



AYBEY  
ELEKTRONİK

**AE-MAESTRO**  
**INTEGRATED LIFT CONTROLLER**

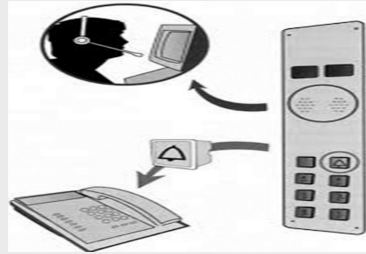
**TECHNICAL TRAINING COURSE – 1B**

***GENERAL SPECIFICATIONS AND  
DEVICE CONNECTIONS***

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**16.04.2021**



## AE-MAESTRO CONTROL SYSTEM GENERAL FEATURES

- It may run up to 64 floors for electrical elevators
- Complies with **EN81-20/50** (The current safety standard of elevators) and **EN81-1** (previous safety standard of elevators)
- **CE certified of STO (Safety Torque Off)**
- Pit communication is car serial or full serial.
- Simpleks, dupleks, tripleks... may run up to **8 within group**
- All PCBs communicates in serial way to one other over CAN-BUS.
- Turkish, English, French and Spanish as language options

## AE-MAESTRO 3x400V SERIES

| MODEL (400V Series)                   | AEM404                                  | AEM405             | AEM407            | AEM411           | AEM415           | AEM422           | AEM430           |
|---------------------------------------|---|--------------------|-------------------|------------------|------------------|------------------|------------------|
| <b>Nominal Motor power</b>            | 4 kW<br>(5.5 HP)                        | 5.5 kW<br>(7.5 HP) | 7.5 kW<br>(10 HP) | 11 kW<br>(15 HP) | 15 kW<br>(20 HP) | 22 kW<br>(30 HP) | 30 kW<br>(40 HP) |
| <b>Nominal Output Current</b>         | 9 A                                     | 13 A               | 18 A              | 25 A             | 32 A             | 45 A             | 60 A             |
| <b>Maximum Current Allowed time</b>   | 18 A<br>5 s                             | 26 A<br>5 s        | 36 A<br>5 s       | 50 A<br>5 s      | 64 A<br>5 s      | 90 A<br>5 s      | 120 A<br>5 s     |
| <b>Control Circuit Supply Voltage</b> | 1-Phase 100V.....240V AC 50/60 Hz +- %5 |                    |                   |                  |                  |                  |                  |
| <b>Line Voltage</b>                   | 3-Phase 340V.....420V AC 50/60 Hz +- %5 |                    |                   |                  |                  |                  |                  |
| <b>Motor Output Voltage</b>           | 3-Phase 0V.....420V AC 0.....100 Hz     |                    |                   |                  |                  |                  |                  |
| <b>Carrier Frequency</b>              | 6....16 kHz                             |                    |                   |                  |                  |                  |                  |

## AE-MAESTRO 3x200V SERIES

| MODEL (200V Series)                      | AEM204                               | AEM205             | AEM207            | AEM211           |
|--|--------------------------------------|--------------------|-------------------|------------------|
| <b>Nominal Motor Power</b>               | 4 kW<br>(5.5 HP)                     | 5.5 kW<br>(7.5 HP) | 7.5 kW<br>(10 HP) | 11 kW<br>(15 HP) |
| <b>Nominal Output Current</b>            | 18 A                                 | 25 A               | 32 A              | 45 A             |
| <b>Maksimum Current<br/>Allowed Time</b> | 36 A<br>5 s                          | 50 A<br>5 s        | 64 A<br>5 s       | 90 A<br>5 s      |
| <b>Control Circuit Supply Voltage</b>    | 1-Phase 100V...240V AC 50/60 Hz ± %5 |                    |                   |                  |
| <b>Line Voltage</b>                      | 3-Phase 190V...220V AC 50/60 Hz ± %5 |                    |                   |                  |
| <b>Motor Output Voltage</b>              | 3-Phase 0V...220V AC 0...100 Hz      |                    |                   |                  |
| <b>Carrier Frequency</b>                 | 6...16 kHz                           |                    |                   |                  |

# MAESTRO CODE STRUCTURE



| Product Code | AE MAESTRO 3X400V SERIES                     | Current | Door Bridging Circuit | Safety Circuit Voltage |
|--------------|--|---------|-----------------------|------------------------|
| 264AEM05N48  | AE-MAESTRO 5,5 kW (EN81-1+A2)                | 13 A    | No                    | 48 V                   |
| 264AEM05N22  | AE-MAESTRO 5,5 kW (EN81-1+A2)                | 13 A    | No                    | 220 V                  |
| 264AEM05D48  | AE-MAESTRO 5,5 kW (EN81-20/50 and EN81-1+A3) | 13 A    | SDB                   | 48 V                   |
| 264AEM05D22  | AE-MAESTRO 5,5 kW (EN81-20/50 and EN81-1+A3) | 13 A    | SDB                   | 220 V                  |

| Product Code | AE MAESTRO 3X400V SERIES                     | Current | Door Bridging Circuit | Safety Circuit Voltage |
|--------------|--|---------|-----------------------|------------------------|
| 262AEM05N48  | AE-MAESTRO 5,5 kW (EN81-1+A2)                | 25 A    | No                    | 48 V                   |
| 262AEM05N22  | AE-MAESTRO 5,5 kW (EN81-1+A2)                | 25 A    | No                    | 220 V                  |
| 262AEM05D48  | AE-MAESTRO 5,5 kW (EN81-20/50 and EN81-1+A3) | 25 A    | SDB                   | 48 V                   |
| 262AEM05D22  | AE-MAESTRO 5,5 kW (EN81-20/50 and EN81-1+A3) | 25 A    | SDB                   | 220 V                  |

|                    |                 |                  |               |   |                            |                       |
|--------------------|-----------------|------------------|---------------|---|----------------------------|-----------------------|
| <b>264AEM05N48</b> | <b>26</b>       | <b>4</b>         | <b>AEM</b>    | <b>5</b>  | <b>N</b>                   | <b>48</b>             |
|                    | 26              | X                | AEM           | KW  | K                          | G                     |
|                    | <b>CONSTANT</b> | <b>LINE</b>      | <b>STABLE</b> | <b>POWER</b>  | <b>BRIDGING DOOR BOARD</b> | <b>SAFETY CIRCUIT</b> |
|                    |                 | 2-200V<br>4-400V |               | 4-4KW<br>5-5.5KW<br>7-7.5kW<br>11-11KW<br>15-15KW<br>22-22KW<br>30-30KW | N-NO<br>D-YES              | 48-48V<br>220-220V    |



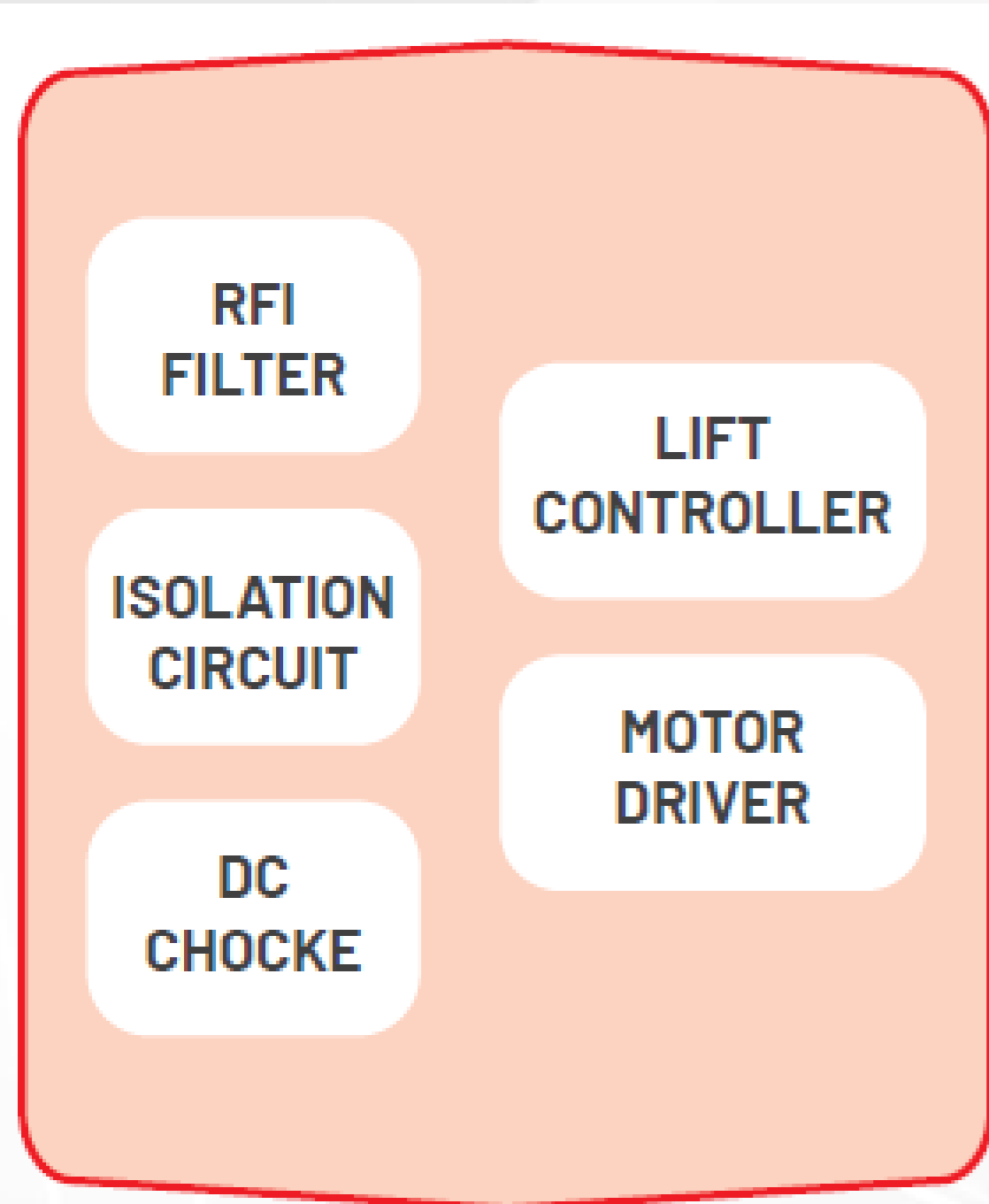
**AE-MAESTRO is a compact integrated control system.**

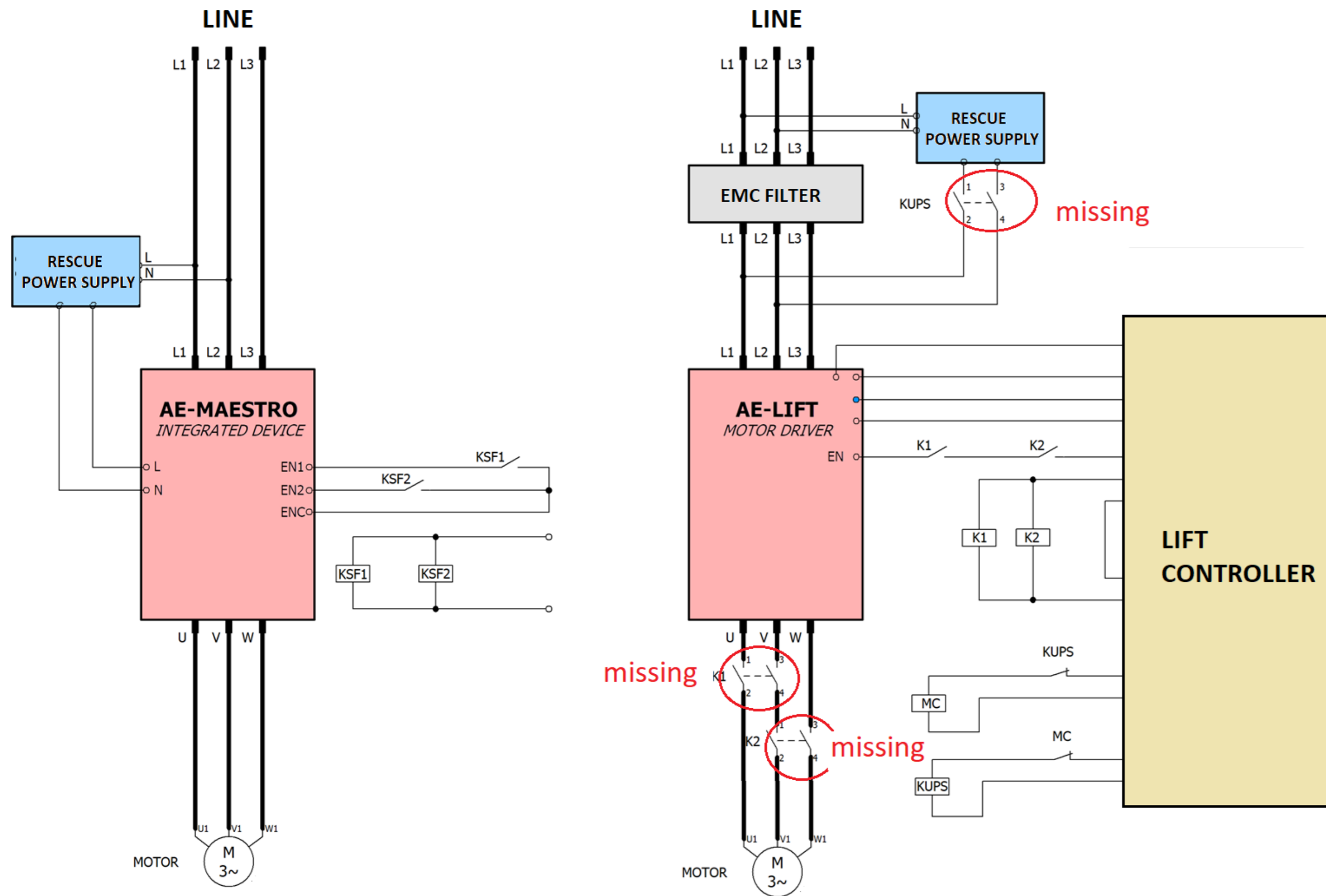
- **AE-MAESTRO** is compact integrated lift controller where lift controller and motor driver are in one device.

**AE-MAESTRO** includes;

- EMC filter
- Dc choke coil
- Rescue system isolating circuits

inside the device.

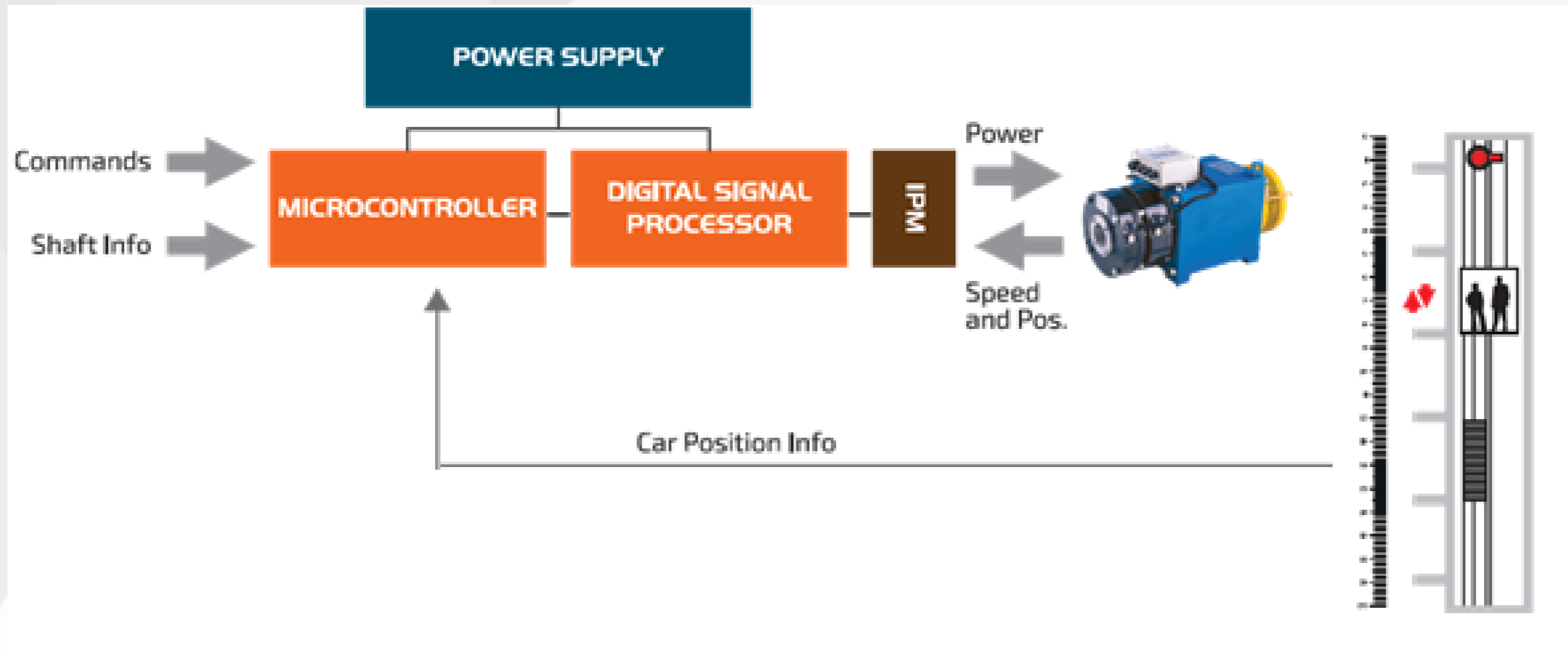




- **AE-MAESTRO** reduces number of wiring in control panel as it is driven in STO and includes rescue system power isolating circuits, EMC filter and DC choke coil(180->90).
- Production process time of control panel reduced and simplified as well
- Easy troubleshooting
- Malfunctions due to contactors are eliminated

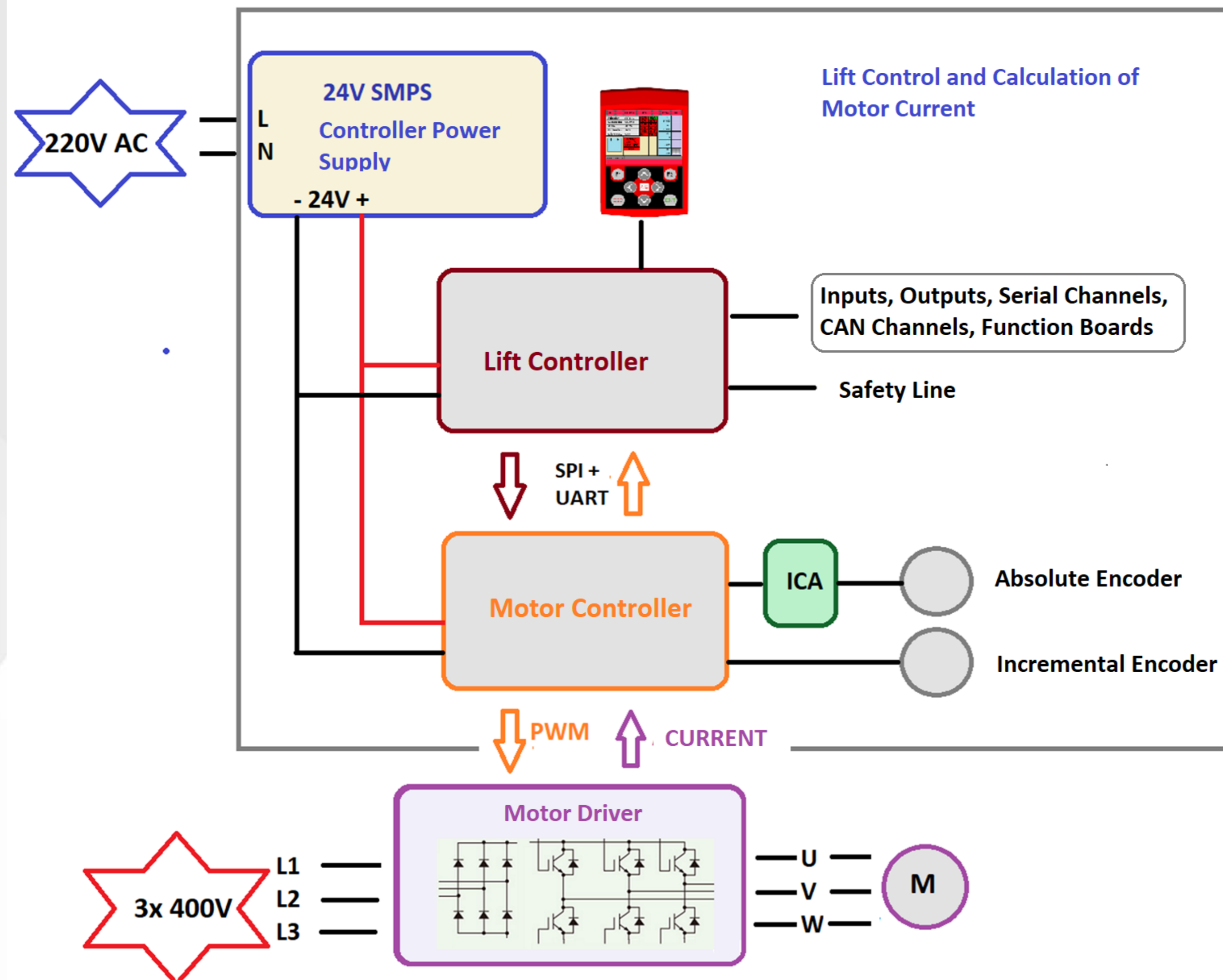


**AE-MAESTRO is a combination of control board and high performance motor driver with double microprocessor architecture.**



- Motor signals are processed by DSP in **AE-Maestro**.
- Motor driving is provided in the highest precision cause DSP is only dedicated to generating motor signals
- Lift is managed by a seperated microprocessor.
- In this way, AE-MAESTRO has a strong basis from double microprocessor architecture (multi-processing)

# BLOCK DIAGRAM OF THE SYSTEM



- System consists of 3 parts : System lift manager, motor manager and motor driver.
- Power from inputs L,N energizes all the electronic control, processing and communication parts.
- DC Bus voltage is acquired by being rectifying power from terminals L1,L2 and L3 on motor board.
- Intelligent Power Module (IPM) drives motor by PWM signal from motor management board.
- In case of rescue operation battery or UPS voltage switched by isolation circuit is transmitted to inputs L1,L2 and L3.

# BLOCK DIAGRAM OF THE SYSTEM



LifNET Mo (0532111111 # FABRIKA ASANSÖR) ERROR LOG

Confir

(0532111111 # FABRIKA ASANSÖR) ERROR LOG

| GSM No     | ROW | FLOO... | ERROR NO                  | DATE             | DIRECTI... | MOD    | DOOR 1 | DOOR 2 | CAUSE | STAGE | MPHASE | CAR POS |
|------------|-----|---------|---------------------------|------------------|------------|--------|--------|--------|-------|-------|--------|---------|
| 1 05321111 | 1   | 1       | 21 - FLOOR PULSE ERROR    | 18.01.2000 01:57 | -          | REV    | CLOSE  | CLOSE  | 0     | 0     | 0      | 3670    |
| 2 00905356 | 2   | 0       | 119 - 15V VOLTAGE FAILURE | 18.01.2000 01:33 | -          | REV    | OPEN   | CLOSE  | 0     | 0     | 0      | 985     |
| 3 05333333 | 3   | 2       | 119 - 15V VOLTAGE FAILURE | 04.01.2000 23:30 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4655    |
| 4 05222222 | 4   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:16 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4210    |
| 5 05111111 | 5   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:15 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4176    |
|            | 6   | 1       | 65 - BRAKE NOT OPENED     | 04.01.2000 23:14 | -          | NORMAL | OPEN   | CLOSE  | 4     | 38    | 60     | 4161    |
|            | 7   | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:11 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |
|            | 8   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:06 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4147    |
|            | 9   | 1       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:15 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4159    |
|            | 10  | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 20:14 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4189    |
|            | 11  | 2       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:12 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4809    |
|            | 12  | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 20:09 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |
|            | 13  | 0       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:01 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 985     |
|            | 14  | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 19:55 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |
|            | 15  | 2       | 65 - BRAKE NOT OPENED     | 03.01.2000 22:17 | DOWN       | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4828    |
|            | 16  | 1       | 119 - 15V VOLTAGE FAILURE | 03.01.2000 19:44 | -          | NORMAL | CLOSE  | CLOSE  | 0     | 0     | 0      | 4387    |
|            | 17  | 1       | 65 - BRAKE NOT OPENED     | 03.01.2000 19:40 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4155    |
|            | 18  | 1       | 31 - LOW VOLTAGE          | 03.01.2000 19:38 | -          |        |        |        | 0     | 0     | 0      | 3640    |

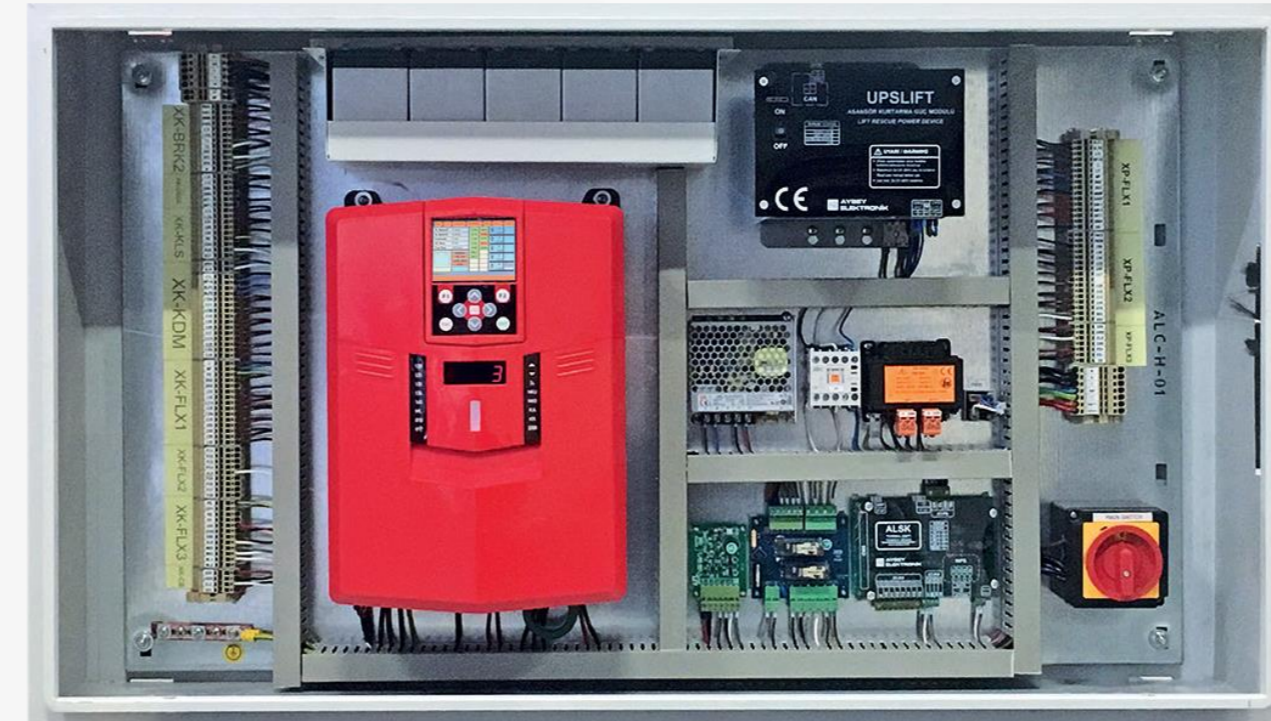
Receive completed. 128 / 128

Refresh Print Close

- System consists of 3 parts : System lift manager, motor manager and motor driver.
- Power from inputs L,N energizes all the electronic control, processing and communication parts.
- DC Bus voltage is acquired by being rectifying power from terminals L1,L2 and L3 on motor board.
- Intelligent Power Module (IPM) drives motor by PWM signal from motor managment board.
- In case of rescuebattery or UPS voltage switched by isolation contactors is transmitted to inputs L1,L2 and L3.

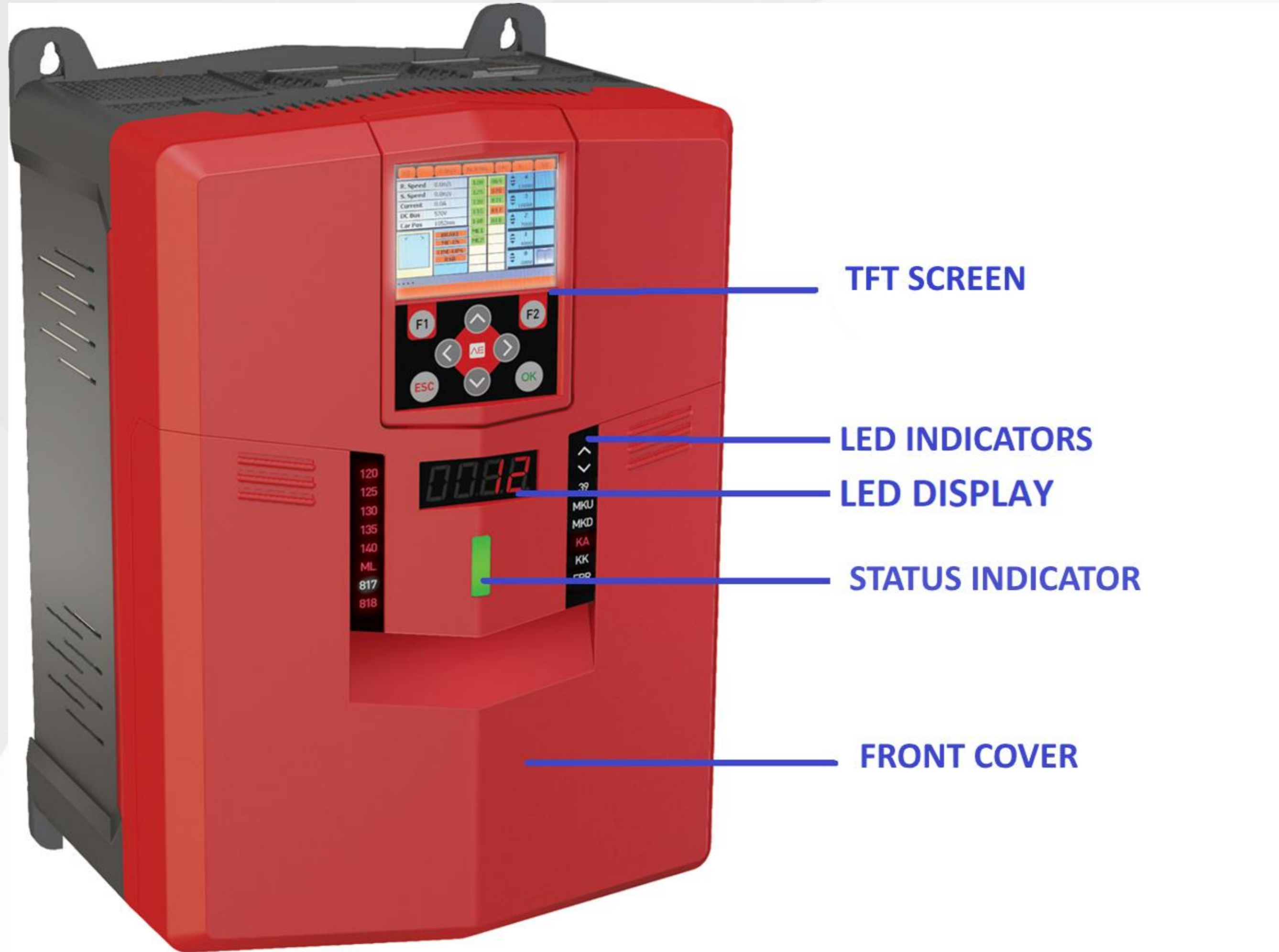


- Control panels are manufactured in three main types :
- Machine Room (MR),
- Machine Roomless (MRL).
- Shaft+Door Frame



- The other type of control panel is one consisting of two part shaft controller and door frame switch panel.
- All hand switching components are placed into door frame panel.
- The other components placed into shaft controller.





TFT SCREEN

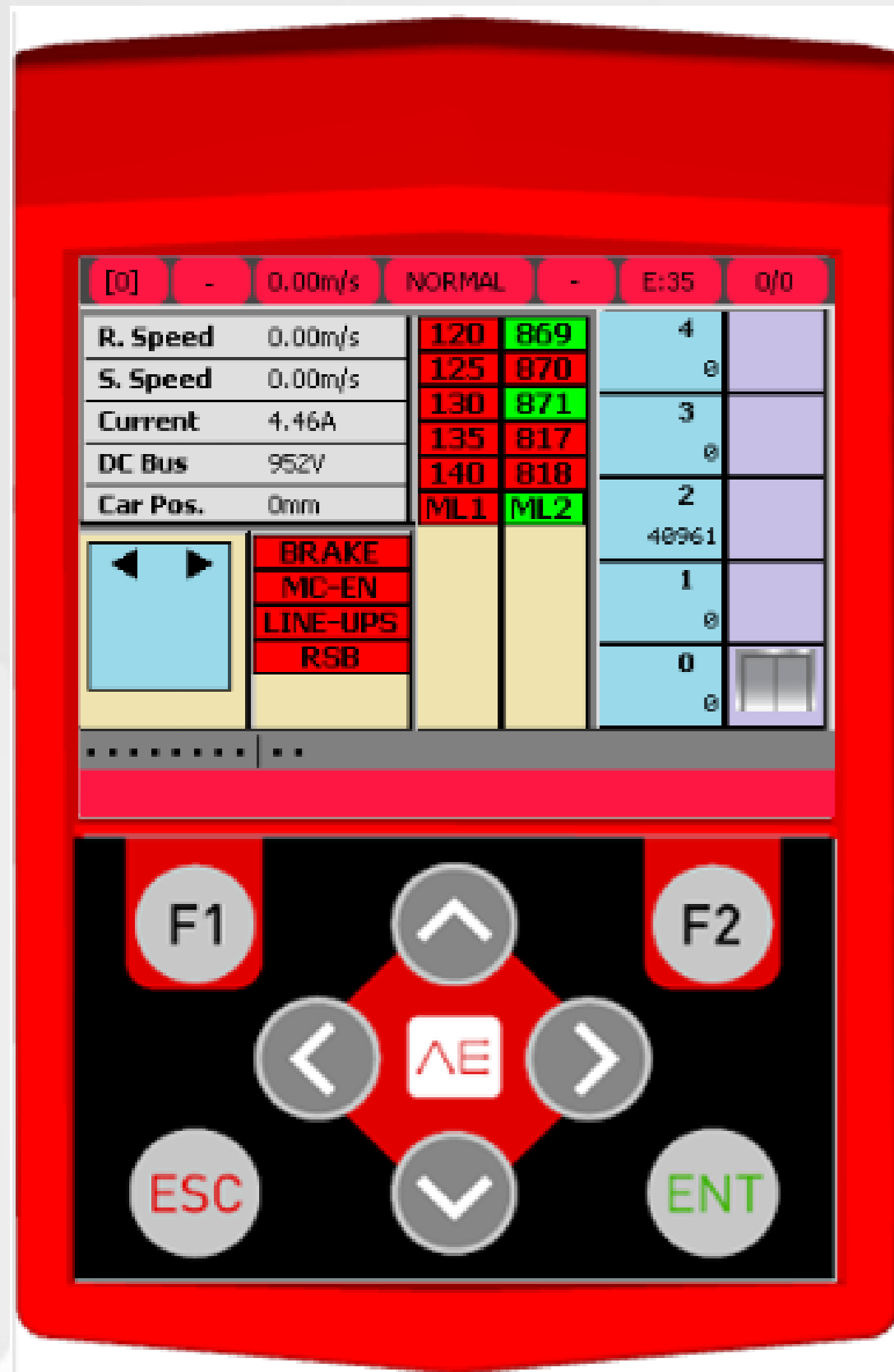
LED INDICATORS

LED DISPLAY

STATUS INDICATOR

FRONT COVER

- Dismountable hand terminal with 8 buttons and a TFT display
- The system may run without display but not possible to change any parameter.
- LED indicators show status of the system.
- All additional boards exist behind the top cover.



- It provides a wide variety of software upgrade, storing parameters, error inspection and graphs of observations.
- A dedicated location at the top surface of the system is allocated for TFT hand terminal.
- One UART and one CAN connection socket in that location.
- Fast communication is achieved over UART so the hand terminal turns on more quickly when connected to the system.
- The hand terminal has a SD card reader so possible to transmit new softwares and parameters to the system.
- SW upgrade can only be done over UART which means the hand terminal is mounted to its location on the system.
- TFT hand terminal can be used to control the system by connecting to CAN socket in anywhere in the shaft.



**LED INDICATORS**

- **AE-MAESTRO** shows some of important inputs, current floor number, errors by LED panel.
- Led indicators at both sides show current status of related inputs.
- All safety circuit and pit position detector, errors and door commands can be observed in this panel.
- LED red illuminated indicates at a detected input signal (closed contact)
- Led not lit indicates at no input signal (open contact).





### [E03] – DEVICE LED DISPLAY

|   |                |
|---|----------------|
| 0 | Floor Number   |
| 1 | Real Speed     |
| 2 | Travel Speed   |
| 3 | Set Speed      |
| 4 | Current        |
| 5 | DC Bus Voltage |
| 6 | Target Floor   |
| 7 | Device Phase   |
| 8 | Motion Phase   |

- **LED Digital 7 Segment Display**
- Led digital 7 segment display can be set through **E03** to observe parameters.
- The display is set to current floor number as default.
- It denotes error code by flashing in case of trouble.



- **STATUS INDICATOR**
- It shows status of lift controller by **color** and **blinking**.
- **Color green** means lift in normal mode
- **Color red** in case of trouble,
- **Color yellow** means inspection mode.
- **Blinking** indicates at lift movement.

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

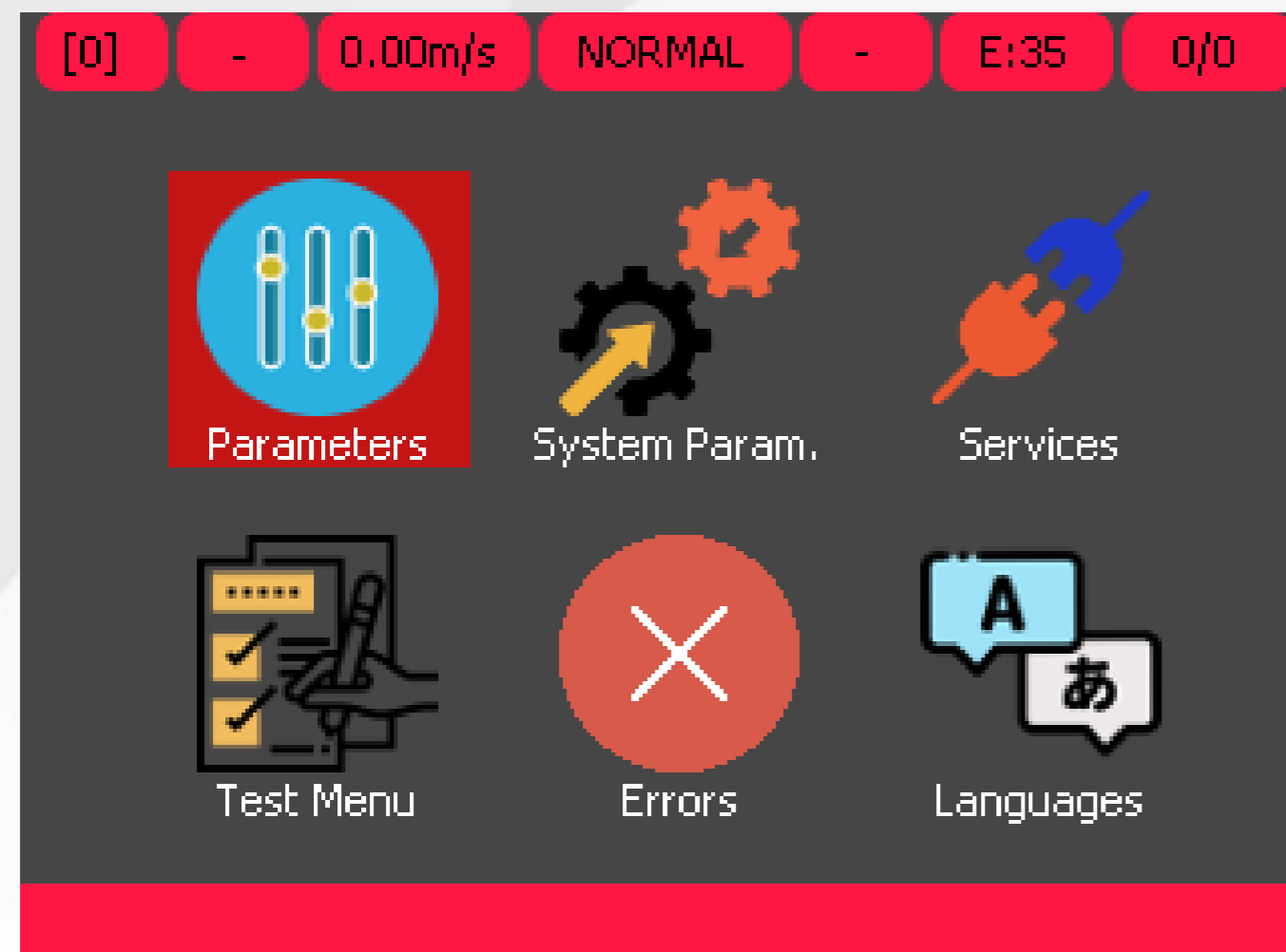
The main screen shows the following values about the lift:

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

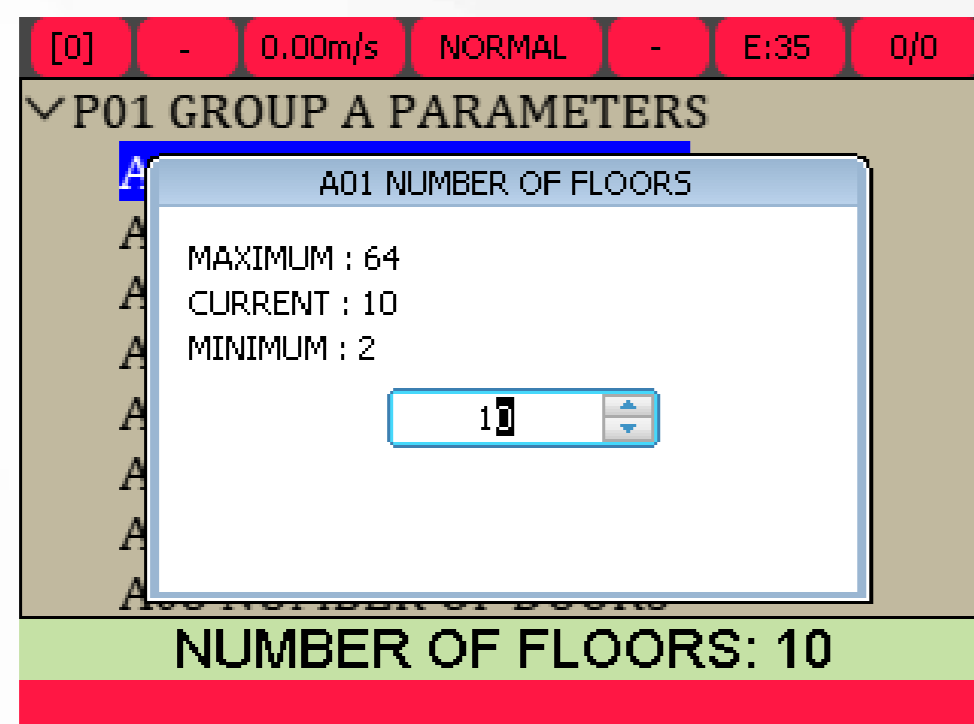
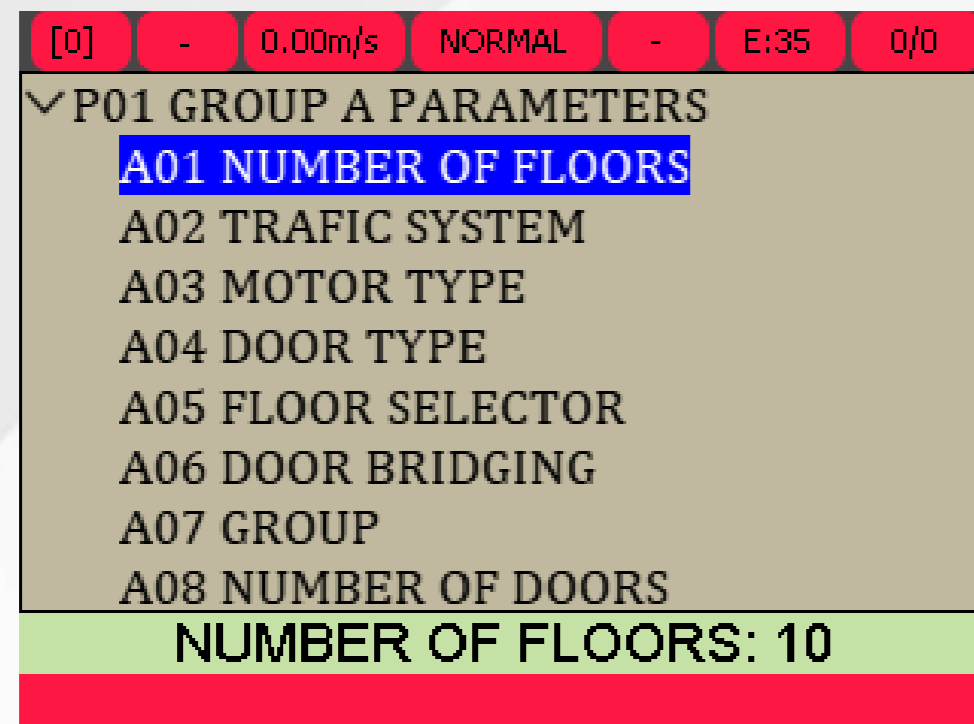
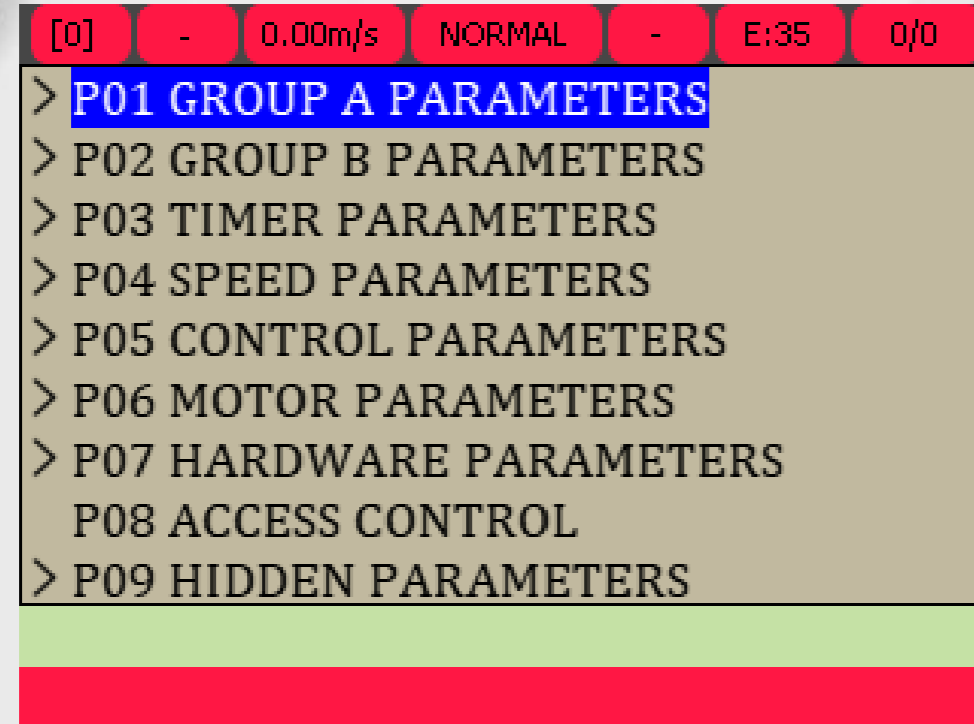
| [0] - 0.00m/s INSP - E:35 0/0 |            |                   |            |
|-------------------------------|------------|-------------------|------------|
| Table A                       |            | Table B           |            |
| PARAMETER                     | VALUE      | PARAMETER         | VALUE      |
| Serial No:                    | 1448304471 | Date:             | 02.02.2021 |
| Control Board:                | 2.33r      | Clock:            | 14:05      |
| Motor Driver:                 | 2.20n      | Maintenance Time: | 19.05.2021 |
| Hand Terminal:                | 2.22u      | Start:            | 0          |
| SD Version:                   | 2.0m       | Remaining Starts: | 3584       |
| Line Voltage:                 | 200 V      | Direction Change: | 0          |
| Power:                        | 4 KW       | Maks. Dir.Change: | 15000000   |
| Device Total Starts           | 986652     | Weight:           | 0          |

| [0] - 0.00m/s INSP - E:35 0/0 |            |           |       |
|-------------------------------|------------|-----------|-------|
| Table B                       |            | Table C   |       |
| PARAMETER                     | VALUE      | PARAMETER | VALUE |
| Date:                         | 02.02.2021 | ALxK:     | 1.5   |
| Clock:                        | 14:05      | SCBa:     | -     |
| Maintenance Time:             | 19.05.2021 | SCBb:     | -     |
| Start:                        | 0          | PWL:      | 1.9   |
| Remaining Starts:             | 3584       | PWSa:     | 1.53  |
| Direction Change:             | 0          | PWSb:     | 1.53  |
| Maks. Dir.Change:             | 15000000   | ICG:      | -     |
| Weight:                       | 0          | Angl:     | 0     |

- After pressing ESC Button in main screen info screen can be seen.
- In this screen some information about the device, softwares of the connected boards, maintenance, start counter and some other variables are displayed.



- Pressing ENT button in main screen leads to the menu.
- In this screen you can move by using cursor keys (arrows).
- In order to enter into an application or sub-menu come to the related icon by using cursor keys on the screen and press ENT when its icon is highlighted.
- For example, select Parameters and press ENT while parameter icon is being highlighted.
- So, you will go into parameter menu.



The parameters can be edited in parameter menu.

**P01-GROUP A PARAMETERS:** These parameters are denoted with a prefix letter ‘A’ as Axx.

Main parameters define the type and basic functions of the lift. They can be modified only when the lift is resting.

**P02- GROUP B PARAMETERS:** These parameters are denoted with a prefix letter ‘B’ as Bxx.

Auxiliary parameters define most of the functions of the lift. They can be modified at any time.

**P03-TIMER PARAMETERS:** These parameters are denoted with a prefix letter ‘C’ as Cxx.

Timer parameters store all of the user definable timer settings. They can be modified at any time.

**P04-SPEED PARAMETERS:** This section contains parameters for speed adjustments.

They can be modified only when the lift is resting.

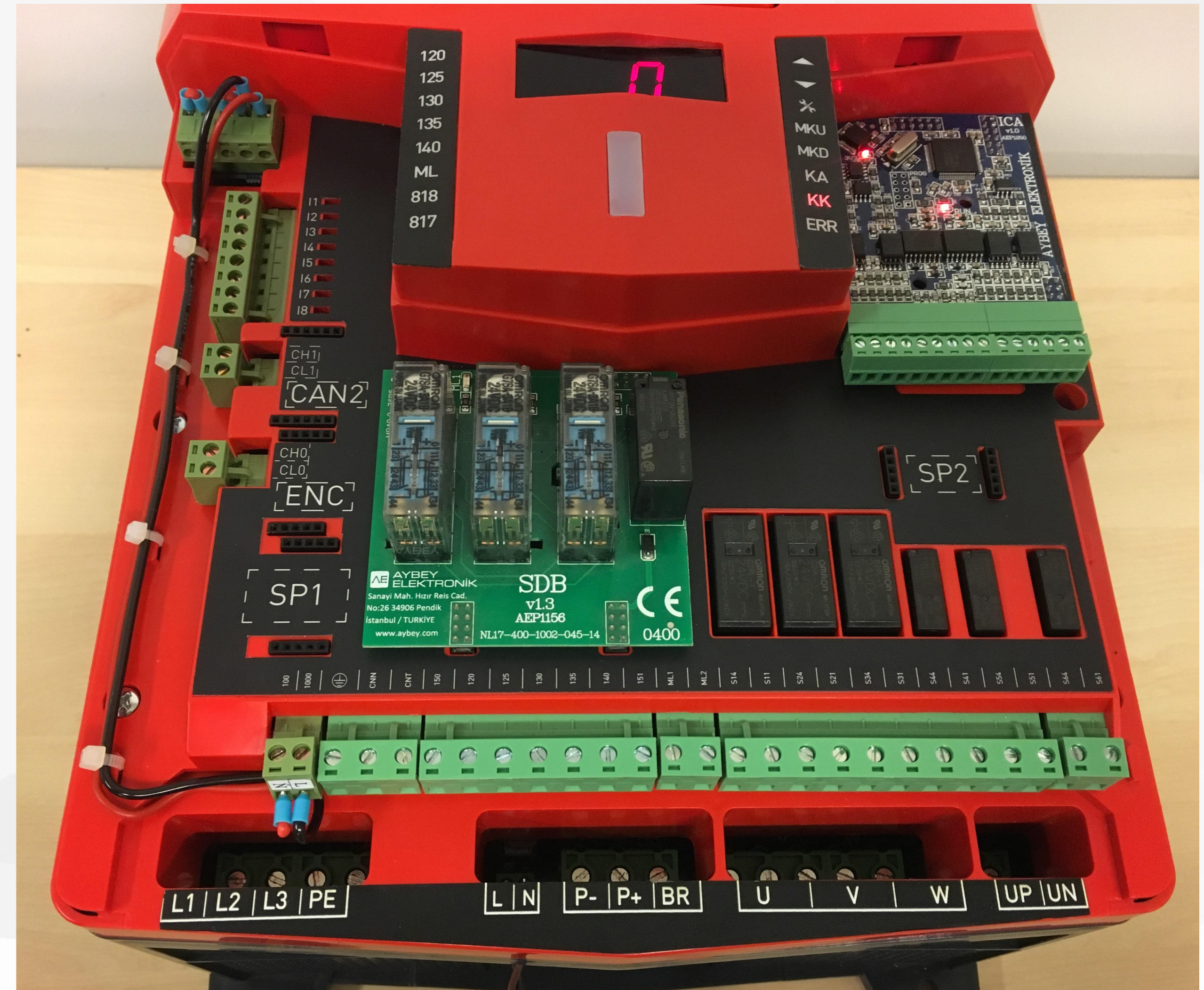
**P05-CONTROL PARAMETERS:** Control parameters are mainly the parameters which are used to control the behaviour of the motor. They can be modified only when the lift is resting.

**P06-MOTOR PARAMETERS:** This section has parameters on motor and encoder specifications.

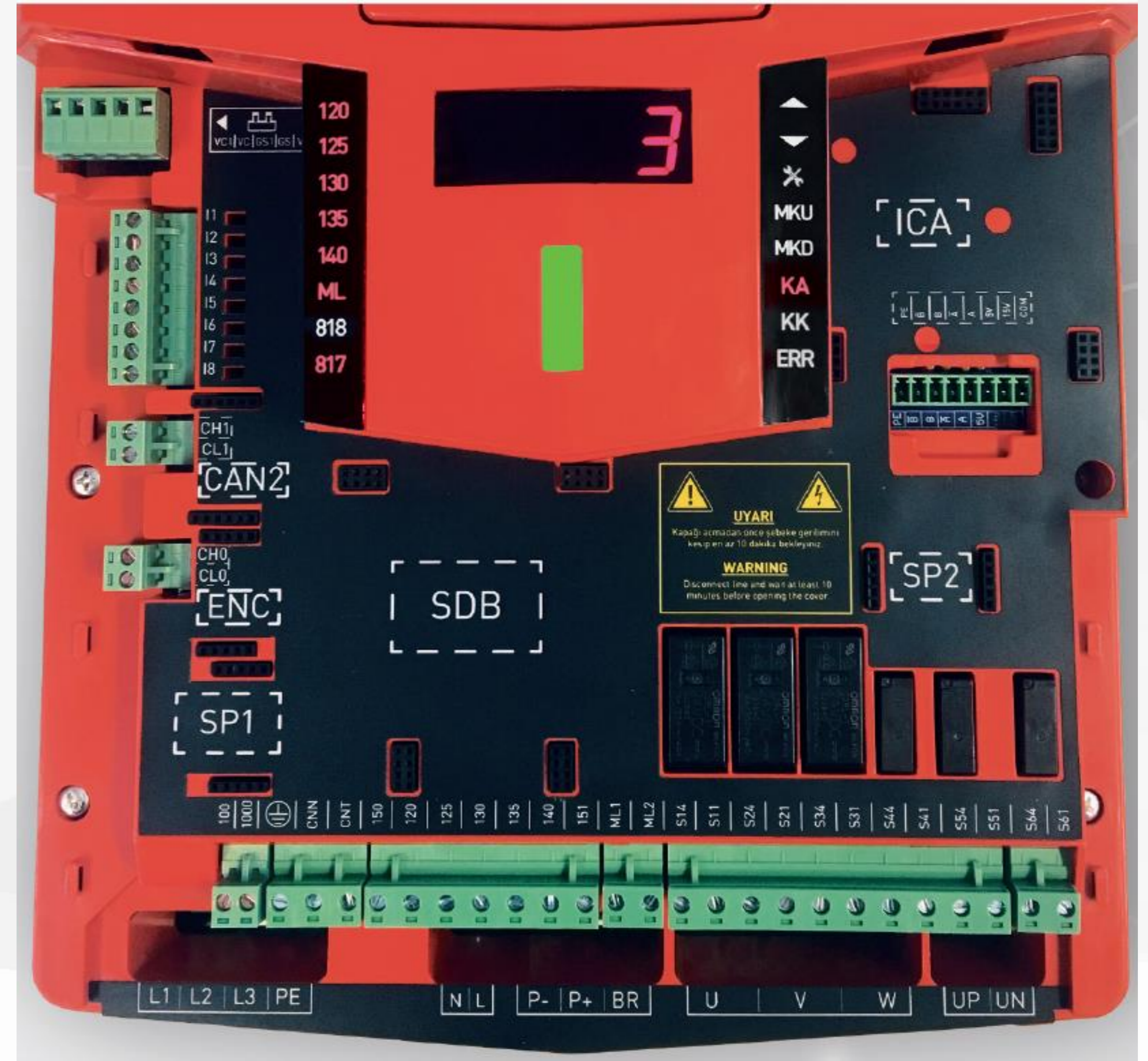
They can be modified only when the lift is resting.

**P07-HARDWARE PARAMETERS:** These parameters store the settings for the hardware of the device.

- All low current connections done behind the top cover
- Additional function boards mounted here.
- Electronic boards except the additional function boards are restricted to access.
- Cables can be fixed by cable tire at the both sides.

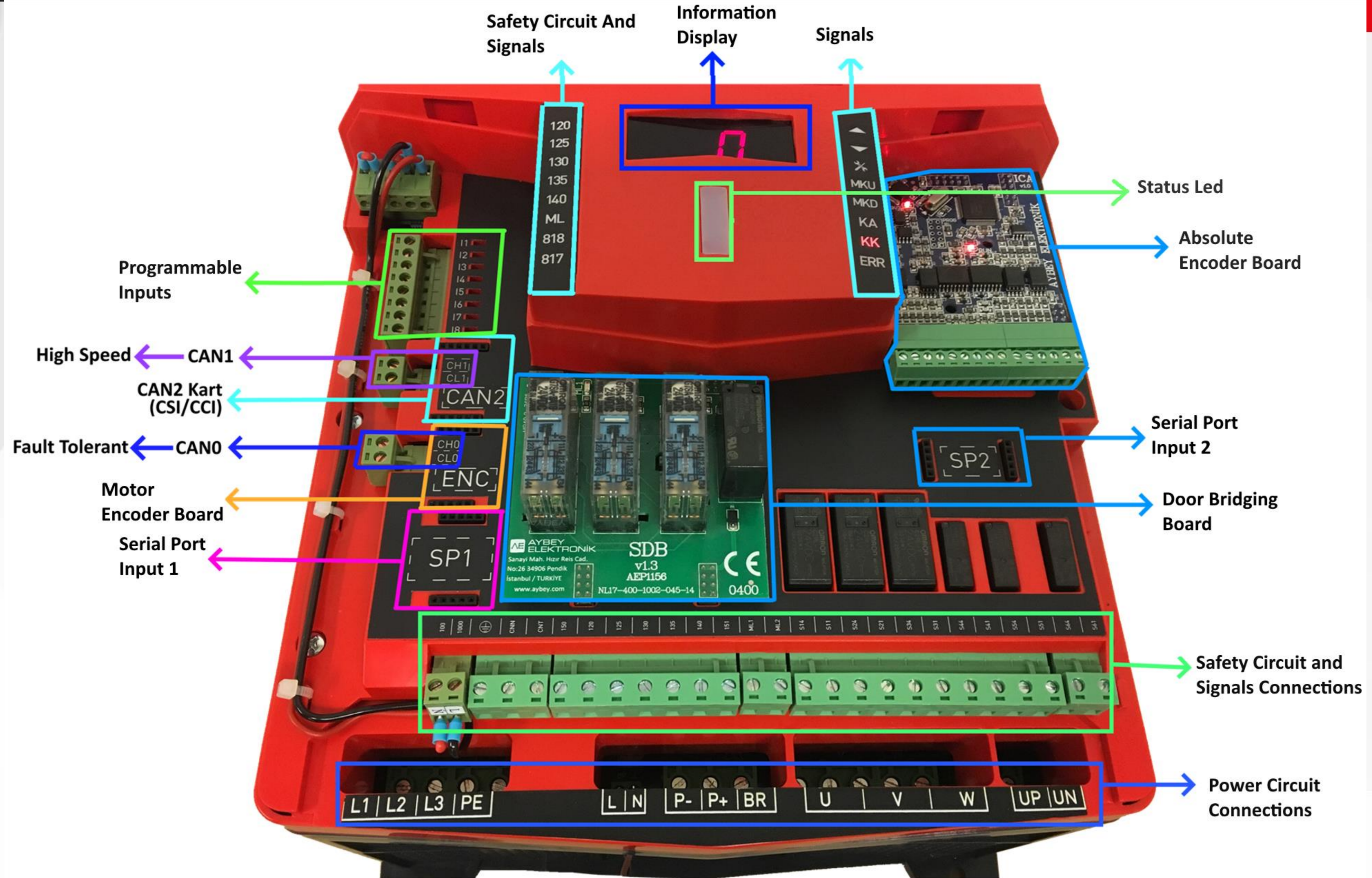


- Locations for all the additional boards are specified behind the top cover.

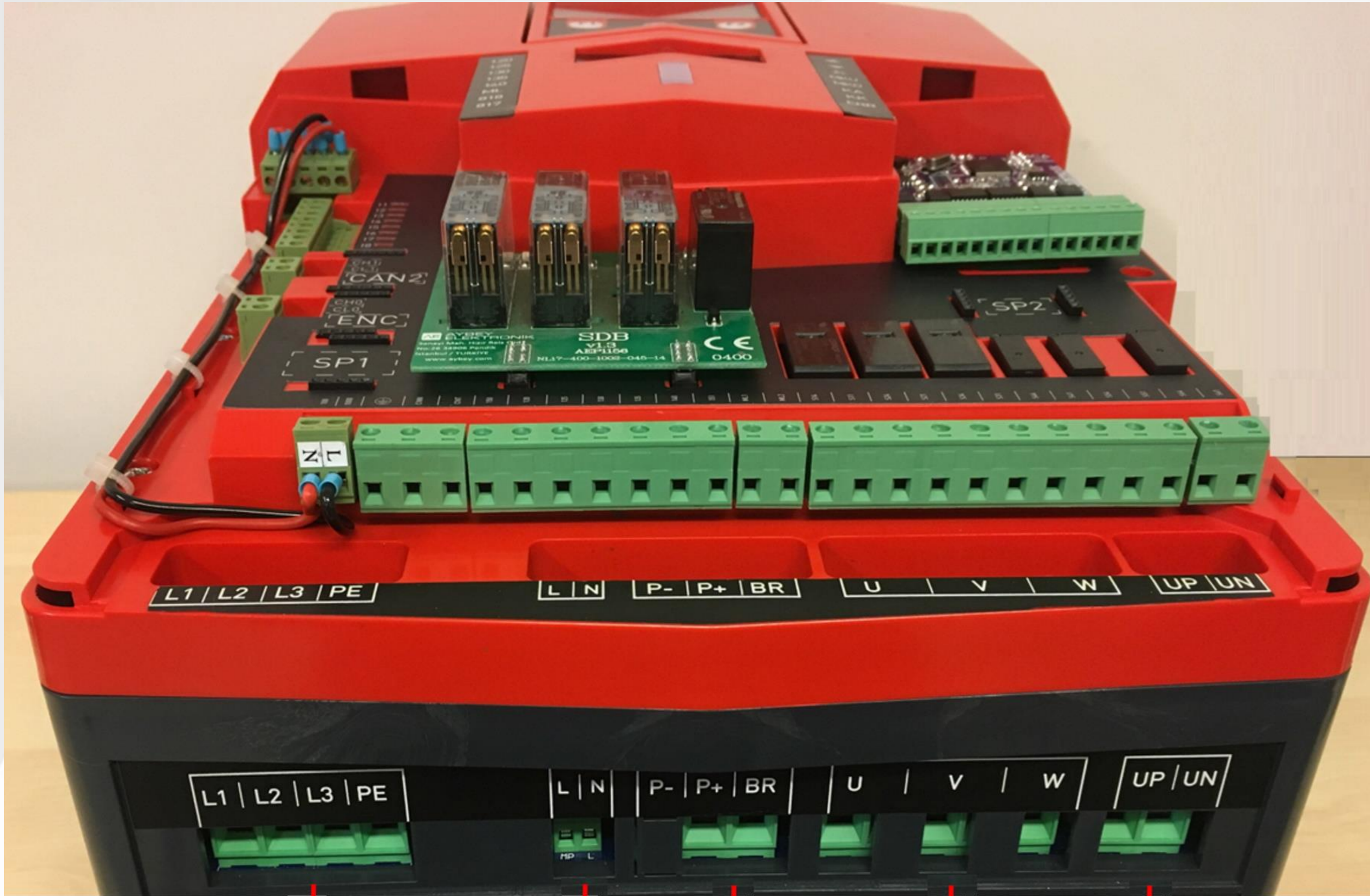




# DEVICE CONNECTIONS AND ADDITIONAL BOARDS



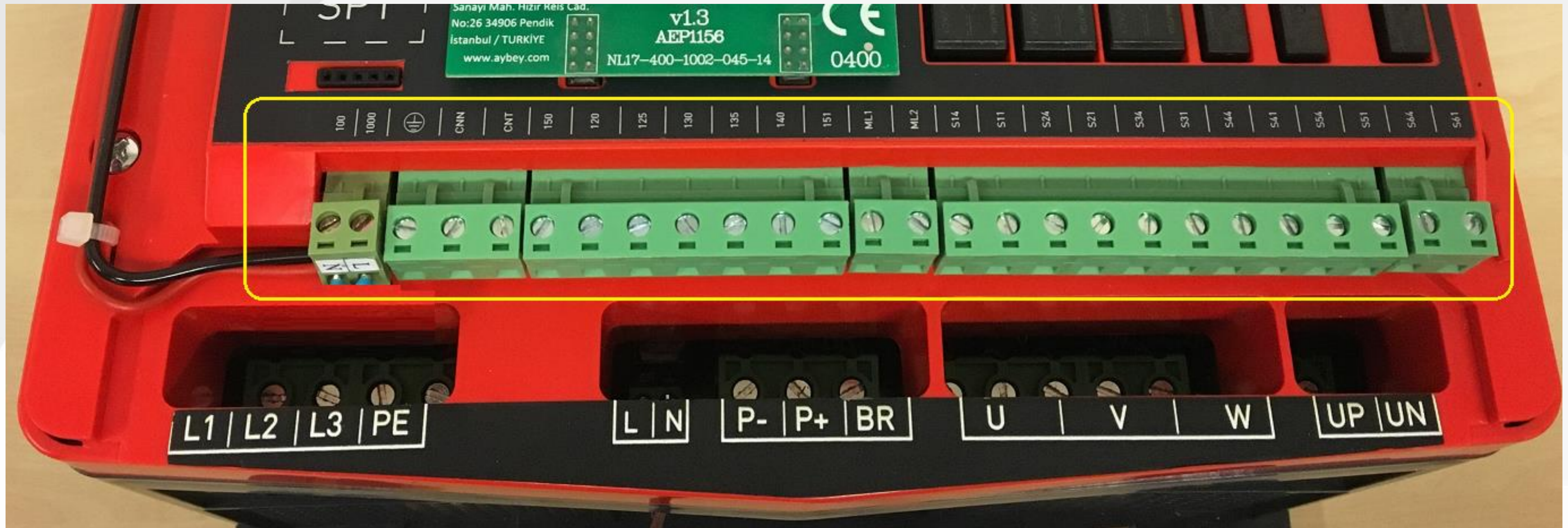
# POWER SUPPLY AND MOTOR CONNECTIONS



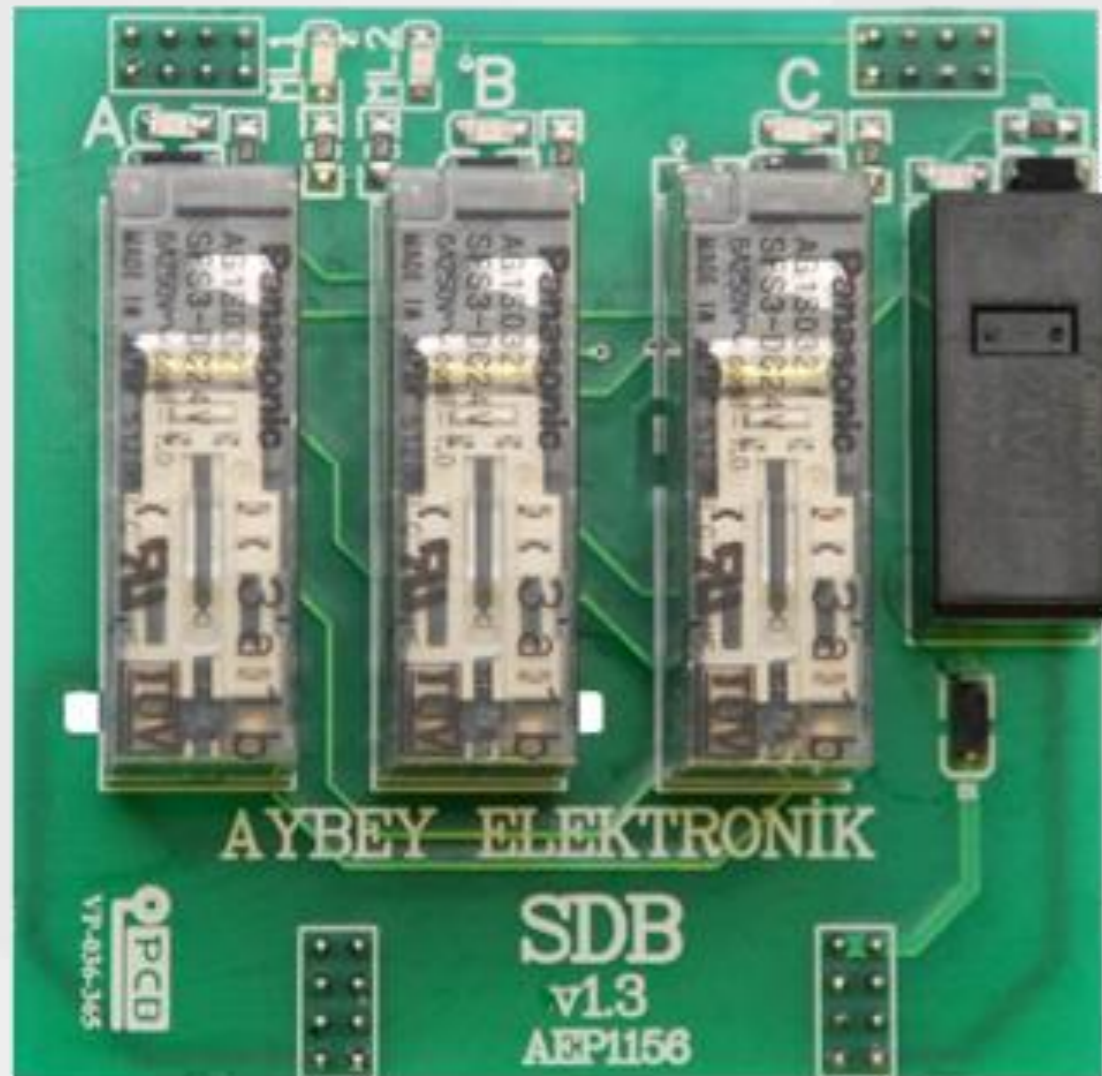
Connections to power supply, motor and braking resistor done through terminal at the bottom of the system.

- Line Voltage
- Control Circuit Supply 220/230V
- Braking Resistor
- Motor Windings
- Rescue Supply Voltage

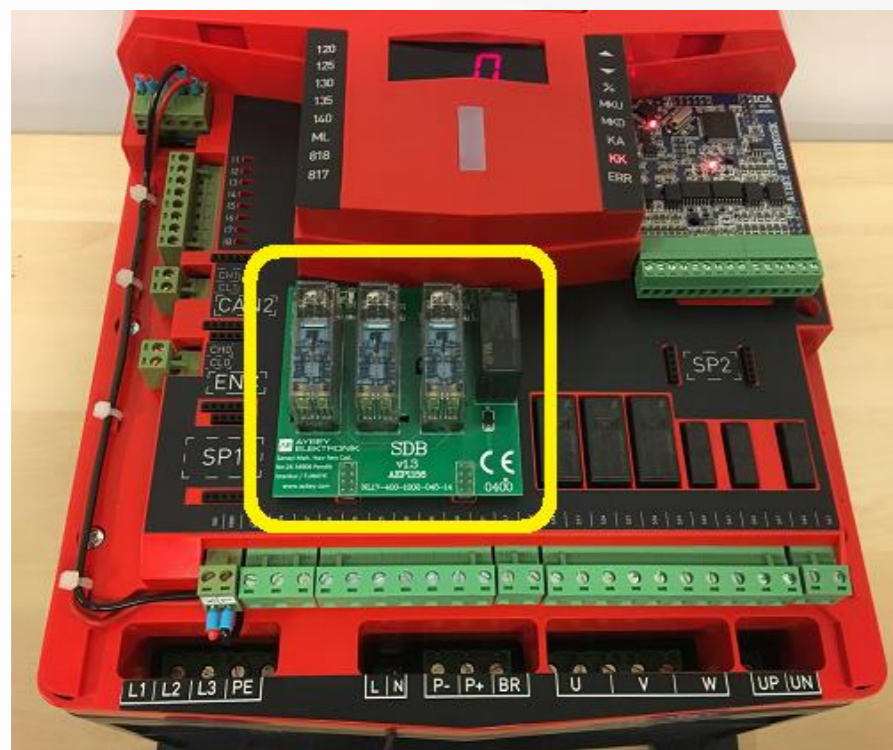
Connections of all signals and safety circuit done through terminals behind the top cover, which is indicated by yellow rectangular below.



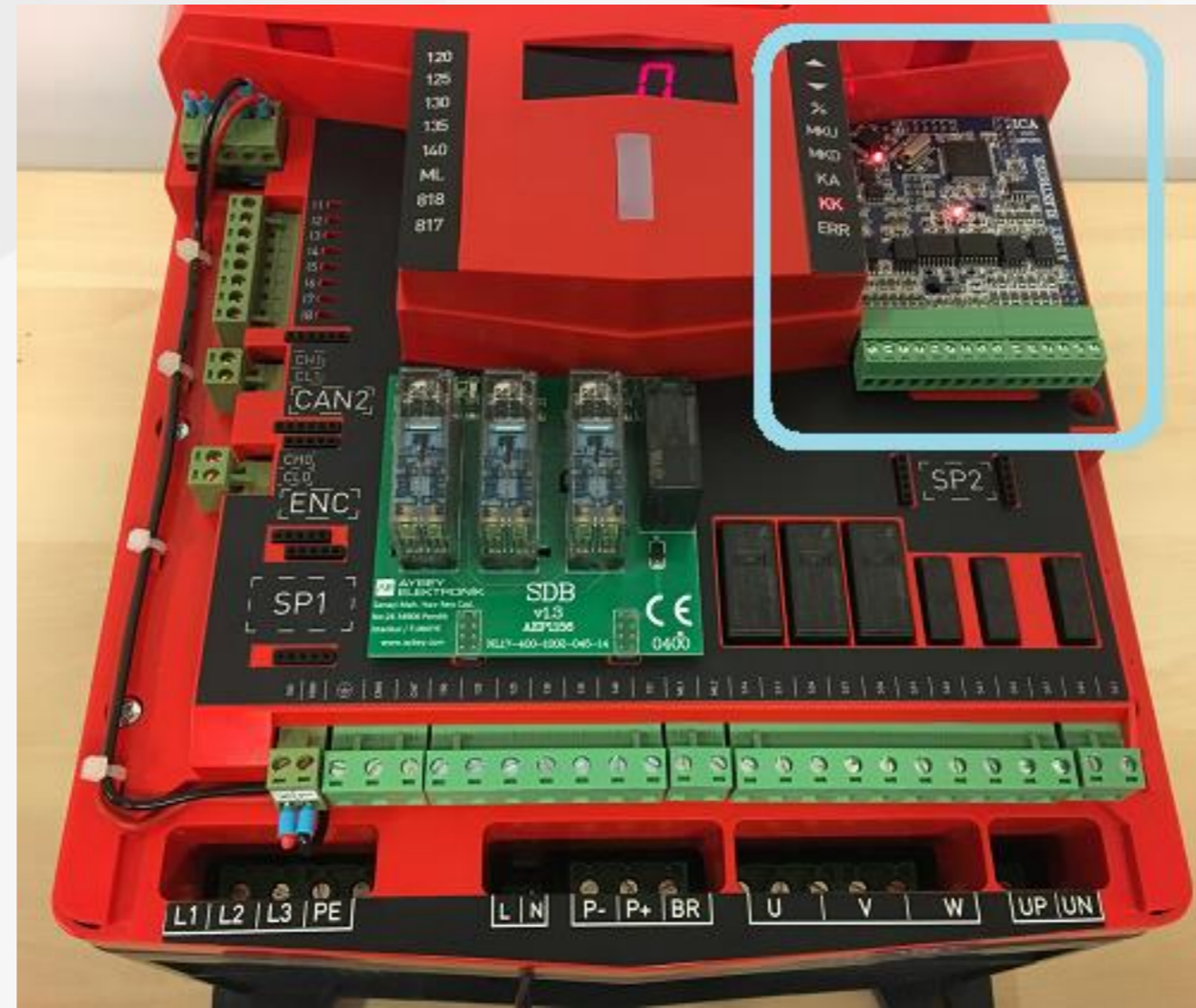
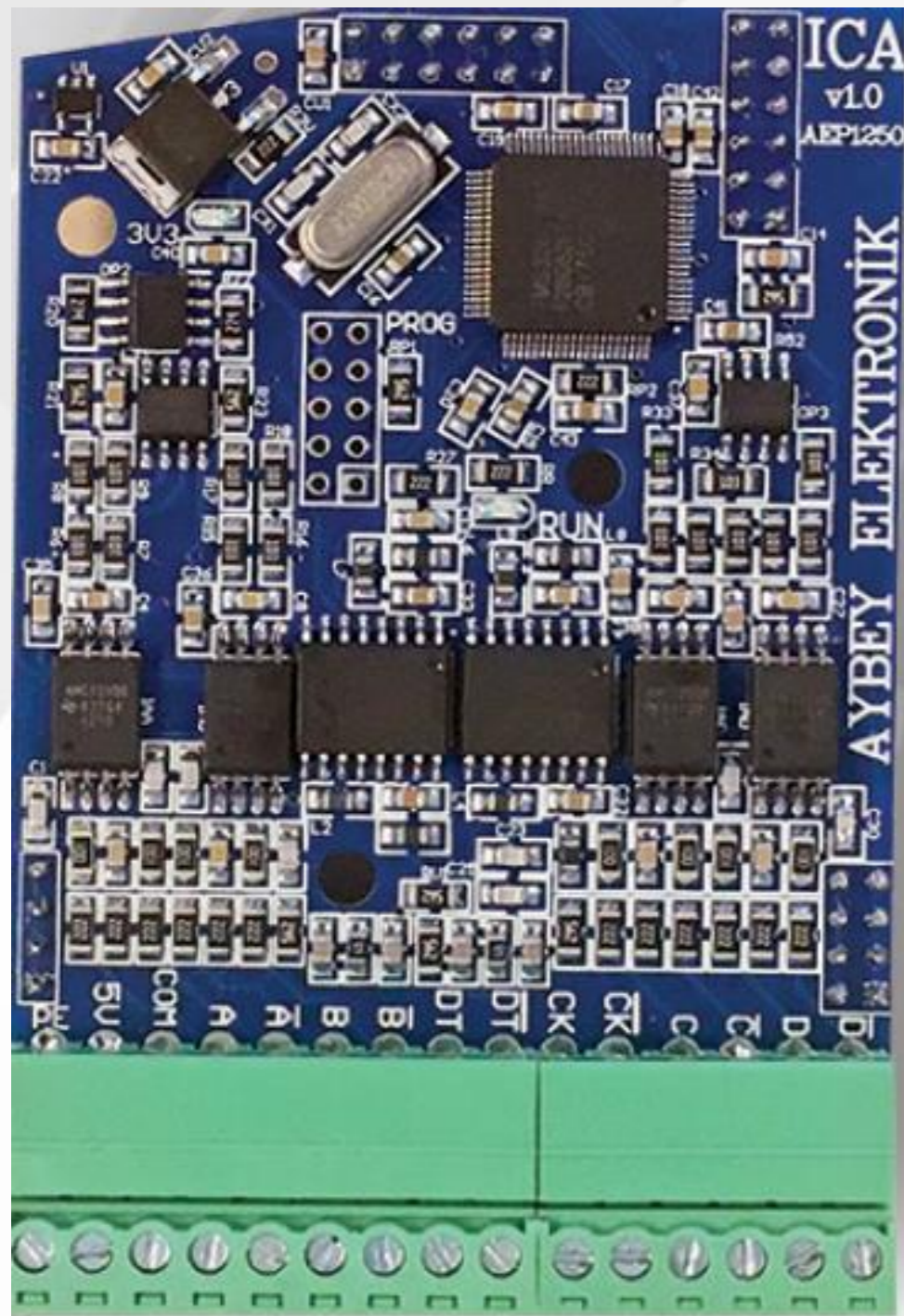
## SDB Door Bridging Board



- It is a **certified** board in charge of bridging door contacts and safety relays.
- Mounted into SDB socket at AE-MAESTRO controller system.
- **Application:**
  - Levelling
  - Early door opening
  - Floor levelling inside car in case of encoder as floor selector.
  - **Mandatory to use this board according to EN81-20/50 standards. Open door test which is necessary for the standard can be done by SDB.**



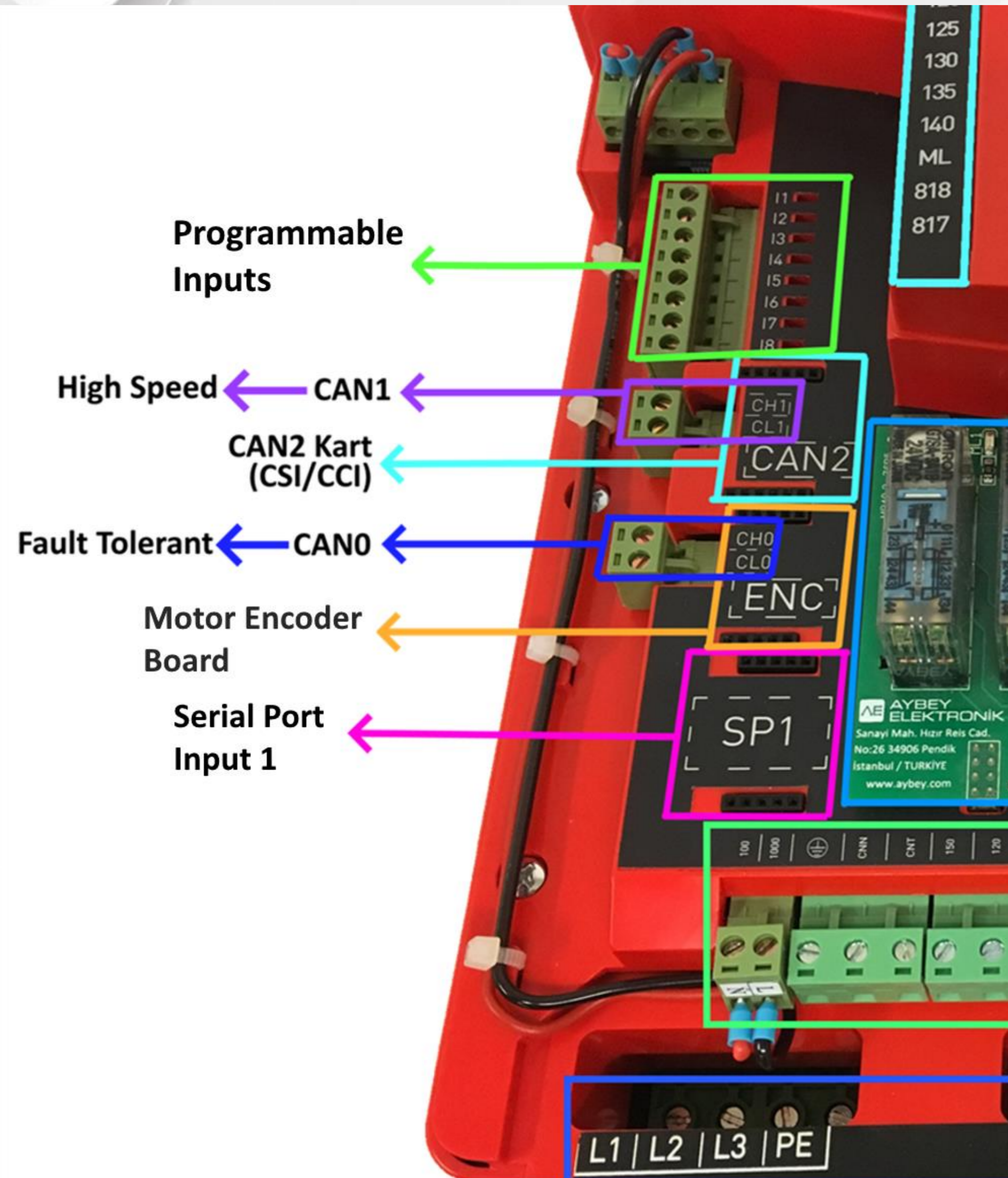
## ICA Absolute Encoder Board



### [M16] – ENCODER TYPE

|   |             |                                     |
|---|-------------|-------------------------------------|
| 0 | INCREMENTAL | Closed Loop<br>Asynchronous Machine |
| 1 | ENDAT       | Synchronous Machine                 |
| 2 | SINCOS      |                                     |
| 3 | BISS (Gray) |                                     |
| 4 | SSI (Gray)  |                                     |
| 5 | ENDAT-SPI   |                                     |
| 6 | BISS-BINARY |                                     |
| 7 | SSI-BINARY  |                                     |

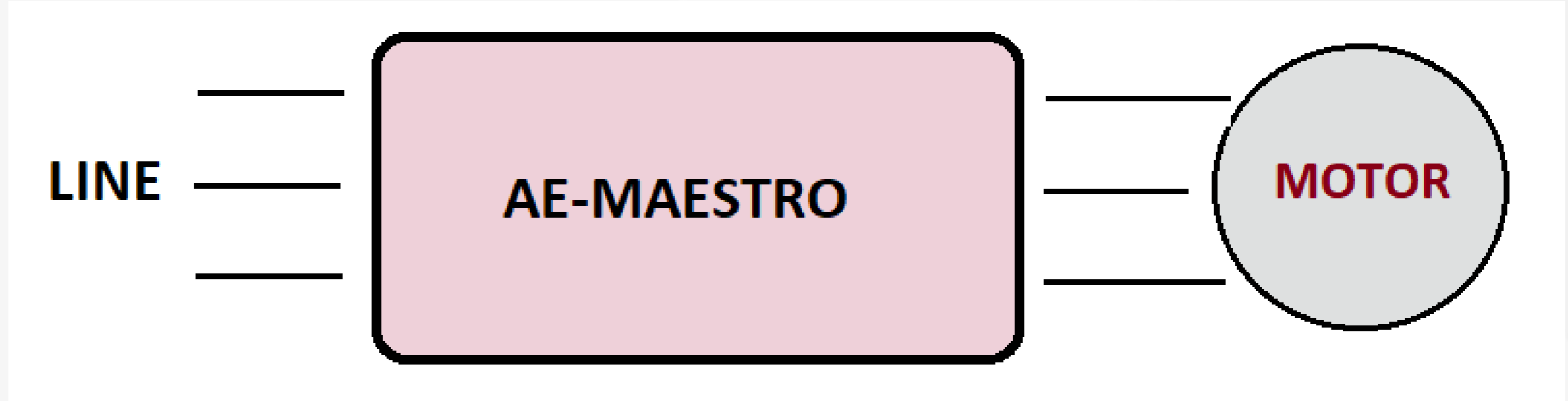
- ICA Absolute Encoder board is used within gearless machines (synchronous motor).
- Mounted at ICA socket on AE-MAESTRO controller system.
- Supports SinCos, EnDAT, biss and SSI encoders.
- Parameter M16 must be set depending on encoder type selected in application.



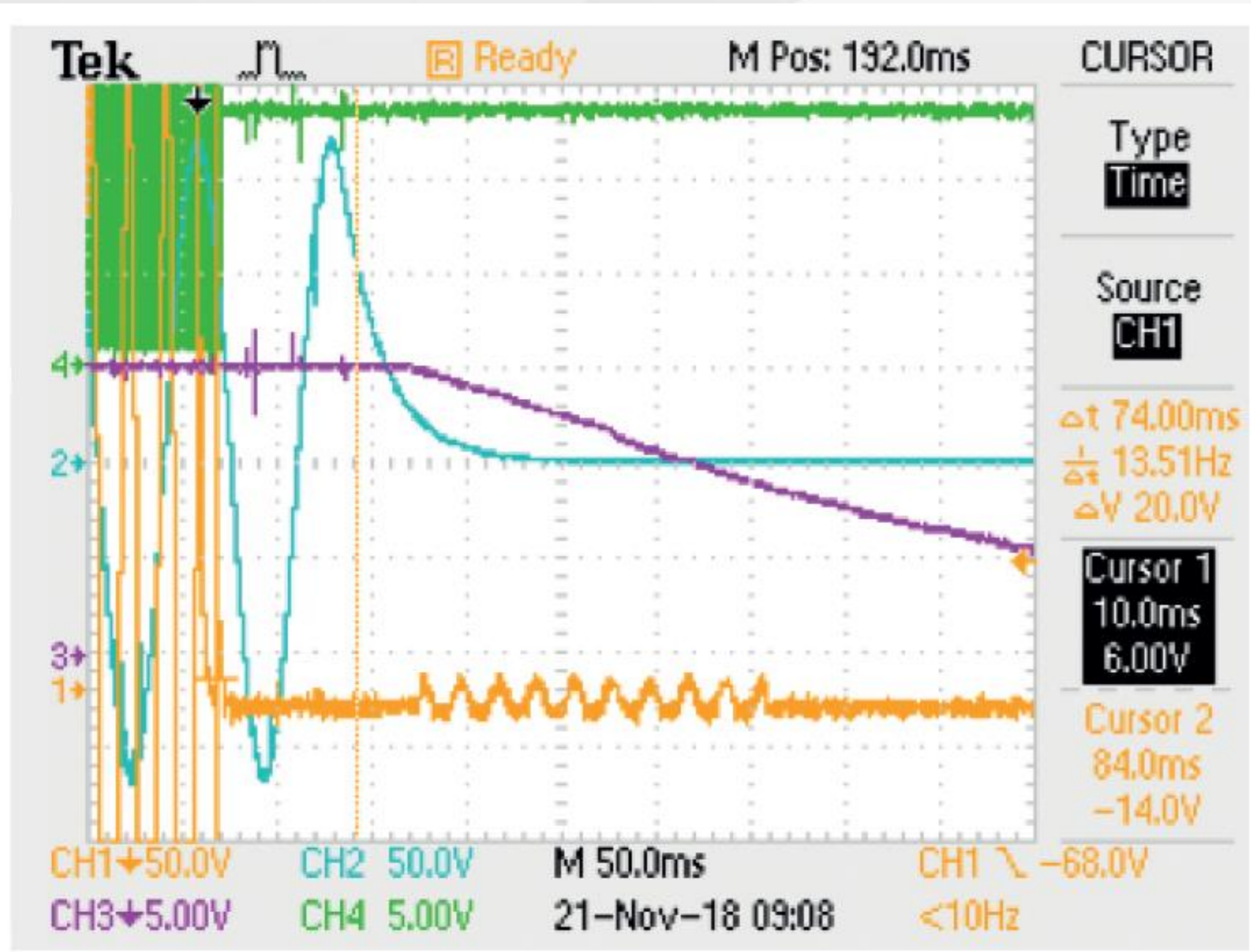
- Terminals of CAN 0 and CAN 1, 8 programmable inputs behind the top cover.
- CAN 2 can be become active by using CSI and CCI depending on the requirments of application.
- In case of shaft encoder(mounted on speed governor regulator) as floor selector, Incremental encoder board is connected to ENC socket. No more functions.
- Communication channels are SP1 at the left side and SP2 at the right side.
- SP1 and SP2 sockets are suitable for boards of USB, Ethernet, RS232, RS485 communications.



AE-MAESTRO is **contactorless** integrated lift control system.



As a result of the compatability (**Safe Torque Off – STO**) of AE-MAESTRO which could be connected to directly motor **without contactor**, it is approved and certified after a series of challanging tests

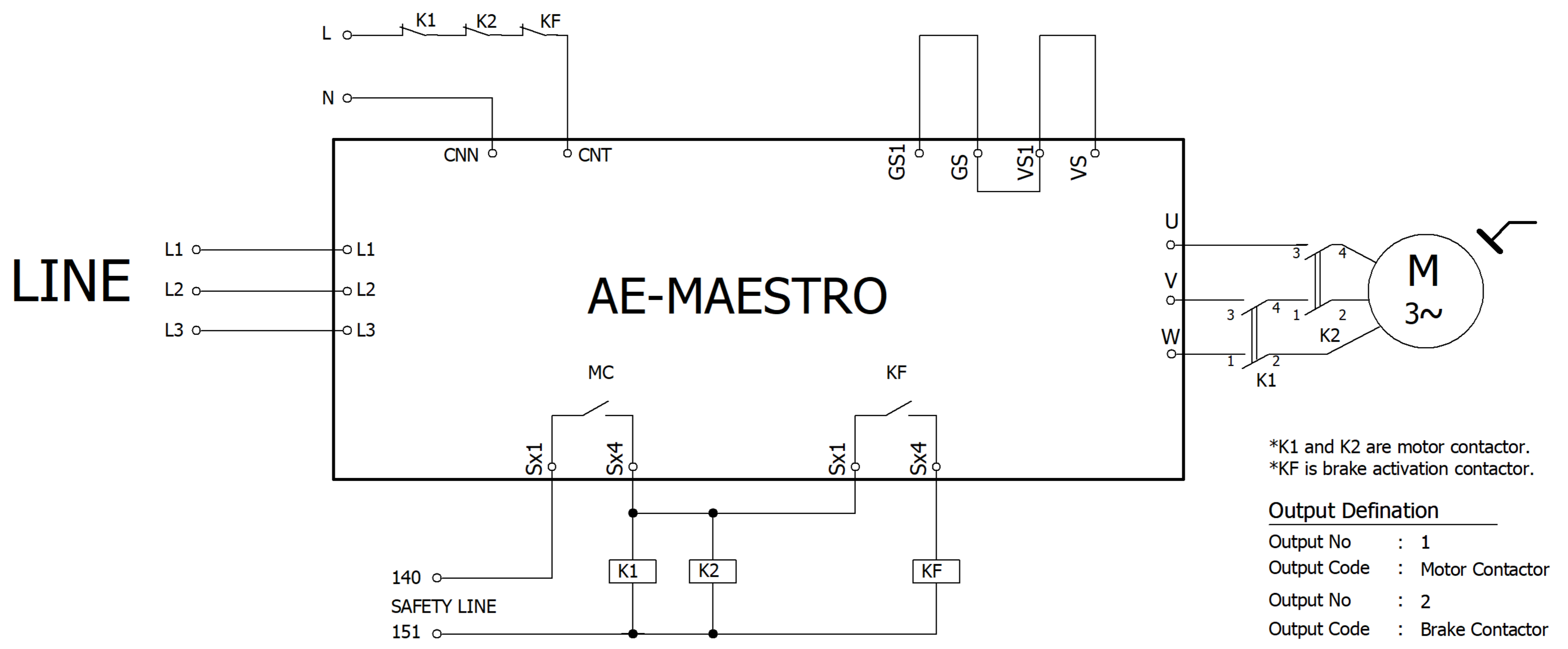


*Motor current cuts down by 80 ms whenever Safety circuit breaks down with STO.*

- The system detects in a short period and stops motor in case of dangerous circumstance happened.
- It cuts down current to motor electronically by 80 ms whenever safety circuit breaks down.
- The reliability of the system is verified by a wide variety of tests.

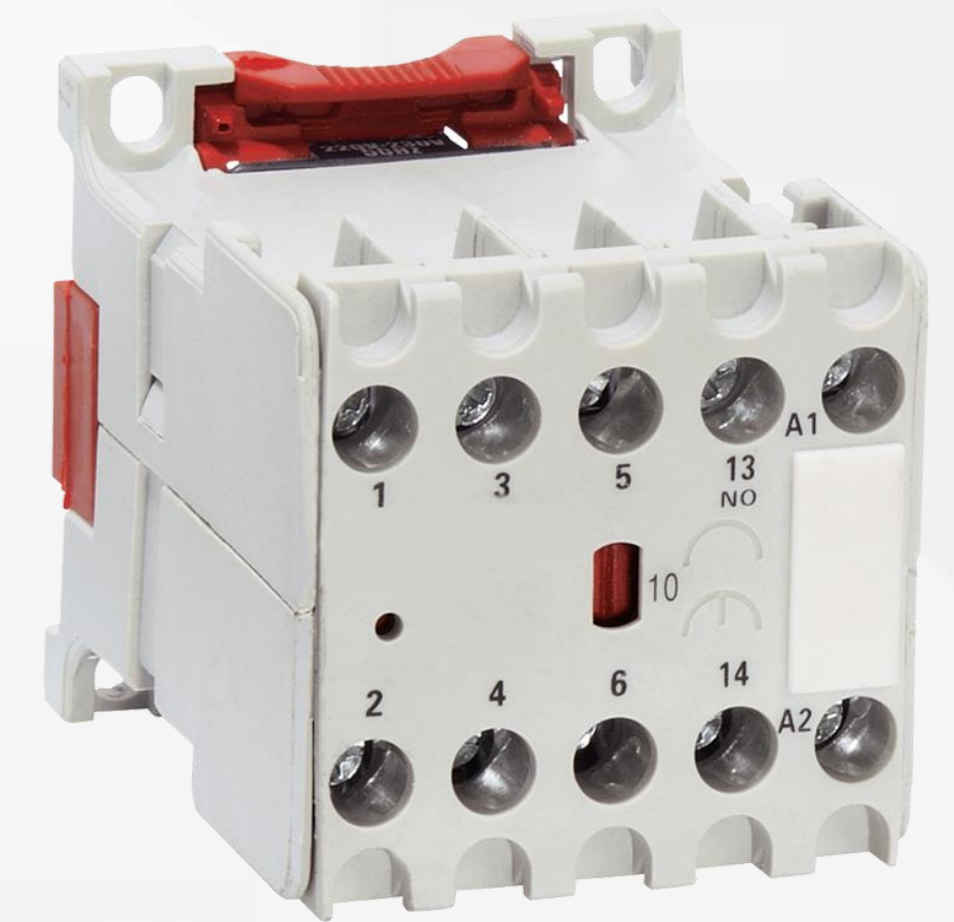
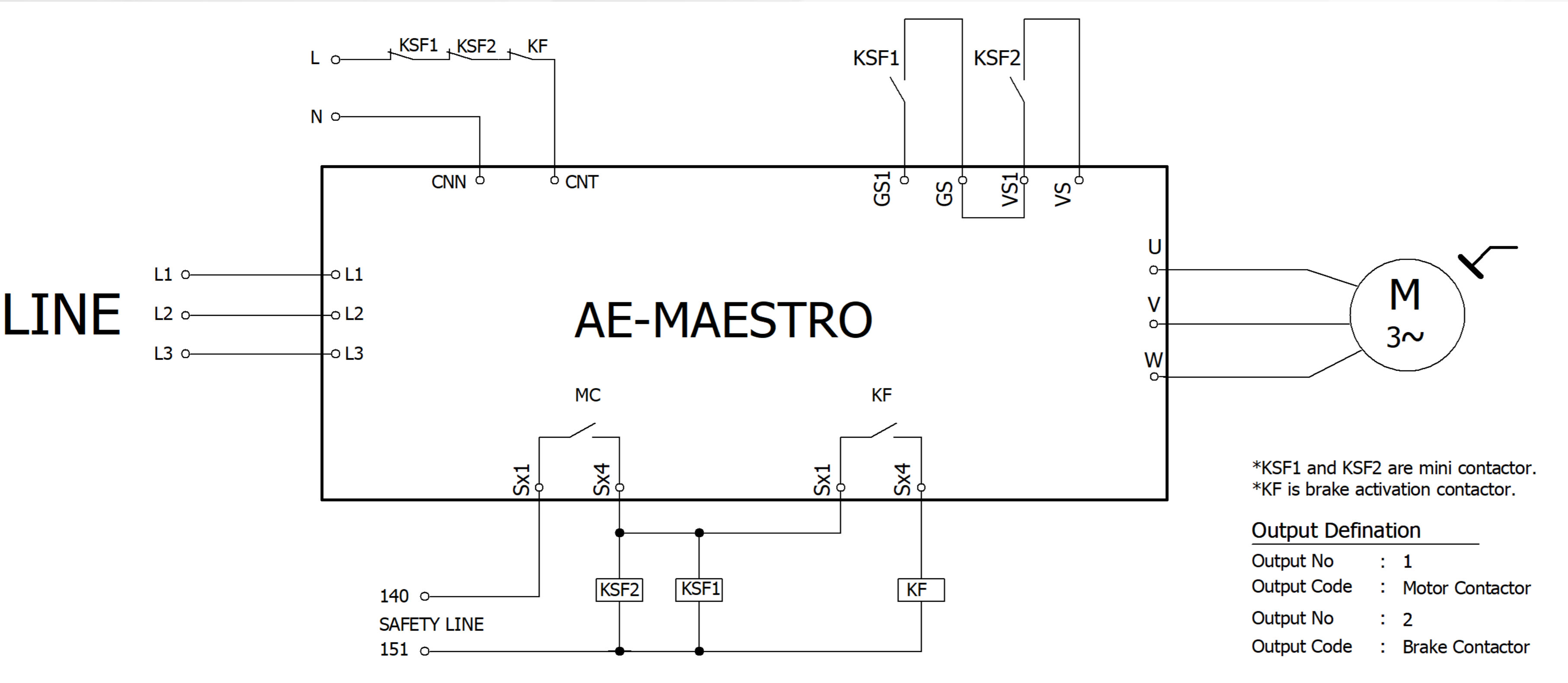


### Motor Connections with Power Contactors



By deactivating STO [A26=0], It is possible to drive the system in a traditional way by power contactors.

## Drive with STO by mini contactors



**Mini Contactor**

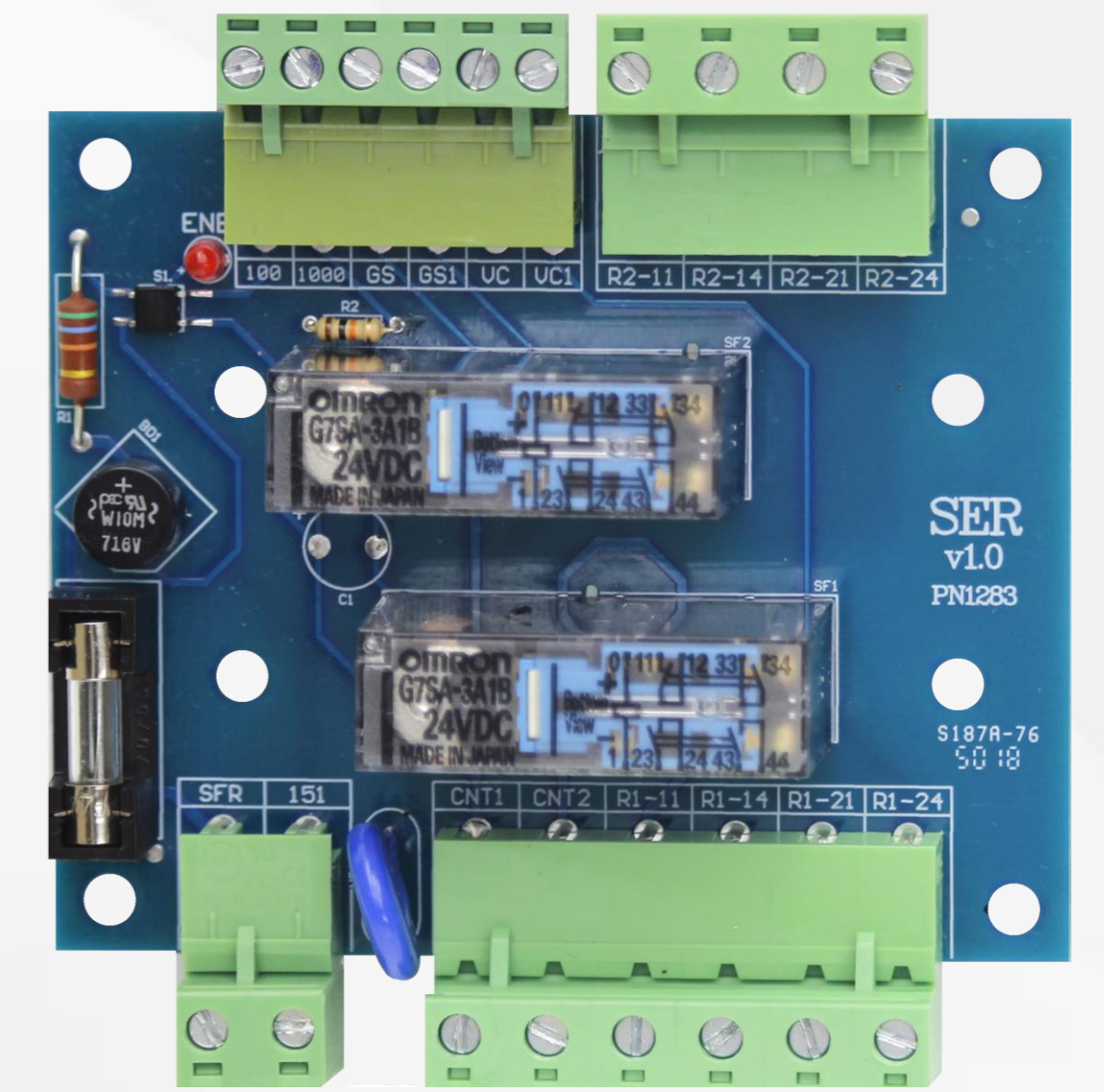
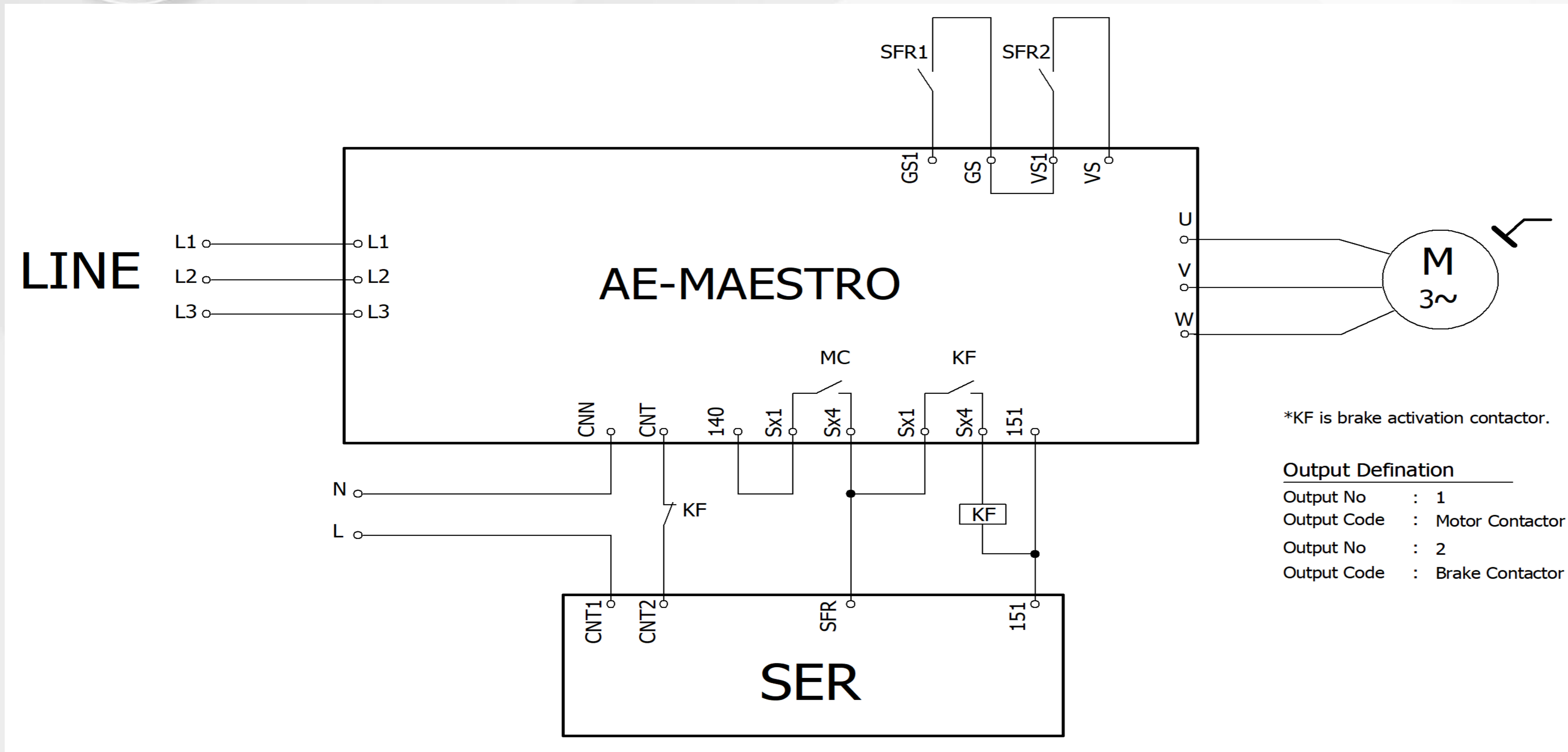
As shown above

- Mini contactors Class EN 60947-5-1:2004

Or

- Enable circuit becomes active by safety relays complying with EN50205 standard. No need of power contactors anymore.

## SER kartı ile uygulanan Kontaktörsüz çalışma



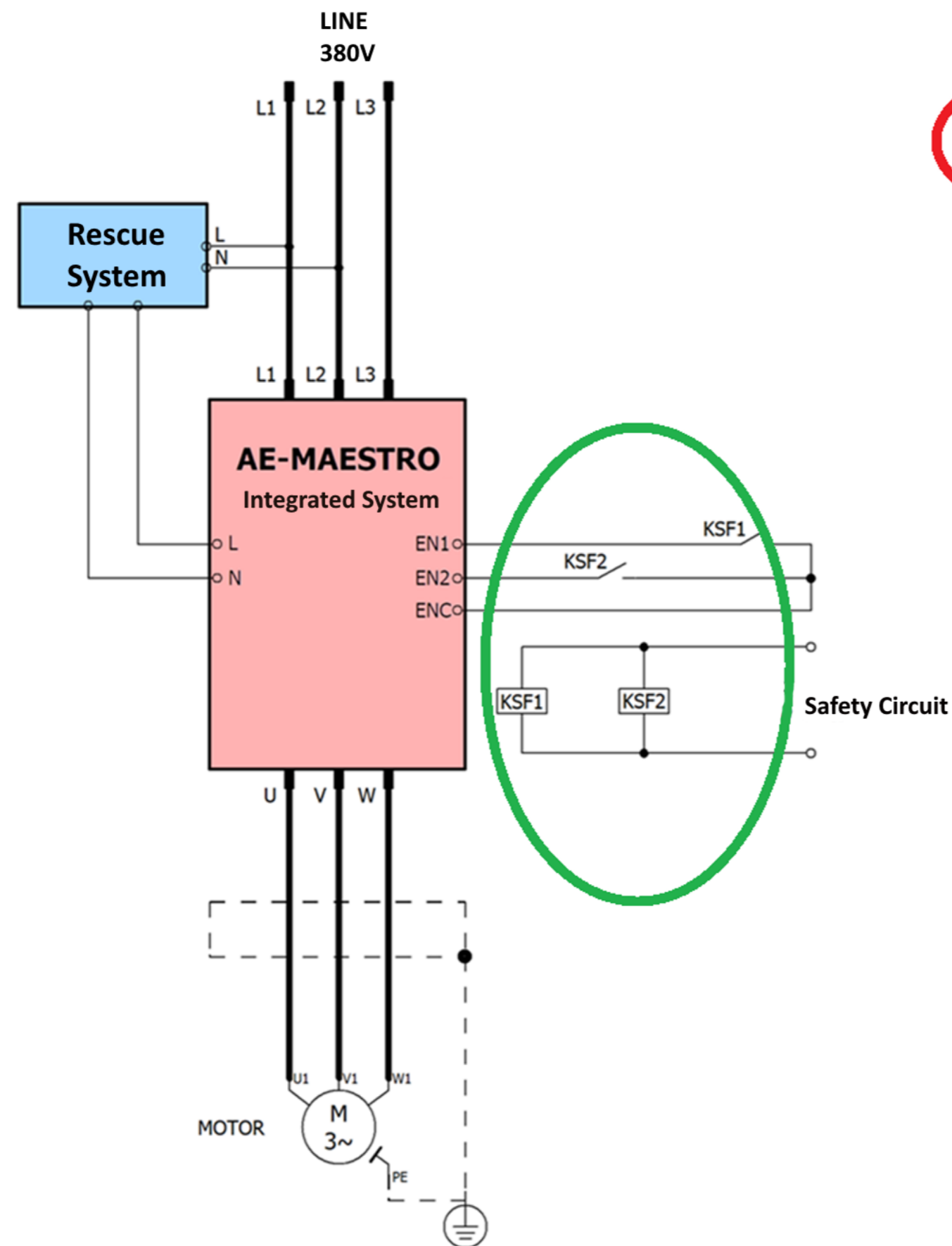
**SER Safety Board**

The other way to drive without contactorless is to get SER board.  
 It covers safety relays and circuit required.  
 No need for power contactors in case of SER.

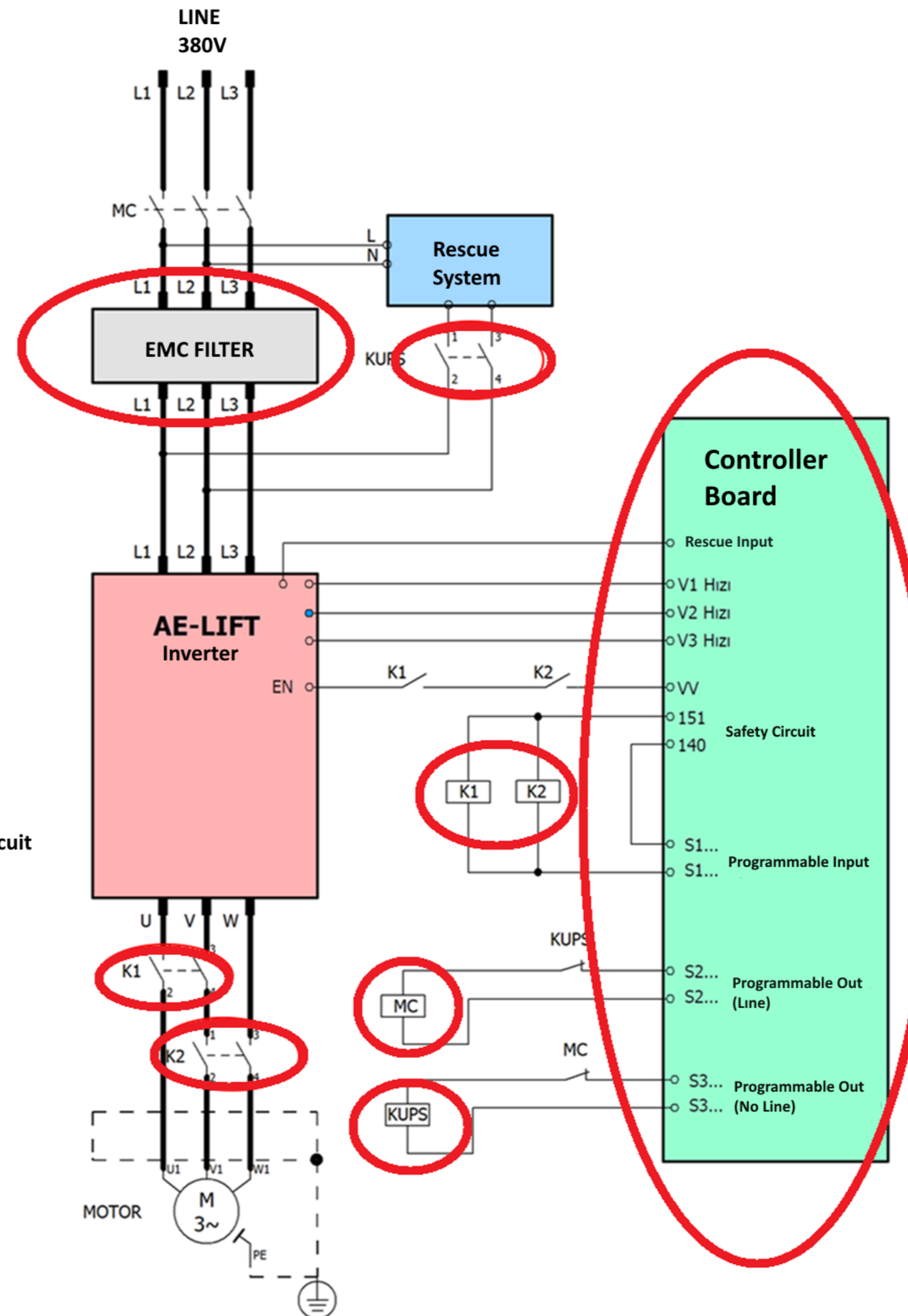


- Control panel without contactors works **silently** because of no mechanical switching components.
- Transistor outputs of motor driver are **never switched mechanically**.
- **Transistor current** is always dampened through motor winding and **damping never stops**.
- That's why **lifetime of power transistors (IGBT)** which is the most sensitive components of the system will be **longer**.
- This leads to longer lifetime for the whole system.
- **Less components** will be needed in control panel.
- Connections is less and simple.
- Less connections and components, less malfunctions.

# LESS COMPONENTS



AE-MAESTRO **Contactless**

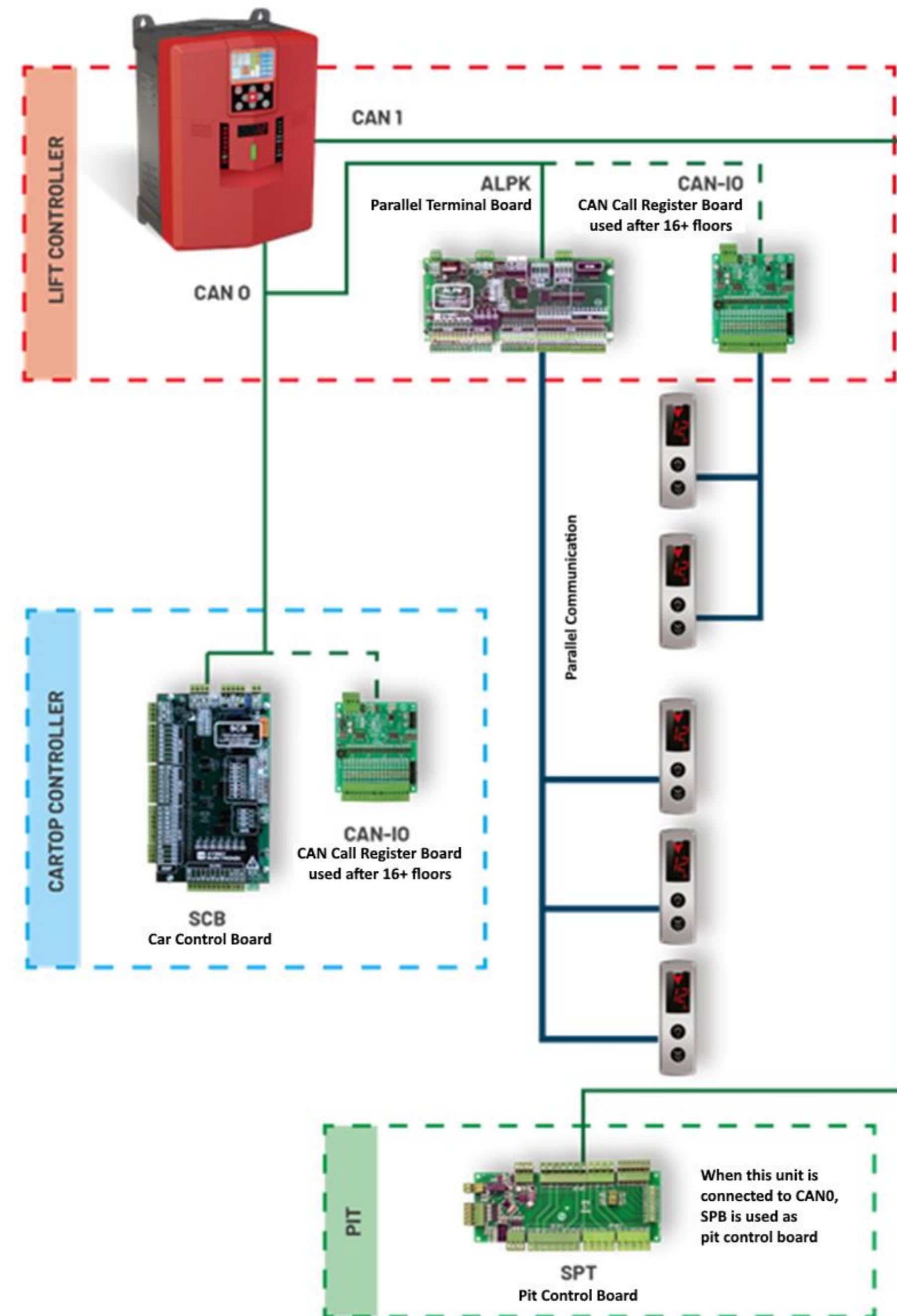


Motor Driver + Control Board **with Contactor**

# CAR SERIAL

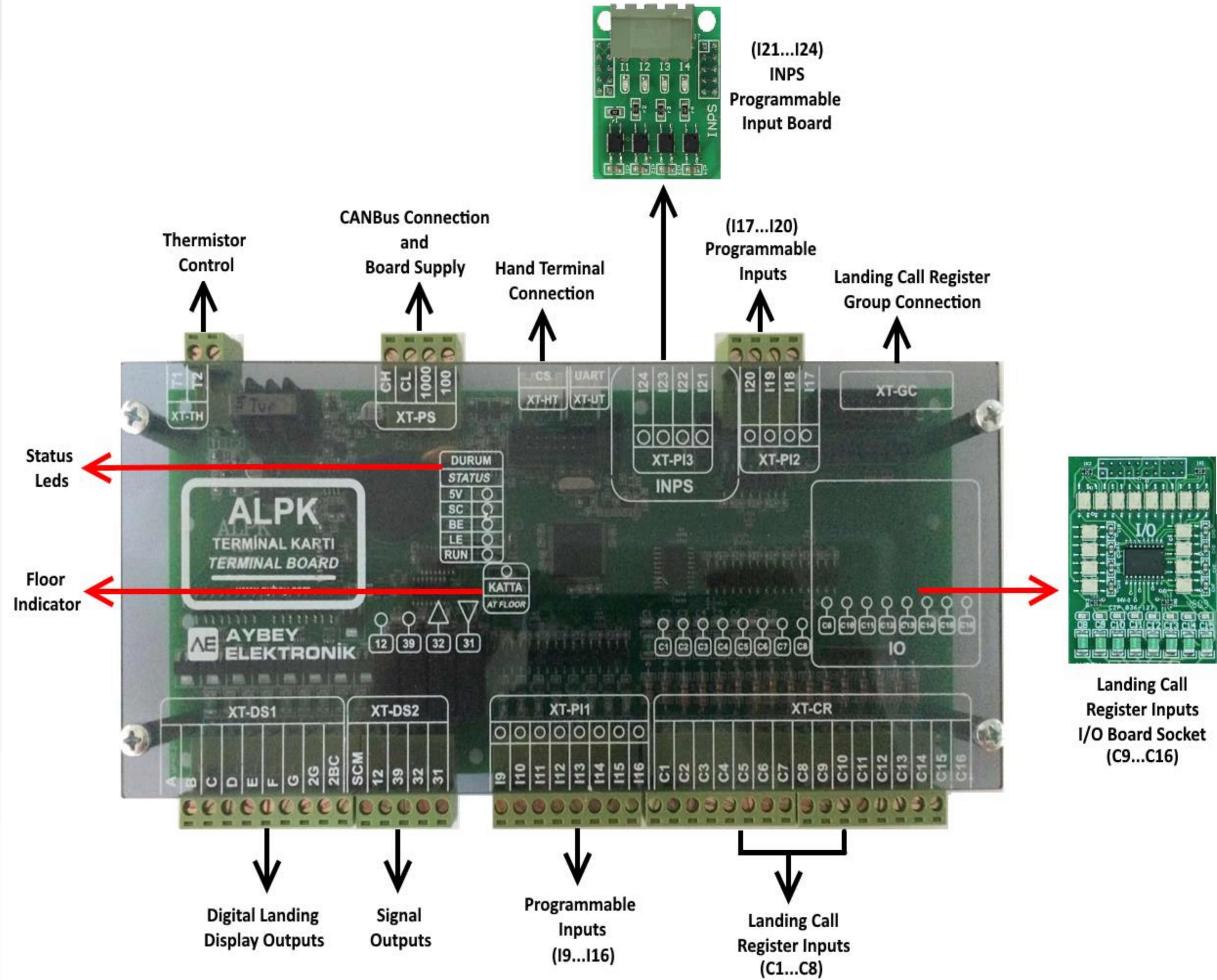
- AE-MAESTRO communicates with **car** over **CAN-Bus** all the time.
- **CAN0** is typically reserved for car communication.
- **ALPK** is mounted into control panel and connected to CAN0 circuit.
- **The terminal board ALPK has 8 call registers onboard.** That means 16 stops for simple push button, 8 stops for simple collective, 9 stops for full collective.
- If more number of call registers needed, then **CAN-I/O** board is connected to CAN0 circuit therefore 16 more call registers are added to the system.
- If used, Shaft pit board SPT must be selected and connected to **CAN1**.

## SYSTEM BOARDS IN NON-PREWIRED CONNECTIONS



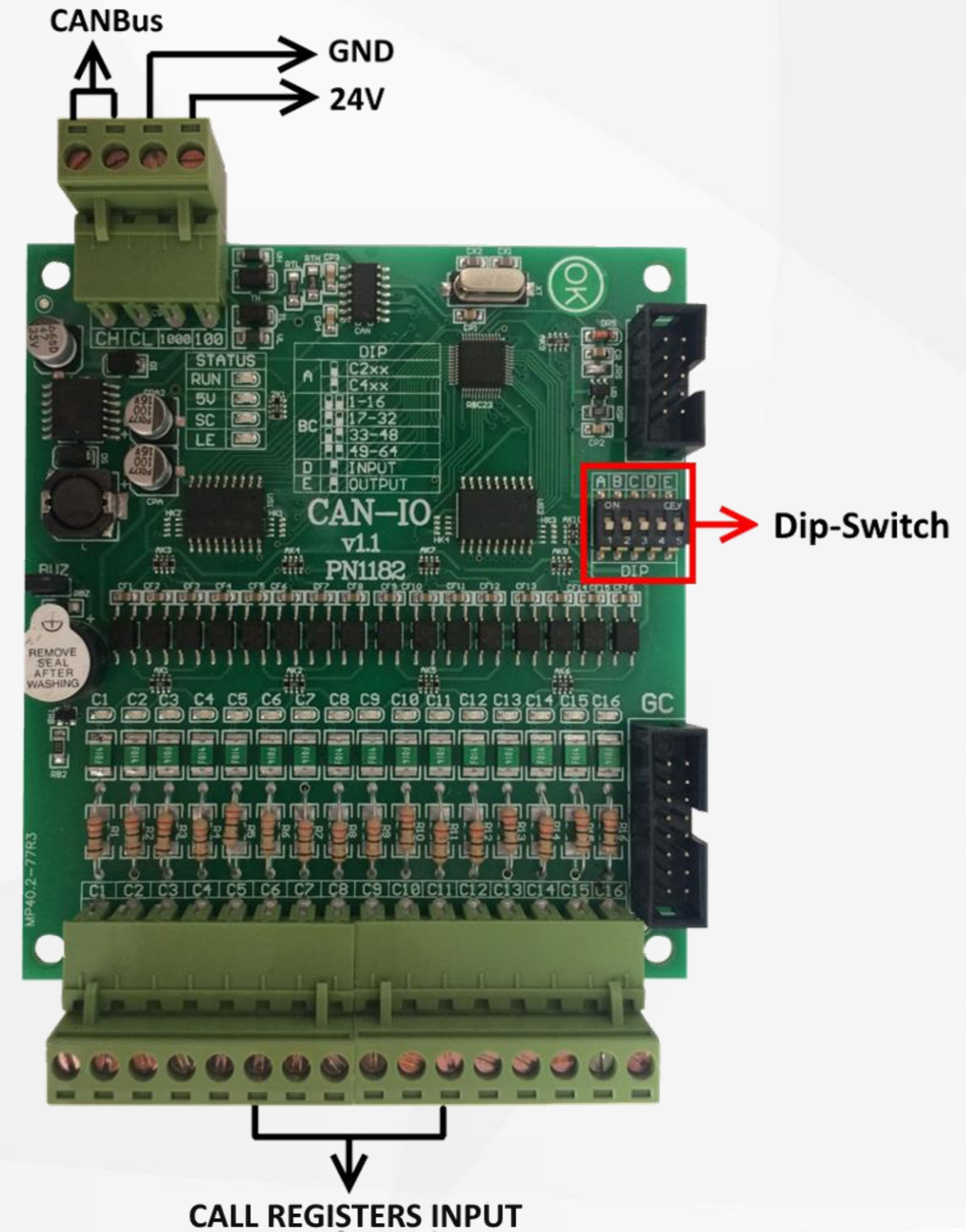
## ALPK Terminal Board

- This is a terminal board of AE-MAESTRO control system.
- It communicates with AE-MAESTRO by CAN-Bus.
- There are typically 8 call registers on it. Possible to increase number of registers to 16 by I/O option board
- Number of landing calls can be increased by option board CAN-I/O.



## CAN-IO BOARD

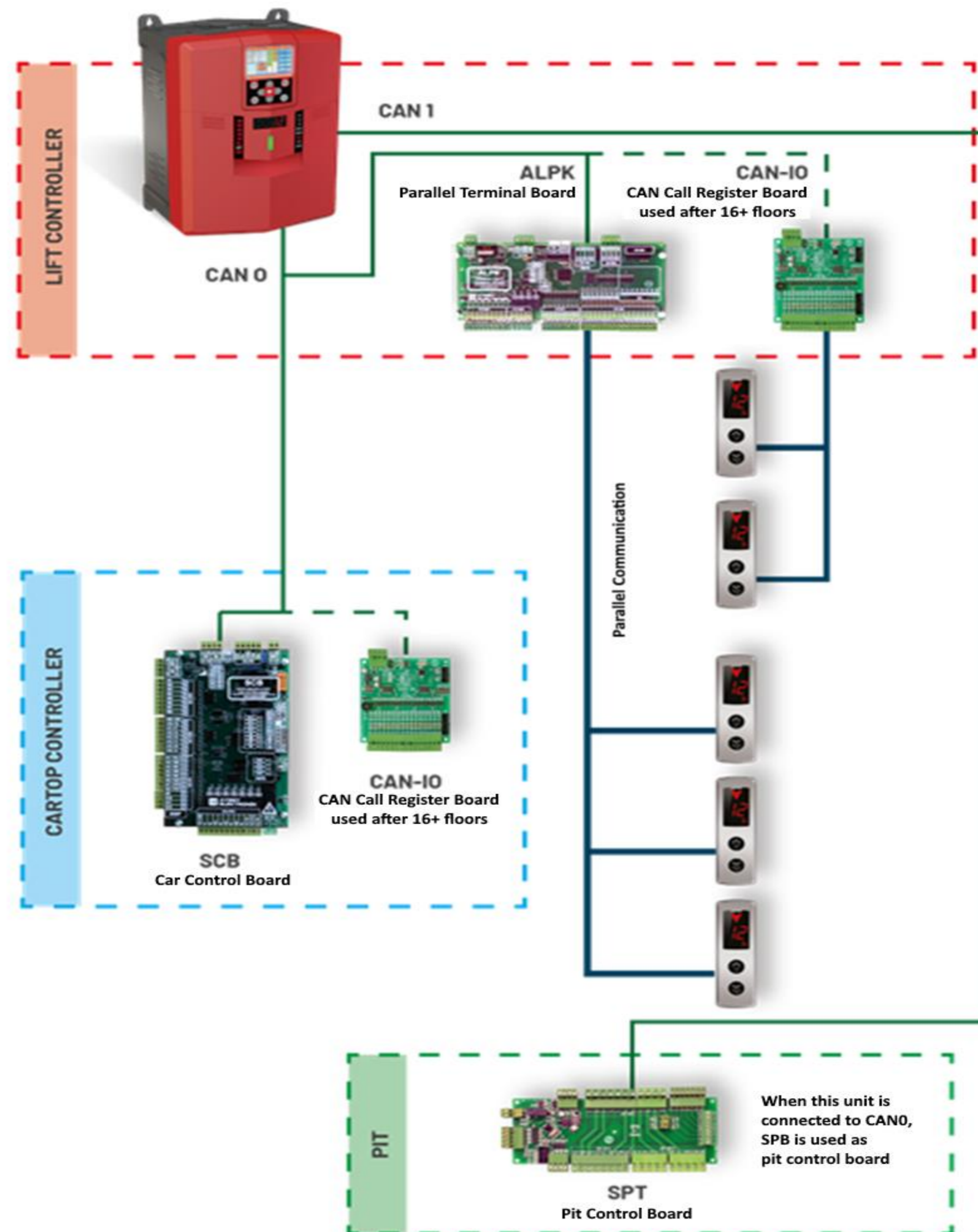
- CAN-IO board is used to increase number of landing and car calls.
- Used for more than 16 landing calls in car serial communication.
- Used for car calls in case of more than 16 stops.
- Every CAN-IO board provides 16 more call registers.
- It communicates with the main control board by CAN-Bus.





- **SCB** is used as car control board in **non pre-wired** systems.
- **SCB** stores **16 car calls**. That means enough for **16 floors**.
- If total number of floors exceeds 16 then a **CAN-I/O** board is connected to CAN0 circuit therefore 16 more call registers is added to system.
- By this way, lift system extends up to 64 floors by connecting 3 CAN-I/O board.

## SYSTEM BOARDS IN NON-PREWired CONNECTIONS

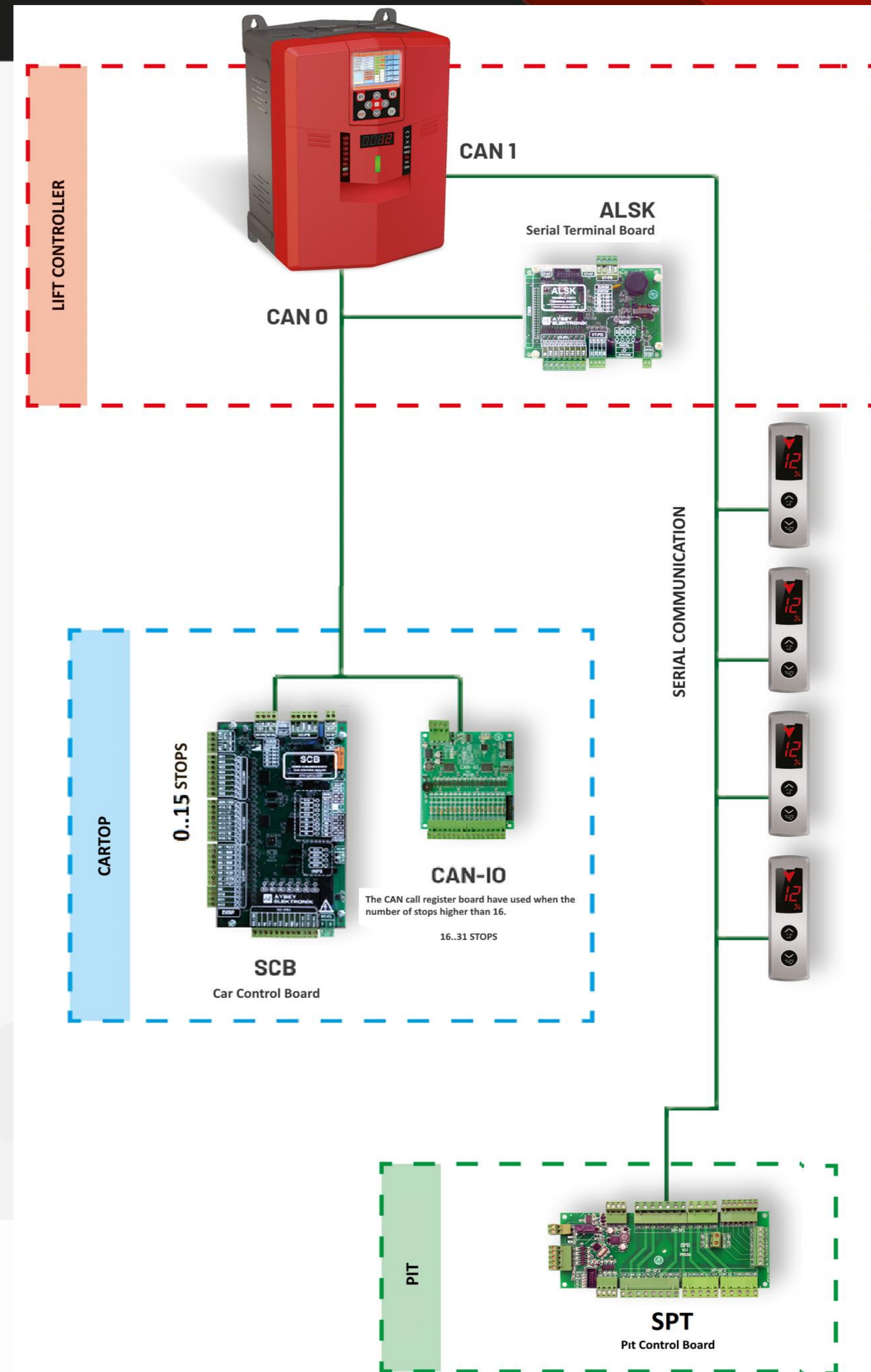




# FULL SERIAL w/o PRE-WIRED

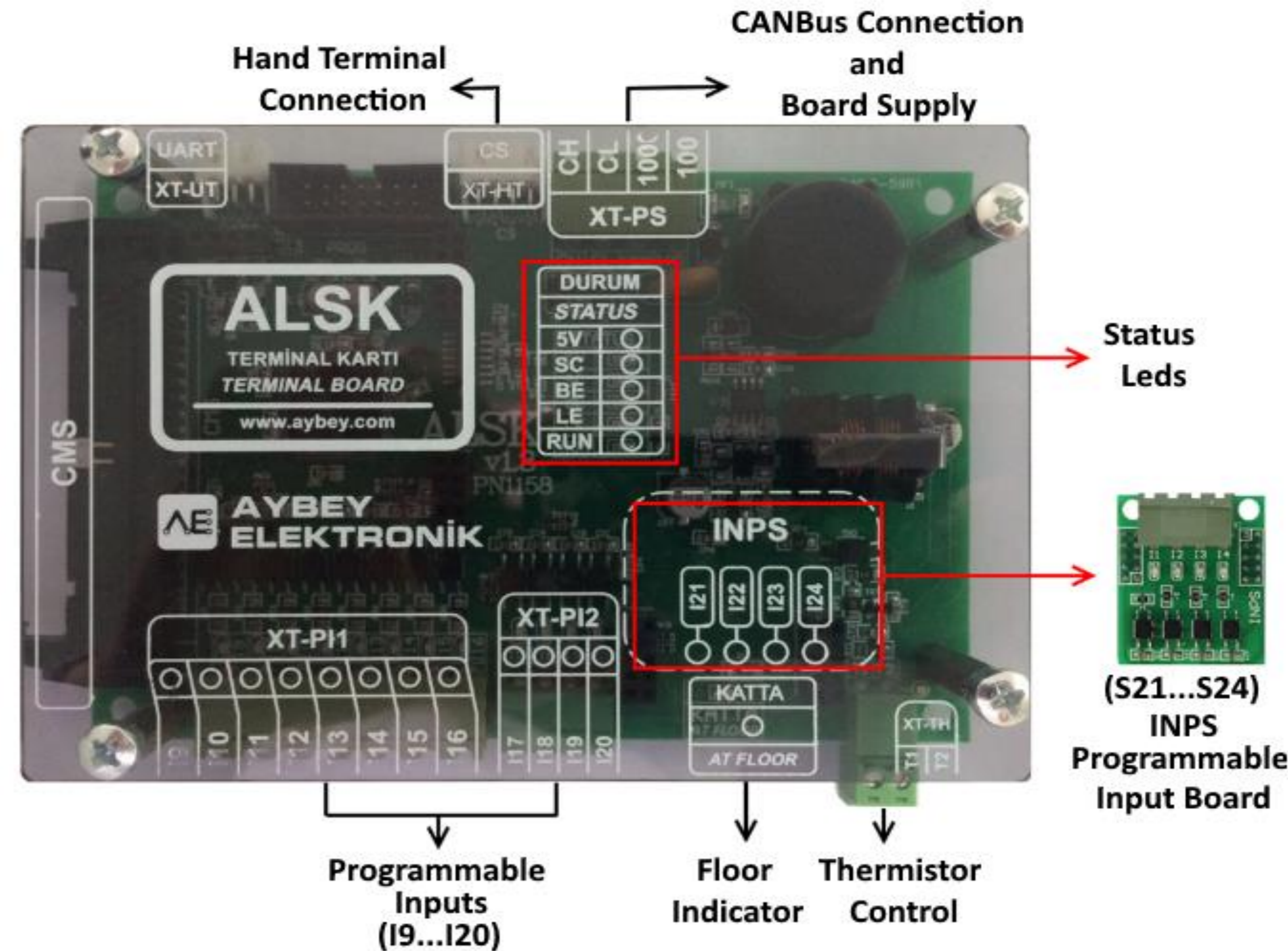


- ALSK is used as panel-in auxiliary board in case of full serial communication including pit end, and connected to CAN0 line.
- **Landing panel** is serial connected to **CAN1** line.
- CAN1 is a **high speed** CAN interface and drives serial communicating landing panels of **ALYA-BELLA** series.
- If used, **SPT** must be selected as pit end board and be connected to CAN1 line.
- If **EVOS-LUNA** series landing panels are requested to be used (only simplex systems), then those can run by mounting CSI CAN interface to **CAN2 socket**. In this case, SPB as pit end board must be used.
- **SCB** is used as car control board in **non pre-wired** systems.



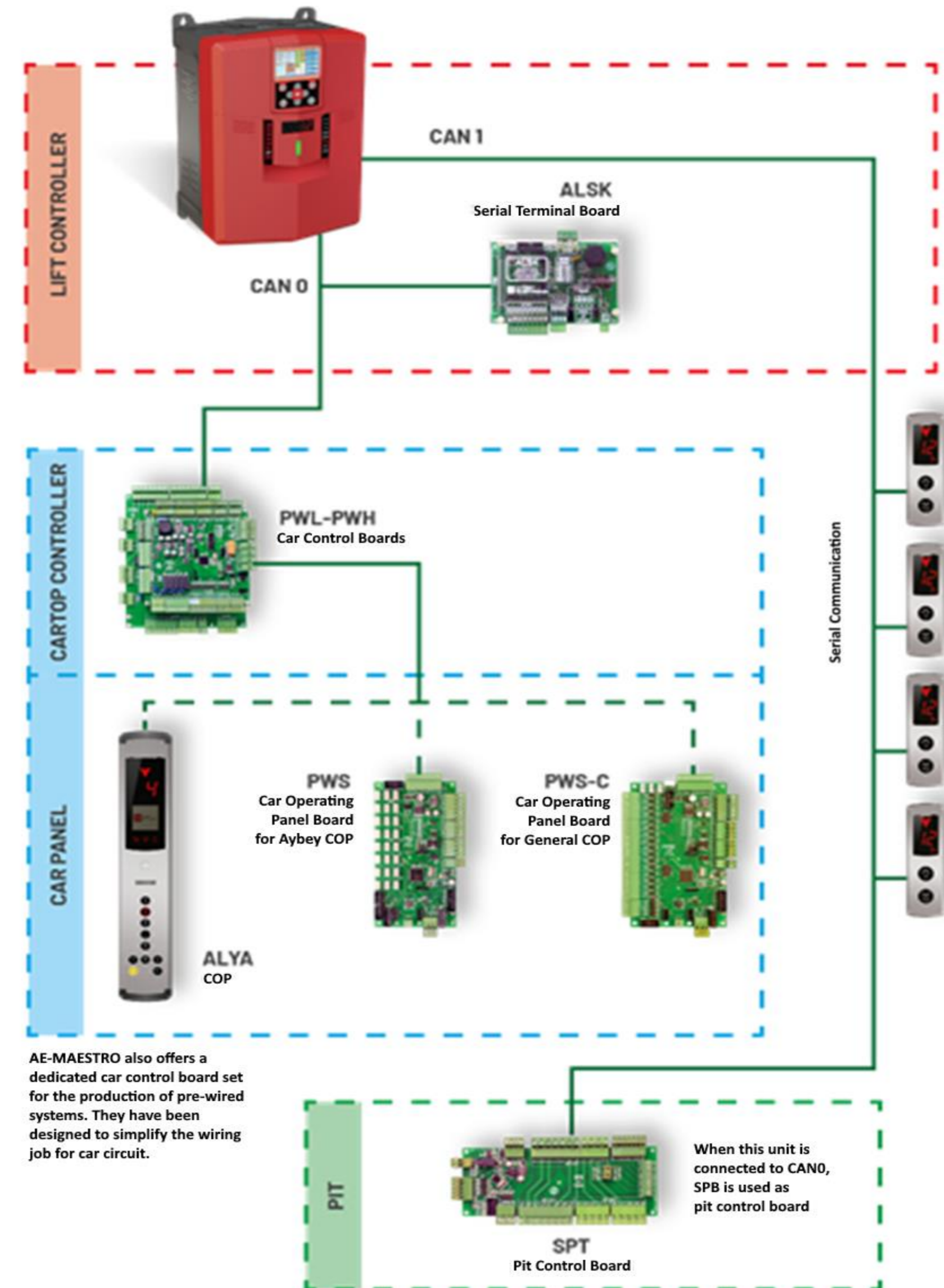
## ALSK Terminal Board

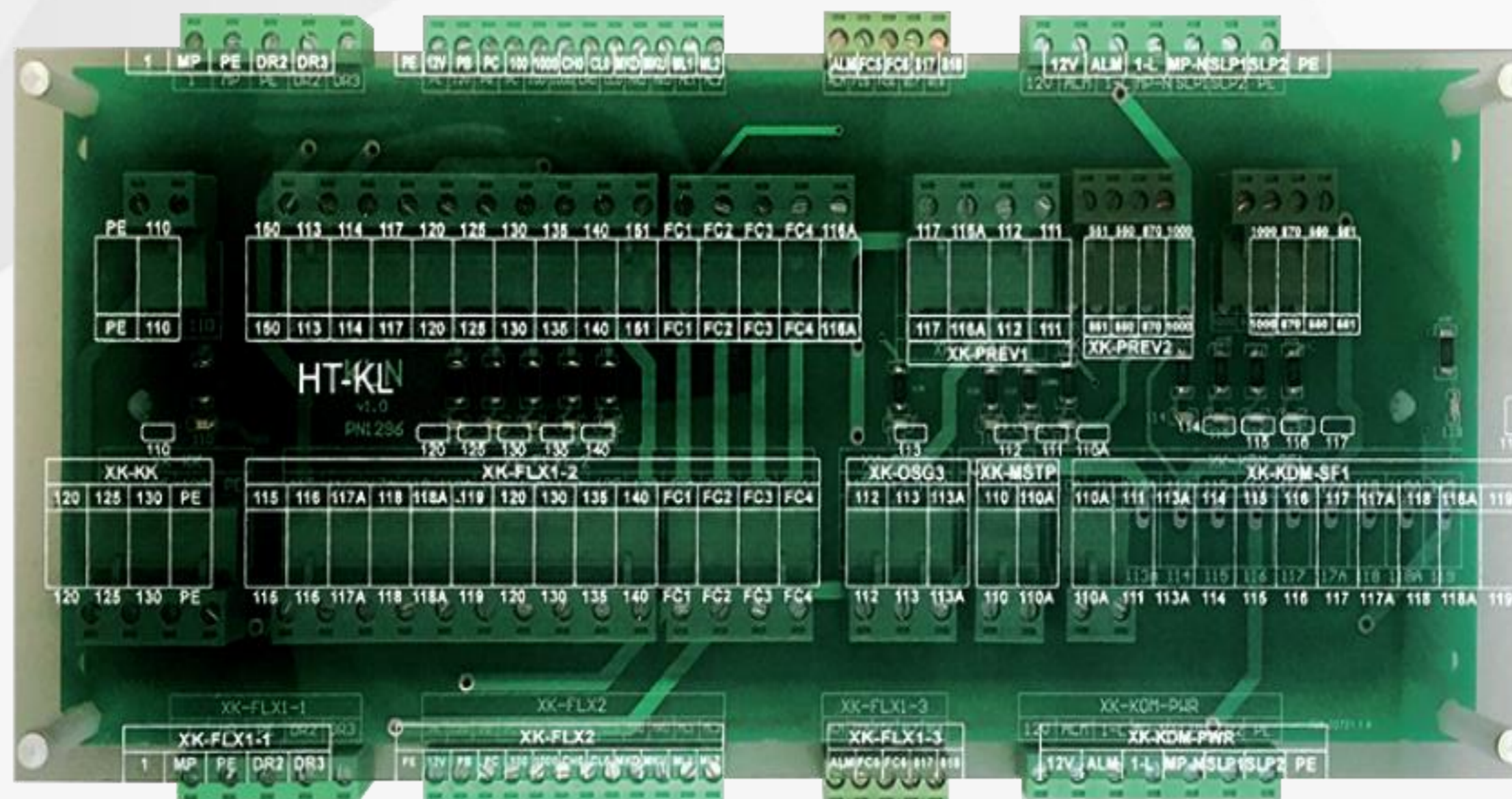
- It is the terminal board of AE-MAESTRO system in full serial communication.
- Communicates with AE-MAESTRO over CAN-Bus.



- Components used in connections of landing and panel in full serial communication systems are the same in pre-wired systems.
- The difference is the cabinet circuit comparing to non pre-wired systems.
- Cabinet control board consists of two boards called as **PWL-PWH**.
- Those board are directly connected to flexible cable.
- 10 wire cable from PWL goes to cabinet panel.
- **PWS** located inside car panel drives buttons.
- **PWS-C** board has to be selected in case of other brand car panel.
- **ALYA – BELLA** series car panel is directly connected to **PWL** . No need for PWS board.

## SYSTEM BOARDS IN PREWIRED CONNECTIONS





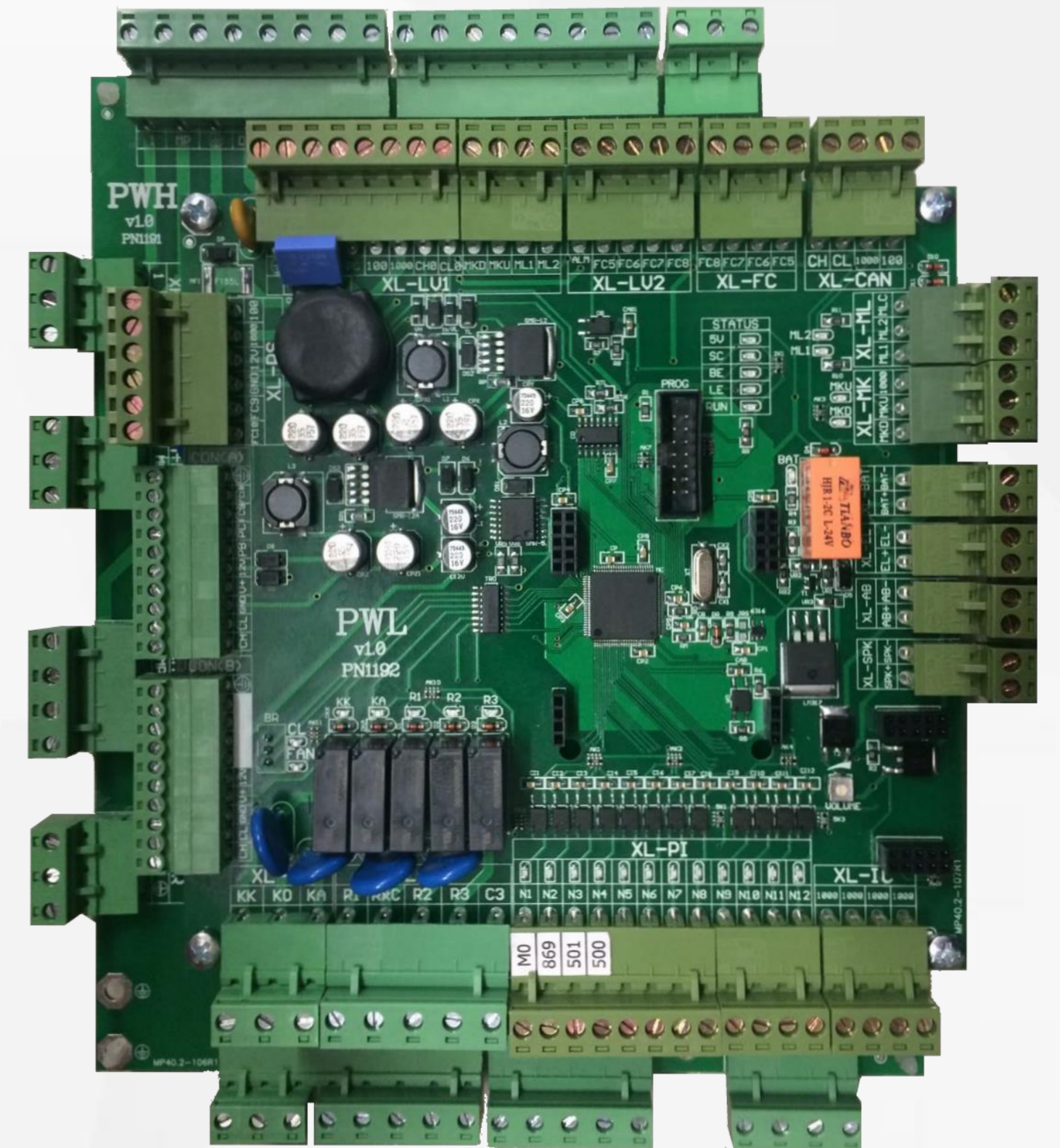
HT-KL Board serves as the terminal of the controller in pre-wired systems.

The terminals for the flex cable are on HT-KL board.

There are two pieces flex cables between car and controller, one 12 the other 24 wires.

## CAR CONTROL BOARDS IN PRE-WIRED SYSTEMS – PWL-PWH

- Those are car-top control boards in pre-wired systems.
- PWL provides communication between car board (PWS) and AE-MAESTRO.
- PWL is the board for low voltage(24V) terminal connections. (for example: Alarm, battery, magnetic switch,programmable input and output connections, etc.)
- PWH is a transition board for high voltage(220V) terminal connections (For example: Automatic door supply voltage, cabinet light, power outlet, photocell supply voltage, fan, etc...)
- **ALYA ve BELLA** series car panel could be directly connected.
- Supports 2 car panels.



## CAR PANEL BOARD FOR PRE-WIRED SYSTEMS : PWS

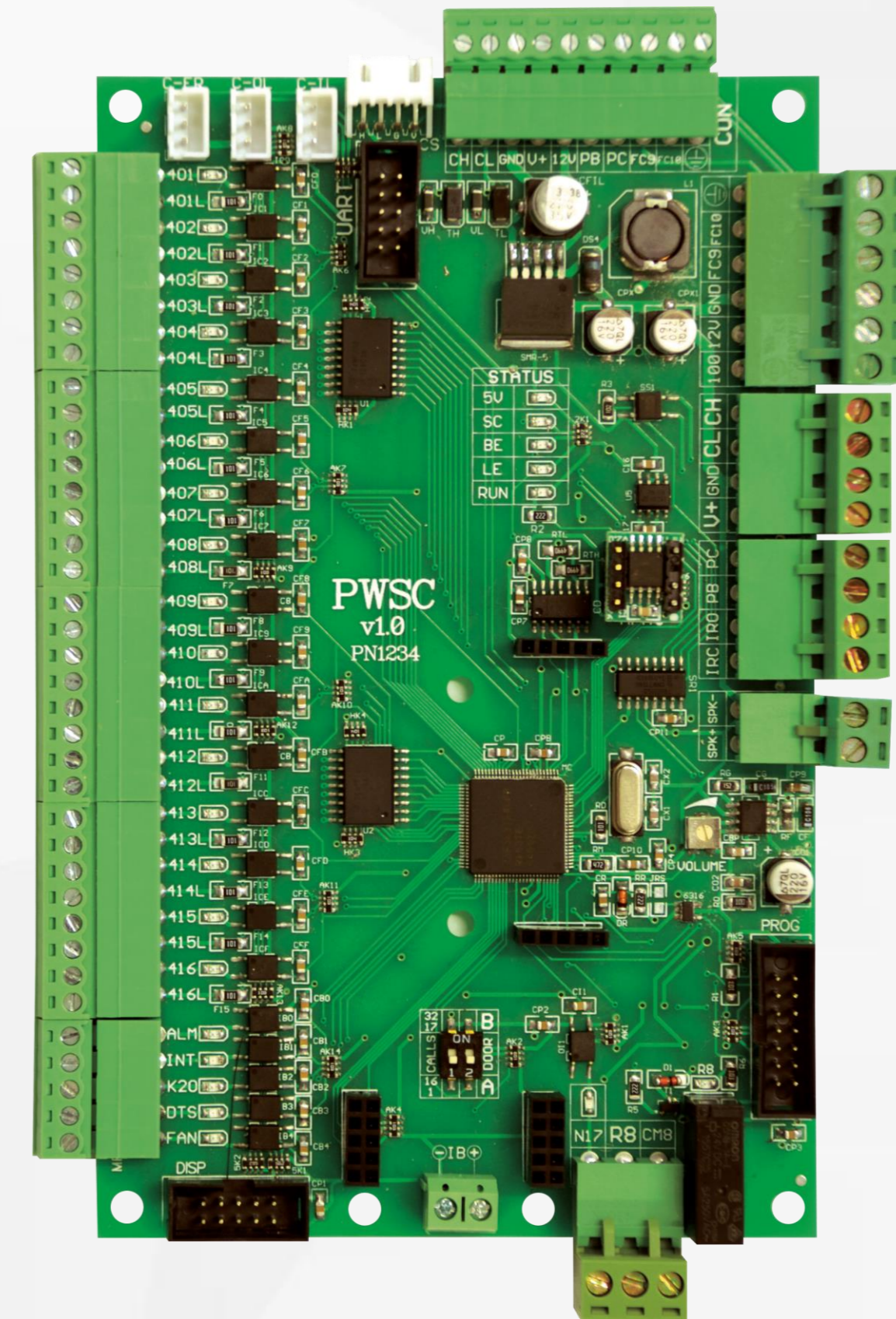
- Car panel board for pre-wired systems.
- Used in KVP, KSP and KSD Series AYBEY car panels.
- Drives Aybey pre-wired buttons.
- Announce system(AFMS) is available on the board.
- 2 PWS used in case of double car panels.
- Connections of Intercom, alarm, fan, opening/closing door, etc...are done through this board.

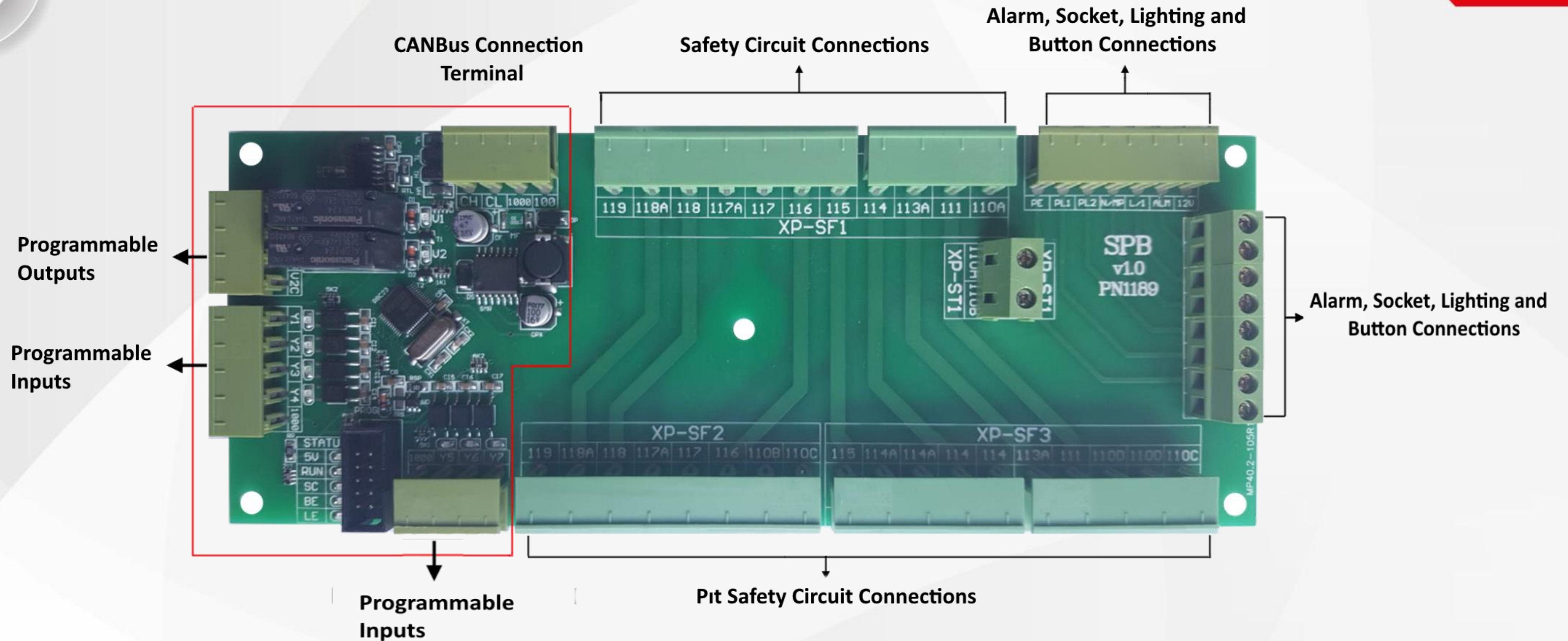




## PWSC CAR PANEL BOARD FOR PRE-WIRED SYS.

- Car panel board for pre-wired systems
- General-purpose car panel button driver board.
- Announce system (AFM) is available on the board.
- 2 PWSC are used in case of double car panels.
- Connections of Intercom, alarm, fan, opening/closing doors, etc... are done through this board.





- Pit end board is used as a junction box for safety circuit connections between inspection box and mainboard.
- Inputs at the pit end are transmitted to mainboard by CAN-Bus.
- Included by pit end unit.
- SPB is used in fault tolerance application and SPT in high speed applications.

## Number of Programmable Inputs

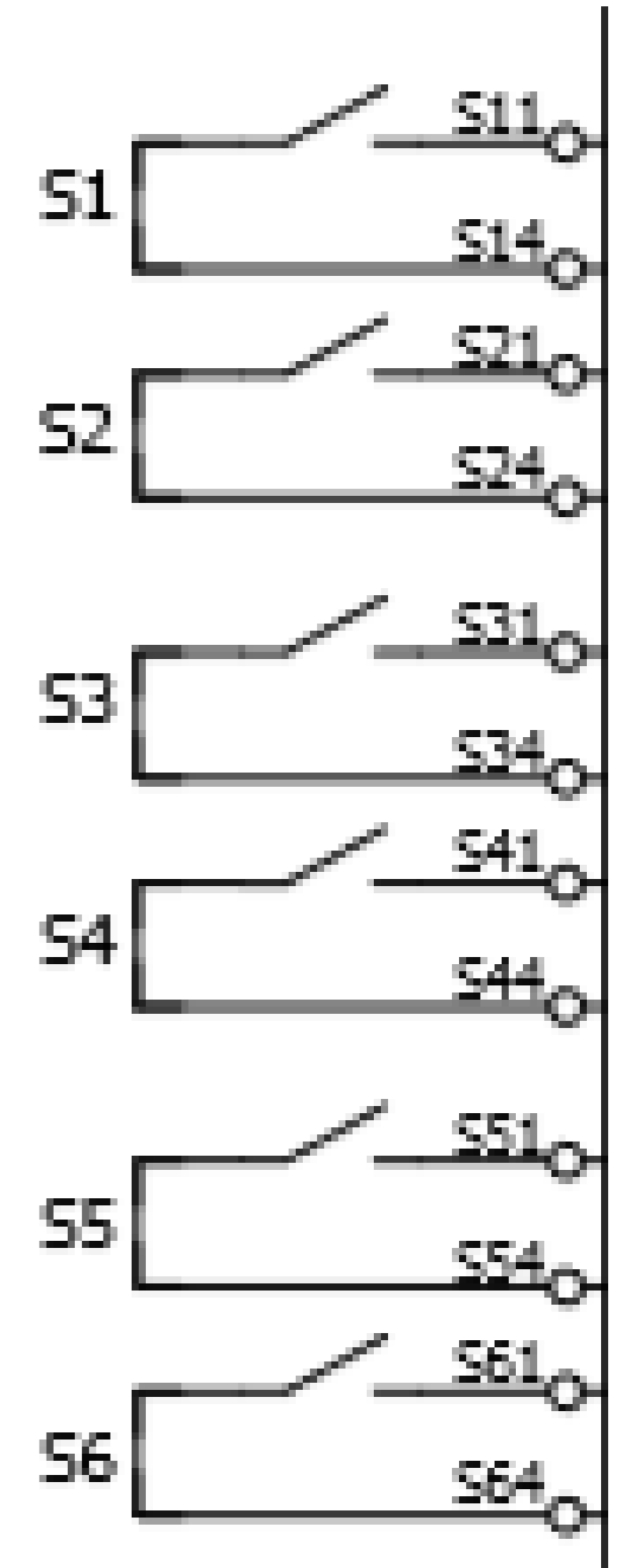
|                          | Default | Optional |
|--------------------------|---------|----------|
| AE-MAESTRO Control Board | 8       |          |
| ALSK Terminal Board      | 12      | 4 (INPS) |
| SCB Car Control Board    | 12      | 4 (INPS) |
| PWL Car Control Board    | 12      | 4 (INPS) |
| PWS Car Panel Board      | 1       | 4 (INPS) |
| SPB Pit End Board        | 7       | -        |

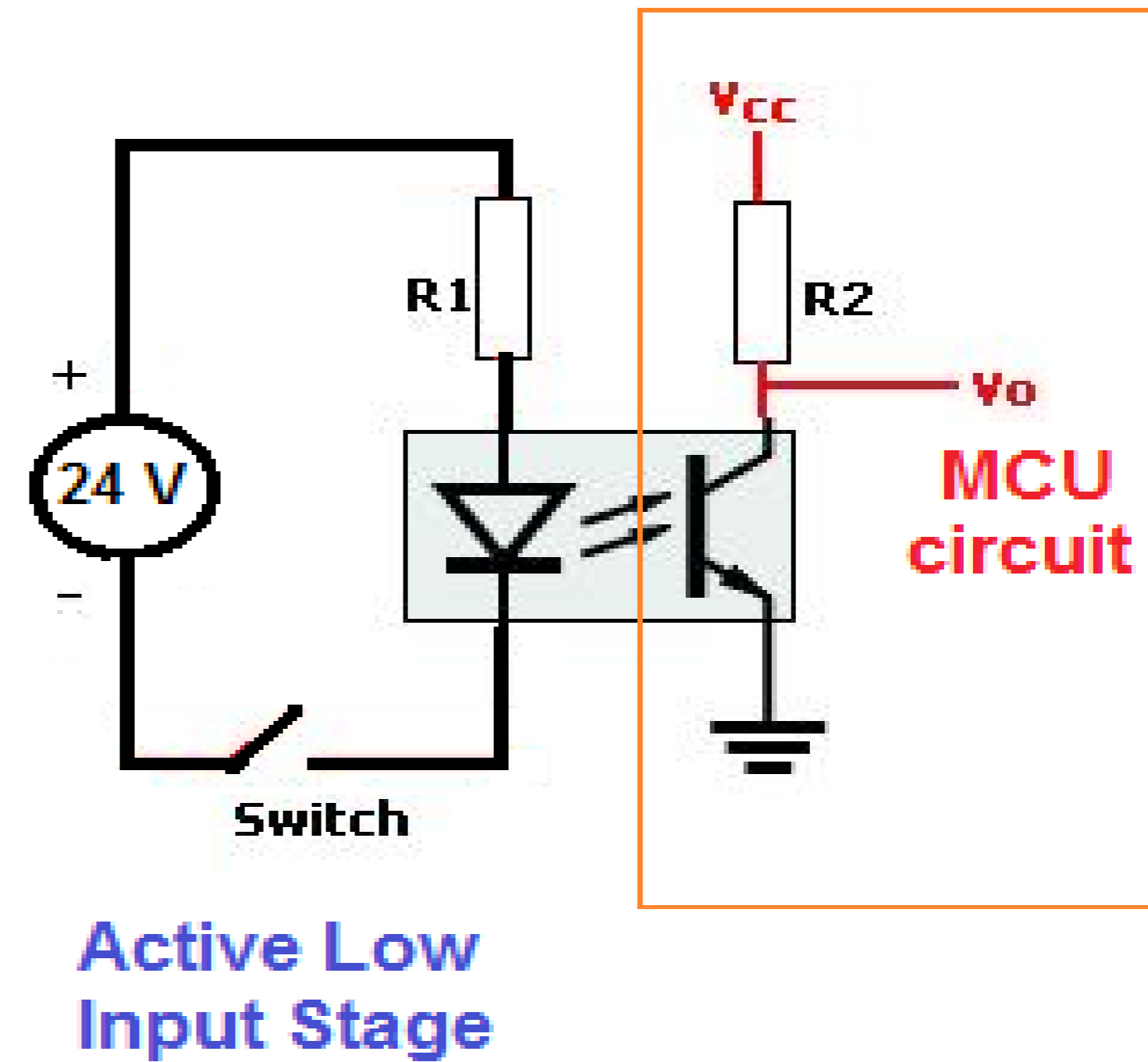
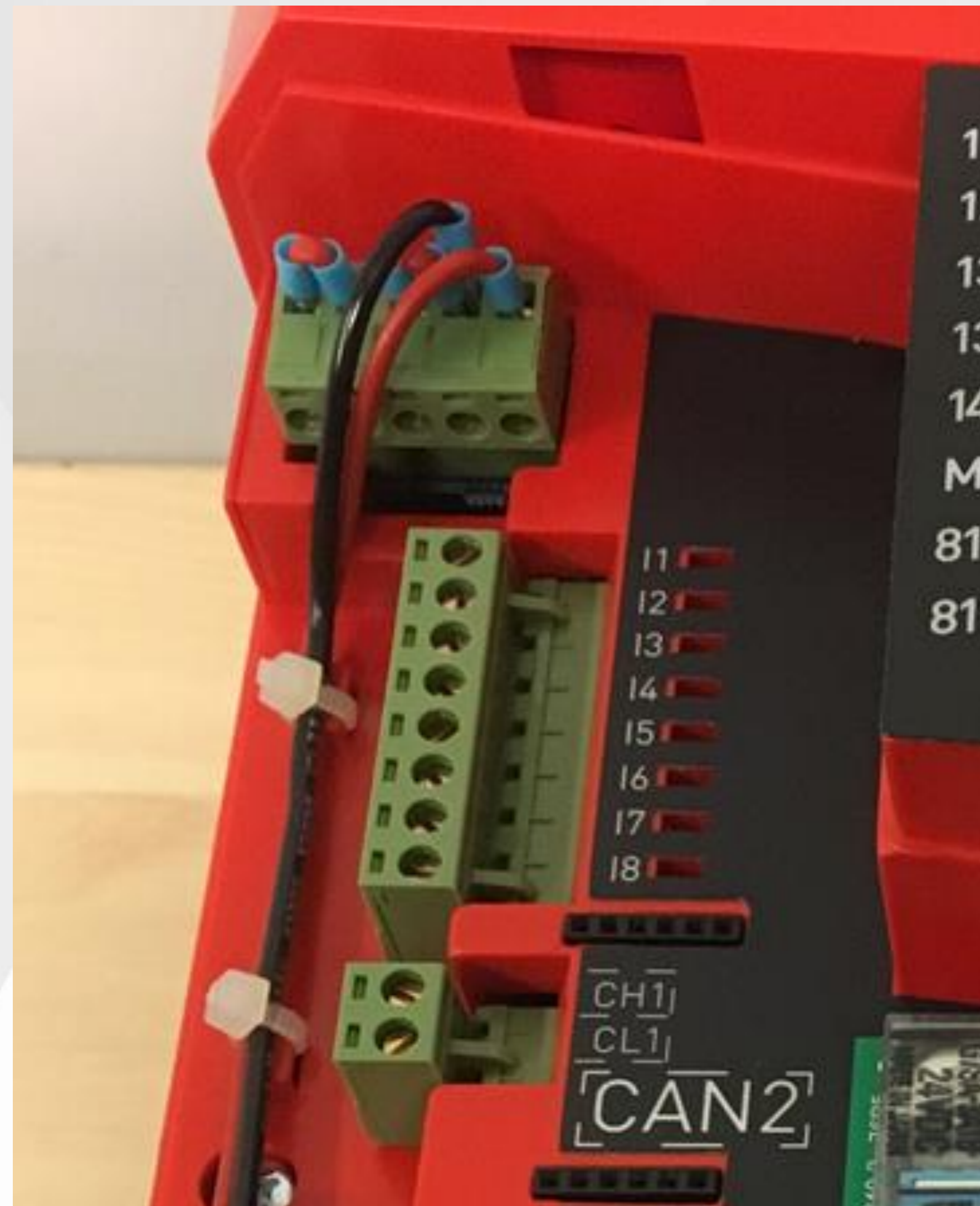
## Number of Programmable Outputs

|                          | Default | Optional       |
|--------------------------|---------|----------------|
| AE-MAESTRO Control Board | 6       |                |
| SCB Car Control Board    | 5       | 8 (EOR or SDE) |
| PWL Car Control Board    | 3       | 4 (OUT)        |
| PWS Car Panel Board      | 1       | -              |
| SPB Pit End Board        | 2       | -              |



- There are 6 programmable N.O. relays on the device.
- Max. current for S1, S2, S3 is 10A.
- Max. current for S4, S5, S6 is 3A.





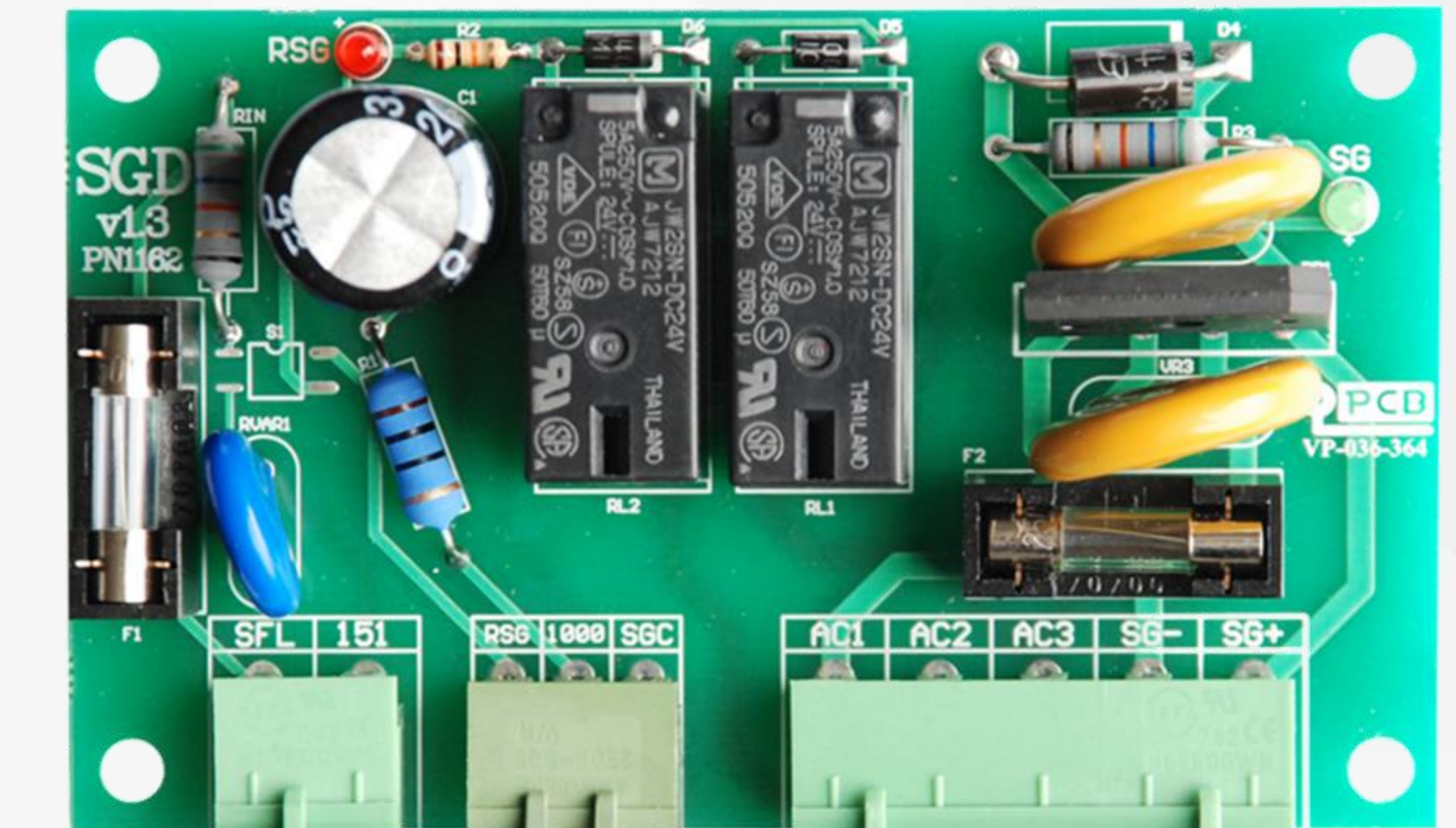
- All inputs except ML1-ML2 and safet circuit are active negative.
- It means that an input is assumed as active when connected to the earth reference (0V) of DC power supply.
- All inputs are galvanically isolated and connected to circuit by optical components.

| INPUT NO  | PLACE / SOCKET   | BOARD NAME                 | TERMINAL NAME |
|-----------|------------------|----------------------------|---------------|
| I1...I8   | PANEL / TERMINAL | AE-MAESTRO                 | I1...I8       |
| I9...I16  | PANEL / TERMINAL | ALSK / ALPK                | I9...I16      |
| I21...I24 | PANEL / TERMINAL | ALSK (INPS)<br>ALPK (INPS) | I21...I24     |
| N1...N12  | CAR / TERMINAL   | SCB / PWL                  | N1...N12      |
| N13...N16 | CAR / TERMINAL   | SCB (INPS)<br>PWL (INPS)   | I1...I4       |
| N17       | CAR / TERMINAL   | PWS                        | N17           |
| N18...N21 | CAR / TERMINAL   | PWS (INPS)                 | I1...I4       |
| Y1...Y7   | PIT CONTROLLER   | SPB/SPT                    | Y1...Y7       |

- Locations of programmable inputs are shown in the chart above.

# SGD Speed Governor UCM Control Coil Drive Board

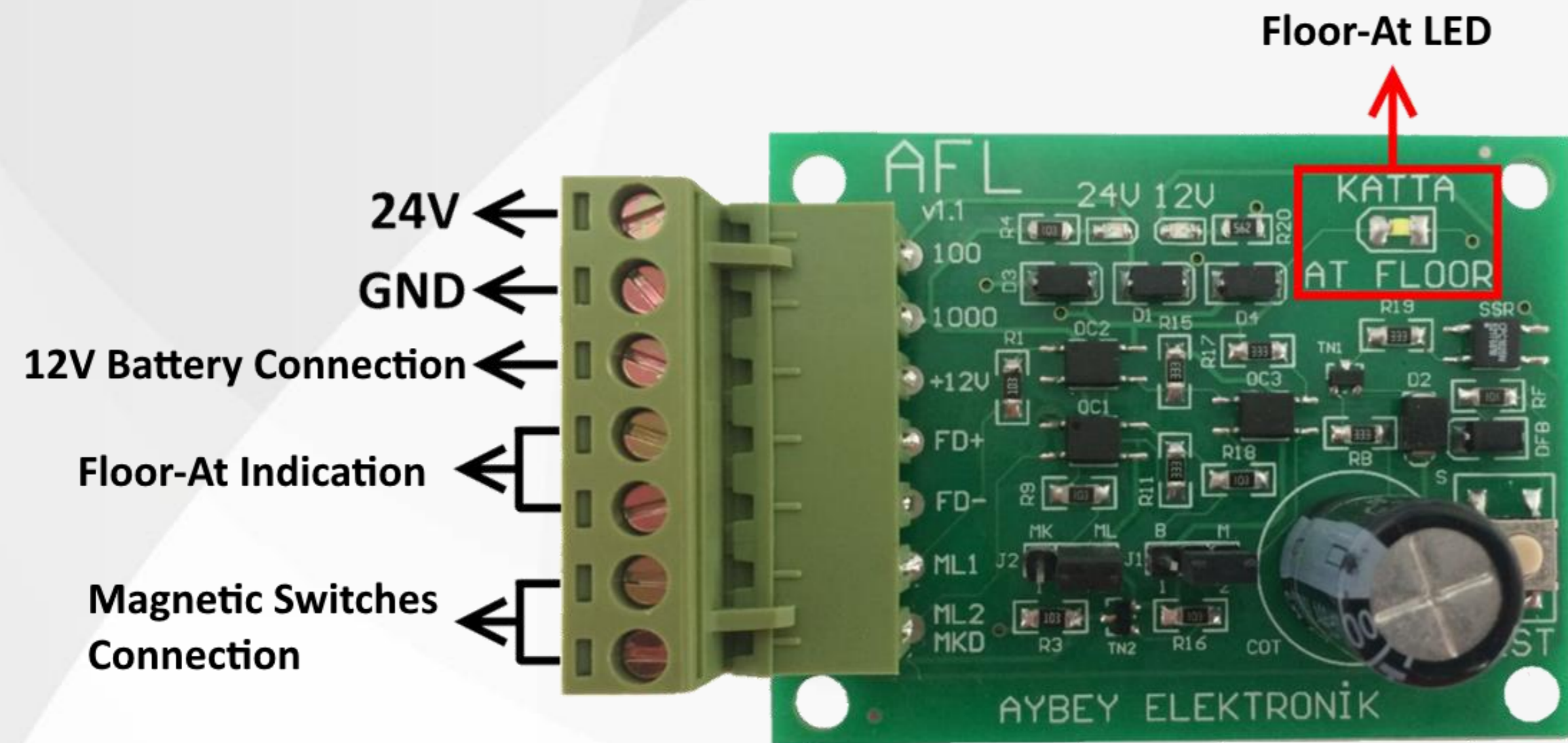
- It is a supply voltage board for UCM Governor coil at Speed governor.
- Located in Control Panel.
- Used in Asynchronous machine applications.
- Also possible to use it in gearless systems if parameter A27 is set to 1.
- No firmware inside.



### [A27] SGD in Gearless Machine

|   |   |
|---|---|
| 0 | <u>Not user</u><br>SGD board is not used in systems with gearless machines.                 |
| 1 | <u>Present</u><br>SGD board is employed for UCM purposes in systems with gearless machines. |

## AFL Car Floor-At Indicator Board



- It is a board of car floor-At indication (Floor-At LED is lit when lift is within door open zone.)
- No support from Battery charge but supplied by battery from inspection box when electricity goes out.
- It also may provide external output of floor-at indication (by 12VDC)
- It may work with monstable or bistable magnetic switches.
- Located in control panel.



## OPTION BOARDS

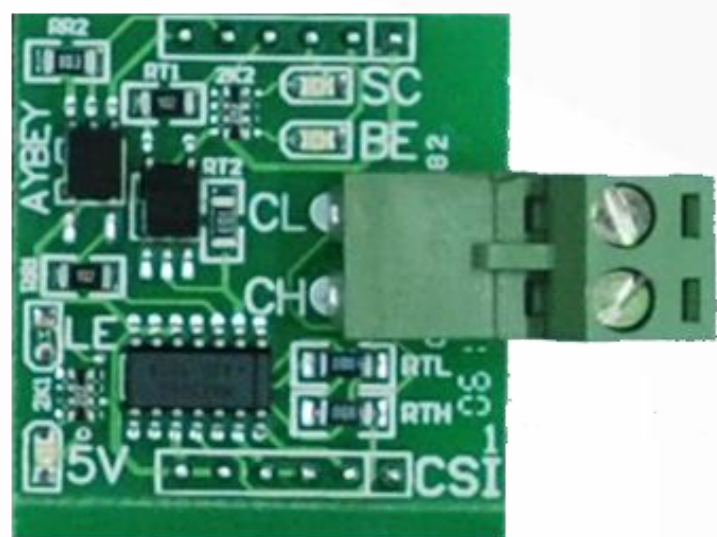
**CSI** : CAN-Bus interface Board for fault tolerant.

**CCI** : CAN-Bus interface board for high speed communication. It's used in landing panel circuit.

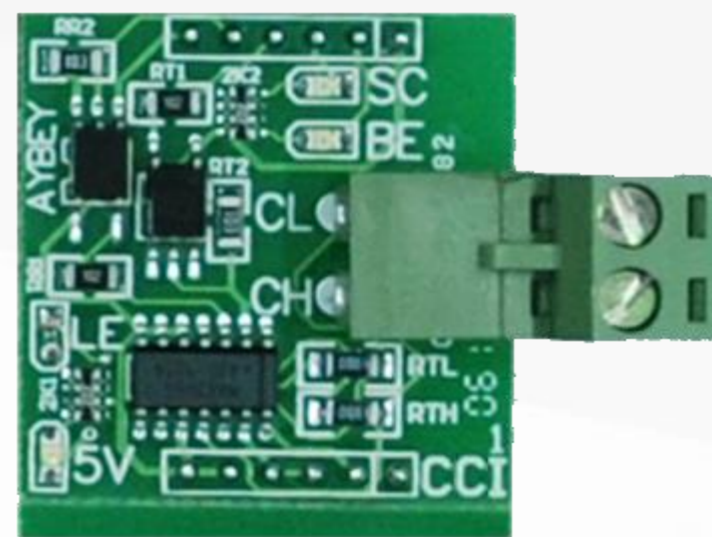
**INPS** : There are 4 programmable inputs on this board.

**OUT** : There are 4 programmable output relays on OUT board.

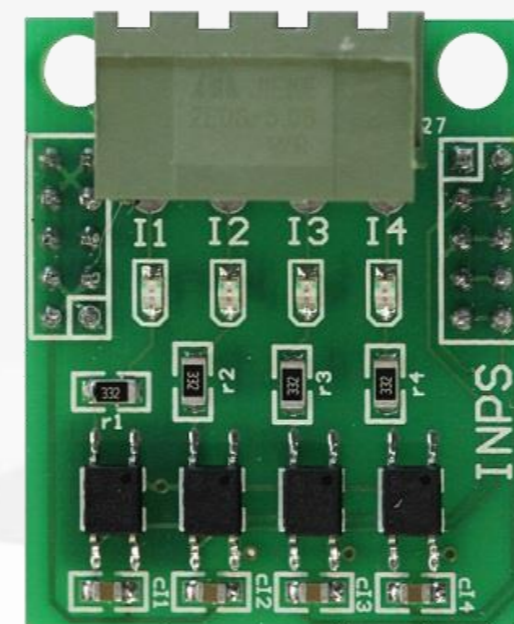
**IO** : Used to increase number of call registers on ALPK. This board provides additional 8 registers.



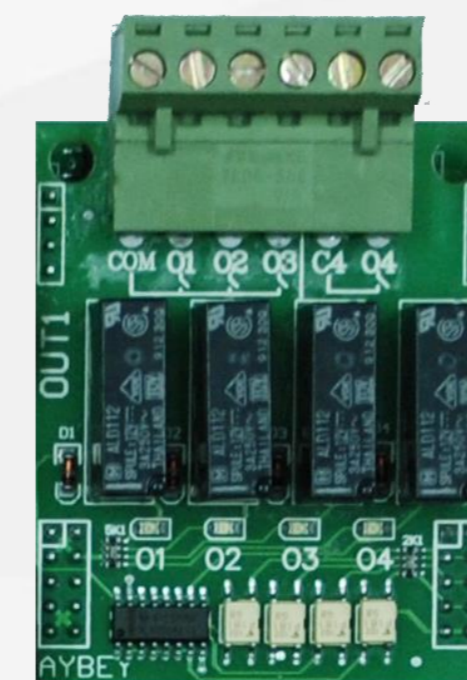
CSI



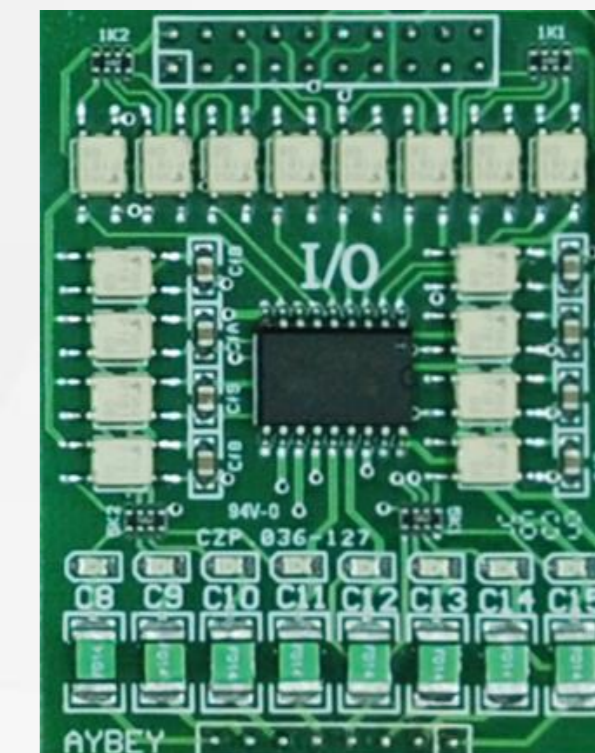
CCI



INPS



OUT

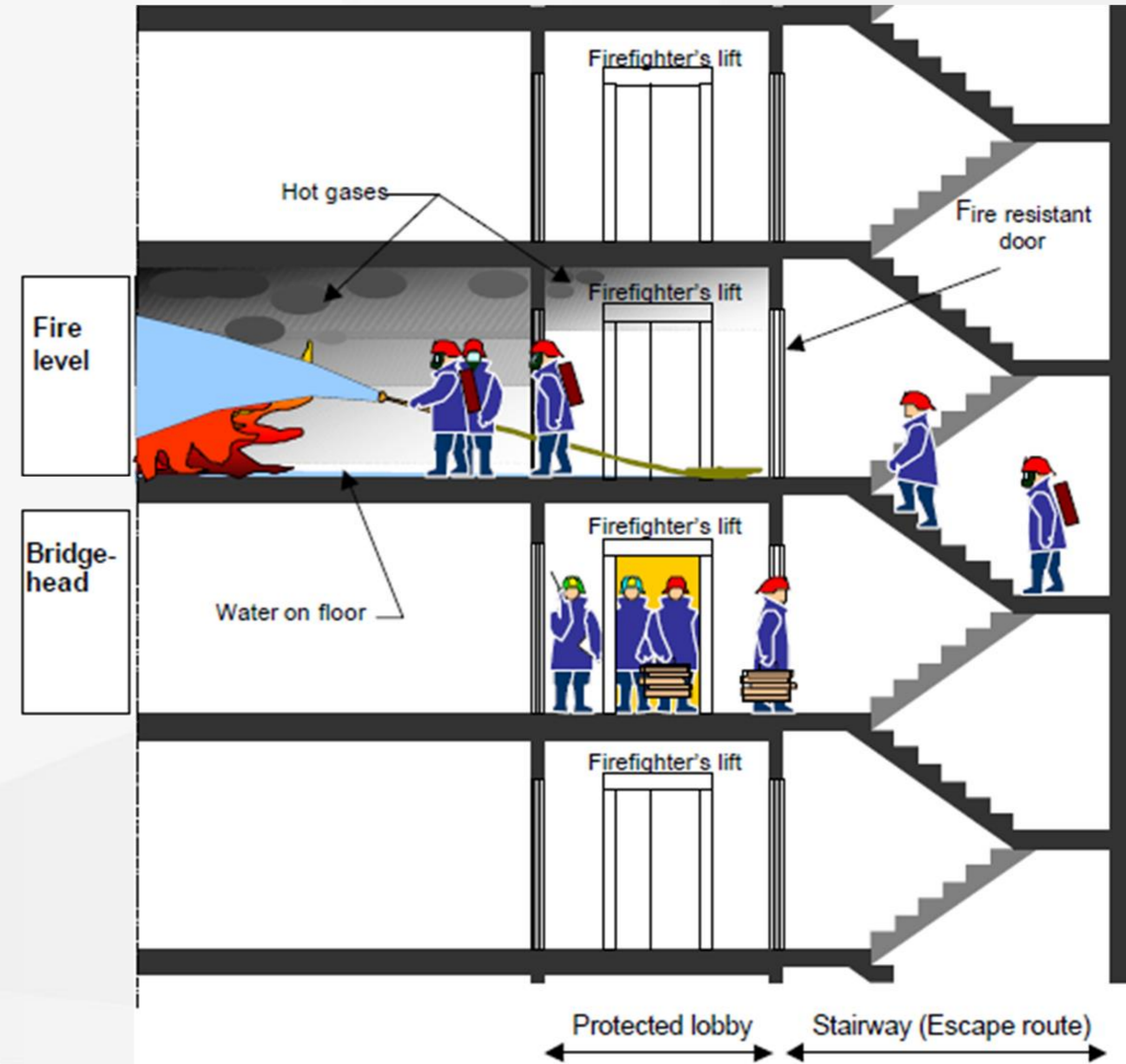


IO

## [A14] FIRE STANDARD

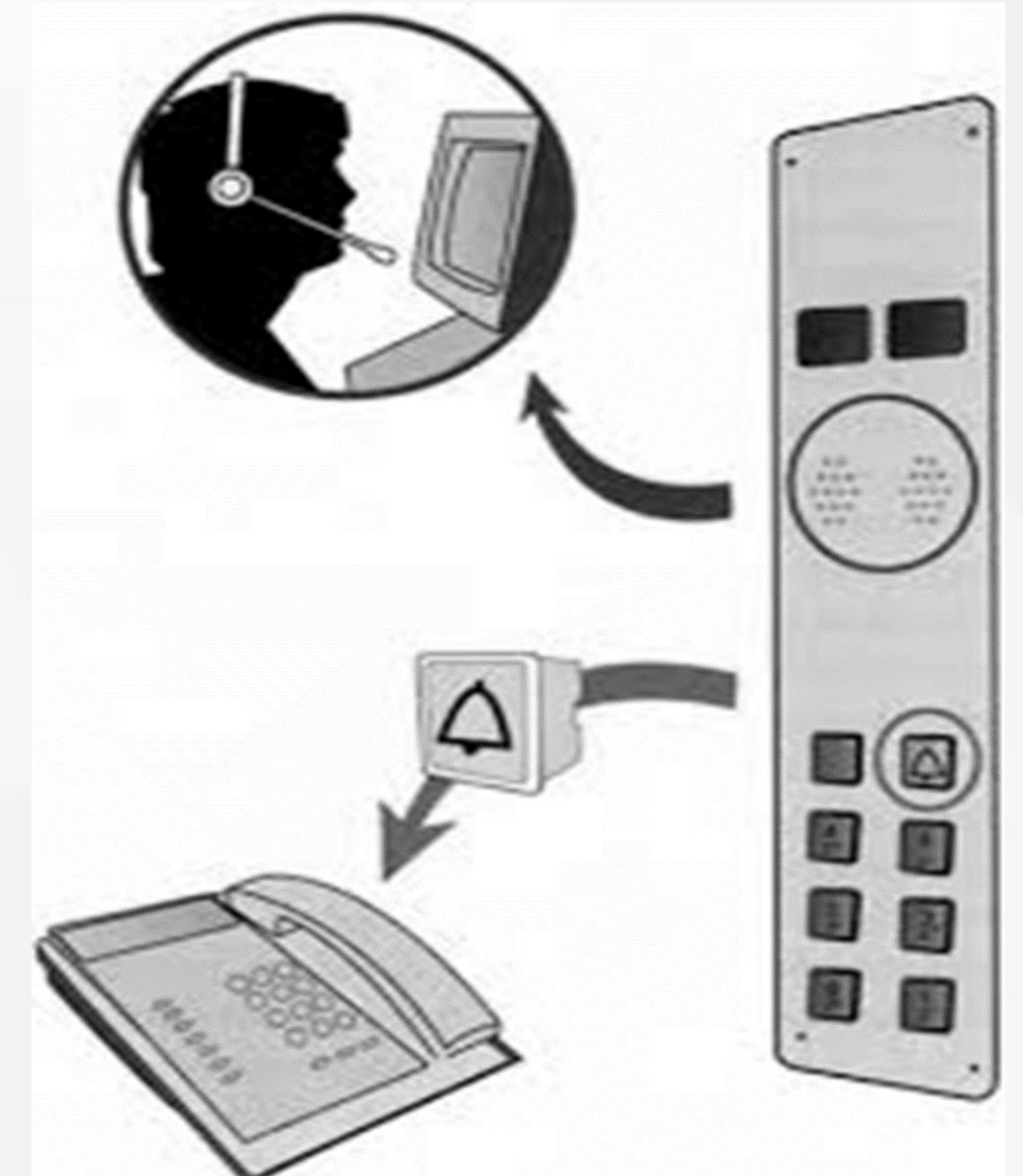
|   |   |
|---|---|
| 0 | EN81-73   |
| 1 | EN81-72 Fire fighter Lift                         |
| 2 | EN81-72 Fire fighter Lift with car fireman switch |
| 3 | Reserved  |
| 4 | EN81-73 with blocking after operation             |

- AE-MAESTRO provides at the time of fire behaviour complying with **EN 81 – 73** standard supports fireman lift standard **EN81-72**.
- **4 different target floors** for fire could be defined.





- AE-MAESTRO supports remote communication standard **EN 81 – 28**.
- It includes function of ALARM FILTER which prevents unnecessary usage of Emergency call phone.



**Access to AE-MAESTRO CONTROL SYSTEM**

- Computer access over USB and Ethernet
- Computer access over Local Network (LAN) or internet
- Access by hand terminal in pit where CAN line is available



## REMOTE ACCESS OPTION BOARD

**USN** : USB interface board..

**ETN** : Ethernet interface board for local network or internet access.

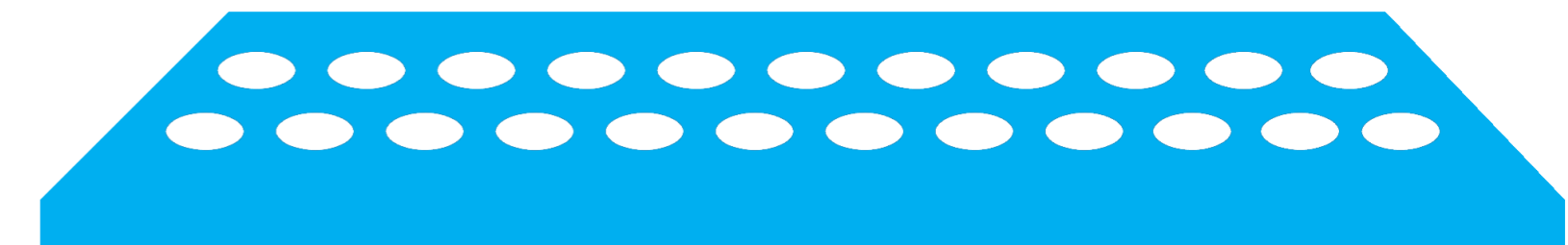
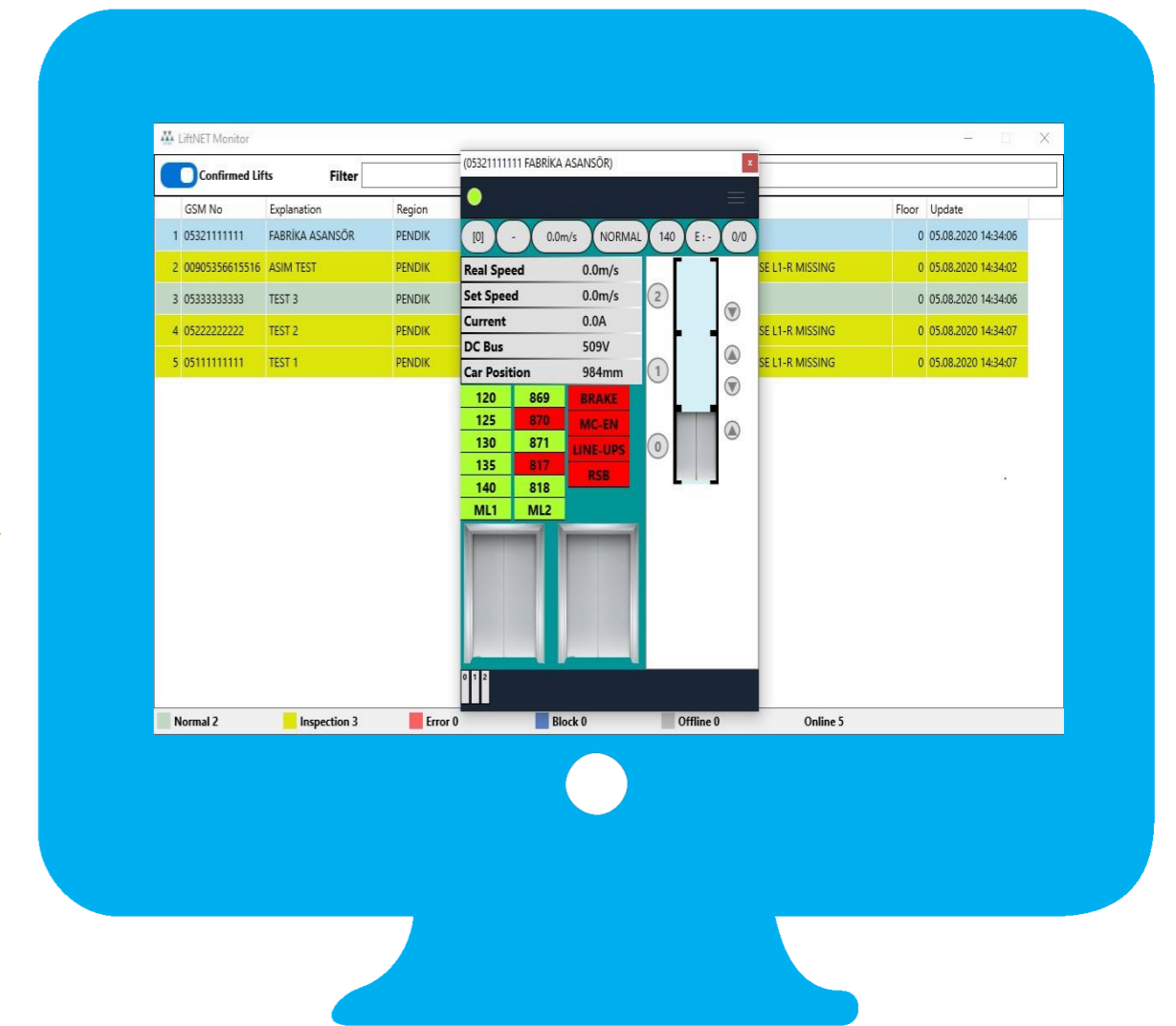
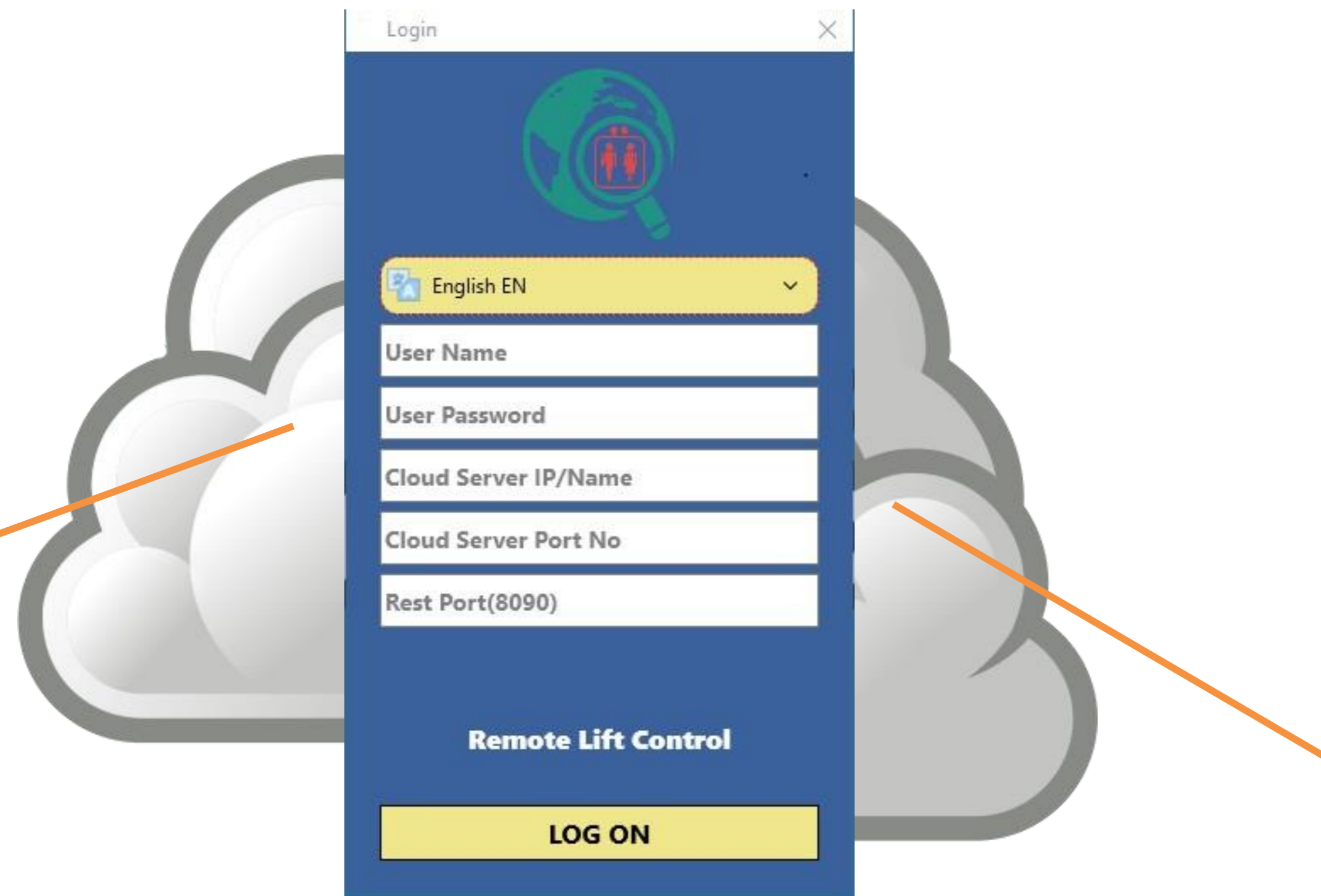


USN



ETN

# COMPUTER COMMUNICATION



- Possible to connect to lift control panel over AybeyCloud.
- Lift companies may check all maintenance periods of lifts by getting cloud services.
- Control panel may connect to cloud service by GSM communication as well.

# COMPUTER COMMUNICATION

LiftNET Monitor - □ ×

Confirmed Lifts Filter

|   | GSM No         | Explanation     | Region | Region Group | Mode         | Fault                 | Floor | Update              |  |
|---|----------------|-----------------|--------|--------------|--------------|-----------------------|-------|---------------------|--|
| 1 | 05321111111    | FABRIKA ASANSÖR | PENDIK |              | 1 NORMAL     | -                     | 0     | 05.08.2020 14:33:06 |  |
| 2 | 00905356615516 | ASIM TEST       | PENDIK |              | 2 INSPECTION | 35 PHASE L1-R MISSING | 0     | 05.08.2020 14:33:02 |  |
| 3 | 05333333333    | TEST 3          | PENDIK |              | 1 NORMAL     | -                     | 0     | 05.08.2020 14:33:06 |  |
| 4 | 05222222222    | TEST 2          | PENDIK |              | 2 INSPECTION | 35 PHASE L1-R MISSING | 0     | 05.08.2020 14:33:07 |  |
| 5 | 05111111111    | TEST 1          |        |              | 2 INSPECTION | 35 PHASE L1-R MISSING | 0     | 05.08.2020 14:33:07 |  |

Save To File

Normal 2    Inspection 3    Error 0    Block 0    Offline 0    Online 5

- Could be categorized according to lift companies or regions.
- Users are authorized according to company or region.
- Lift companies may observe the most significant variables of lift.

# COMPUTER COMMUNICATION

The screenshot displays the LiftNET Monitor interface. On the left, a table lists confirmed lifts with columns for GSM No, Explanation, and Region. A central panel shows detailed status for lift (05321111111 FABRIKA ASANSÖR), including speed (0.0m/s), current (0.0A), DC Bus (509V), and car position (984mm). Below this, a table lists various parameters like BRAKE, MC-EN, LINE-UPS, and RSB. A diagram of the lift shaft shows the car's current position between floors 0, 1, and 2. On the right, a table shows floor and update information. At the bottom, a status bar indicates the lift's current state: Normal 2, Inspection 3, Error 0, Block 0, Offline 0, and Online 5.

| GSM No           | Explanation     | Region |
|------------------|-----------------|--------|
| 1 05321111111    | FABRIKA ASANSÖR | PENDIK |
| 2 00905356615516 | ASIM TEST       | PENDIK |
| 3 05333333333    | TEST 3          | PENDIK |
| 4 05222222222    | TEST 2          | PENDIK |
| 5 05111111111    | TEST 1          | PENDIK |

| Real Speed | Set Speed | Current | DC Bus | Car Position |
|------------|-----------|---------|--------|--------------|
| 0.0m/s     | 0.0m/s    | 0.0A    | 509V   | 984mm        |

| Parameter | Value | Status   |
|-----------|-------|----------|
| 120       | 869   | BRAKE    |
| 125       | 870   | MC-EN    |
| 130       | 871   | LINE-UPS |
| 135       | 817   | RSB      |
| 140       | 818   |          |
| ML1       | ML2   |          |

| Floor | Update              |
|-------|---------------------|
| 0     | 05.08.2020 14:34:06 |
| 0     | 05.08.2020 14:34:02 |
| 0     | 05.08.2020 14:34:06 |
| 0     | 05.08.2020 14:34:07 |
| 0     | 05.08.2020 14:34:07 |

Normal 2   Inspection 3   Error 0   Block 0   Offline 0   Online 5

- Status parameters and lift movement can be viewed.
- Possible to send call.



# COMPUTER COMMUNICATION

LiftNET Mod (0532111111 # FABRIKA ASANSÖR) ERROR LOG

Conf

(0532111111 # FABRIKA ASANSÖR) ERROR LOG

| GSM No     | ROW | FLOO... | ERROR NO                  | DATE             | DIRECTI... | MOD    | DOOR 1 | DOOR 2 | CAUSE | STAGE | MPHASE | CAR POS |       |
|------------|-----|---------|---------------------------|------------------|------------|--------|--------|--------|-------|-------|--------|---------|-------|
| 1 05321111 | 1   | 1       | 21 - FLOOR PULSE ERROR    | 18.01.2000 01:57 | -          | REV    | CLOSE  | CLOSE  | 0     | 0     | 0      | 3670    | 37:12 |
| 2 00905356 | 2   | 0       | 119 - 15V VOLTAGE FAILURE | 18.01.2000 01:33 | -          | REV    | OPEN   | CLOSE  | 0     | 0     | 0      | 985     | 37:02 |
| 3 05333333 | 3   | 2       | 119 - 15V VOLTAGE FAILURE | 04.01.2000 23:30 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4655    | 37:07 |
| 4 05222222 | 4   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:16 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4210    | 37:07 |
| 5 05111111 | 5   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:15 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4176    | 37:08 |
|            | 6   | 1       | 65 - BRAKE NOT OPENED     | 04.01.2000 23:14 | -          | NORMAL | OPEN   | CLOSE  | 4     | 38    | 60     | 4161    |       |
|            | 7   | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:11 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |       |
|            | 8   | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 23:06 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4147    |       |
|            | 9   | 1       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:15 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4159    |       |
|            | 10  | 1       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 20:14 | -          | NORMAL | OPEN   | CLOSE  | 0     | 0     | 0      | 4189    |       |
|            | 11  | 2       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:12 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4809    |       |
|            | 12  | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 20:09 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |       |
|            | 13  | 0       | 65 - BRAKE NOT OPENED     | 04.01.2000 20:01 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 985     |       |
|            | 14  | 2       | 1 - STOP CIRCUIT OPEN     | 04.01.2000 19:55 | -          | NORMAL | CLOSE  | OPEN   | 0     | 0     | 0      | 4809    |       |
|            | 15  | 2       | 65 - BRAKE NOT OPENED     | 03.01.2000 22:17 | DOWN       | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4828    |       |
|            | 16  | 1       | 119 - 15V VOLTAGE FAILURE | 03.01.2000 19:44 | -          | NORMAL | CLOSE  | CLOSE  | 0     | 0     | 0      | 4387    |       |
|            | 17  | 1       | 65 - BRAKE NOT OPENED     | 03.01.2000 19:40 | -          | NORMAL | CLOSE  | CLOSE  | 4     | 38    | 60     | 4155    |       |
|            | 18  | 1       | 31 - LOW VOLTAGE          | 03.01.2000 19:38 | -          |        |        |        | 0     | 0     | 0      | 3640    |       |

Receive completed.

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Normal 2

Refresh Print Close

- A list of errors could be retrieved.

# COMPUTER COMMUNICATION

The screenshot displays the LiftNET Monitor interface. On the left, a table lists lift configurations with columns for GSM No, Explanation, and Region. A central window titled '(0532111111 # FABRIKA ASANSÖR) PRS SPEED PAR.' shows a list of 22 parameters (S01-S22) with their current values and adjustable spinners. On the right, a table shows lift status with columns for Floor and Update. The bottom status bar indicates 'Normal 2', 'Inspection 3', and 'Online 5'.

| GSM No           | Explanation     | Region |
|------------------|-----------------|--------|
| 1 05321111111    | FABRIKA ASANSÖR | PENDI  |
| 2 00905356615516 | ASIM TEST       | PENDI  |
| 3 05333333333    | TEST 3          | PENDI  |
| 4 05222222222    | TEST 2          | PENDI  |
| 5 05111111111    | TEST 1          | PENDI  |

| Parameter                 | Value              |
|---------------------------|--------------------|
| S01 NOMINAL SPEED         | 1.600              |
| S02 RECALL SPEED          | 0.200              |
| S03 LEVELLING SPEED       | 0.020              |
| S04 INSP.NORMAL SPEED     | 0.200              |
| S05 INSP.SLOW SPEED       | 0.060              |
| S06 RESCUE SPEED          | 0.060              |
| S07 RESETTING SPEED       | 0.900              |
| S08 CREEPING SPEED        | 0.060              |
| S09 STARTING SPEED        | 0.000              |
| S10 ACCELERATION          | 1.800              |
| S11 ACC.START S-CURVE     | 1.400              |
| S12 ACC.END S-CURVE       | 1.400              |
| S13 DECELERATION          | 1.500              |
| S14 DEC.START S-CURVE     | 1.400              |
| S15 DEC.END S-CURVE       | 0.550              |
| S16 STOPPING METHOD       | 4-DECLINING TORQUE |
| S17 STOP SPEED            | 0.001              |
| S18 STOPPING REFERENCE    | 0-MEASURED SPEED   |
| S19 STARTING MODE         | 4-PRE-TORQUE       |
| S20 STOPPING DECELERATION | 0.300              |
| S21 STOP S-CURVE          | 0.300              |
| S22 CREEPING PATH         | 100.000            |

|         | Floor | Update              |
|---------|-------|---------------------|
|         | 0     | 05.08.2020 14:40:12 |
| MISSING | 0     | 05.08.2020 14:40:02 |
|         | 0     | 05.08.2020 14:40:07 |
| MISSING | 0     | 05.08.2020 14:40:07 |
| MISSING | 0     | 05.08.2020 14:40:07 |

Normal 2   Inspection 3   Online 5

- Parameters can be seen and changed by remote connection



AYBEY  
ELEKTRONİK

THANK YOU...