light
- Travelling cable

With these connections, the car is ready to startup run. The procedure of running are described below:


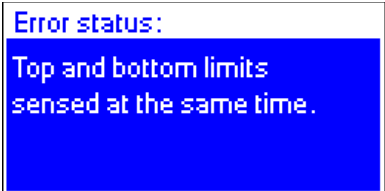
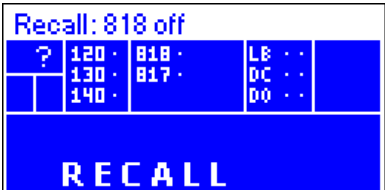
- Turn the recall switch in recall hand terminal to “INSPECTION” (The inspection switch in inspection hand terminal must be “NORMAL”).

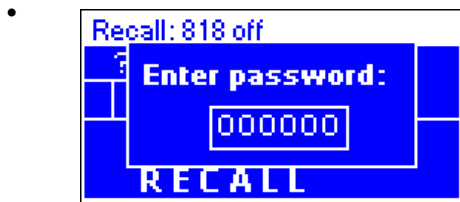
Note

When ARL-500 controller is switched on or rebooted, it checks the bottom limit switch (817) to correct its position counter. If the inspection or recall control is activated before this correction drive, the system can be operated only in “**Inspection mode only**”.

Note

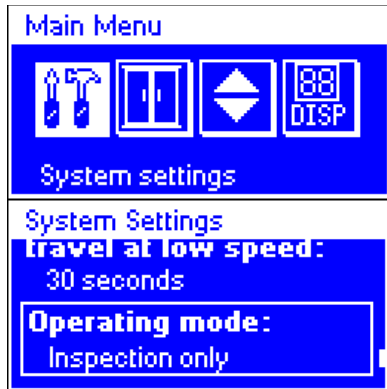
The controller is already set to “**Inspection mode only**” mode in the default factory settings for safety startup installation. By this way, controller can only be operated in inspection mode or recall mode and cannot be operated in normal mode.

-  On completion of the booting, the startup screen is briefly displayed on LCD and then switches to the main display. Make sure that there exists supply voltages on ARL-500 main controller by observing 5V and 100 and CPU Leds. CPU Led flashes rapidly while there is an error or flashes slowly while there is no error and the controller is working correctly.
-  “**Top and bottom limits(817-818) sensed at the same time**” warning message is displayed on error screen.
-  Suppress the warning message by pressing the **ESC** key and then the “**RECALL**” screen is displayed.



Pressing ENTER on main screen takes you to the password screen. User password has six digits. The default setting for the password is “000000”. It is highly recommended to change it to an individual one having entered lift parameters first.

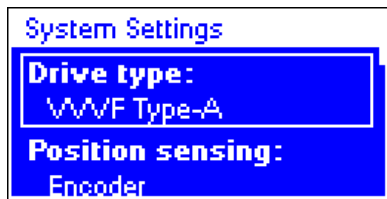
Blinking cursor at the beginning of a numbers means a change mode. LEFT/RIGHT buttons are used to move cursor left / right and UP/DOWN buttons are used to increase / decrease value. ENTER should be pressed to access into main menu. The correct password enables access to the parameters menu. An invalid value or pushing EXIT returns to the main screen.



Ensure that the parameter “**System Settings > Operating mode**” is set to “**Inspection only**” in ARL-500 menu. In “**Inspection only**” mode controller can only be operated in inspection mode or recall mode and cannot be operated in normal mode.

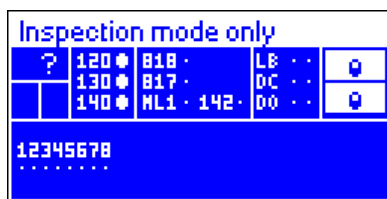
⚠ Note

This parameter should be set to “**Normal operation**” during normal operation.

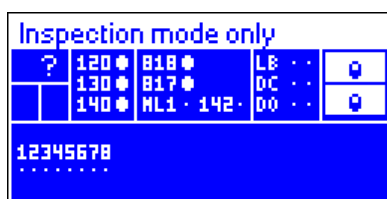


Check the parameter “**System settings > Drive type**”. It must be set according to the lift system. The drive type can be set to “**VVVF Type-A**” for ADrive motor driver or “**VVVF Type-B**” for other motor drivers or “**Hydraulic**” for hydraulic systems or “**Two speed**” for two-speed systems.

- Turn the recall switch in recall hand terminal to “**NORMAL**”.



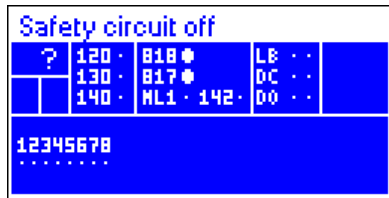
Check the safety circuit inputs with the help of LEDs labelled 110-140 on KBK-9 connection board. Check the 120, 130 and 140 safety monitoring LEDs on ARL-500 main controller. ARL-500 display shows the states of the 120, 130 and 140 signals on main screen. The activated signals are marked with ‘●’ sign. If any of these signal is not activated and marked with ‘?’ sign, check the wiring connections of safety circuit contacts according to wiring diagram (see sheet 5).



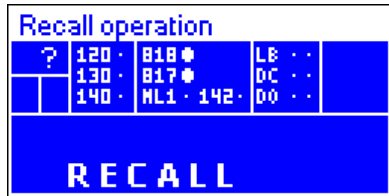
Bridge up (818) and down (817) limit switches with plug 100 temporarily to move the car in both directions. You must work carefully at the bottom and top floors because up and down limit switches will be out of work. ARL-500 display shows the states of the 817 and 818 signals on main screen. Both of these signals must be marked with ‘●’ sign after bridging.

⚠ Warning

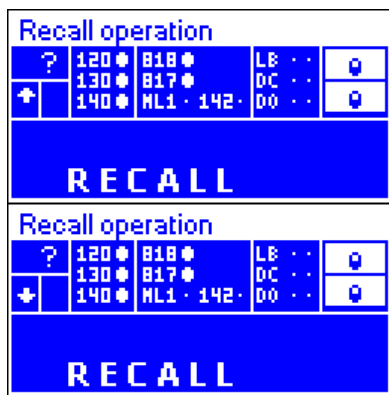
Up (818) and down (817) limit switches must not bridged to terminal 100 in normal operation mode.



Check the connection of emergency stop switch in recall hand terminal. Push the emergency stop switch. “**Safety circuit off**” warning message appears on ARL-500 display. The safety circuit LEDs on KBK-9 connection board must be switched off beginning from plug 112. If this is not the case, there is an installation fault which must be rectified. Then release the emergency stop switch.



Return the recall switch to “INSPECTION”. The recall switch Led (870) on ARL-500 controller must be switched off. “**RECALL**” warning message appears on ARL-500 display. The safety circuit LEDs on KBK-9 connection board must be switched off beginning from plug 119B.

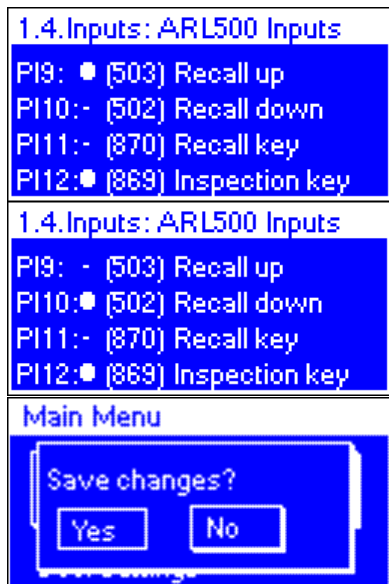


Check the connection of UP (503) and DOWN (502) switches on recall hand terminal. 503 Led must be switched on while pressing the recall UP button and 502 Led must be switched on while pressing the recall DOWN button. The state of the directions is marked with ‘↓’ and ‘↑’ sign on ARL-500 display. Be sure that the car is at one of the intermediate floors.



Warning

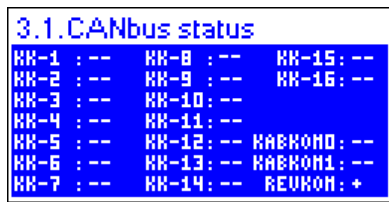
The recall switch is in the safety circuit. The safety circuit closes when the recall UP/DOWN buttons are operated.



It can also be checked by using the status screen. Press RIGHT key on main screen until the “**1.1.Inputs: ARL500 inputs**” status screen is showed on ARL-500 display. Then press DOWN key until the “**1.4.Inputs: ARL500 inputs**” status screen is showed on display.

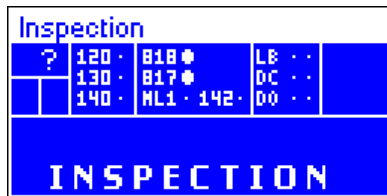
503 signal must be activated on while pressing the recall UP button and 502 signal must be activated on while pressing the recall DOWN button. If not, press “enter” on the main screen and enter your password. Then go to “Programmable inputs>ARL-500 inputs” in the menu and press DOWN button until you find PI-9 input. Firstly press enter to activate that parameter and by using UP/DOWN buttons find “(503) Recall up” and press enter again to select that input. Press “Esc” twice and save your settings.

- Car runs only at low speed (or inspection speed for VVVF systems) in recall (and inspection) operation mode. Check the connection wirings of the lift motor by moving the car with up and down recall buttons in recall mode. If the car runs up while down inspection button is pressed and vice versa, change any of two ends of U, V, W connections of the lift motor at the control panel rail terminals.
- Move the car to an intermediate floor. Make sure that there exists supply voltages on REVKON car top controller by observing 5V and 100 and the CPU Leds. CPU Led flashes rapidly while the car CANbus communication is working correctly or flashes slowly while there is no car CANbus communication between the ARL-500 main controller and REVKON car top controller. Be sure that there is 20-26 VDC between connectors 100 and 1000.



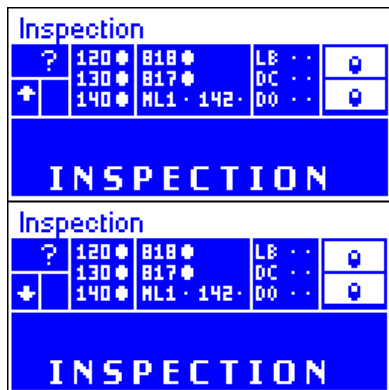
Press LEFT key on main screen until the “3.1.CANbus status” status screen is showed on ARL-500 display. There must be ‘+’ mark for “REVKON”. It means the REVKON can communicate with ARL-500 controller. No ‘+’ mark means there is no communication.

- Check the connection of car safety circuit connected to REVKON car top controller according to wiring diagrams (see sheet 5).
- Turn the inspection switch in inspection hand terminal to “INSPECTION”. In that case the car cannot be moved by recall buttons on the control panel.



In inspection mode the inspection switch Led (869) on ARL-500 controller must be switched off. “INSPECTION” message appears on ARL-500 display. The safety circuit LEDs on KBK-9 connection board must be switched off beginning from plug 135.

- Check the connection of UP (501) and DOWN (500) switches in inspection recall hand terminal by observing Leds on REVKON car top controller. 501 Led must be switched on while pressing the recall UP button and 500 Led must be switched on while pressing the recall DOWN button.



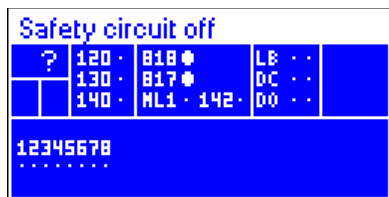
The state of the directions is marked with ‘↓’ and ‘↑’ sign on ARL-500 display. Be sure that the car is at one of the intermediate floors.



Warning

The inspection switch is in the safety circuit. The safety circuit closes when the inspection UP/DOWN buttons are operated

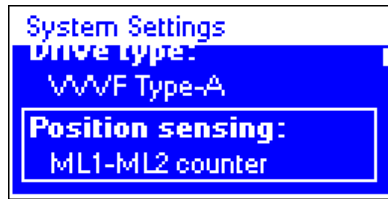
- Check the function of emergency stop switch in inspection hand terminal by pushing the emergency stop switch while running in inspection mode. Then release the emergency stop switch.



“Safety circuit off” warning message appears on ARL-500 display. The safety circuit LEDs on KBK-9 connection board must be switched off beginning from plug 135.

7. INSTALLATION OF MAGNETIC SWITCHES AND MAGNETS

ARL-500 controller is available with four different car positioning systems listed below:



- Standart M1 counter
- Special JF counter
- ML1-ML2 counter
- Encoder counter

Check the parameter “**System settings > Position sensing**”. It must be set according to the lift system.

Standart M1 counter: Used with two-speed systems that the deceleration distance is less than the half of floor to floor distance.

Special JF counter: Used with VVVF systems that the deceleration distance is more than the half of floor to floor distance and when door pre-opening is not employed.

ML1-ML2 counter: Used with VVVF and hydraulic systems with door pre-opening and releveling functions.

Encoder counter: Used with systems for positioning with incremental encoder on motor, speed limiter or in the shaft.

The following table shows when to use which type of magnetic switch:

Car position sensing	Drive type	Door pre-opening and releveling	Required magnetic switch	Required magnets
Standart M1 counter	Two speed	Not supported	SM1 (Bi-stable) SJF (Bi-stable)	Round magnets
Special JF counter	VVVF	Not supported	SM1 (Bi-stable) SJF (Bi-stable)	Round magnets
ML1-ML2 counter	VVVF Hydraulic	Supported	SML1, SML2 (Mono-stable) SJF1, SJF2 (Mono-stable)	Bar magnets
Encoder counter (*)	VVVF	Supported	SML1, SML2 (Mono-stable)	Bar magnets

* : Encoder counter system cannot be used for 2-stop lifts.

7.1. INSTALLATION AND CONNECTION FOR M1 COUNTER

7.1.1. Installation of magnetic switches and magnets

M1 counter positioning requires 2 additional magnetic switches on the car top:

1. Floor counting ve deceleration magnetic switch (SM1, Bi-stable)
2. Level stopping magnetic switch (SJF, Bi-stable)

Bi-stable magnetic switches and round magnets are used for this positioning system. SM1 (ML1) magnetic switch is used for floor counting at the same time for deceleration of the car. SJF (142) magnetic switch is used for stopping at floor level.

- Install the round magnets carefully according to wiring diagrams with taking care of the distance between magnets and the pole of magnets (see sheet 13).

7.1.2. Connection of magnetic switches

- SM1 magnetic switch is connected to plugs ML1-100 of the REVKON board.
- SJF magnetic switch is connected to plugs 142-100 of the REVKON board.

7.2. INSTALLATION AND CONNECTION FOR SPECIAL JF COUNTER

7.2.1. Installation of magnetic switches and magnets

Special JF counter positioning requires 2 additional magnetic switches on the car top:

1. Floor counting ve level stopping magnetic switch (SJF, Bi-stable)
2. Deceleration magnetic switch (SM1, Bi-stable)

Bi-stable magnetic switches and round magnets are used for this positioning system. SJF (142) magnetic switch is used for floor counting at the same time for stopping at floor level. SM1 (ML1) magnetic switch is used for deceleration of the car.

- Install the round magnets carefully according to wiring diagrams with taking care of the distance between magnets and the pole of magnets (see sheet 13).

7.2.2. Connection of magnetic switches

- SJF magnetic switch is connected to plugs 142-100 of the REVKON board.
- SM1 magnetic switch is connected to plugs ML1-100 of the REVKON board.

7.3. INSTALLATION AND CONNECTION FOR ML1-ML2 COUNTER

ML1-ML2 counter positioning requires 2 additional magnetic switches on the car top:

1. Door zone magnetic switches (SML1, SML2)
2. Travelling magnetic switches (SJF1, SJF2)

7.3.1. DOOR ZONE MAGNETIC SWITCHES (SML1, SML2)

1. Door Zone Magnetic Switch-1 (SML1, Monostable, NO-normally open)
2. Door Zone Magnetic Switch-2 (SML2, Monostable, NO-normally open)

SML1-SML2 magnetic switches inform control panel that the car is in door opening zone.

7.3.1.1. Installation of magnetic switches

- Install the SML1-SML2 magnetic switches on the cage beam in a pre-assembled bracket. SML2 magnetic switch must be on top of SML1 and two of them must observe the same side of guide rail.

7.3.1.2. Connection of magnetic switches

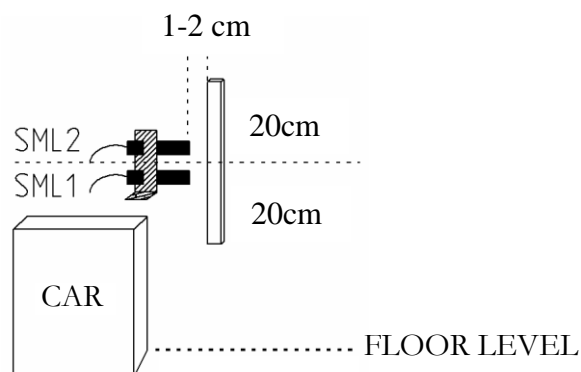
- SML1-SML2 magnetic switches are connected to plugs ML1-MLO-1000 and ML2-MLO-1000 of the REVKON board respectively.

Bar magnets are used for this positioning system. The length of the zone magnets are approx. **40cm**. The number of zone magnets are determined by number of floor:

Number of bar magnets length 40 cm = Number of floor

7.3.1.3. Installation of zone magnets

- Move the car to the end of floors
- Car threshold must be exactly at the floor level
- Install the bar magnets opposite to the zone magnetic switches. The middle of the bar magnet must be on a level with the middle of the magnetic switches. The distance between magnetic switches and magnet must be **1-2 cm**.
- **40 cm bar magnets must be fixed with screw or glue**
- Repeat this installing operation at all floors.



7.3.2. TRAVELLING MAGNETIC SWITCHES (SJF1, SJF2)

1. Downward travelling magnetic switch (SJF1, Monostable, NO-normally open)
2. Upward travelling magnetic switch (SJF2, Monostable, NO-normally open)

SJF1 and SJF2 magnetic switches are used to deceleration and stopping the car depending on the direction of travel. Moreover they are used to releveling for hydraulic systems.

7.3.2.1. Installation of magnetic switches

- Install the SJF1 and SJF2 magnetic switches on the cage beam in a pre-assembled brackets separately. They must be installed side by side and must observe the different side of guide rail.

7.3.2.2. Connection of magnetic switches

- SJF1 magnetic switch is connected to plugs 141-MLO-1000 of the REVKON board.
- SJF2 magnetic switch is connected to plugs 142-MLO-1000 of the REVKON board.

The length of the zone magnets are approx. **10cm**. The number of zone magnets are determined by number of floor and can be calculated by the following formula:

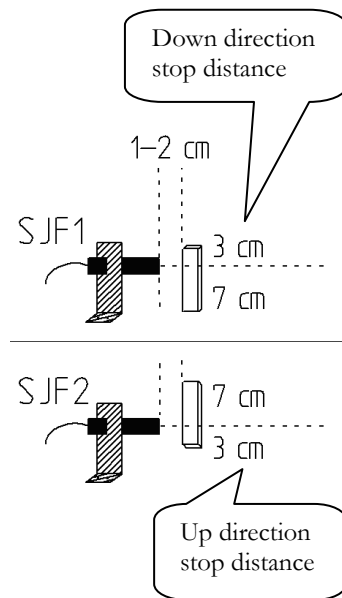
$\text{Number of bar magnets length 10 cm} = (\text{Number of floor} \times 4) - 2$

7.3.2.3. Installation of travelling magnets

There are two types of travelling bar magnets:

- Level stopping/relevelling magnetic switches
- Deceleration magnetic switches

7.3.2.3.1 Level stopping/relevelling bar magnets



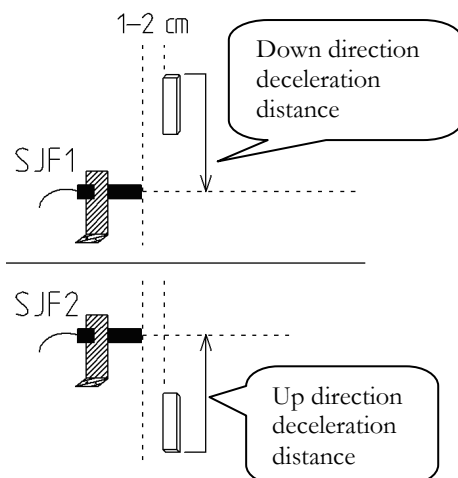
- Move the car to the end of floors
- Car threshold must be exactly at the floor level
- Install one of the bar magnets length 10cm opposite to the SJF1 magnetic switch. The middle of the magnetic switch must observe the bar magnet 3 cm above and 7 cm below. The distance between magnetic switches and magnet must be 1-2 cm.
- Install the other bar magnet length 10cm opposite to the SJF2 magnetic switch. The middle of the magnetic switch must observe the bar magnet 7 cm above and 3 cm below. The distance between magnetic switches and magnet must be 1-2 cm.
- Repeat this installing operation at all floors.



Note

The 3 cm distance of magnet above/below the magnetic switches is determined by the need of deceleration distance. It can be different in any system. It is required that both magnetic switches observe their magnets at floor level.

7.3.2.3.1 Deceleration magnets



- Install the bar magnet as deceleration distance above the SJF1 magnetic switch (Excluding the top floor).
- Install the bar magnet as deceleration distance below the SJF2 magnetic switch (Excluding the bottom floor).
- Repeat this installing operation at all floors



Note

The deceleration distance is determined by speed of the car. It can be different in any system and can be accepted 180 cm for VVVF systems and 60 cm for hdraulic systems.

7.4. INSTALLATION FOR ENCODER COUNTER

ARL-500 controller is available with incremental encoder positioning. Incremental encoder can be mounted on motor, speed limiter, or in the shaft.

Incremental positioning requires two additional magnetic switches on the car roof. SML1-SML2 monostable magnetic switches and the bar magnets length 40 cm are used for this positioning system.

7.4.1. DOOR ZONE MAGNETIC SWITCHES (SML1, SML2)

1. Door Zone Magnetic Switch-1 (SML1, Monostable, NO-normally open)
2. Door Zone Magnetic Switch-2 (SML2, Monostable, NO-normally open)

During the learn drive SML1-SML2 magnetic switches are used for learning floor changes so the distances between floors. During drive these magnetic switches are used to correct car position values of incremental encoder. Also if door bridging is necessary, they inform control panel that the car is in door opening zone.

7.4.1.1 Installation of magnetic switches

- Install the SML1-SML2 magnetic switches on the cage beam in a pre-assembled bracket. SML2 magnetic switch must be on top of SML1 and two of them must observe the same side of guide rail.

7.4.1.2. Connection of magnetic switches

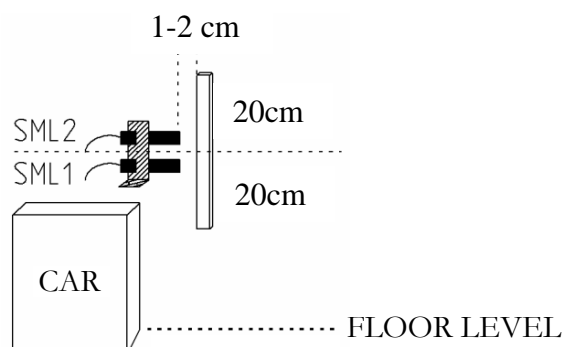
- SML1-SML2 magnetic switches are connected to plugs ML1-MLO-1000 and ML2-MLO-1000 of the REVKON board respectively.

The length of the zone magnets are approx. **40cm**. The number of zone magnets are determined by number of floor:

Number of bar magnets length 40 cm = Number of floor

7.4.1.3. Installation of zone magnets

- Move the car to the end of floors
- Car threshold must be exactly at the floor level
- Install the bar magnet opposite to the zone magnetic switches. The middle of the bar magnet must be on a level with the middle of the magnetic switches. The distance between magnetic switches and magnet must be **1-2 cm**.
- **40 cm bar magnets must be fixed with screw or glue**
- Repeat this installing operation at all floors.



8. CONNECTION OF INCREMENTAL ENCODER

8.1. ARL-500 encoder terminals

The incremental value encoder is connected to encoder plug X12 of the ARL-500 board. The following table shows the plug and terminal strip:

Encoder terminals on ARL-500 controller	
-A	Encoder -A phase pulse input
A	Encoder A phase pulse input
-B	Encoder -B phase pulse input
B	Encoder B phase pulse input

8.2 ARL-500 encoder jumpers

With incremental positioning, encoder supply voltage is assigned by using the encoder jumpers on ARL-500 controller. Two jumpers is used for each settings.

Encoder jumper settings	Supply voltage selected
5V jumpers are plugged	+5VDC encoder supply
12V jumpers are plugged	+12VDC to +15VDC encoder supply
24V jumpers are plugged	+24VDC to +30VDC Encoder supply

Warning

12V jumpers are delivered plugged and must be set according to the encoder supply voltage before operating ARL-500 controller. Faulty connection can cause damage to the board.

Note

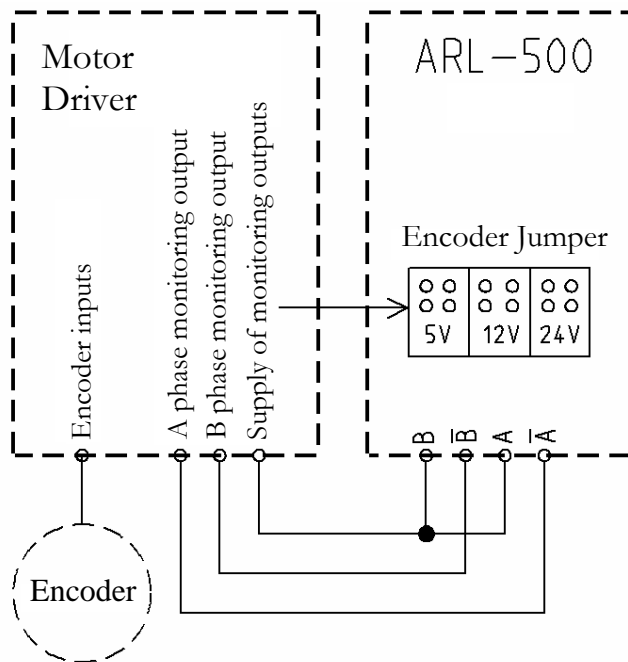
Connect the shielding of the encoder cable to PE in order to avert noise signals.

Note

Make the connection of encoder according to the wiring diagram (see sheet 9)

8.3. Encoder connection for motor drivers with encoder monitoring outputs

If encoder monitoring outputs are available with motor driver, make the following connection for encoder.



Encoder is connected to motor driver and the encoder monitoring outputs of motor driver are connected to ARL-500 encoder terminals.

Encoder jumper settings depends on the supply voltage of motor driver for encoder monitoring outputs.

The supply voltage for encoder monitoring outputs of ADrive motor driver is +15V DC. So the encoder jumpers must plugged to 12V when ADrive is used.

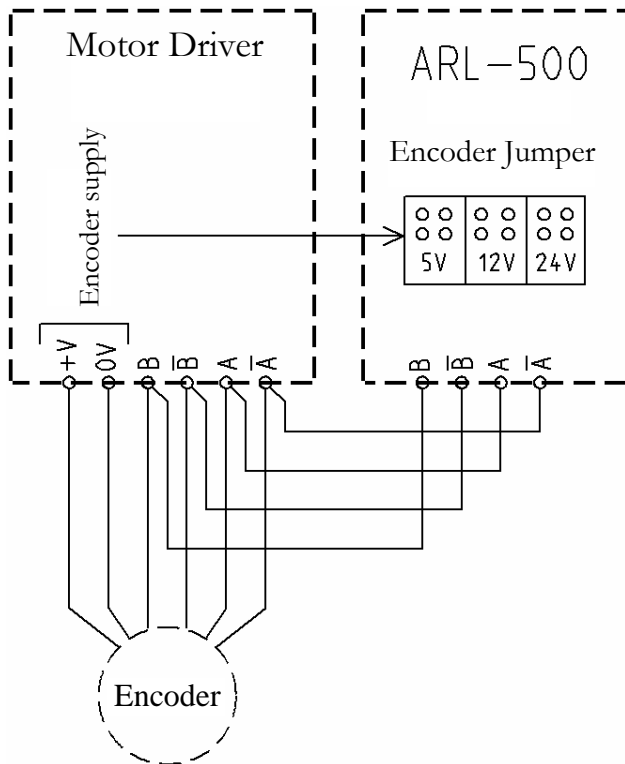
⚠ Note

- ADrive motor driver can connect to ARL-500 via two method:
- parallel connection shown above
 - serial connection via RS-485 port

Please refer to ADrive manual for detail information.

8.4. Encoder connection for motor drivers without encoder monitoring outputs

If encoder monitoring outputs are not available with motor driver, make the following connection for encoder.



Encoder is connected parallel to motor driver and ARL-500 encoder terminals.

Encoder jumpers are plugged according to the supply voltage of encoder.

9. CONNECTION OF TOP & BOTTOM LIMIT SWITCHES

ARL-500 controller is available with two different top & bottom limit switch options.

- Spool switches
- Bi-stable magnetic switches

9.1. USING SPOOL SWITCHES

9.1.1. Bottom limit switch (SKSR1)

9.1.1.1. Installation of SKSR1 bottom limit switch and metal plate

- Move the car to the bottom floor. The bottom limit switch must be switched off when car is below the bottom floor level as deceleration distance. It means it must be switched when down deceleration signal for bottom floor is activated. Install the spool switch and metal plate according to this need. Deceleration distance is direct proportional to the cars speed. This distance is approximately 180 cm for VVVF drives and 60 cm for hydraulics systems.

9.1.1.2. Connection of SKSR1 bottom limit switch

- If the spool switch is mounted to car, it is connected to plugs 817-100 of the REVKON car top controller. If it is mounted to shaft, it is connected to plugs 817-100 of the KBK-7 connection board.

9.1.2. Top limit switch (SKSR2)

9.1.2.1. Installation of SKSR2 top limit switch and metal plate

- Move the car to the top floor. The top limit switch must be switched off when the car is above the bottom floor level as deceleration distance. It means it must be switched when up deceleration signal for top floor is activated. Install the spool switch and metal plate according to this need.

9.1.2.2. Connection of SKSR2 top limit switch

- If the spool switch is mounted to car, it is connected to plugs 818-100 of the REVKON car top controller. If it is mounted to shaft, it is connected to plugs 818-100 of the KBK-7 connection board.



Note

Make the connection of up & down limit switches according to the wiring diagram (see sheet 8 and 13)

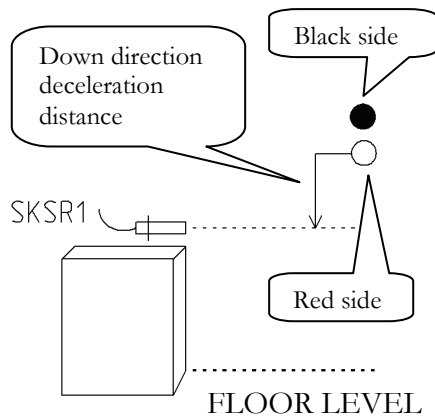
9.2. USING BI-STABLE MAGNETIC SWITCHES

9.2.1. Bottom limit switch (SKSR1)

9.2.1.1. Installation and connection of SKSR1 bottom limit switch

- Install the SKSR1 bi-stable magnetic switches on the cage beam in a pre-assembled bracket.
- SKSR1 magnetic switch is connected to plugs 817-100 of the REVKON board.

9.2.1.2. Installation of round magnets



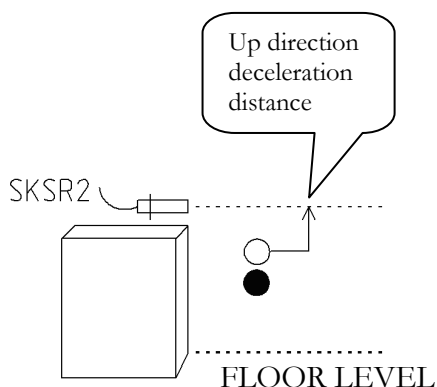
- Move the car to the bottom floor. Car must be exactly at the floor level.
- Install the round magnet with red color side above the SKSR1 magnetic switch as deceleration distance. It means it must be switched on when down deceleration signal for bottom floor is activated.
- Install the round magnet with black color side a little above the red color magnet. It means it must be switched off when the car is out of the bottom limit zone. The distance between magnetic switch and magnets must be **1-2 cm**.

9.2.2. Top limit switch (SKSR2)

9.2.2.1. Installation and connection of SKSR2 top limit switch

- Install the SKSR2 bi-stable magnetic switches on the cage beam in a pre-assembled bracket.
- SKSR2 magnetic switch is connected to plugs 818-100 of the REVKON board.

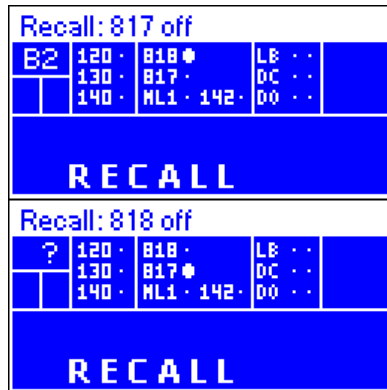
9.2.2.2. Installation of round magnets



- Move the car to the bottom floor. Car must be exactly at the floor level
- Install the round magnet with red color side below the SKSR2 magnetic switch as deceleration distance. It means it must be switched on when up deceleration signal for bottom floor is activated.
- Install the round magnet with black color side a little below the red color magnet. It means it must be switched off when the car is out of the top limit zone. The distance between magnetic switch and magnets must be **1-2 cm**.

9.3. CHECKING THE FUNCTION OF TOP&BOTTOM LIMIT SWITCHES

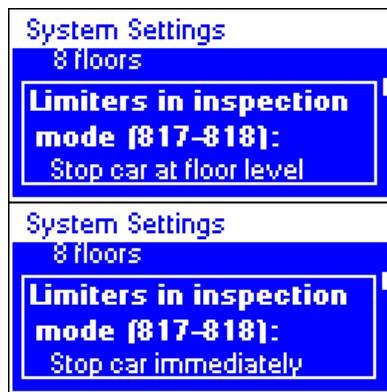
- Take off the bridging wire of bottom (817) and top (818) limit switches to terminal 100.



Check the function of limit switches by observing 817 and 818 signals on ARL-500 display.

817 signal must be off when the car is at bottom floor, 818 signal must be off when the car is at bottom floor, 817 and 818 signals must be on when the car is at any intermediate floor.

- The 817 bottom limit switch must be switched off when down deceleration signal for bottom floor is activated. Also the 818 top limit switch must be switched off when up deceleration signal for top floor is activated.



After the installation of limit switches, the function of limit switches in inspection mode can be set on ARL-500 menu. Set the parameter “**System settings > Limiters in inspection mode (817-818)**”.

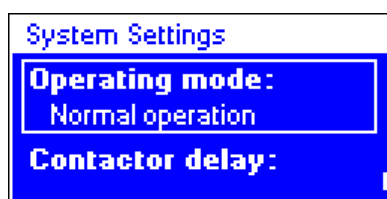
“**Stop car at floor level**” : Car is run until the bottom/top floor level after the limit switch signals are activated.

“**Stop car immediately**” : Car is stopped immediately when the limit switch signals are activated.

Note

Set this parameter to “**Stop car at floor level**” for systems with AKUS-SD evacuation unit.

- Turn the recall switch in recall hand terminal and to “NORMAL” (The inspection switch in inspection hand terminal must also be “NORMAL”). As mentioned before when ARL-500 controller is switched on or rebooted, it checks the bottom limit switch (817) to correct its position counter. If the inspection or recall control is activated before this correction drive, the system can be operated only in “Inspection only mode”. The controller is already set to “**Inspection only**” mode in the default factory settings for safety startup installation. By this way, the controller was only be operated in inspection mode or recall mode during the startup installation.



Before normal operation this parameter should be set to normal operation mode. Set the parameter “**System settings > Operation mode**” to “**Normal operation**” in ARL-500 menu. From now on the controller is normal operation mode and can process car commands and landing calls.

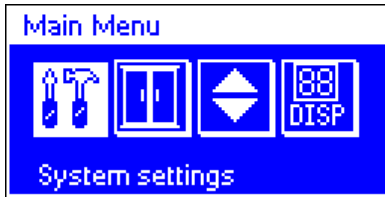
10. BASIC SETTINGS ON THE ARL-500 CONTROLLER

Assuming you have completed the connections described in installation sections, you now need to adjust some basic parameters before the run. These are:

- General system settings
- Assigning functions to programmable outputs
- Assigning functions to programmable inputs
- Setting door types

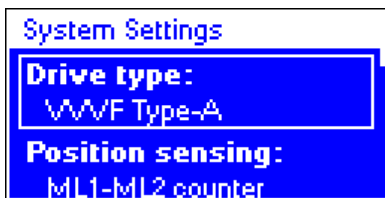
10.1. GENERAL SYSTEM SETTINGS

•



First, settings in the “**System settings**” submenu.

•



“**Drive type**” and “**Position sensing**” parameters were adjusted previously. An example setting for a VVVF type lift with ML1-ML2 counter is shown at the left.

•



Enter the number of floors of the lift into the “**Number of floors**” parameter. ARL-500 supports up to 48 stops..

•



In the “**Call response settings**” submenu, select the “**collection type**” of the lift. The options for this parameter are as follows:

“**Two buttons**”: On the call panels, up/down buttons will be connected to the up button terminals and down button terminals.

“**Both directions, single button**”: On the call panels, a single button will be connected to one of the button terminals (no matter which one). The calls from those buttons will be collected in both directions.

“**Single direction, single button**”: On the call panels, connect the button to the up terminal for collecting on up direction, and to the down terminal for collecting on down direction. .

10.2. ASSIGNING PROGRAMMABLE OUTPUTS

ARL-500 main controller is available with 8 functionally programmable relay outputs (PR1-PR8) and 6 functionally programmable transistor outputs (PT1-PT6). Additionally, there are 3 functionally programmable relay outputs (PR21-PR23) on the REVKON car top controller and 1 programmable output on each KK-x landing call/indicator module.



The functions of the programmable relays and transistors can be assigned using the “**Programmable outputs**” submenu. There are 4 sections under this submenu:

- “**ARL-500 relays**”: for PR1-PR8 relay outputs on ARL-500 main controller.
- “**ARL-500 transistors**”: for PT1-PT6 transistor outputs on ARL-500 main controller.
- “**REVKON relays**”: for PR21-PR23 relay outputs on REVKON car top controller.
- “**KK-x outputs**”: for outputs on each KK-x landing call/indicator module.

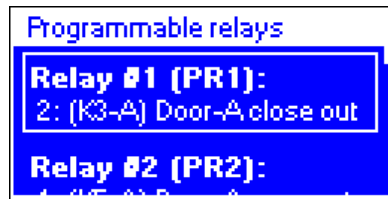
Note

When programming the ARL-500 programmable outputs, refer to wiring diagrams of the control panel. Outputs must be assigned according to these diagrams

Note

You can find the entire list of the programmable outputs from ARL-500 programming manual.

10.2.1. ASSIGNING FUNCTIONS TO ARL-500 PROGRAMMABLE RELAYS



For assigning functions to programmable outputs on ARL-500 controller, select “**ARL-500 relays**” item and press Enter. In this menu, 8 rows of outputs (PR1-PR8) are listed. Select the output that you wish to assign a function by up/down keys and press Enter. The function assigned to that output will start to flash. Using up/down keys, select the desired function. And press the Enter key again to accept your selection.

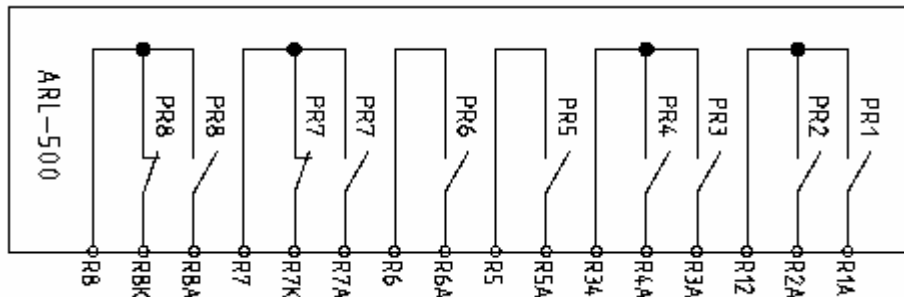
Programmable outputs are shown on ARL-500 menu display as described below. “0: <undefined>” means no function is assigned to the output.

Function number	(Function alias)	Function description
2:	(K3-A)	Door-A close output

10.2.1.1. CONNECTION OF ARL-500 PROGRAMMABLE RELAYS

Connect the wirings according to relays contacts circuit shown in figure below when assigning a new function to a relay or changing the function of relay.

Relay Contacts: 10A 250V AC / 10A 30V DC.

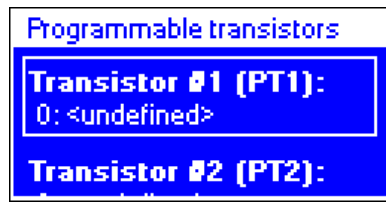


The factory defaults of ARL-500 programmable relays are listed in the table below:

Output		Function number	(Function alias)	Function description	Note
#	Factory setting				
PR1	A-K3	2	K3-A	Door-A close output	
PR2	A-K5	1	K5-A	Door-A open output	
PR3	B-K3	5	K3-B	Door-B close output	Dual automatic door
PR4	B-K5	4	K5-B	Door-B open output	
PR5	-	0	-	undefined	
PR6	-	0	-	undefined	
PR7	-	0	-	undefined	
PR8	-	0	-	undefined	

10.2.2. ASSIGNING FUNCTIONS TO ARL-500 PROGRAMMABLE TRANSISTORS

-



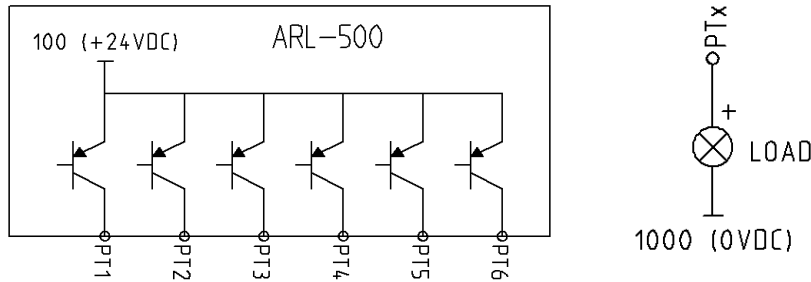
For assigning functions to programmable transistor outputs on ARL-500 select “**ARL-500 transistors**” item and press Enter.

In this menu, 6 rows of outputs (PT1-PT6) are listed. Select the output that you wish to assign and set the desired function.

10.2.2.1. CONNECTION OF ARL-500 PROGRAMMABLE TRANSISTORS

Connect the wirings according to the circuit shown in figure below when assigning a new function to an output or changing the function of output.

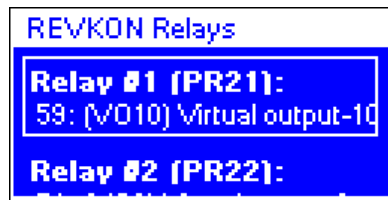
Outputs: Open collector, 24VDC, optodecoupled, short-circuit and overload protection, total output current max. 3A.



The factory defaults of ARL-500 programmable transistors are listed in the table below:

Output		Function number	(Function alias)	Function description	Note
#	Factory setting				
PT1	-	0	-	undefined	-
PT2	-	0	-	undefined	-
PT3	-	0	-	undefined	-
PT4	-	0	-	undefined	-
PT5	-	0	-	undefined	-
PT6	-	0	-	undefined	-

10.2.3. ASSIGNING FUNCTIONS TO REVKON PROGRAMMABLE RELAYS

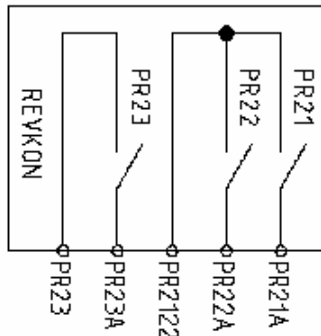


For assigning functions to programmable outputs on REVKON, select “**REVKON relays**” item and press Enter. In this menu, 3 rows of outputs (PR21-PR23) are listed. Select the output that you wish to assign and set the desired function.

10.2.3.1. CONNECTION OF REVKON PROGRAMMABLE RELAYS

Connect the wirings according to relays contacts circuit shown in figure below when assigning a new function to a relay or changing the function of relay.

Relay Contacts: 3A 250V AC / 3A 30V DC.



The factory defaults of REVKON programmable relays are listed in the table below:

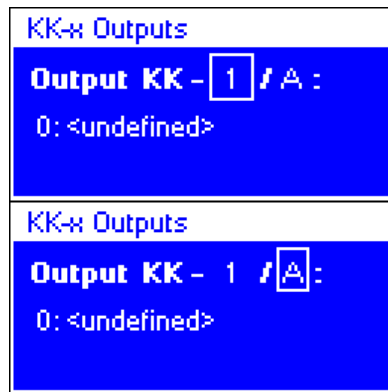
Output		Function number	(Function alias)	Function description	Note
#	Factory setting				
PR1	A-K5	1	K5-A	Door-A close output	
PR2	A-K3	2	K3-A	Door-A open output	
PR3	A-K4	3	K4-A	Door-A slow close	



Note

Further information and the list off all selectable output functions can be found in ARL-500 programming manual.

10.2.4. ASSIGNING FUNCTIONS TO KK-x PROGRAMMABLE OUTPUTS



For assigning functions to programmable outputs on each KK-x, select “**KK-x outputs**” submenu and press ENTER.

In this menu, each KK-x output is shown by two rows. The upper row shows the KK-x output code and bottom row shows the assigned function.

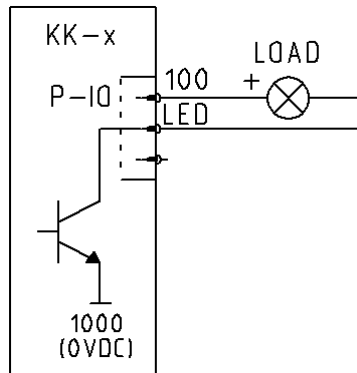
The KK-x landing number can be set from 1 to 48. Door side setting can be ‘A’ or ‘B’ (‘B’ is used for the second entrance).

Select the output that you wish to assign by changing the KK-x landing number and door side setting in the upper row. Then set the desired function.

KK-x programmable output code used in the upper row is described below:

Output	Landing number	/ Door side
KK -	1	/A

10.2.4.1. CONNECTION OF KK-x PROGRAMMABLE OUTPUTS



Connect the wirings according to circuit shown in figure when assigning a new function to a an output or changing the function of output.

Outputs: Open collector, 0VDC, short-circuit and overload protection, output current max. 50mA.

The factory defaults of KK-x programmable inputs are listed in the table below:

Output	Function number	(Function alias)	Function description
KK - x /x	0	-	Undefined

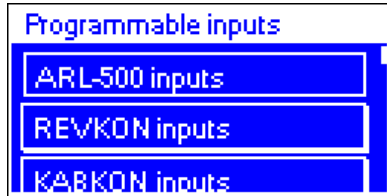


Note

Further information and the list off all selectible output functions can be found in ARL-500 programming manual.

10.3. ASSIGNING FUNCTIONS TO PROGRAMMABLE INPUTS

ARL-500 controller is available with 14 programmable inputs whose functions can be selected by the user. Additionally, there are 6 programmable inputs on the REVKON board, 3 programmable inputs on each KABKON board and 1 programmable input on each KK-x board that can be assigned functions by the user.



Assigning functions to programmable inputs can be done using the “**Programmable Inputs**” item in the main menu. There are 4 sections under this submenu:

- “**ARL-500 inputs**” : for PI1-PI14 inputs on ARL-500 main controller.
- “**REVKON inputs** ”: for PI21-PI26 inputs on REVKON car top controller.
- “**KABKON inputs** ”: for PI31-PI33 inputs on each KABKON car panel module.
- “**KK-x inputs** ”: for inputs on each KK-x landing call/indicator module.

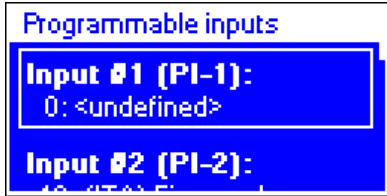
Note

When programming the ARL-500 programmable inputs, refer to wiring diagrams of the control panel. Inputs must be assigned according to these diagrams.

Note

You can find the entire list of the programmable outputs from ARL-500 programming manual.

10.3.1. ASSIGNING FUNCTIONS TO ARL-500 PROGRAMMABLE INPUTS

- 

For assigning functions to programmable inputs on the controller board, select “**ARL-500 Inputs**” item and press Enter.

In this menu, 14 rows of inputs (PI1-PI14) are listed. Select the input that you wish to assign a function by up/down keys and press Enter. The function assigned to that input will start to flash. Using up/down keys, select the desired function. And press the Enter key again to accept your selection.

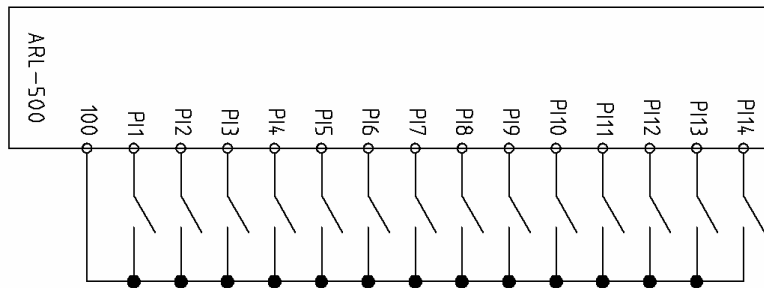
Programmable inputs are shown on ARL-500 menu display as described below. “0: <undefined>” means no function is assigned to the input.

Function number	Function alias	Function description
11:	(KRC)	Contactor check-back

10.3.1.1. CONNECTION OF ARL-500 PROGRAMMABLE INPUTS

The programmable inputs of ARL-500 board function high active and detect a signal as present if it is connected to the terminal 100.

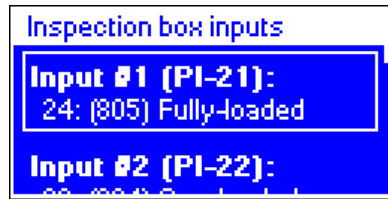
Inputs: +24V DC, optodecoupled, input current approx. 5 mA



The factory defaults of ARL-500 programmable inputs are listed in the table below:

Input #	Factory setting	Function number	(Function alias)	Function description	Note
PI2	-	0	-	Undefined	Reserve
PI3	-	0	-	Undefined	Reserve
PI4	-	0	-	Undefined	Reserve
PI5	-	0	-	Undefined	Reserve
PI6	DEP	17	DEP	Earthquake input	
PI7	YAN	18	YAN	Fire sensor input	
PI8	KRC	11	KRC	Contactor check-back	
PI9	503	16	503	Recall up	
PI10	502	15	502	Recall down	
PI11	870	14	870	Recall switch	
PI12	869	13	869	Inspection switch	
PI13	142	27	142	Positioning signal	
PI14	141	26	141	Positioning signal	

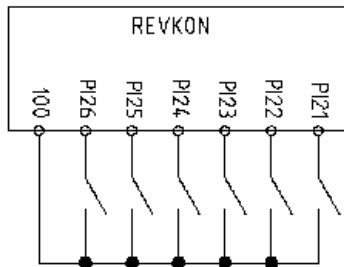
10.3.2. ASSIGNING FUNCTIONS TO REVKON PROGRAMMABLE INPUTS



For assigning functions to programmable inputs on the REVKON board, select “**REVKON Inputs**” item and press Enter.

In this menu, 6 rows of inputs (P21-PI26) are listed. Select the input that you wish to assign a function by up/down keys and press Enter. The function assigned to that input will start to flash. Using up/down keys, select the desired function. And press the Enter key again to accept your selection.

10.3.2.1. CONNECTION OF REVKON PROGRAMMABLE INPUTS



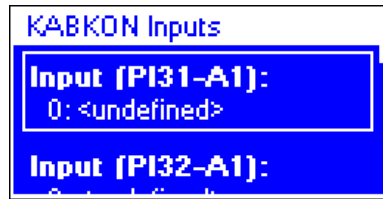
The programmable inputs of REVKON board function high active and detect a signal as present if it is connected to the terminal 100.

Inputs: +24V DC, input current approx. 5 mA

The factory defaults of REVKON programmable inputs are listed in the table below:

Input	Function number	(Function alias)	Function description
PI21	24	805	Full load
PI22	23	804	Overload
PI23	1	FSL-A	Door-A photocell
PI24	6	FSL-B	Door-B photocell
PI25	0	-	Undefined
PI26	0	-	Undefined

10.3.3. ASSIGNING FUNCTIONS TO KABKON PROGRAMMABLE INPUTS



For assigning functions to programmable inputs on the KABKON board, select “**KABKON Inputs**” item and press Enter.

In this menu, 12 rows of inputs (PI31-PI33 of each KABKON) are listed. The inputs are listed according to the KABKON input code and the door side setting.

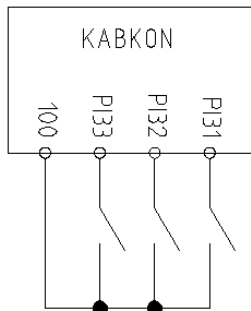
The car panel module KABKON’s number can be **1** or **2**. The second KABKON is used for systems more than 24 stops to increase the number of stops up to 48. Door side setting can be ‘**A**’ or ‘**B**’. ‘**B**’ is used for the second entrance.

Select the input that you wish to assign a function by up/down keys and press Enter.

KABKON programmable input code used in ARL-500 display is described below:

Input	Door side	KABKON number
PI31-	A	1

10.3.3.1. CONNECTION OF KABKON PROGRAMMABLE INPUTS



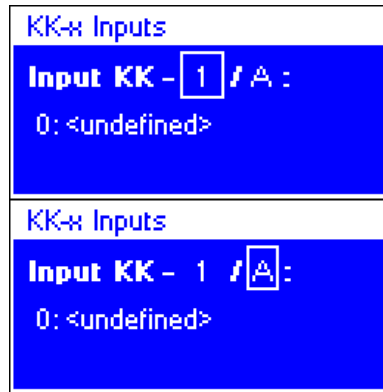
The programmable inputs of REVKON board function high active and detect a signal as present if it is connected to the terminal 100.

Inputs: +24V DC, input current approx. 5 mA

The factory defaults of KABKON programmable inputs are listed in the table below:

Input	Function number	(Function alias)	Function description
PI31-A1	0	-	Undefined
PI32-A1	0	-	Undefined
PI33-A1	0	-	Undefined
PI31-A2	0	-	Undefined
PI32-A2	0	-	Undefined
PI33-A2	0	-	Undefined
PI31-B1	0	-	Undefined
PI32-B1	0	-	Undefined
PI33-B1	0	-	Undefined
PI31-B2	0	-	Undefined
PI32-B2	0	-	Undefined
PI33-B2	0	-	Undefined

10.3.4. ASSIGNING FUNCTIONS TO KK-x PROGRAMMABLE INPUTS



For assigning functions to programmable inputs on the KK-x modules, select “**KK-x Inputs**” item and press Enter.

In this menu, each KK output is shown by two rows. The upper row shows the KK output code and bottom row shows the assigned function.

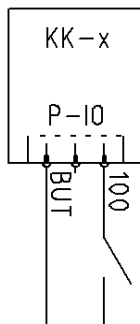
The KK landing number can be set from 1 to 48. Door side setting can be ‘A’ or ‘B’ (‘B’ is used for the second entrance).

Select the output that you wish to assign by changing the KK landing number and door side setting in the upper row. Then set the desired function.

KK-x programmable input code used in the upper row is described below:

KK module -	Landing number	/ Door side
KK -	1	/A

10.3.4.1. CONNECTION OF KK-x PROGRAMMABLE INPUTS



The programmable inputs of KK-x modules function high active and detect a signal as present if it is connected to the terminal 100.

Inputs: +24V DC, input current approx. 5 mA

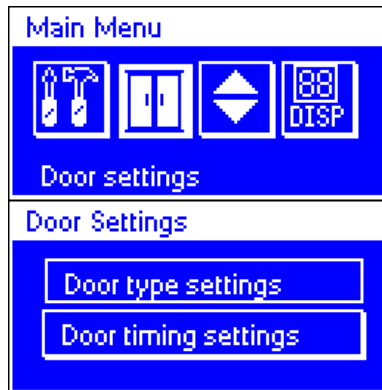
The factory defaults of KK-x programmable inputs are listed in the table below:

Input	Function number	Function alias	Function description
KK - x /x	0	-	Undefined

10.4. DOOR TYPE SETTINGS

ARL-500 system can control up to two semi-automatic or full-automatic doors which can be enabled or disabled for each floor independently.

- To select door types and/or enable/disable doors for each floor, enter the “**Door Settings > Door type settings**” submenu in the main menu.

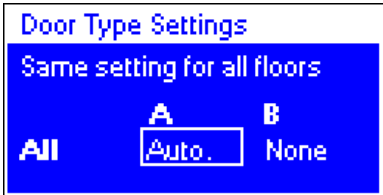


In the “**Door type settings**” menu, you may choose to set each floor individually or set all doors to the same type by selecting the setup method on the top row to “**Individual setting for each floor**” or “**Same setting for all floors**” respectively.

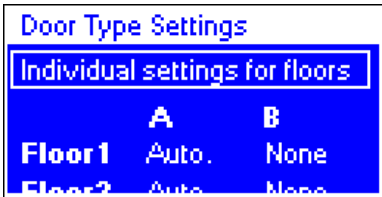
There are 3 options for door type:

- “**None**”: No doors at this side (A or B side).
- “**Semi**”: Semi-automatic door at this side (A or B side).
- “**Auto**”: Full automatic door at this side (A or B side).

10.4.1. Same door setting for all floors

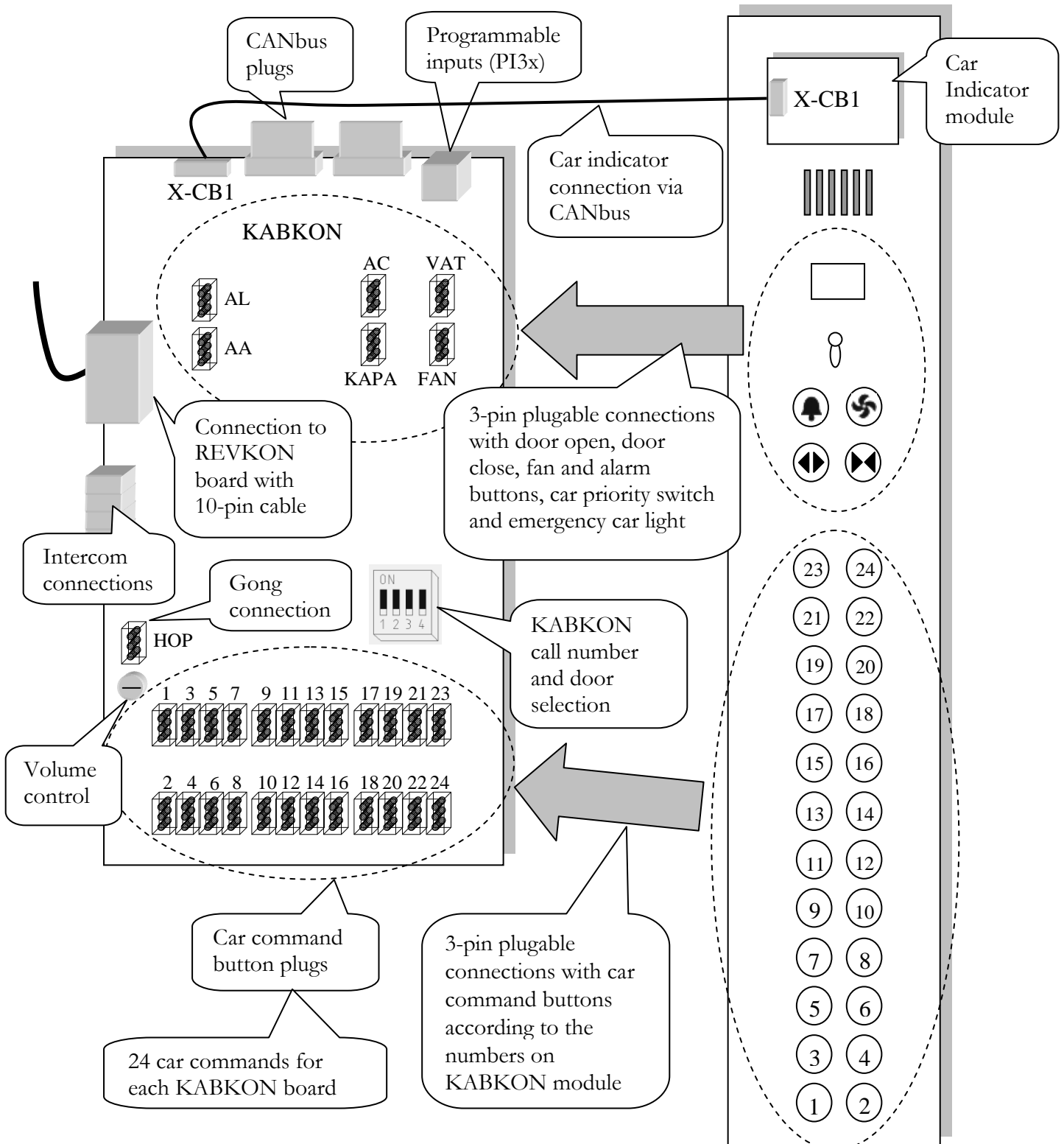
-  If all of the doors are of the same type, select “**Same setting for all doors**” option.

10.4.2. Individual door setting for each floor

-  If at least the type of one of the doors is different from the others, select “**Individual setting for each door**” option.
- When this option is selected, side-A and side-B doors will be listed for each floor. Now you can select which floor has which type of door at which side.

11. CONNECTION OF CAR PANEL

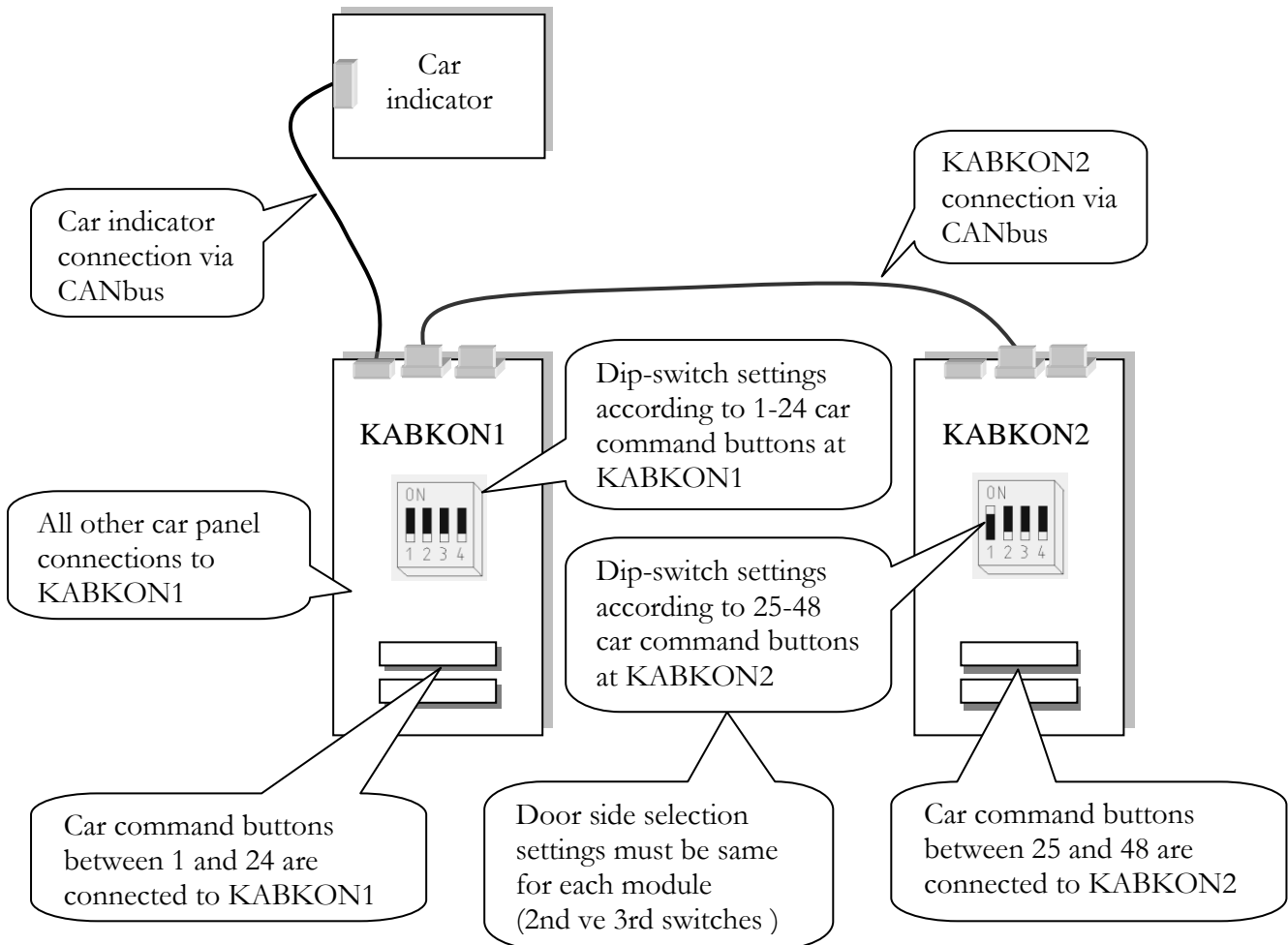
KABKON car command controller is mounted in the car operating panel. KABKON collects commands from car operating panel and sends them to the inspection box controller. On board, there is a socket for car top controller connection, sockets for car CANbus serial communication. Pluggable connection for car command buttons, door open, door close, fan and alarm buttons, car priority switch, emergency light, intercom and gong connection. Besides, 3 free programmable inputs and 1 free programmable output. Second KABKON board is used for systems more than 24 stops to increase the number of stops up to 48.



11.1. CONNECTION OF KABKON FOR MORE THAN 24 STOPS

Second KABKON board is used for systems more than 24 stops to increase the number of stops up to 48. Any CANbus on first KABKON or on LCD indicator plug can be be used for connecting second KABKON into CANbus. All other car operating panel connections must be connected to KABKON1 module. Also the settings for number of commands must be adjusted by using dip-switches.

The connections of two KABKON modules in car panel are described below:



Note

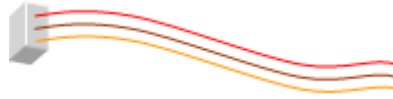
Make the connection of KABKONs according to the wiring diagram (see sheet 7B)

11.2. CONNECTION OF COMMAND BUTTONS AND FURTHER FUNCTIONS

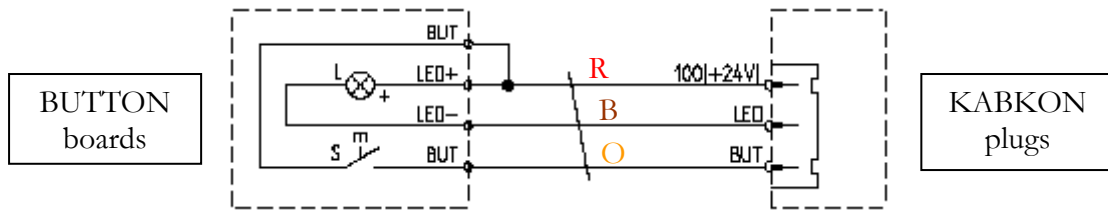
Almost all connections between KABKON board and car panel functions are made with pre-wired cables. 3-pin plug on one-side cables are used for car panel buttons and components.

Color-code of 3-pin cables are described below:

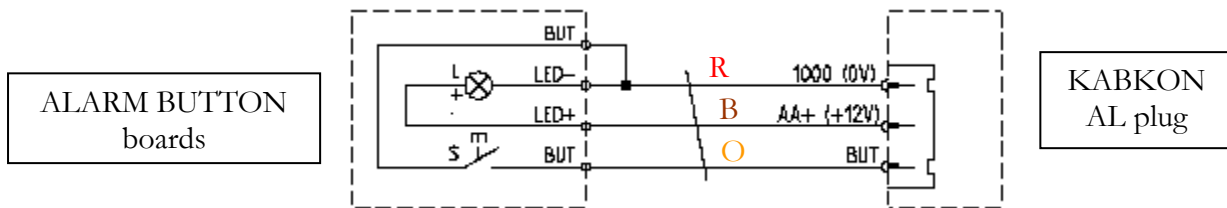
Red	R
Brown	B
Orange	O



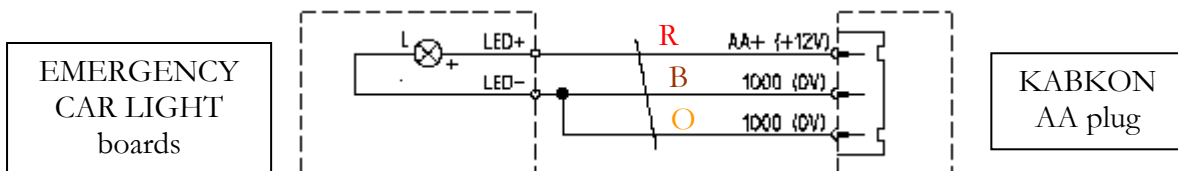
- Car command buttons, door open, door close, fan, car priority switch connections are similar. The connections are showed below:



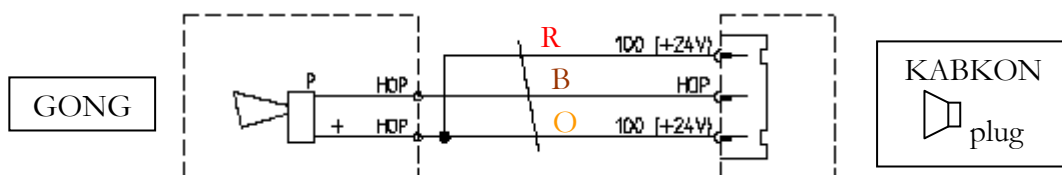
- The connection of alarm button is showed below:



- The connection of car emergency light is showed below:



- The connection of car panel gong is showed below:



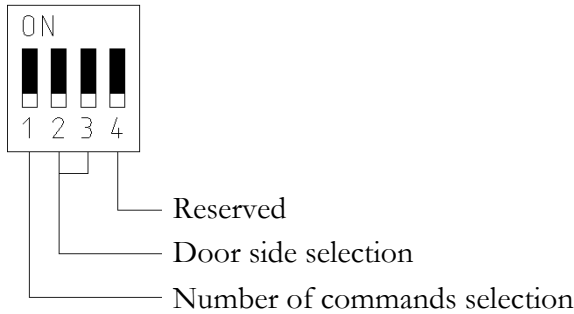
- TLF1, TLF2, YK1, +12 ve 0 terminals are used for intercom connections.

Note

Make the connections of car panel according to the wiring diagram (see sheet 7)

11.3. CAR OPERATING PANEL SETTING WITH DIPSWITCHES

4-switch dipswitches at the backside of the KABKON board is used for door selecting and number of commands selecting. The 1st switch is used for selecting number of commands less/more than 24, the 2nd and 3rd switches are used for door selection and the 4th switch is reserved.



The settings for number of car commands are described below:

	Set for car commands between 1 and 24 (KABKON board with this setting is showed as “ KABKON1 ” on ARL-500 display)
	Set for car commands between 25 and 48 (KABKON board with this setting is showed as “ KABKON2 ” on ARL-500 display)

The settings for door side selection are described below:

	This panel commands both door-A and door-B
	This panel commands door-A
	This panel commands door-B

11.4. SETTING-CONNECTION TESTING OF CAR PANEL

After connecting car operating panel, you can check the correctness of the connections by using the “CANbus status” screens and “Test Mode” function on the ARL-500 controller’s display. With this feature you can easily test the connections between car command buttons and KABKON module(s).

11.4.1. CHECKING CANBUS STATUS OF CAR PANEL

- First of all check the CANbus status on KABKON module by observing the CPU Leds. CPU Led flashes rapidly while the car CANbus communication is working correctly or flashes slowly while there is no car CANbus communication between the ARL-500 controller and KABKON module.

```

3.1.CANbus status
KK-1 :-B  KK-8 :--  KK-15:--
KK-2 :--  KK-9 :--  KK-16:--
KK-3 :--  KK-10:--
KK-4 :AB  KK-11:--
KK-5 :AB  KK-12:--  KABKON2: AB
KK-6 :--  KK-13:--  KABKON1: --
KK-7 :--  KK-14:--  REUKON: +

```

Find one of “CANbus status” screen on ARL-500 display by pressing LEFT key (CANbus status screens consist of 3 pages). On this screen there is KABKON1 and KABKON2. KABKON1 is used for buildings which have less than or equal to 24 floors and KABKON2 is used for buildings which have more than 24 floors. “A”, “B” or “AB” are used to show that ARL-500 mainboard has connection with that KABKON “A” means door A, “B” means door B and “AB” means both doors A and B has connection with KABKON.

In the CANbus status screen:
‘+’ means connection is made
‘-’ means no connection

11.4.2. TEST MODE for CAR COMMAND BUTTONS

By the help of the “Test Mode” built in ARL-500 display, you can check the car command button connections to the KABKON module.

```

Debug tools
Disable doors: No
Run as simplex: No
Test mode: Buttons

```

To go into test mode: when on the main status screen, press up arrow. On this screen, select “**Test mode**” and change the value to “Buttons”, thereby system buttons will start to operate in test mode.

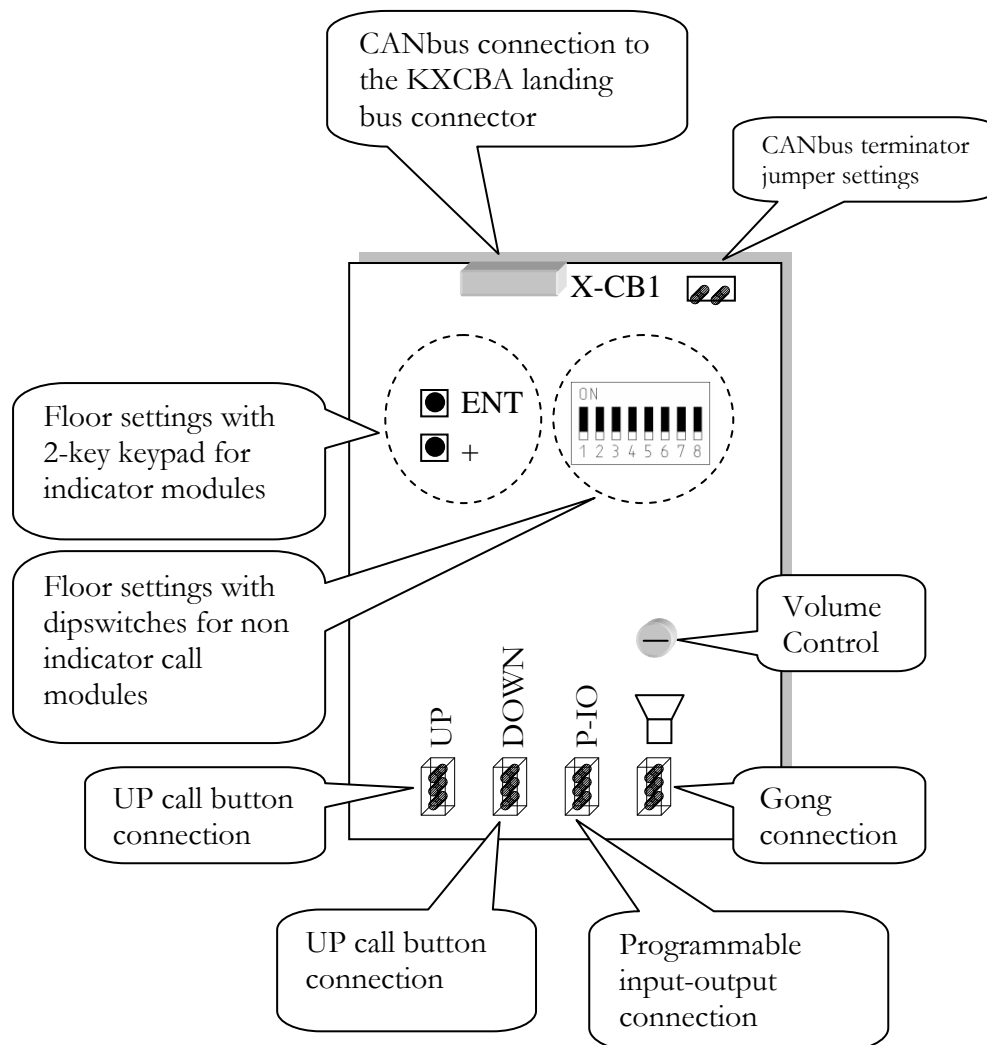
- In this mode, the leds of car command buttons will flash in increasing order according to the plug number on KABKON module.
- When you press a command button, its led will flash at a faster rate, indicating that the button and led connections are correct.

11.4.3. CHECKING FURTHER CAR FUNCTIONS

All car functions must be checked using the wiring diagram (see sheet 7).

12. CONNECTION OF LANDING CALL/INDICATOR MODULES

KK-x call/indicator modules are mounted in landing panels. On boards, there are socket for shaft CANbus communication, sockets for up and down call buttons, 1 free programmable input-output and gong connection. Modules with indicator displays floor name, direction/collection arrows and out of service signals. 2-key keypad or 8-switch dipswitches are used for floor settings on modules.



12.1. CALL BUTTON CONNECTIONS ACCORDING TO COMMAND TYPE

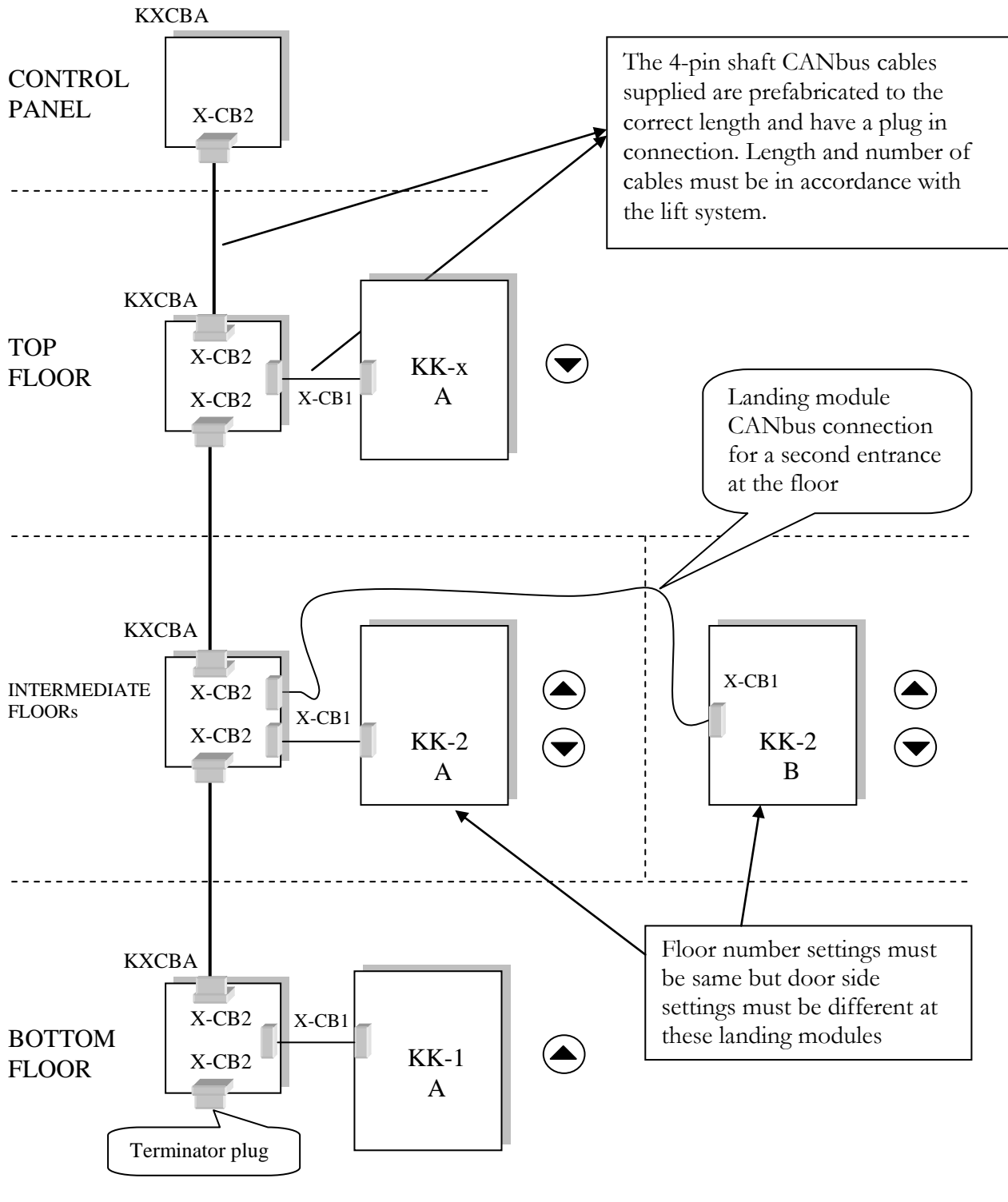
- **Full collective:** Connect up button to UP plug and down button to DOWN plug
- **Down collective:** Connect button to UP plug at bottom floor and connect buttons to DOWN plugs at other floors.
- **Up collective:** Connect button to DOWN plug at top floor and connect buttons to UP plugs at other floors.
- **Single button collective:** Connect buttons whatever to UP or DOWN plugs.

12.2. CONNECTION OF SHAFT CANbus

KK-x landing call/indicator modules are mounted at landing panel (non-indicator call modules can also be mounted in the shaft). The KXCBA CANbus connection board of the closest floor is connected to the ARL-500 controller according to the wiring diagram. The shaft CANbus is looped through from KXCBA to KXCBA and bus cables are installed in the shaft. The CANbus terminator (line end) plug must be plugged at module of the bottom floor.

Note

Make the connections of car panel according to the wiring diagram (see sheet 10)

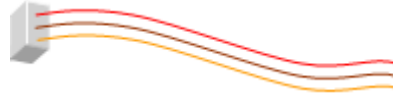


12.3. CONNECTION OF CALL BUTTONS AND FURTHER FUNCTIONS

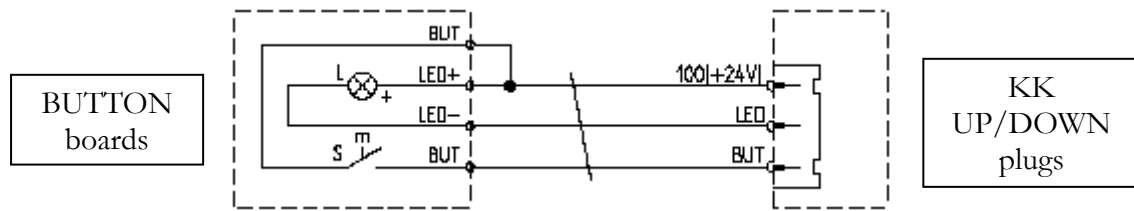
Connections between KK-x landing modules and landing panel functions are made with 3-pin plug on one-side cables.

Color-code of 3-pin cables are described below:

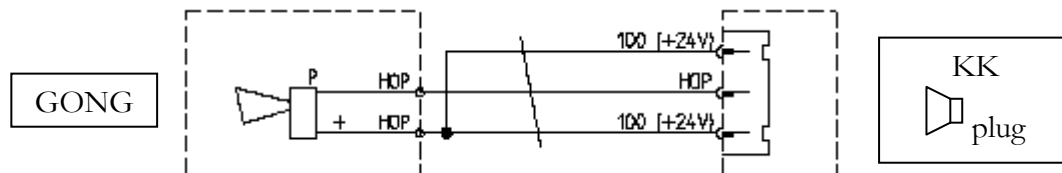
Red	R
Brown	B
Orange	O



- The connection of UP/DOWN call buttons is showed below:



- The connection of landing panel gong is showed below:



Note

Make the connections of landing panel according to the wiring diagram (see sheet 10)

12.4. PARAMETER SETTINGS FOR LANDING CALL PANELS


(KK2x3057, KK3x3057, KKLCD-x, KKBT)

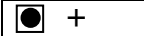
Unlike the parallel connected call panels in conventional systems, ARL-500 system uses a serial bus, called CANbus, to connect all call-panels and indicator boards with a single cable. This setup minimizes the cost of wiring and facilitates installation. But as all panels are connected to a single port in the system, it is obligatory that we introduce a way to give a unique identifier to each call-panel. This identification is called “floor setting” and is done by using DIP switches or push buttons at the backsides of call-panels. The below table, shows which panel type uses which setting method.

Indicator module Type	Floor setting by
KK2x3057	2-key & menu
KK3x3057	2-key & menu
KKLCD-x	2-key & menu
KKBT	DIP switches

12.4.1. LANDING CALL PANEL SETTING BY KEYPAD & MENU

There are two keys labelled “ENT” and “+” at the backside of the call boards.

 For entering the menu and selecting parameters

 For changing the value of the selected parameter

To select the parameter to change, press “ENT” key. In 3 character displays (KK3x) a letter indicating the selected parameter will flash in the first digit, and the value of the selected parameter will be indicated at the other two digits. In 2 digit displays (KK2x), the letter of the selected parameter and its value will be show alternately in 1 second intervals.

To change the value of the parameter: press “+” key.

To select the next parameter: press “ENT” key. The meaning of each parameter is summarized in the setting table.

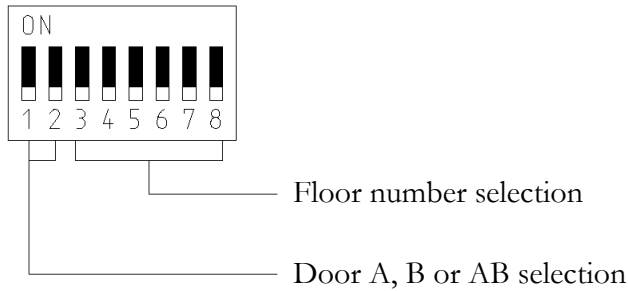
To exit menu press “ENT” repeatedly until the display turns into normal mode. When changing to normal mode, parameters will be saved into the permanent memory of the landing call panel automatically.

The table below summarizes the effect of each setting:

Letter shown on the indicator		Parameter adjusted	Selectable values	Description
KK2x3057 KK3x3057	KKLCD-x			
D	Durak	Floor setting	1-48	Set this parameter to the floor number of the call panel (bottom floor is 1)
K	Kapı	Door setting	A,B or AB	For landings with two doors and two call panels, set this parameter to A or B, depending on which door this panel commands. For single door landings, or two door landings with a single call panel, set this parameter to AB.
B	Buton	Button setting	+ or -	Set this parameter to “-“ if you will not connect call buttons to this panel (for use only as an over-door indicator). Otherwise set this value to “+”

12.4.2. LANDING CALL PANEL SETTING WITH DIPSWITCHES

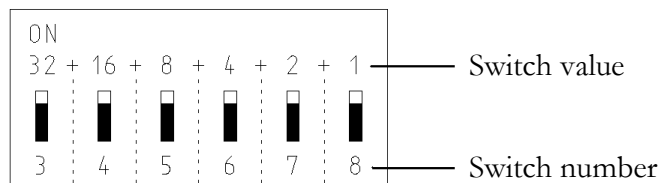
In call-panels; KKBT, 8-switch dipswitches at the backside of the board is used. The first two switches are for door selecting, the other 6 are for floor selection.



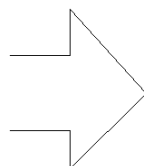
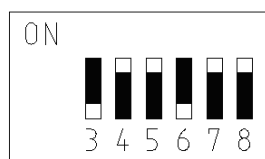
For door selection switches, use the table below:

	<p>This panel commands both door-A and door-B</p>
	<p>This panel commands door-A</p>
	<p>This panel commands door-B</p>

The procedure of floor selection switches is explained below:



Floor number is coded in binary code. The most-right switch has the least value. The value of switch which is ON is added to floor number. The value of switch which is OFF is 0 (zero). Floor number is selected by the sum of ON switches value + 1.



For this example floor number 28 is coded.

$$0 + 16 + 8 + 0 + 2 + 1 + 1 = 28$$

This landing call panel is indicated as “**KK-28**” on ARL-500 display.

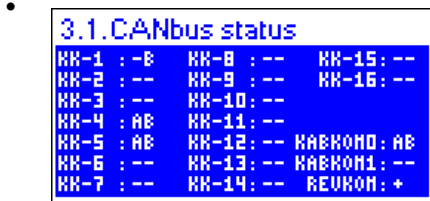
Note

Make floor settings carefully according to the wiring diagram (see sheet 10)

12.5. SETTING-CONNECTION TESTING OF LANDING CALL PANELS

After connecting landing call/indicator panels, you can check the connections by using the “CANbus status” screens and “Test Mode” function on the ARL-500 controller’s display.

12.5.1. CHECKING CANBUS STATUS OF LANDING PANELS



Find one of “CANbus status” screen on ARL-500 display by pressing LEFT/RIGHT key. In screens 3.1, 3.2 and 3.3 the connection to all landing panels that are connected to the shaft CANbus will be shown with two-digit signs next to them.

The first digit shows the communication of landing panel at door side A and the 2nd digit shows the communication of landing panel at door side B.

In the CANbus status screen:

‘A’ means connection of landing panel side A is made

‘B’ means connection of landing panel side B is made

‘-’ means no connection

12.5.2. TEST MODE for LANDING CALL BUTTONS

By the help of the “Test Mode” built in ARL-500 display, you can check the call button connections to the call-panels.



To go into test mode: when on the main status screen, press UP key. On this screen, select “Test mode” and change the value to “Buttons” to make the system operate in test mode.

In this mode, all call panels with indicator which are connected to the CANbus will display their floor number and blink, if not, check your connections again. Also the Leds of call buttons will flash in 1 second intervals.

When you press a call-button, its Led will flash at a faster rate, indicating that the button and led connections are correct.

Accuracy test for landing numbers

Landing numbers accuracy can be tested also if you have indicator modules. When on the main status screen, press UP key. On this screen, select “Test mode” and change value to “Buttons”. On the car panel, the landing number that you have set before with dipswitches will be shown (between floors 1 to 48). If there is any problem in the indicators, check your connections and dipswitches settings. The landing numbers set in car panels must all be different from each other. If there are two doors on the landing floor landing numbers set in the car panels can be same but the door selections must be different in the panels.

13. DOOR BRIDGING SAFETY CIRCUIT

The door bridging SAFETY circuit is integrated in the ARL-500 controller board (SR1, SR2, SR3 safety relays and RBE relay) and enables car movements in the door zone with open car and landing doors. This makes approaching and releveling with open doors possible.

The door bridging circuit requires two magnetic mono stable switches on car roof SML1 (door zone-1) and SML2 (door zone-2). SML1-SML2 magnetic switches must be installed in the same pre-assembled bracket and SML2 (door zone-2) magnetic switch must be on top of SML1 (door zone-1). 40cm bar magnets are used with door zone magnetic switches.

The door bridging operation can only be activated and commissioned if these two magnetic switches including magnets are installed and connected (see installation and connection of door zone magnetic switches).



Note

If the two functions “Door pre-opening” and “Hydraulic releveling” are not required, the door bridging operation is not activated. But the magnetic switches zone-1 & zone-2 including magnets are required for ML1-ML2 counter positioning and incremental encoder positioning.



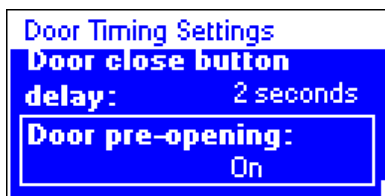
Warning

According to EN81, the maximum size of the door zone is 400mm (200mm in each direction). The actual dimensions of the door zone are forced by the length of the door cam.

- The distance to the door zone magnets must not be larger than the length of the door cam. Maximum length 40cm.
- The door zone magnets must be placed so both magnetic switches are closed in the door zone and open outside the door zone.

13.1. PARAMETER SETTINGS FOR DOOR BRIDGING OPERATION

The door bridging functions can be activated in the ARL-500 menu with the following parameters, after the door zone magnetic switches 1 & 2 and magnets are installed and connected.

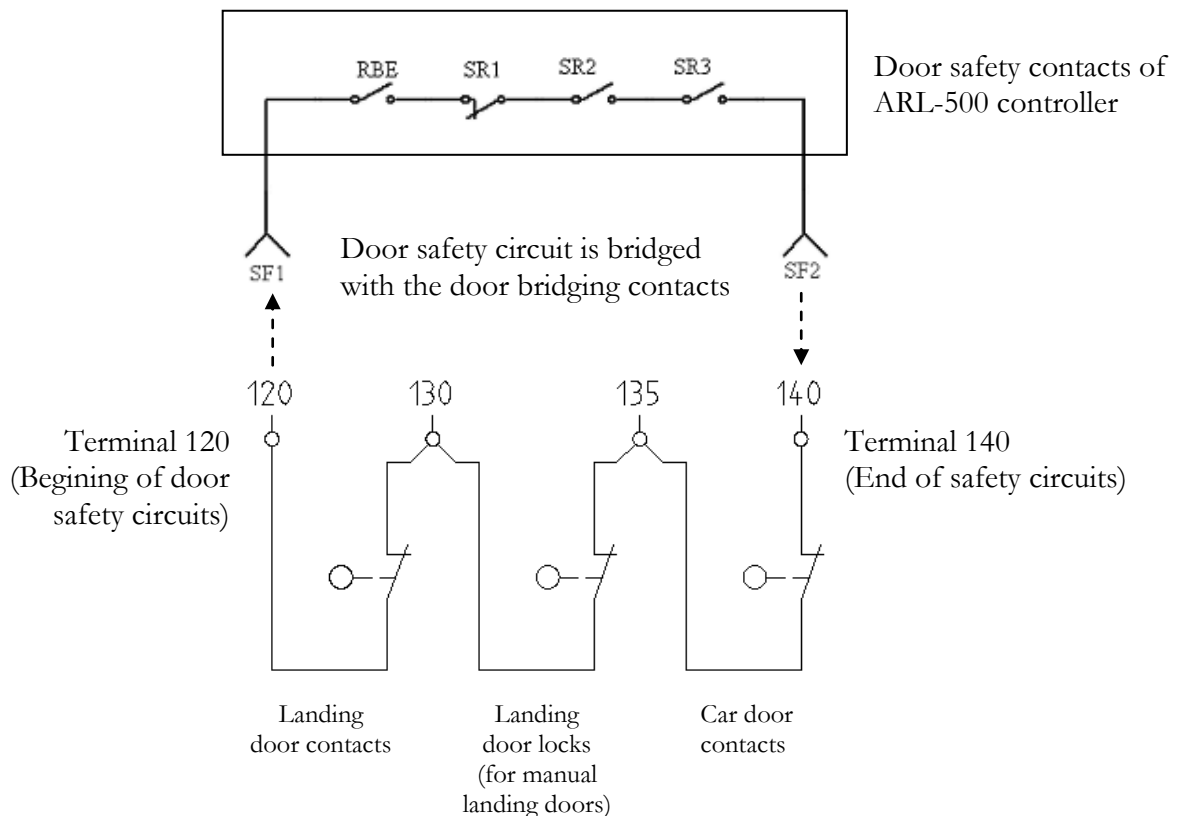


In order to activate pre-opening with open doors set “**Door settings > Door timing settings > Door pre-opening**” parameter to “**On**” in the ARL-500 main menu.

13.2. DOOR BRIDGING PRINCIPLE

The door bridging principle can be described with the following steps below :

- The relays SR1, SR2, SR3 and RBE are released in the beginning.
- If the car approaches the target floor with a slow speed, safety relay SR1 (starting door bridging) is activated by the controller.
- By the way SR2 and SR3 safety relays get ready to be triggered and activated by SR1 safety relay when car reaches the door zone. The safety relays SR2 and SR3 issue the zone message to the controller (car is in door zone).
- If the car reaches the door zone, first the magnetic switches of door zone-1 (SML1) trigger and activate the safety relay SR2 (when running downward).
- After then the magnetic switches of door zone-2 (SML2) trigger and activate the SR3.
- The safety relay SR1 (starting door bridging) is released after the SR2 and SR3 relays are activated.
- After the control software received the bridging available message, the enable relay RBE is activated.
- These relays' state (RBE activated, SR1 released, SR2 activated, SR3 activated) bridges the door contacts in the safety circuit and allows drive movement with the doors open as showed in the following diagram.



13.3. THE MONITORING OF DOOR BRIDGING

The door bridging circuit is designed with a safety monitoring so that the system is blocked in a result of system faults.

5. Error status
ML1-ML2 turned on
simultaneously. Short-circuit?

When malfunction of magnetic switches SML1-SML2 is detected, the ML1-ML2 signal monitoring blocks the elevator with the error message “**ML1-ML2 turned on simultaneously. Short-circuit?**”

When any of the relays in **door bridging circuit** is melted or mechanically blocked the check-back signal blocks the elevator with the error message “**Wrong checkback in door bridging**”.

The LEDs listed in the following table are located to the left of relays SR1, SR2, SR3 and RBE and show the state of relays.

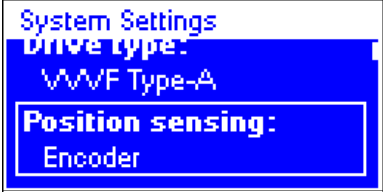
LED	Color	Status	Description
SR1	Red	On	Door bridging operation is started
SR2	Red	On	Door zone-1 signal is enabled
SR3	Red	On	Door zone-2 signal is enabled
RBE	Red	On	Door bridging is enabled

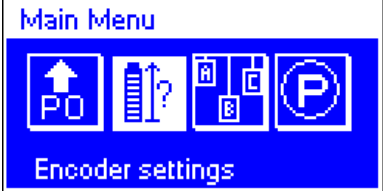
When power is switched on at door zone ARL-500 controller does not activate door bridging function after one correct travel. After a travel, controller checks ML1-ML2 zone enable signals. If there is no fault and no short circuit at ML1-ML2 door zone signals then door bridging is activated.

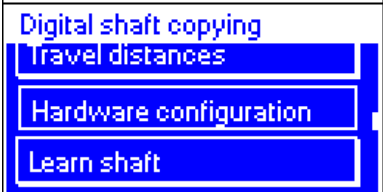
14. SHAFT LEARNING WITH INCREMENTAL ENCODER POSITIONING

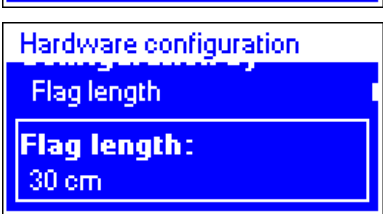
If you are using an incremental encoder for positioning, ARL-500 needs to do a special shaft-learning run before going in to normal operation. This must be done only once.

Before performing a shaft-learning run, please check your magnets and magnetic switches that are needed for incremental encoder positioning system and then follow the steps described below:

- 

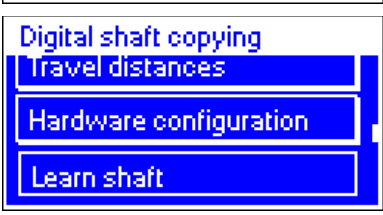
In the main menu: Set the parameter “**System Settings> Position sensing**” to “**Encoder**”. You can set this parameter only if “VVVF Type-A” or “VVVF Type-B” drivers are used in the system.
- 


In the main menu enter: “**Encoder settings**” submenu. Then enter “**Encoder settings > Hardware configuration**” submenu.
- 

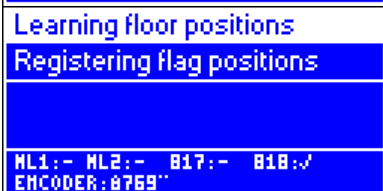
Set the “**Flag length**” parameter to the length of your stick magnets. By default this value is set to 40 cm’s. In the shaft-learning run, ARL-500 will determine the relation between pulse-count and centimeters by using this “flag length” information.
- 

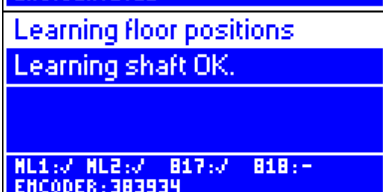
Now to start the shaft-learning run, select “**Learn shaft**” button and press Enter. ARL-500 will start a learning run.

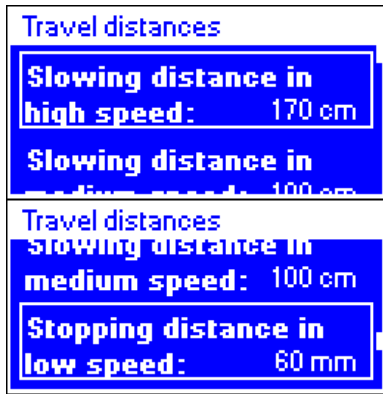
For the shaft-learning run to start, the lift must not be in inspection or recall mode and safety circuit must be closed.

If you need to interrupt the shaft-learning run for any reason, press the “Emergency Stop” button or take the lift into inspection mode by turning on the inspection switch.
- 

In the shaft-learning run, the car will find the bottom level and go upwards in high speed until the top level of the shaft. So, depending on the length of the shaft, this may take a while.
- 

When the shaft learning run is completed, a message “**Shaft learned**” will be displayed and the screen will return to “**Encoder settings**” menu in 5 seconds.
- 

To make the learned shaft information permanent, you need to save changes when exiting the main menu.
- 



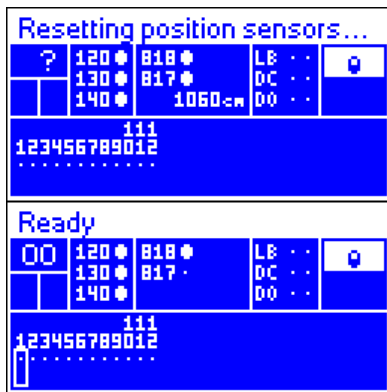
Before going on to floor-level fine tuning, you need to set “**Slowing distance in high speed**” and “**Stopping distance in low speed**” parameters.

The “**Slowing distance in high speed**” parameter indicates the position where the slow-down command will be sent to the motor driver.

The “**Stopping distance in low speed**” parameter indicates the position where the stop command will be sent to the driver.

These two parameters must be compatible with the settings of your motor driver.

The “**Slowing distance in medium speed**” parameter is reserved for future use, and not operational in this version.

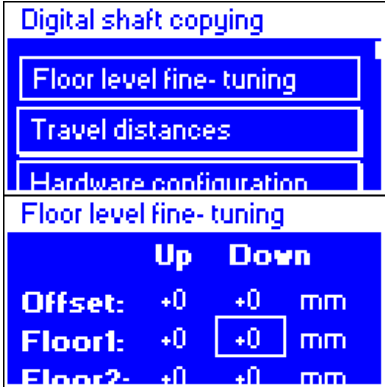


When you are finished with the above settings, exit the menu and answer “**Yes**” to the “**Save changes?**” prompt. Otherwise the learned shaft information will be lost.


When you exit the menu, the controller will reset itself and the car will do a reset run by moving to the bottom floor. And after reaching the bottom floor, “**Ready**” message will be displayed at the top of the status screen.

15. FINE-TUNING OF FLOOR LEVELS

Before moving on to fine-tuning of floor levels, the “shaft learning procedure” must have been executed properly as described above and the elevator must be able to travel between floors with slight levelling errors. Below you will see how those small levelling errors can be fixed:

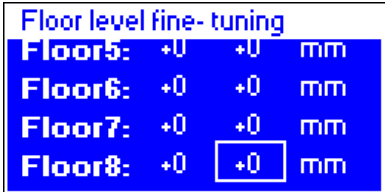
- 

In the menu, select **“Encoder settings/Floor level fine-tuning”** In this window; floors are listed starting from Floor1 up to FloorN, where N is the top floor of the building. At the right side of each floor row, there are two settings: The “Up” and “Down” settings which show the error correction to be done when the car approaches the related floor upwards or downwards respectively. There is an additional setting row labeled as “Offset”. This setting affects all the floors and the value entered in this setting is added to the setting of each floor.

- 

Error correction values are in millimeter units. Positive (+) values mean that the car will stop above and negative(-) values mean that the car will stop below the normal stopping point.

In other words, if the car stopped below the desired point, you must enter the difference in millimeters as a positive value. If the car stopped above the desired point, you must enter the difference in millimeters as a negative value.

- 

To change a setting in this window, move the rectangle with the direction buttons. Press enter so the value starts blinking. While the value is blinking, use up/down direction keys to change the value, and press enter button again to accept the value.

Normally, you should be doing these settings inside the car with the help of the “HS500 hand terminal” and giving car commands from inside the car. When the “Floor-level Fine Tuning” window is open, and the car stops in reply to a car command, the rectangle will move to the related setting area automatically. All you need to do is to observe the error of the last stopping operation when the door opens, and enter the error correction value to the automatically selected setting area.

As a last note; when exiting the menu, do not forget to “save changes”.

15.1. RECOMMENDED FINE TUNING PROCEDURE

This is the recommended way to fine-tune floor levels. Connect the “HS500 Hand Terminal” to a CANbus port in the car (KABKON or LCD display) and follow the steps below:

Note

If the handheld terminal is available, the stopping precision can be adjusted directly from inside the car. This greatly facilitates the procedure.

Otherwise, the stopping errors for each floor must be noted and adjustments must be made from the machine room.

Step 1: Get inside the car and attach your the “HS500 Hand Terminal” to an empty CANbus terminal. Enter the menu and select “**Encoder settings/Floor level fine-tuning**” screen.

► In this screen, car command buttons are operational although you are in the menu.

Step 2: Give a car command to the bottom floor

Step 3:

- Give a car command to **Floor-2**
- When the car stops at Floor-2, the “Up” setting for Floor-2 will be selected automatically
- Observe the position of the car with respect to floor level.
- If the car stopped lower than the floor level, enter the difference in millimeters into the selected setting area. If the car stopped higher than the floor level, enter the difference as a negative value into the selected setting area.

Step 4: Repeat Step 3 for all of the floors.

► In this point, all error correction values in the “Up” direction must be entered.

Step 5:

- Give a car command to the floor right below the top floor. (Floor N-1)
- When the car stops at Floor N-1, the “Down” setting for Floor N-1 will be selected automatically.
- Observe the position of the car with respect to floor level
- If the car stopped lower than the floor level, enter the difference in millimeters into the selected setting area. If the car stopped higher than the floor level, enter the difference as a negative value into the selected setting area.

Step 6: Repeat Step 5 for all of the floors.

► In this point, all correction values must have been entered.

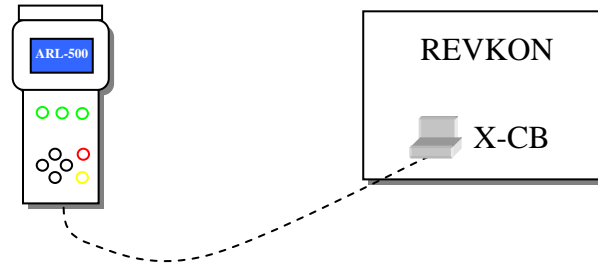
Step 7: If there are still floors that the car does not stop in the desired position, you can repeat the procedure.

16. HS500 HAND TERMINAL

16.1. CONNECTION POSSIBILITIES OF HS500 HAND TERMINAL

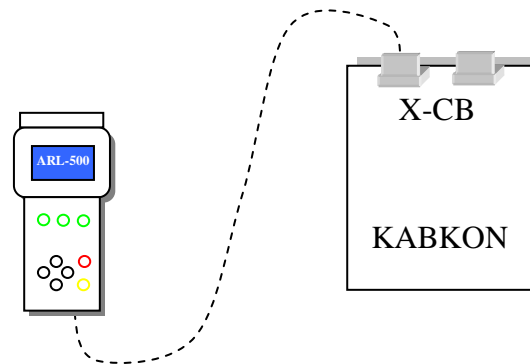
16.1.1. Connection on car top

HS500 Hand Terminal can be connected to CANbus plug of REVKON car top controller in inspection box.



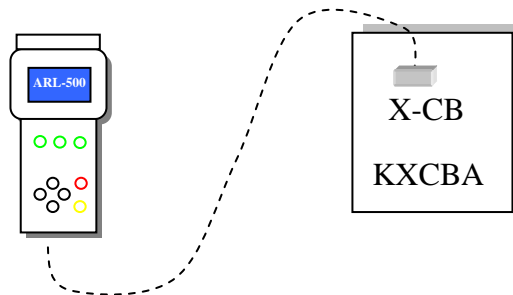
16.1.2. Connection in car

HS500 Hand Terminal can be connected to CANbus plug of KABKON car panel control module or car LCD indicator in car operating panel.



16.1.3. Connection at landings

HS500 Hand Terminal can be connected to the CANbus plug of KXCBA CANbus connector board.



16.2. REMOTE OPERATING THE ARL-500 BY THE HS500 Hand Terminal

This section contains an overview of special features when remote operating the ARL-500 controller by the HS500 Hand Terminal.



The HS500 Hand Terminal is a handheld terminal which can be connected to the system from any point on the CANbus (in the cabin, on the cabin or on landings), in a way, enables you to operate all control functions of the ARL-500 controller for installation and maintenance independent of location.

The user interface of HS500 Hand Terminal consists of 9-key keypad and 128x64 pixel graphic LCD. 6 keys are used for remote operating of ARL-500 controller in the same way as keypad on ARL-500 controller. The other 3 keys (F1, F2, F3) are reserved function keys.

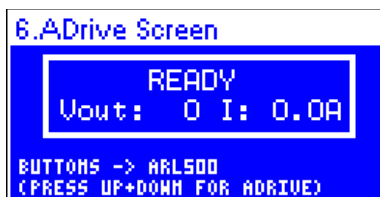
16.3. OPERATING the ADrive VVVF Inverter by the HS500

It is also available to remote operating the ADrive VVVF INVERTER with ARL-500 controller from the HS500.

This communication is used with the ARL-500 and ADrive to enable operation of the ADrive VVVF inverter located in the machine room from any point on the CANbus (in the cabin, on the cabin or on landings) by the user interface of the HS500.

16.3.1. Remote Operating the ADrive

Operating ADrive with HS500 is very convenient and user friendly. Not only does it allow you to adjust settings and parameters of the VVVF inverter the control cabinet but also directly from the car using or from the landings using the handheld terminal.



The only work to do is connecting the cable and no more setting is needed to operate ADrive from the ARL-500 menu.

After connecting the cable ARL-500 automatically detects the communication and the status screen “**ADrive screen**” will be available on the ARL-500 display.

Press LEFT key on main screen in order to activate the “**ADrive screen**” and so the display of the ADrive inverter is simulated on the ARL-500 display. It is one of the status screens and can be switched by LEFT/RIGHT keys.



In this screen first you have to select the usage of keypad either commanding to the ARL-500 or ADrive. When activating “**6. ADrive screen**” the keypad still operates the ARL-500 and it must be changed to ADrive.











Press UP+DOWN keys simultaneously on this screen in order to enable operating ADrive by keypad. By pressing UP+DOWN keys the keypad control is switched between ARL-500 and ADrive:

“**BUTTONS > ARL500**” or

“**BUTTONS > ADrive**”

In order to exit this screen you have to set keypad control to ARL-500.

In this status screen ARL-500 keys have the following functions for operating ADrive:

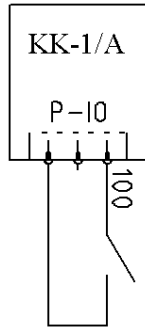
ARL-500 key	ADrive key
	
	
	
	
	

17. VIRTUAL INPUT-OUTPUT CONNECTION

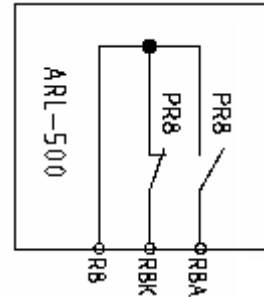
It is possible to virtually connect any programmable input of ARL-500 lift control system to any programmable output.

The same function must be assigned to the programmable input and output which will be virtually connected. 16 virtual input-output connections are available with ARL-500 controller.

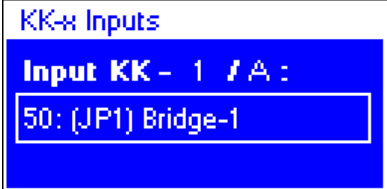
An example for virtual input-output connection is described below:



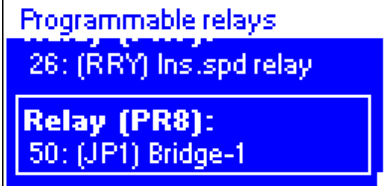
A switch is connected to the programmable input of KK-1/A call module of door side A at 1st floor.



This switch will control one of the programmable relay of ARL-500 main controller PR8 at control panel.

- 

Select the "KK-1/A" input in "KK-x inputs" submenu and assigned the function "(JP1) Bridge-1".

- 

Then select the "Relay (PR8)" output in "ARL-500 relays" submenu and assigned the same function "(JP1) Bridge-1".

After this input-output configuration the input of KK-1/A (landing panel: floor 1/door side A) will control the output of ARL-500 (PR8 programmable relay).

18. GROUP OPERATION

ARL-500 controller is available with group operation up to 8 elevators via RS-485 serial communication. 2 terminal SA and SB are used for group communication on ARL-500 controller.

18.1. GROUP OPERATION TERMINALS

3-pin connection to SA, SB and 1000 terminals on ARL-500 controller is required for group operation. Using of these terminals are described below:

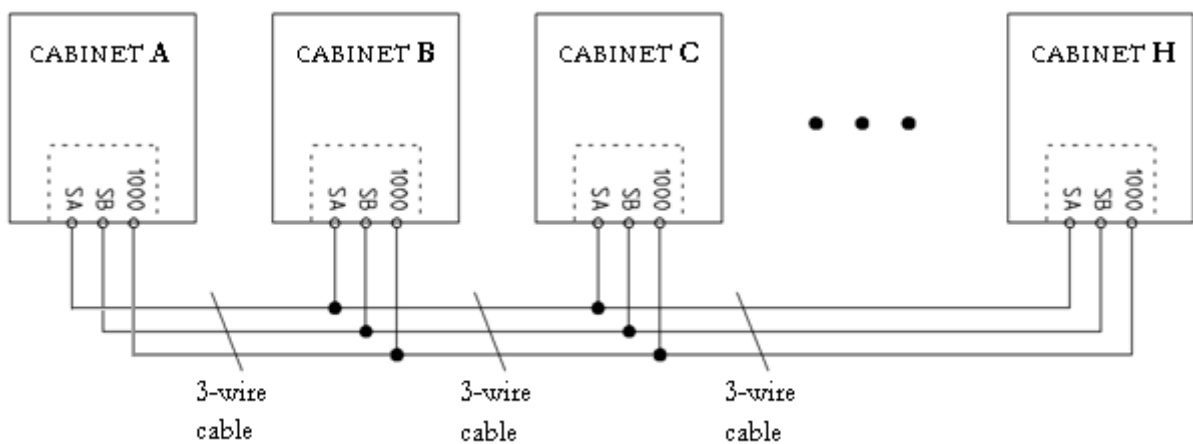
SA: Group communication

SB: Group communication

1000: 0V DC

18.2. CONNECTION OF CONTROL PANELS IN GROUP OPERATION

There is no need any extra group controller in group operation. Only to do is connecting each control panels. 3-wire cables are used for connecting all control panels in elevator group operation. Connection of 8 control panel is showed below:

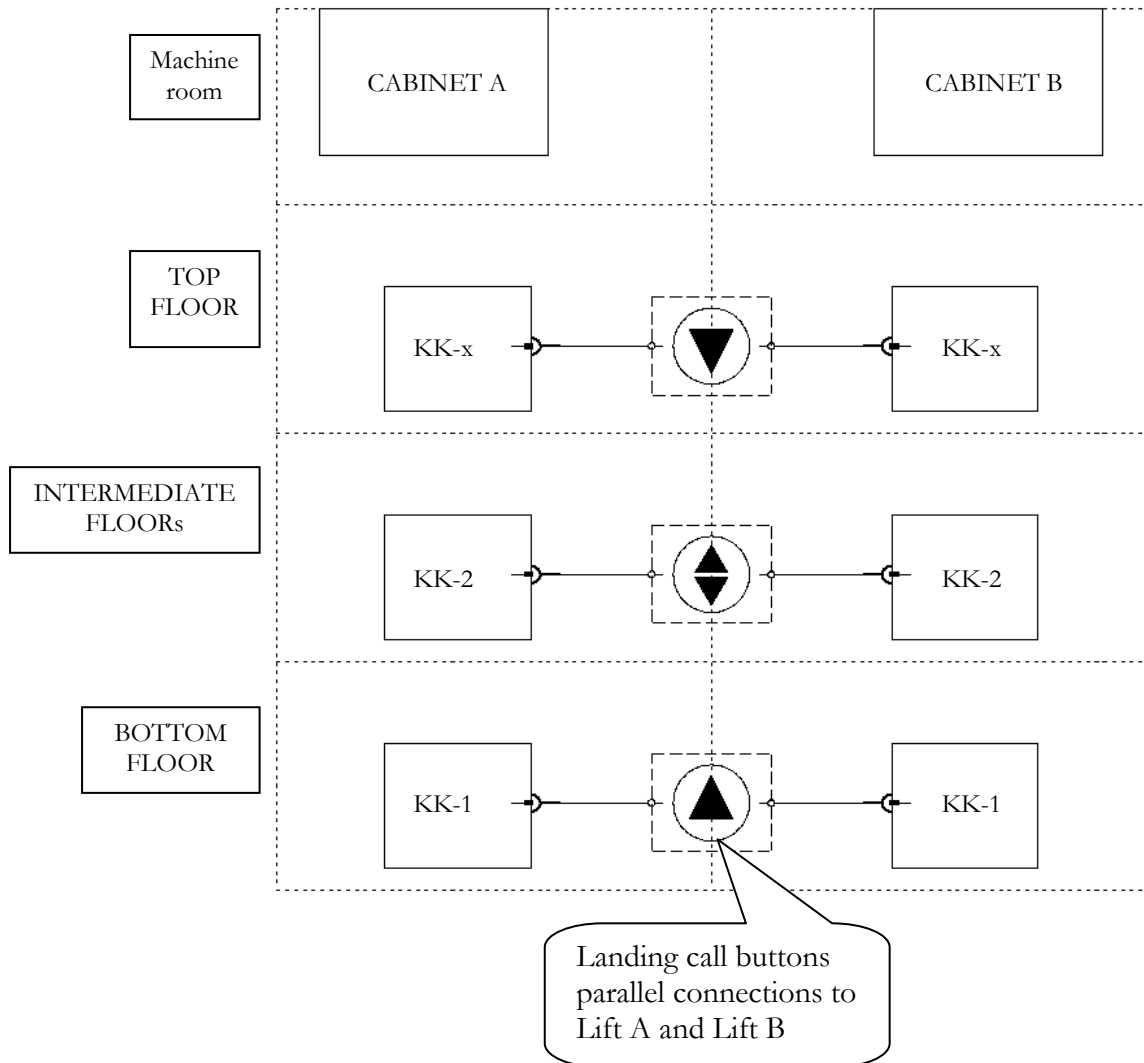


18.3. CONNECTIONS OF LANDING BUTTONS IN DUBLEX OPERATION

Landing call buttons should be connected to each KK-x landing call modules for dublex operation. So when one of controller goes out of group operation by any reason the other controller can carry out landing calls.

Operating of any landing buttons on any landing panel results in sending this information to all the lifts. All the landing pushbuttons are illuminated when the call is registered and the group control program takes care the call.

The connection of landing calls is shown below:



Note

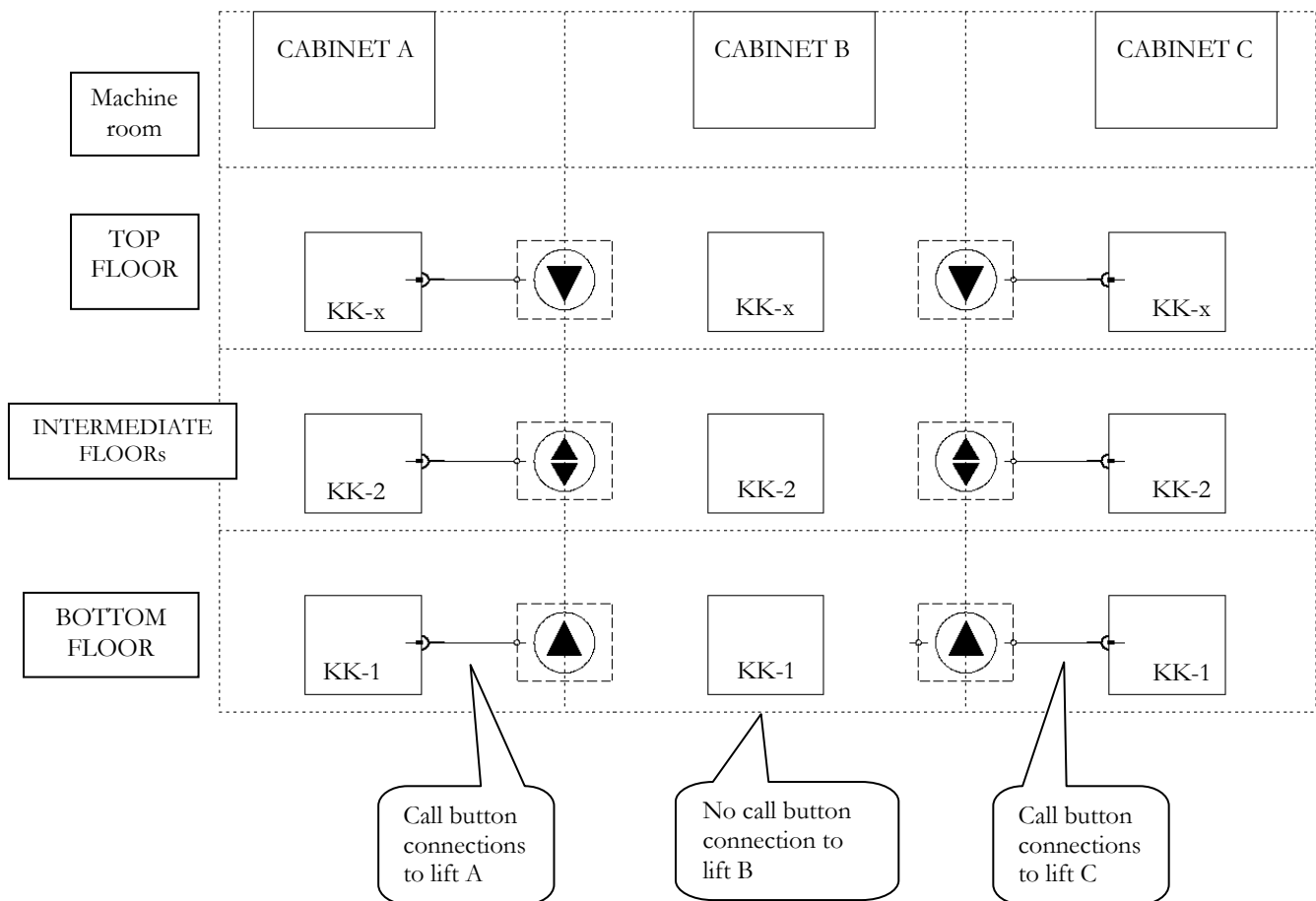
Make the connections of landing panels in dublex group operation according to the wiring diagram (see sheet 15)

18.4. CONNECTIONS IN GROUP OF MORE THAN 3 ELEVATORS

It is recommended to connect each landing call buttons to one KK-x landing call module (one control panel) for an elevator group of more than 3 elevators. By this way landing calls will not be connected to one of the controller in elevator group. But even some controllers goes out of group operation by any reason the other controllers can carry out landing calls and you can save on cables and connections.

Operating of any landing buttons on any landing panel results in sending this information to all the lifts. All the landing buttons are illuminated when the call is registered and the group control program takes care the call.

The recommended connection for an elevator group of 3 elevators is shown below:

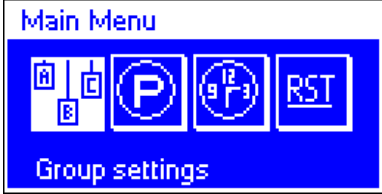


Note

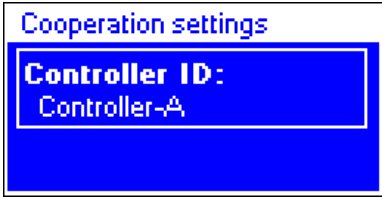
Make the connections of landing panels in group operation according to the wiring diagram (see sheet 15)

18.5. GROUP OPERATION SETTINGS

After connection of control panels in the elevator group only to do is setting each controller as A,B,C,D,E,F,G,H on ARL-500 menu. Each controller must have a different group ID. Group operation can be monitored on each ARL-500 controller's group status screen.

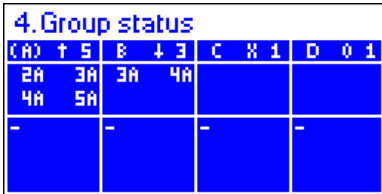
- 

In order to adjust group settings use “**Group settings**” submenu in the main menu.

- 

In this screen, set “**Controller ID**” parameter which controller uses in group operation. Controller ID must be adjusted different within each controller. Single lifts are always set to lift A.

18.6. MONTINORING STATUS OF GROUP OPERATION

- 

Find the “**4.Group status**”screen on ARL-500 display by pressing LEFT/RIGHT key. In this s screen the status of group operation are monitored. 8 elevators in group are summarized in 8 separated screens which are coded from ‘**A**’ to ‘**H**’.

Further information about can be found in “group status screen” section below.

19. FIRE EMERGENCY OPERATIONS

Fire emergency operations on ARL-500 controller consist of 2 phases:

Fire Emergency Phase-1:

When in normal operation mode, an active signal on the programmable input **“18:(YAN)Fire detector”** causes the controller to go into *Fire Emergency Phase-1* mode.

On entry to this mode:

- All car and landing calls are cancelled and no more calls are received
- The speaker on the COP starts emitting an alarm
- The doors are closed immediately and the car starts to travel towards the designated fire exit floor. (If the car was moving at the moment YAN signal was activated, it stops at the nearest floor and without opening doors, starts to move to the fire exit floor)
- On arrival to the fire exit floor, the doors are opened and they stay open.

The controller exits this mode only in these cases:

- System reset → Normal mode
- The input **“33:(CFA) Cancel fire alarm”** is activated → Normal mode
- The input **“12:(ITA) Firemen key”** is activated. → Fire Phase-2

Fire Emergency Phase-2 (Firemen service mode):

When in *Fire Emergency Phase-1*, activation of the programmable input **“12: (ITA) Fireman key”** causes the controller to go into this mode.

In this mode:

- Calls from LOPs are not accepted.
- When the doors are closed, if a car command is given, the car moves to the commanded floor normally but it does not open doors on arrival.
- When the doors are open, they remain open until the door-close button or the car call button of another floor is pressed. When one of these buttons are pressed, the doors starts to close. If the button is released before the doors are fully closed, the doors are opened again.
- When the doors are closed, they remain closed until the door-open button or the car call button of the current floor is pressed. When one of these buttons are pressed, the door starts to open. If the button is released before the doors are fully opened, the doors are closed again.
- The “fully-open” and “fully-closed” states are detected by programmable inputs connected to the open and close limit switches of the doors.

The controller exits this mode only in these cases:

- System reset → Normal mode
- The input **“33:(CFA) Cancel fire alarm”** is activated → Normal mode
- The input **“12:(ITA) Firemen key”** is deactivated → Fire Phase-1

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