AYBEY ELEKTRONİK

AE-MAESTRO INTEGRATED LIFT CONTROLLER

TECHNICAL TRAINING COURSE -2
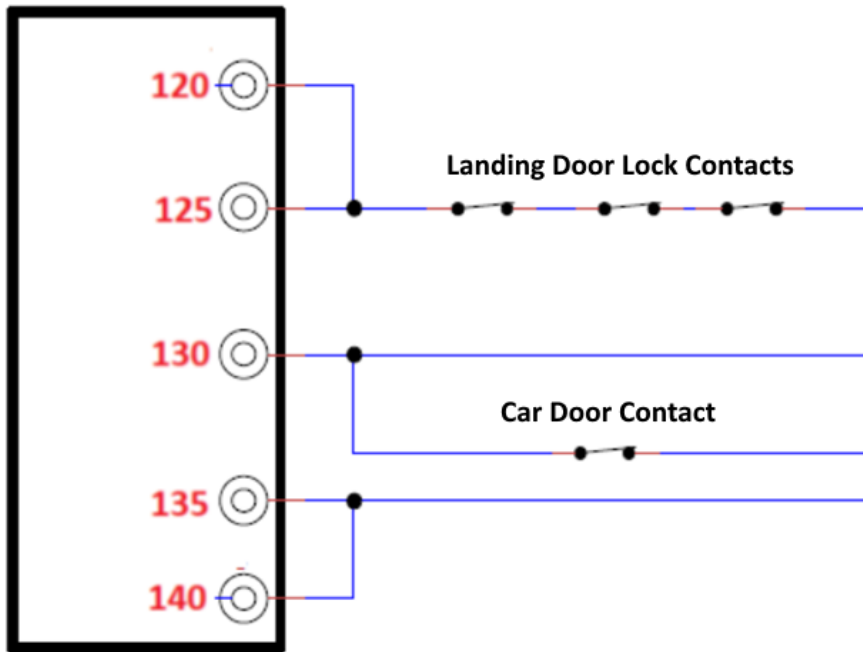**APPLICATIONS**

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- System supports two car doors.

- Slow close and Door open check in accordance with EN81-20/50.

- Doors can be opened in the requested side at the target floor.

- Door close and door open functions, buttons , limit switches and all time parameters are defined for two doors, seperately.
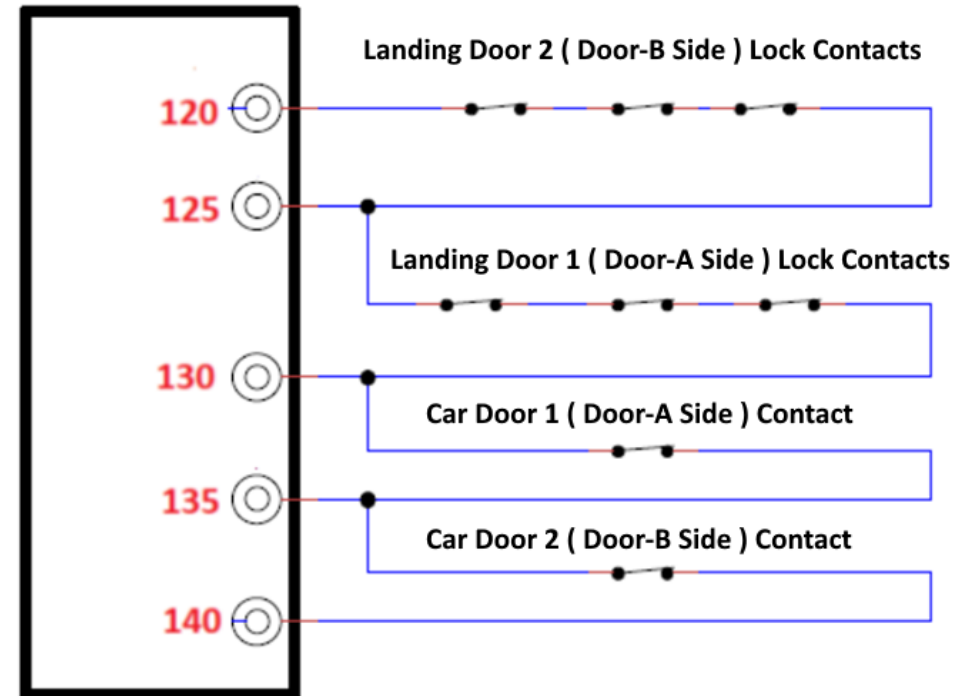
Connections full automatic doors in safety line is shown below.

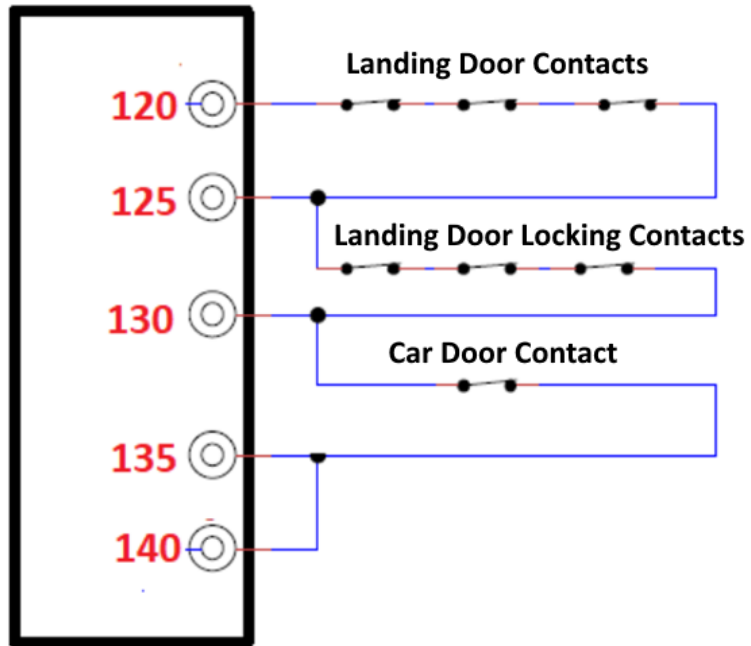Connections for semi- automatic doors in safety line is shown below.

ONE DOOR (SEMI AUTOMATIC)

120 — Landing Door Contacts

125 — Landing Door Locking Contacts

130 — Car Door Contact

135

140

TWO DOORS (SEMI AUTOMATIC)

120 — Landing Door Contacts

125 — Landing Door Locking Contacts

130 — Car Door 1 (Door-A Side) Contact

135 — Car Door 2 (Door-B Side) Contact

140
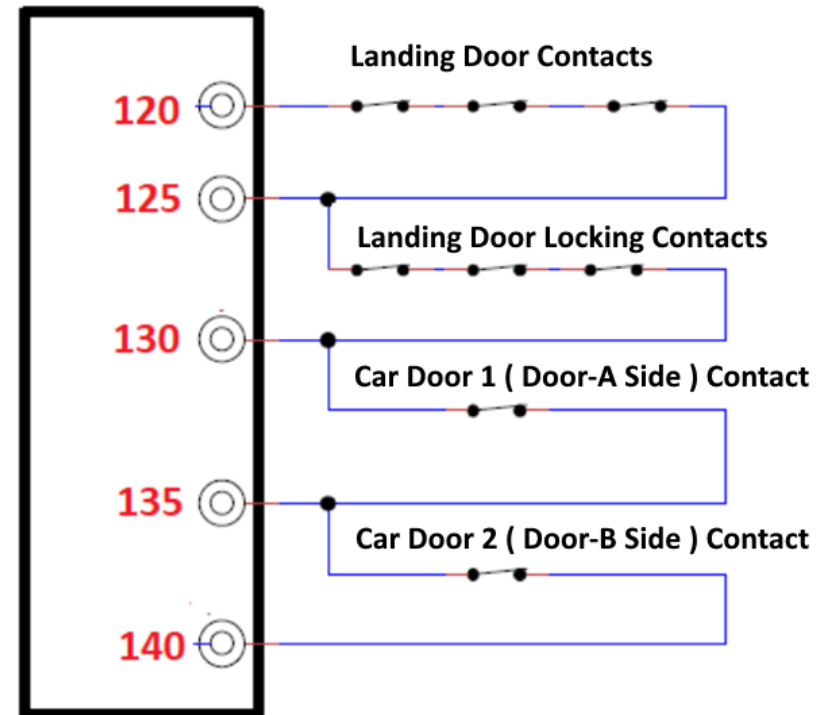
DOOR BUTTONS AND PHOTOCELL INPUTS

INPUT NO	INPUT CODE	FUNCTION	CURRENT STATUS
18	K20	Door open button for Door 1	CLOSED
19	DTS	Door close button for Door 1	CLOSED
20	FOT	Photocell contact for Door 1	CLOSED
29	K22	Door open button for Door 2	CLOSED
30	DT2	Door close button for Door 2	CLOSED
34	FT2	Photocell for Door 2	CLOSED

DOOR LIMIT SWİTCHES

INPUT NO	INPUT CODE	FUNCTION	CURRENT STATUS
21	AL1	Door open limit for Door 1	CLOSED
22	KL1	Door close limit for Door 1	CLOSED
23	K1C	Door obstruction contact for Door 1	OPEN
31	AL2	Door open limit for Door 2	CLOSED
32	KL2	Door close limit for Door 2	CLOSED
33	K2C	Door obstruction contact for Door 2	OPEN

[T06] OPEN WAIT PERIOD-1
[T15] DTS BUTTON DELAY-1
[T17] CAM ACTIVATION DELAY
[T18] K20 PERIOD
[T19] PHOTOCELL PERIOD -1
[T20] DOOR OPEN PERIOD 1
[T21] DOOR CLOSING PERIOD-1
[T22] DOOR OPEN WAIT PERIOD-2
[T23] K22 PERIOD
[T24] PHOTOCELL PERIOD 2
[T25] DOOR OPEN PERIOD-2
[T26] DOOR CLOSING PERIOD-2
[T27] DOOR CONTACT TEST
[T28] DTS BUTTON DELAY-2
[T29] GRUP DOOR WAIT
[T32] ERS DOOR WAIT PERIOD
[T34] PHOTOCELL BYPASS PERIOD 1
[T35] PHOTOCELL BYPASS PERIOD 2
[T39] LOADING PERIOD
[T42] CAM DELAY
[T43] CAM TIMEOUT

- User definable time parameters related to door functions are listed on right hand side.

- These parameters should be set according to the door type, door speed and door width to reduce the problems due the door operation.

- If time parameters are not set correctly, then there is a risk of blocking.

Door Motor Temperature

INPUT NO	INPUT CODE	FUNCTION	ACTIVE STATE
28	DTP	If the door motor overheats then this input function is activated and the controller prevents any motion.	OPEN

Door Inspection Key Input

INPUT NO	INPUT CODE	FUNCTION	ACTIVE STATE
55	DIK	This input is used to sense opening the shaft door manually.	OPEN

Loading Button

INPUT NO	INPUT CODE	FUNCTION	ACTIVE STATE
50	LDB	This input function is used to hold automatic door open for a long-period of time during loading. Holding time is determined by parameter [T39] LOADING PERIOD. Any door close request except DTS /DT2 will be ignored during this period.	CLOSED

Photocell Error Inputs

| INPUT NO	INPUT CODE	Function	ACTIVE STATE
63	FE1	This input should be connected to the error output of the photocell unit employed for the door 1.	CLOSED
64	FE2	This input should be connected to the error output of the photocell unit employed for the door 2.	CLOSED

- EN81-20/50 says that, the doors must be checked after sending a door open command if they are opened really.

- This check is carried out by using door bridging board SDB.

- SDB bridges terminals 120 and 140 during door open test.

- Therefore, SDB must be present in systems with EN81-20/50 even no early door open or levelling is not requested.

- Controller reads door contacts by opening the doors one by one.

- If any error is detected, then the lift is blocked.
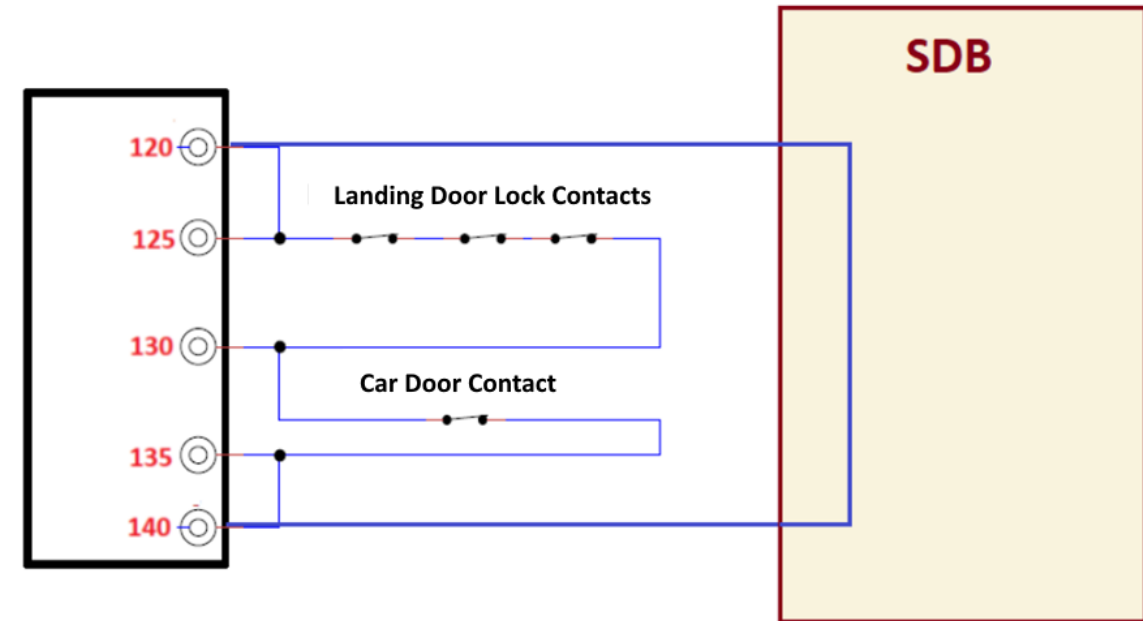
[B38] DOOR OPEN CHECK

0	Check Always Door open check is always carried out when a door open command is executed.
1	Check Once Door open check is carried out once at the first opening after reaching a new floor. If it is passed then no check is carried out at this floor any more. If not passed the system will be blocked.
2	No Checking No door open check is carried out. **Warning: This option is not in conformity with EN81-20/50.**

- Parameter B38 specifies how door open check has to be carried out.

- Door open check is not performed, if Lift standard is not EN81-20/50.
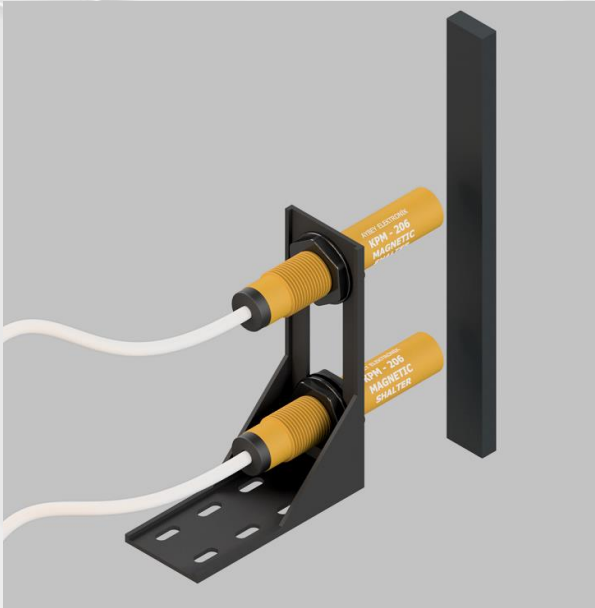
AE-MAESTRO FLOOR DETECTION SYSTEMS

[A05] FLOOR SELECTOR

|	
0	Counter Mono-stable Switch
1	Counter Bi-Stable Switch
2	Motor Encoder
3	Shaft Encoder
4	Absolute Encoder - LIMAX 2M
5	Absolute Encoder - LIMAX3CP

- **ML1 ve ML2** determine together door zone. ML1 and ML2 become «1»in front of the magnet. Doors can be opened when both, ML1 and ML2, are «1».

- ML1 and ML2 are **KPM206 monostable magnetic switches**.

- These switches are used in application of the following floor selectors:
- Counter monostable, Motor Encoder, Shaft encoder, Limax 2M.

- ML1 and ML2 must be in front of the magnets to say the car is at door zone.

- Relevelling, UCM test, early door opening and door open test can only be performed when SDB board is active and Door bridging board (SDB) is active only in door zone.

- In case of bi-stable counter application door zone is defined where MK switch is open. However, door bridging operations required for EN81-20 and EN81-1-+A3 cannot to be carried out in this system.

- Limax 33cp doesn't need ML1 and ML2 switches.

Bi-Stable Counter

Motor and Shaft Encoder
Mono Counter
Limax 2m
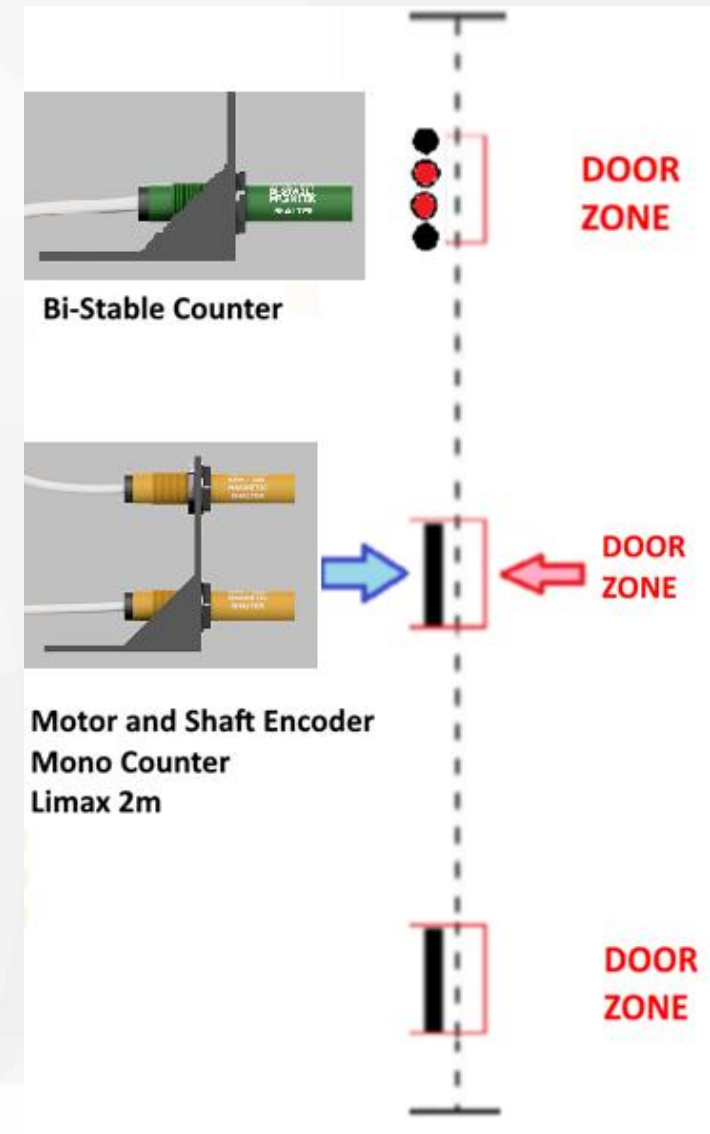
- KSR1 **(817)** and KSR2 (**818**) switches become active (open contact) at docking points at the lowest and highest floors.

- They are used in all floor selector systems except **absolute encoder**.

- They are reference positions of the floor selector system.

- **They set floors numbers to base floor and last floor in counter systems.**

- **At start up car moves to 817 and 818 regions to take its reference point to reset counter system.**

- 817 and 818 are Bistable magnetic switches.

- They determine compulsory low-speed region in two-speed systems. Therefore, these switches must be located after that the lift has switched to low speed.
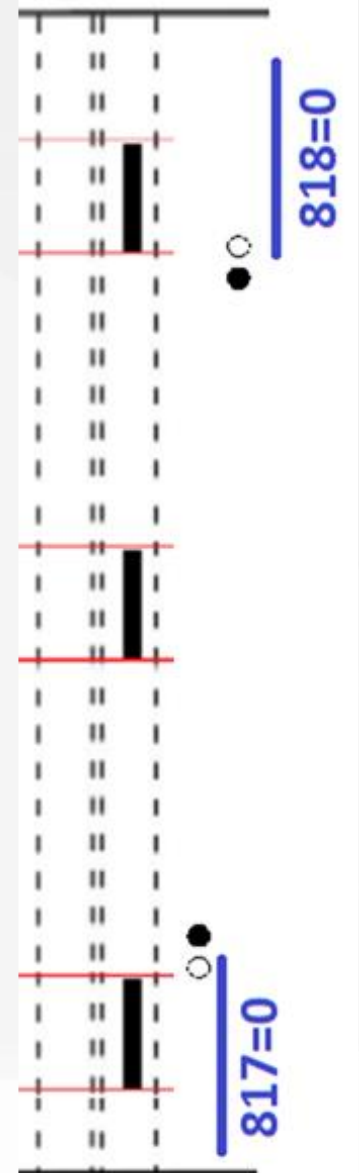
Counter Mono-Stable

- **MKU and MKD** are detectors for starting and finishing relevelling, stopping at target floor, and starting to slow down for target floor.

- KPM206 monostable magnetic switches must be used for ML1, ML2, MKU and MKD. Bi-stable switches must be used for 817 and 818.

- **Slow-down** for target floor starts in MKU in up travel and MKD in down travel.
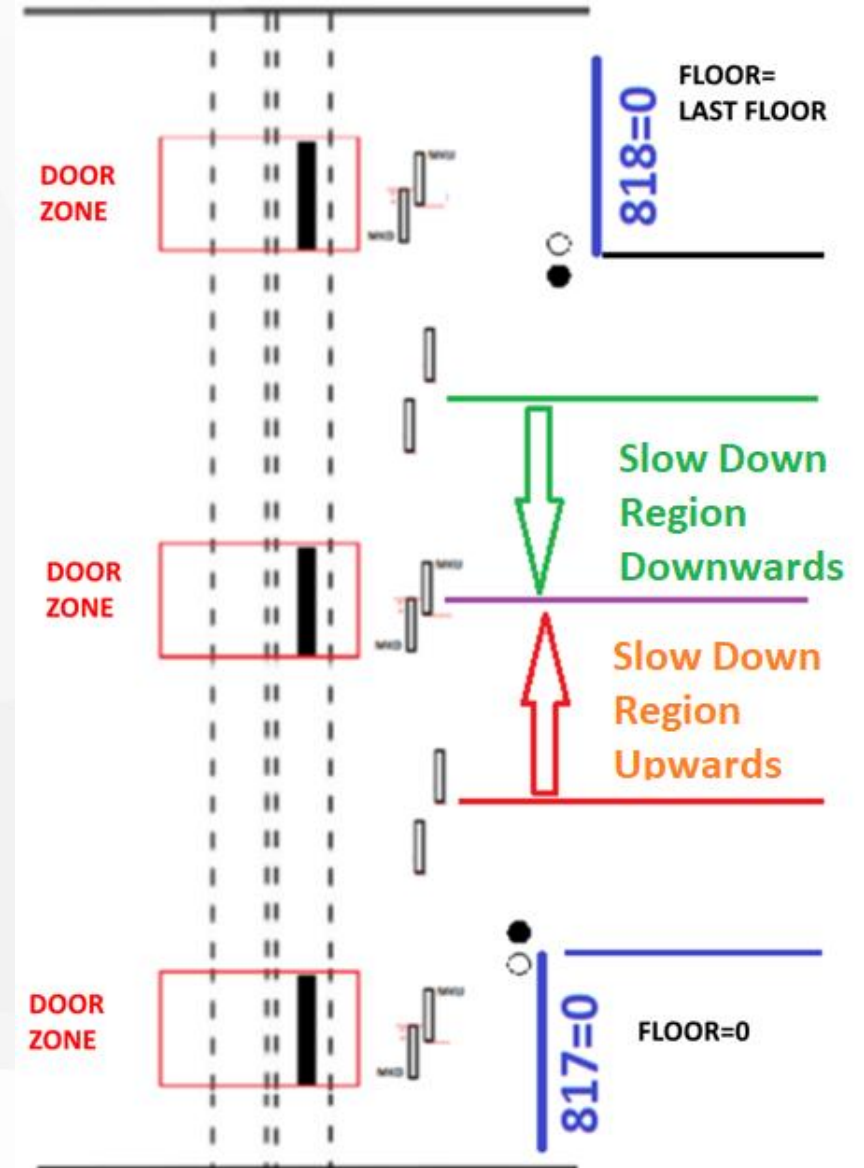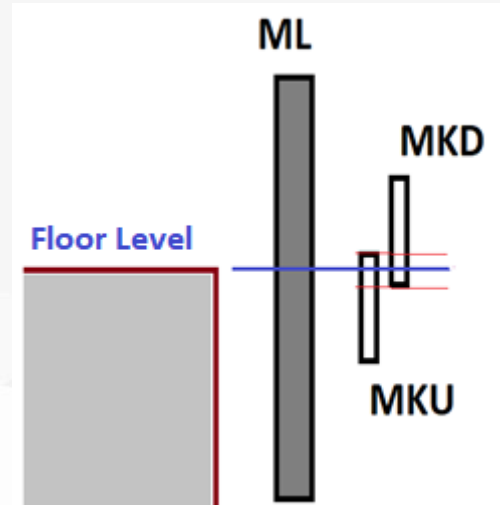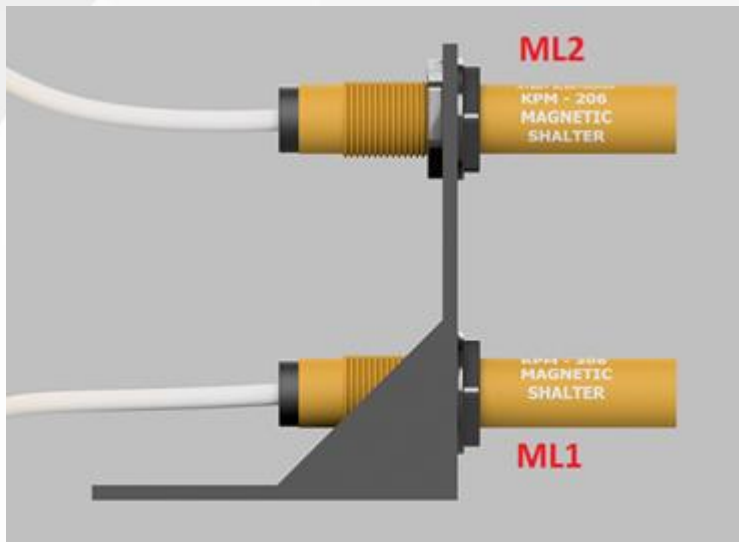
- Motor encoder can only be selected in **closed loop** systems.

- No of additional hardware and connection are needed to use motor encoder as floor selector. Only [**A05=2**] parameter must be set.

- Position information is acquired in mm accuracy.

- When motor encoder is assigned as floor selecter, **relevelling** is carried out by using **MKU and MKD**.

- If no relevelling is requested, then MKU and MKD are not needed.
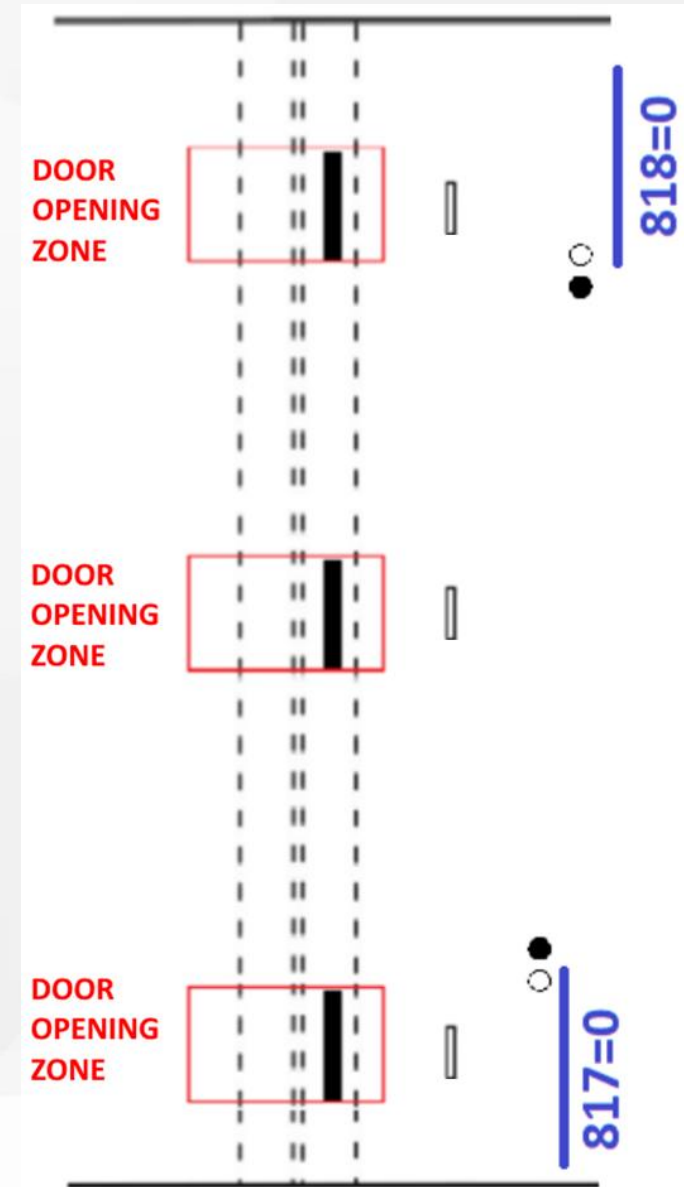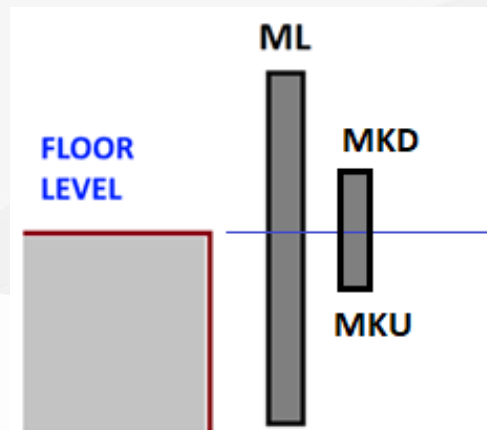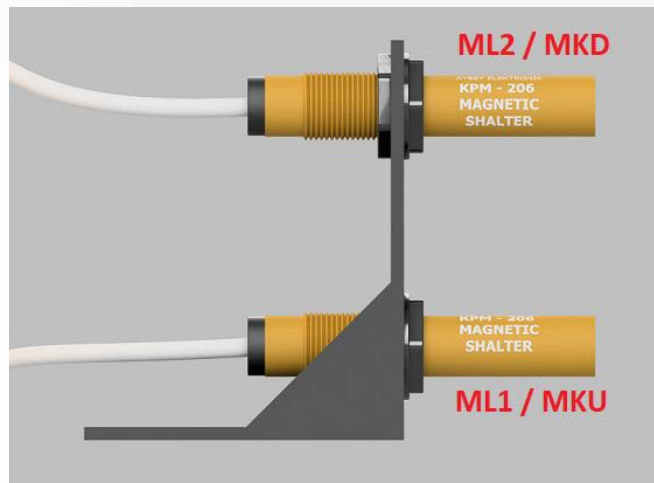
- Shaft encoder application is realised generally with an incremental encoder mounted on overspeedgovernor.

- **ENC board** must be connected to AE-MAESTRO and parameter [**A05=3**] must be set.

- Position information is acquired in mm.

- Only ML magnets and ML1/ML2 switches are used for door zone.

- **Relevelling** is performed by using the information from **encoder**.
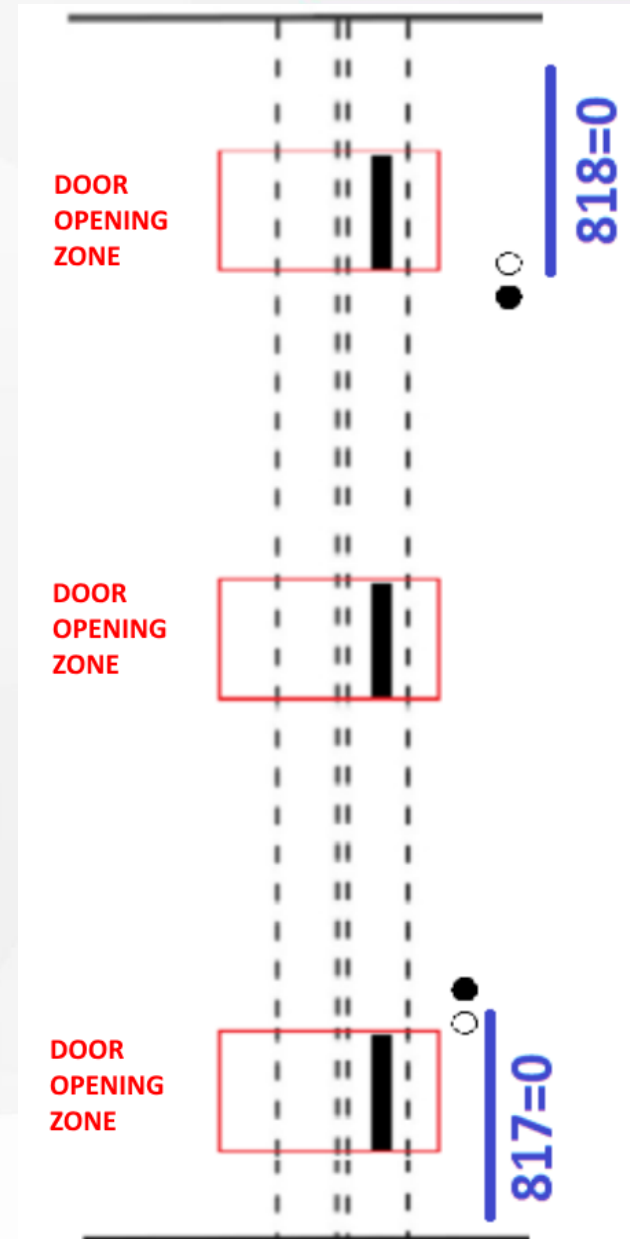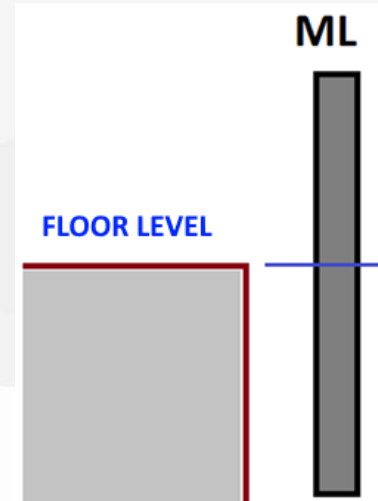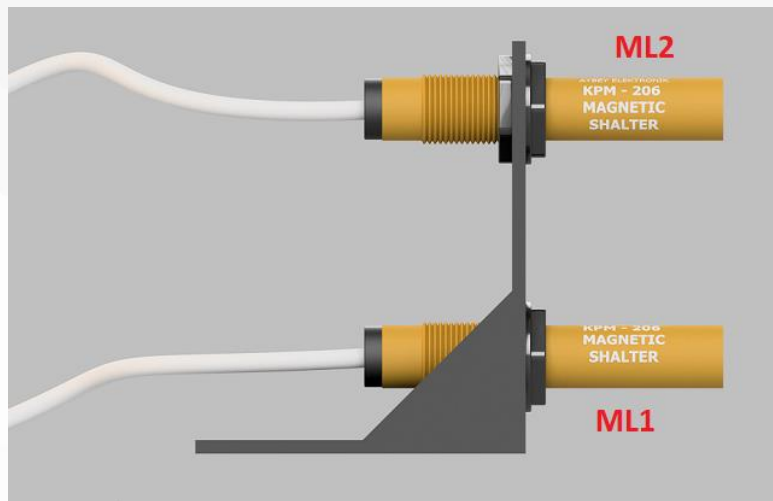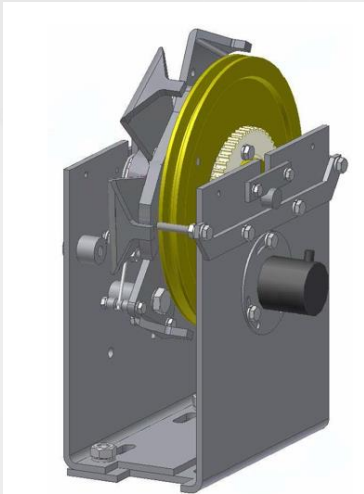
ABSOLUTE ENCODER

- Limax 2m consists of special mechanical apparatus and magnetic tape throuhgout shaft.

- Its sensitivity is 1 mm.

- It can be used for relevelling.

- Robust, with high precision but more expensive.

- Suitable for high-speed systems and fireman lifts.

- It is connected to the controller via CAN Bus by using an ICG board on top of the cabin.

- **ML magnet, ML1 and ML2** are required for door zone.

- No more need of Limit switches 817 and 818.

DOOR OPENING ZONE

DOOR OPENING ZONE

DOOR OPENING ZONE
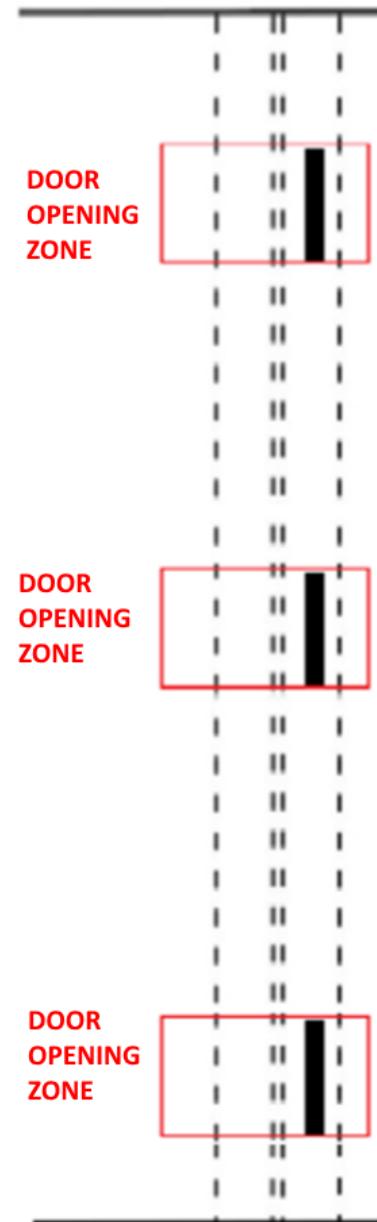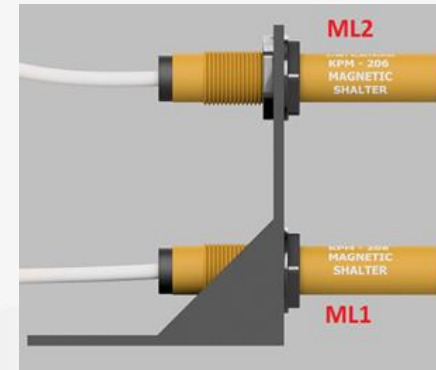
General Overview of Magnets and Magnetic Switches in Floor Selector Systems

Magnetic Switches and Magnets
Only one reading for one floor

Reading Encoder pulses along the shaft with mm precision

0
Mono Stable

Relevelling- allowed

ML1, ML2, MKD, MKU
817, 818

1
Bı Stable

No Relevelling

M0, MK
817, 818

2
Motor Encoder

Relevelling- allowed
ML1, ML2, MKD, MKU
817, 818

No Relevelling
ML1, ML2,
817, 818

3
Shaft Encoder

Relevelling- allowed
ML1, ML2,
817, 818

4
Absolute Encoder

Relevelling- allowed
ML1, ML2
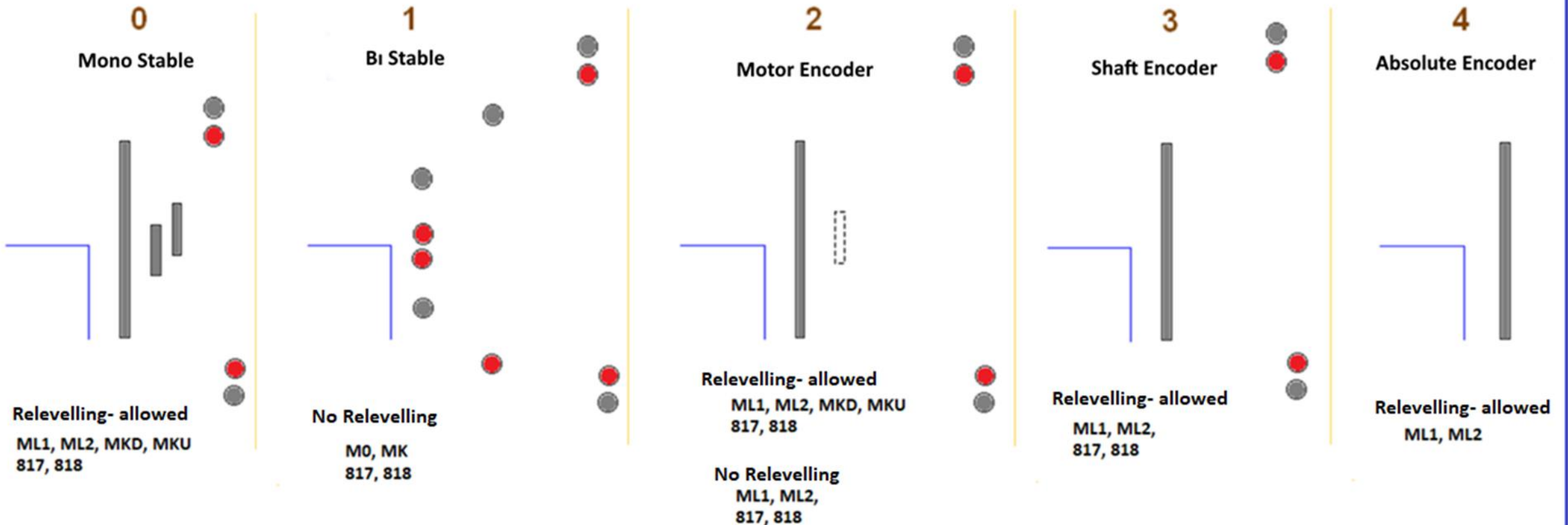
- When encoder is used as floor selector (A05>1), then AE-MAESTRO calculates slowndown point for target floor regarding to S-curve and acceleration parameters in the system.

- Lift starts slow down, when the distance to the target floor is reached.

- Slow down path length cannot be changed by the user.

- However, creeping path can be edited by parameter **S21**.
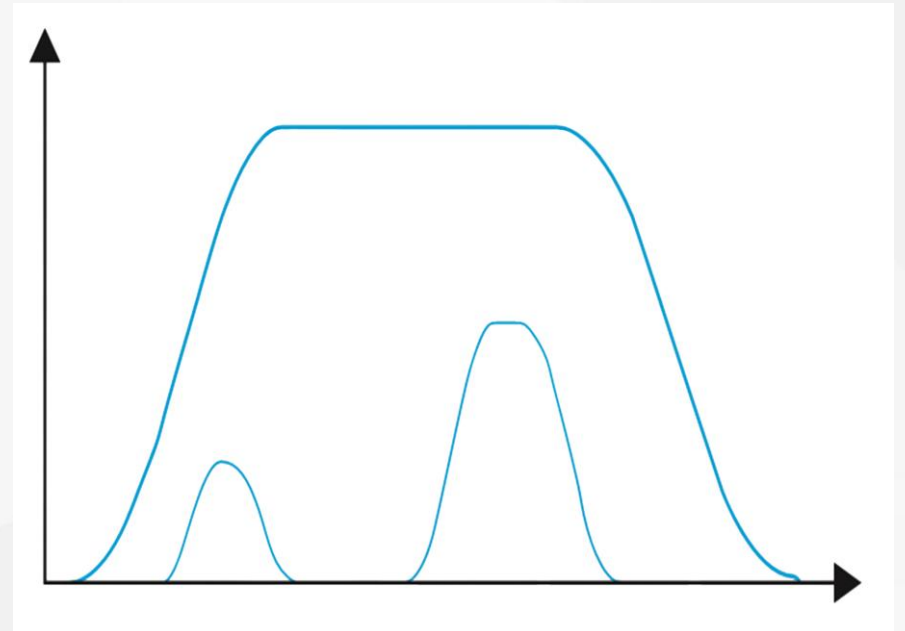
- The Installation and adjustment floors in floor selector with encoder is explained in the manual **AP01 – floor selector installation as incremental encoder**.

- Position change in motion should be verified in inspection mode. The car position count must increases in up travel, and decrease in down travel. If this is not so then reverse Parameter **M20 – Car Direction**.

- Shaft learning is performed automatically by **R02 – Shaft Learning** utility, if total number of floors is **equal to or above 3.**

- In systems with **2 floors,** learning process is carried out in two steps :

- **1)** Move ML magnet in second floor downwards manually.
- **Execute R17 – Get ENC. Pulse Ratio.**

- **2)** Put ML magnet to its original place in second floor.
- **Execute R18 – ENC. Learning Floors.**

- ML1 has to be always under ML2.

- For absolute encoders, execute only **R18 – Enc. Learning Floors.**
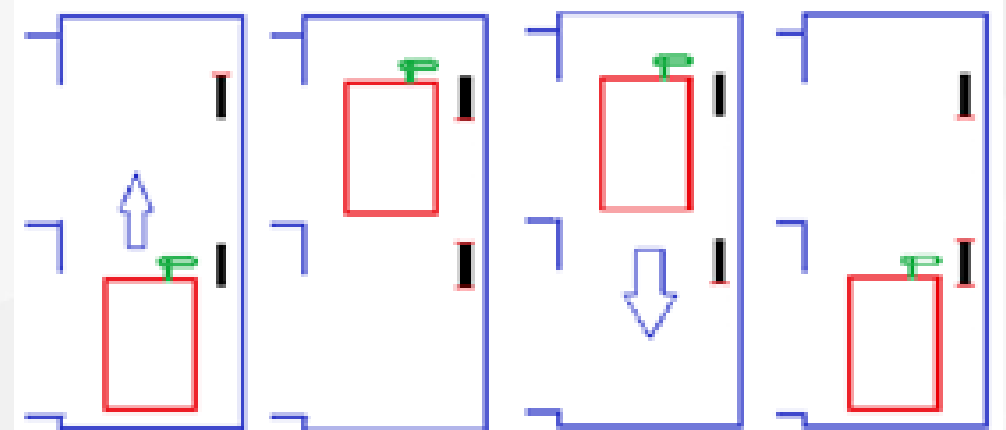
- There are two ways to do floor level fine adjustment.

- **Numerical way** : Two different offset values (one for downwards and one for upwards approaching) can be edited by using **H04 – Floor Levels.**

- Deviation is corrected by positive or negative values.
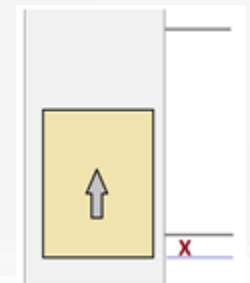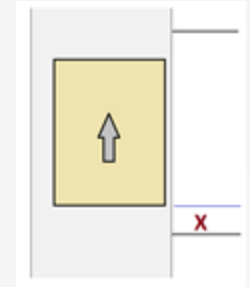
- Floor level can be adjusted by using car panel.

- **Door Bridging Board** must be present in system for this operation.

- The process is started by executing **R03 – Floor Pulse Adjustment** under **SERVICES** menü.

- After arriving at floor to be adjusted the doors are opened any stay open.
- Car can be moved by pressing Door Open Button together with one of the first two call buttons in relevelling speed to bring it level position.

- Then this position should be saved by pressing floor button in car panel.

- This operation can be repeated for all floors.

- System stores floor offsets with reference of travel direction and position.

- If floor levelling is not achieved properly, then it can be corrected numerically by H04 – Enc. Floor Levels menü.
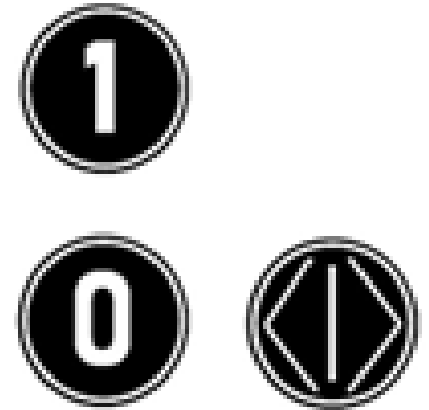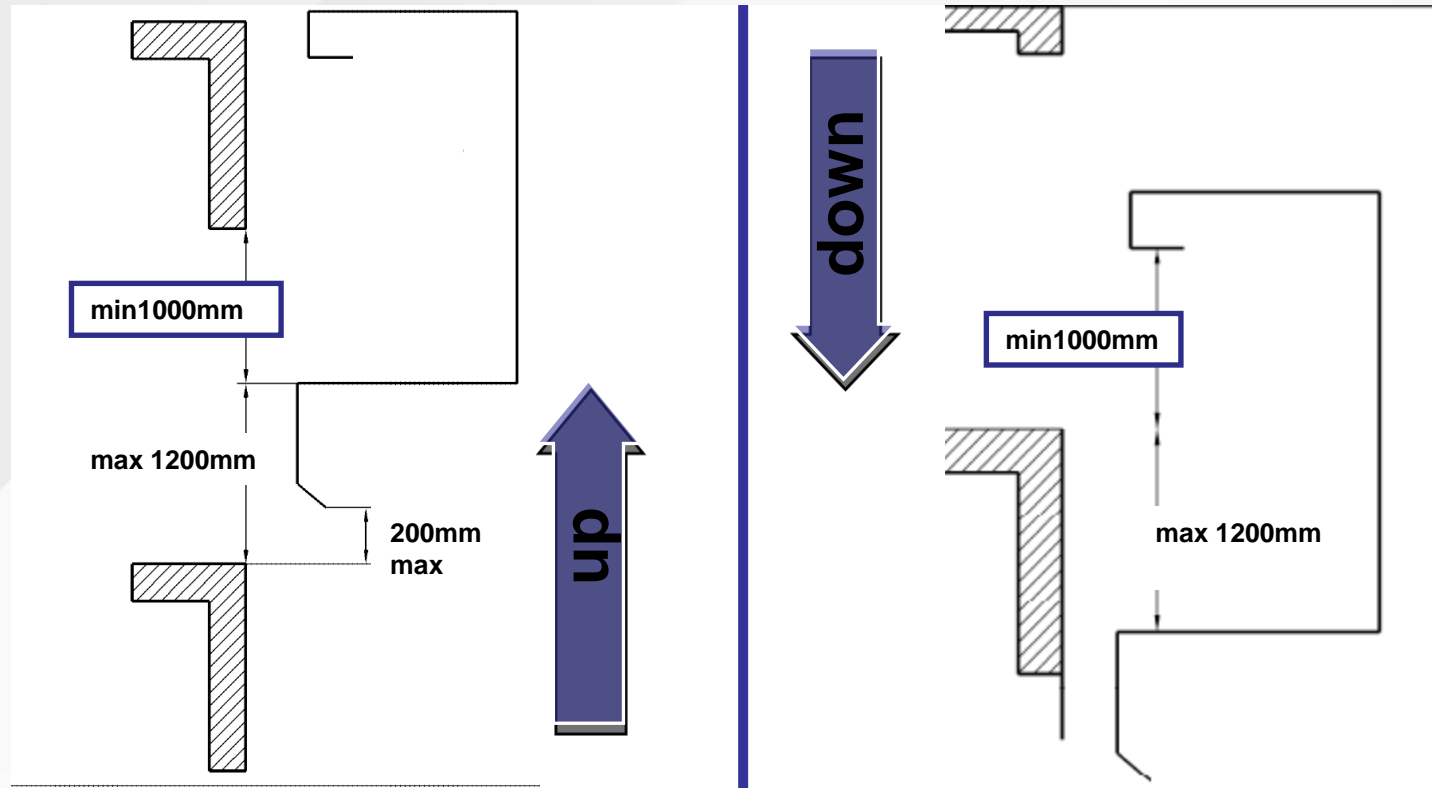
We call the case as **unintended car motion,** when car moves up or down, while waiting at floor level with open doors without any motion command.

In this case car must be stopped by using safety gear, if it goes beyond the allowed region.
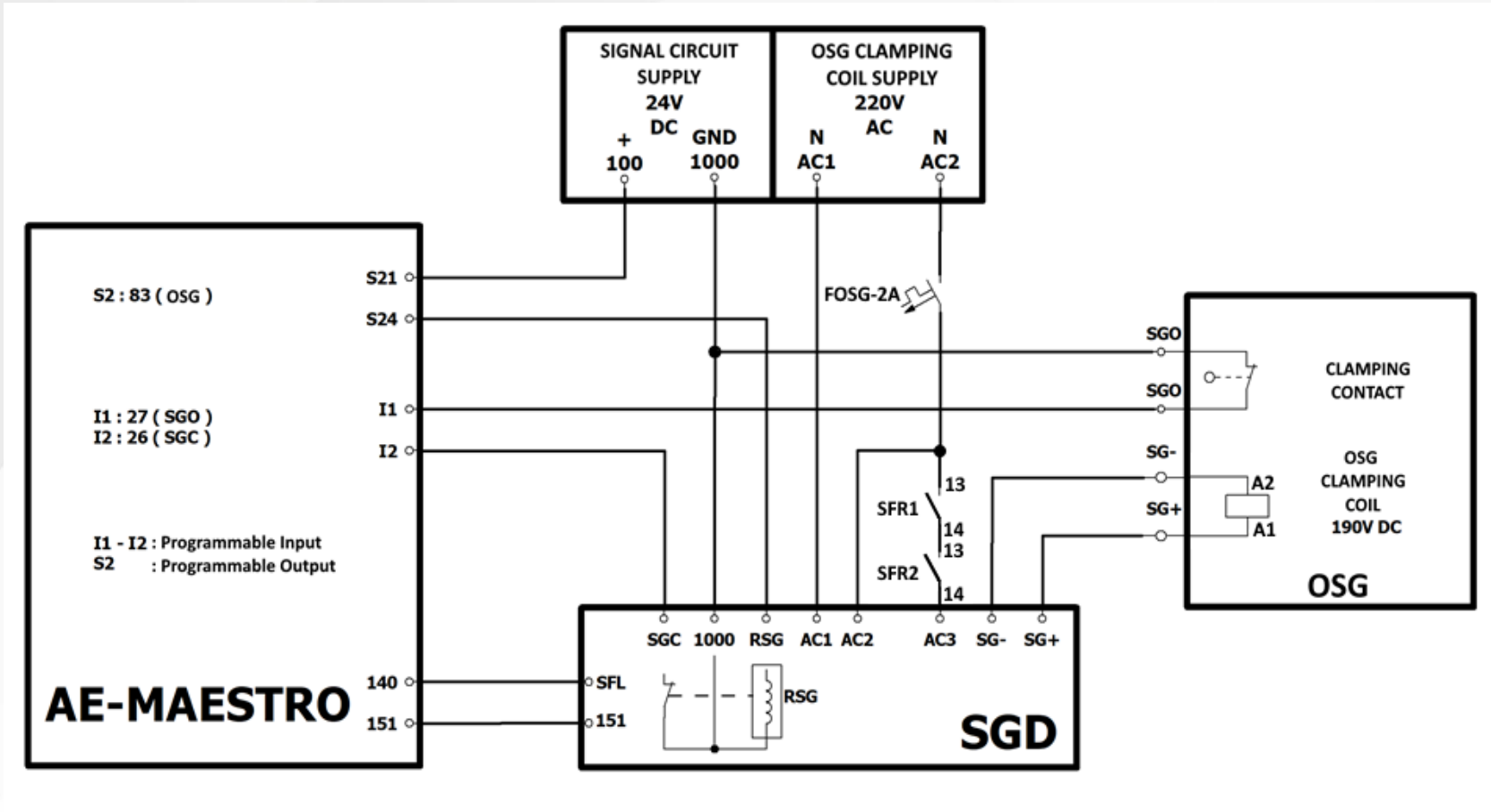
- In applications with geared machines protection against unintended car motion is implemented by a system with SGD board. SGD board controls the coil on the overspeed governor to allow motion or activate safety gear in case of UCM.

- Therefore, SDG board is used in systems with asynchronous motor for protection against UCM.
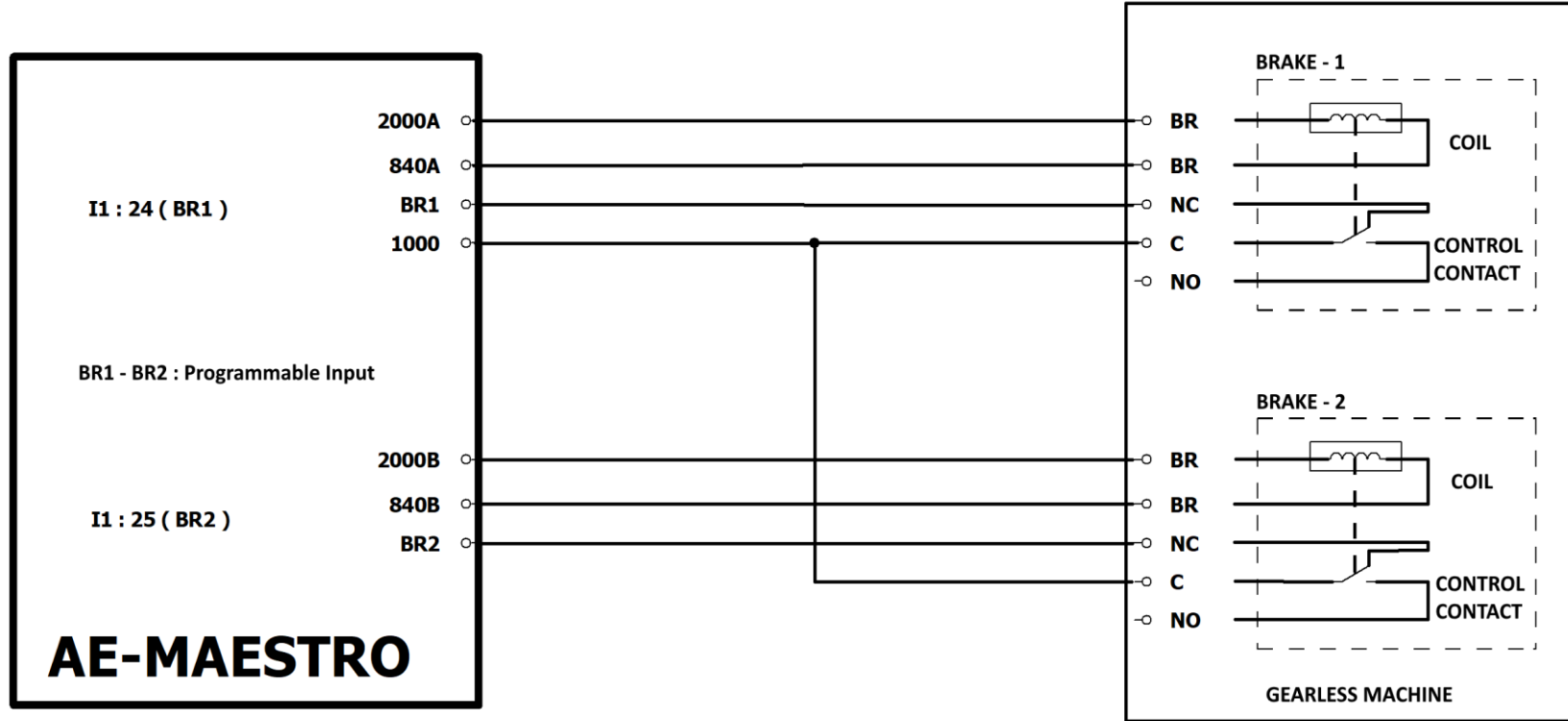
- Brake feedback of gearless machine is checked through inputs **BR1** and **BR2.**
- Controller checks these brake contacts in relation to motion command.
- Controller enters into block mode, if any error in contact states is detected and further motion of the lift is inhibited.

[A16] UCM CONTROLLER

0	Not Active UCM is not carried
1	Active UCM is active.

- Parameter A16 determines if UCM control is ON of OFF.
- When **[A10=0],** UCM control is always OFF (EN81-1+A2 standard).

- **Parameter B04** determines if the system will be blocked or not after any UCM error (Error no : 64,68,69 and 72).

[B04] UCM ERROR BLOCK
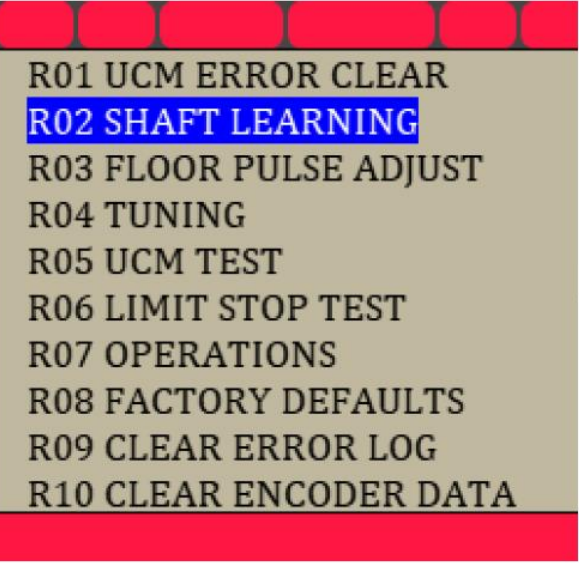
0	CAN BE BLOCKED UCM Errors will block the lift..
1	NO BLOCKING UCM Errors will **not** block the lift. **Warning: This option can be used only for installation, repair and maintenance purposes. This parameter cannot be set to 0 for normal operation according to the current lift standards.**

UCM ERROR CLEAR

- If any system has been blocked due to any UCM error, then this error must be cleared after troubleshooting.
- Clearing should be done only by an authorized person.
- This utility can be executed through **SERVICES** icon **-> R01-UCM ERROR CLEAR.**

- **MANUAL UCM TEST**

- This menu is to simulate an unintended car motion that may occur. It used to test the real behaviour of the lift in case of an UCM event.
- This test can be executed through **SERVICES** icon **-> R05-UCM TEST**.

```
R01 UCM ERROR CLEAR
R02 SHAFT LEARNING
R03 FLOOR PULSE ADJUST
R04 TUNING
R05 UCM TEST
R06 LIMIT STOP TEST
R07 OPERATIONS
R08 FACTORY DEFAULTS
R09 CLEAR ERROR LOG
R10 CLEAR ENCODER DATA
```

ELECTRONIC RESCUE SYSTEM

- In AE-MAESTRO has an automatic rescue system (ERS) to rescue the passengers in case of power failure.

- If **[A23=1],** Electronic Rescue System automatically switches on when the controller detects an error in line phases.

ELECTRONIC RESCUE SYSTEM POWER SUPPLY

- There are two types application of rescue power system as described below:

1. **Electronic Rescue System-1: Type-J**

- A set of batteries in panel (5x12V) and UPSLIFT module.

2. **Rescue System-2: Type-N**

- All connections for a UPS rescue system are present in control panel. However, UPS is not supplied with controller.

- Rescue system will be active when an externel UPS is connected..

3. **No Rescue System Type-A**

- No Rescue operation is supported.

[A23] EMERGENCY RESCUE OPERATION ALLOWED

0	Passive	Emergency rescue operation is inhibited.
1	Active	When the line fails the device enters into rescue mode and initiates the rescue operation.

[A24] EKS VOLTAGE

This parameter stores the motor voltage supplied to the device in case of rescue operation.

0	220V AC
1	380V AC
2	110V AC
3	60V DC
4	48V DC

[T36] MAXIMUM RESCUE PERIOD

600..5000	This parameter defines the maximum time period allowed for emergency rescue operation. If the rescue operation is not completed within this period then it will be terminated by the controller.

[T32] ERS DOOR WAIT PERIOD

20...300	This parameter defines the time delay to close the door after arrival at the floor on the rescue mode.

[T36] MAXIMUM RESCUE PERIOD

600..5000	This parameter defines the maximum time period allowed for emergency rescue operation. If the rescue operation is not completed within this period then it will be terminated by the controller.

[T32] ERS DOOR WAIT PERIOD

20...300	This parameter defines the time delay to close the door after arrival at the floor on the rescue mode.

[T16] RESCUE STARTUP DELAY

30…300	The starting delay of rescue operation after power or phase failure.
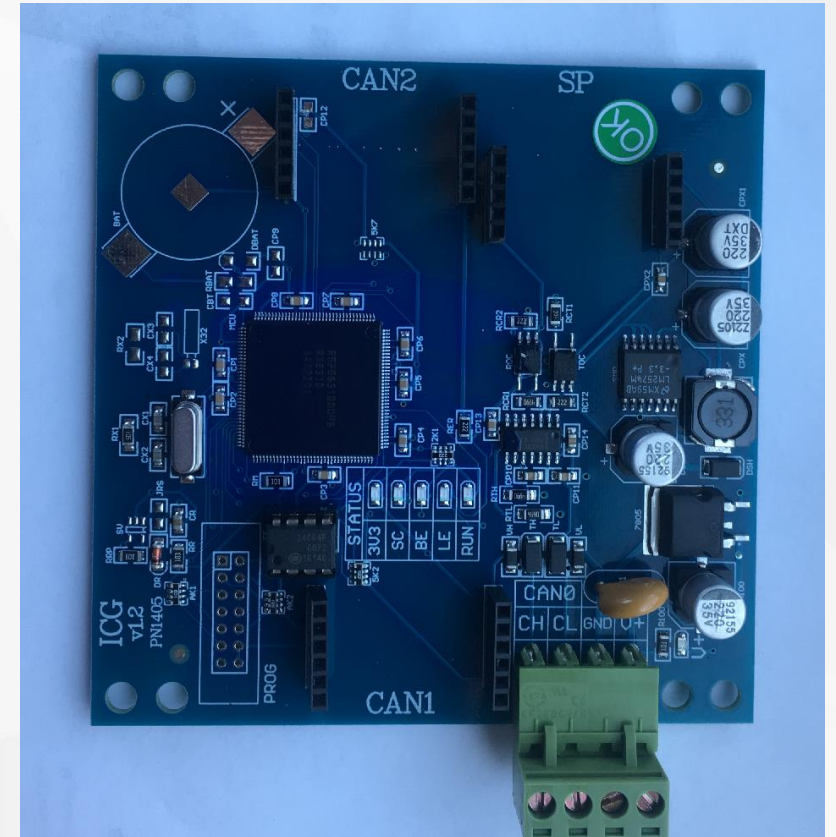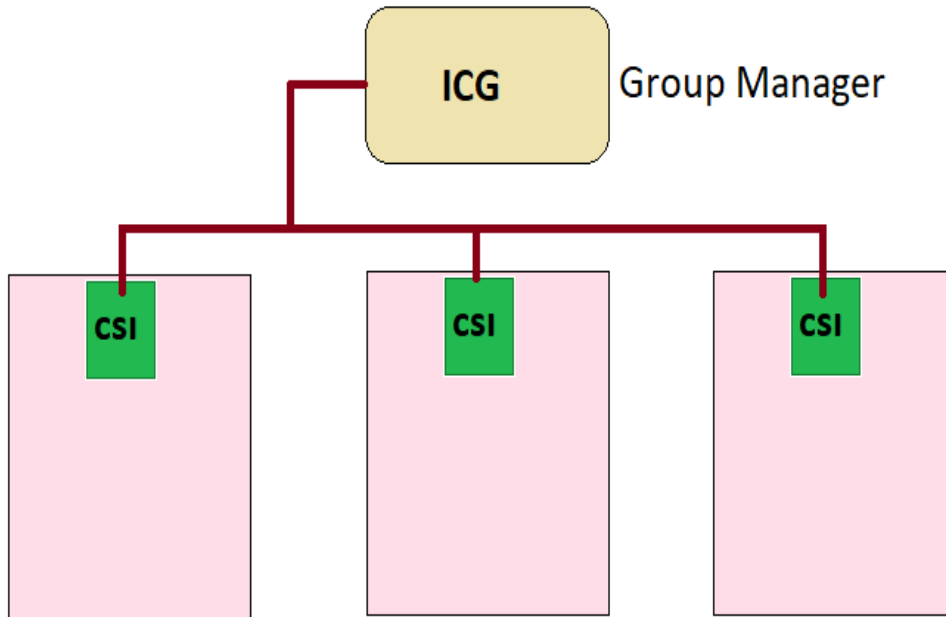
- Group operation is supported up to 8 lifts.
- Group is managed by a dedicated manager board **(ICG).**
- ICG is placed into one of control panels.
- Group communication is done via CAN-Bus. CAN2 is usually assigned for this operation.
- **CSI board** must be installed to CAN2.
- Group communication is carried fault tolerant.

[A02] Command System

0	~~Simple Push Button~~
1	~~Simple Collective~~
2	Down Collective
3	~~Up Collective~~
4	Full Collective

- For a good performance, software compatability between ICG and ICM s must always be checked.

- Only **Down collective** and full collective traffic system are supported in group application.

- All lifts in the group must have **the same value in [A02] command system** as 2 or 4.

- Simple push button or simple collective system are not allowed in group application.

- Negative supply terminal of ICG board is connected to **1000** terminals of all controllers in group.

- Positive supply terminal of ICG board is connected to **100** terminals of all control panels through **a diode** as shown in the figure.

- In this way active control panels keep supplying ICG board.
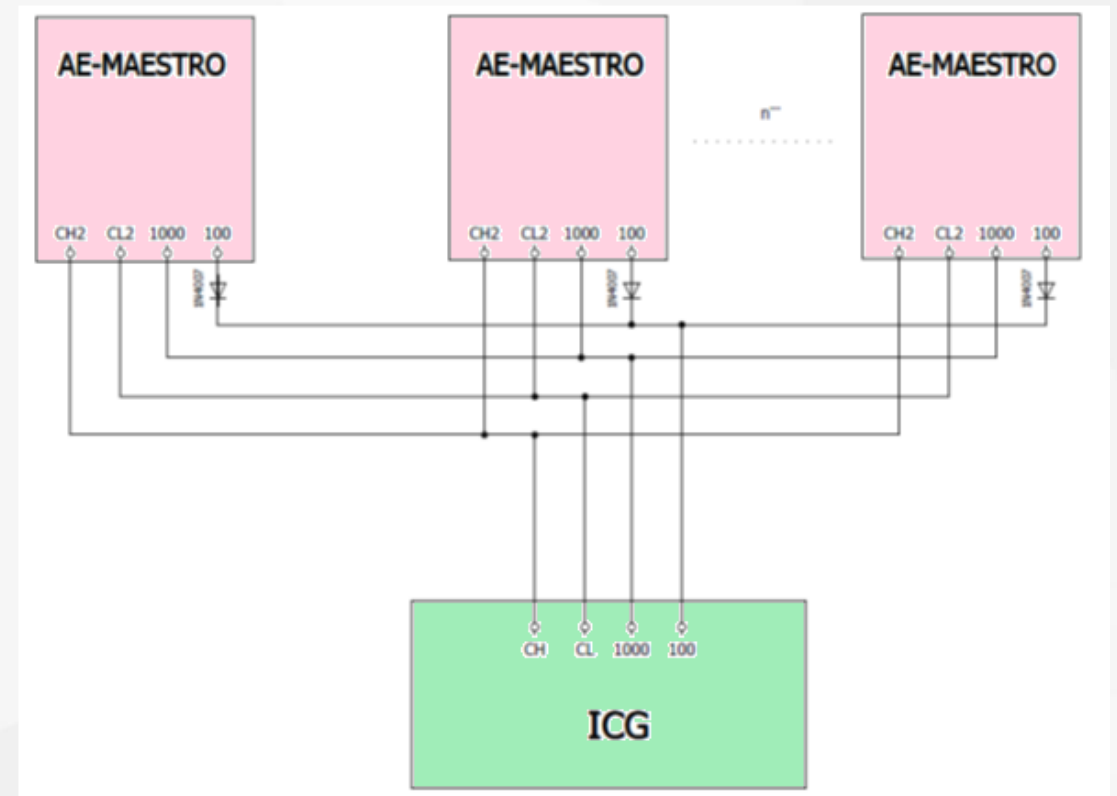
- Lifts in the group receive calls from landing panels and transmist them directly to ICG.

- ICG assigns jobs to the lifts.

- ICG prepares hall call register LEDs and sends them to the controllers.
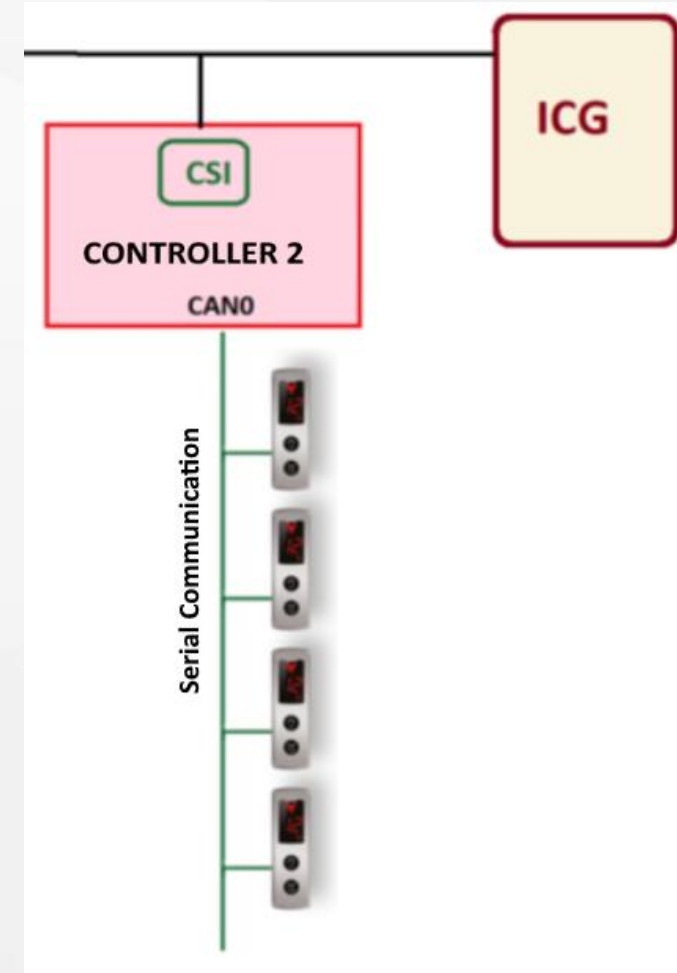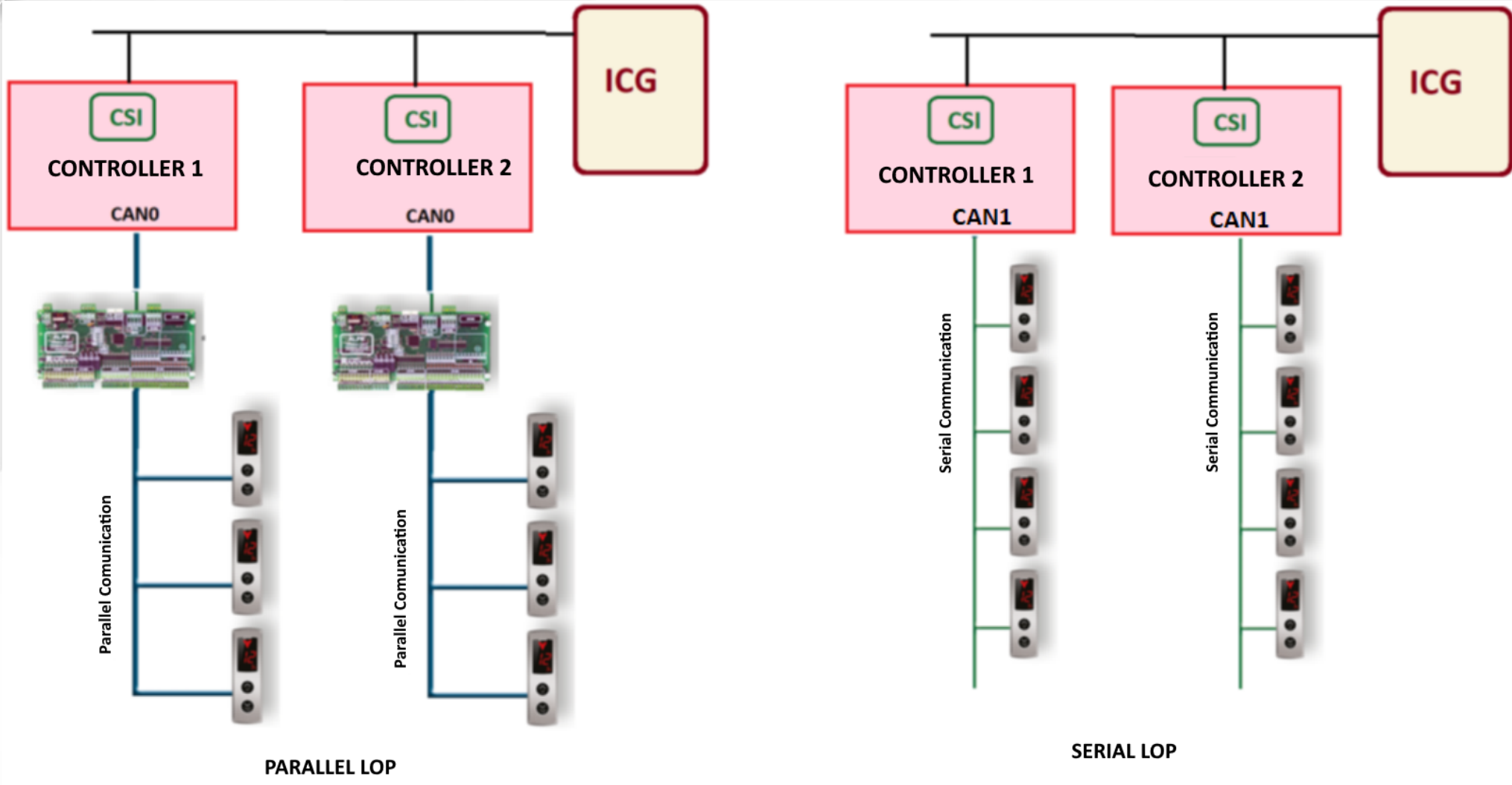
In a group application, Lifts receives calls from their own landing panels and transmitS them to ICG without processing.

- Calls from landing panels in serial or parallel communication are transmitted to ICG.

- However landing panels are able to be connected to direcly ICG in serial.

- In that case, landing calls are executed by directly ICG.

- Landing call(s) is transmitted to lift assigned.

- Movement direction displays and landing indicators are supplied by lift control panels.

ICG

CSI	CSI
CONTROLLER 1	CONTROLLER 2
CAN1	CAN1

Serial Communication

FLOOR INDICATORS OR
HALL LANTERN

LOPS
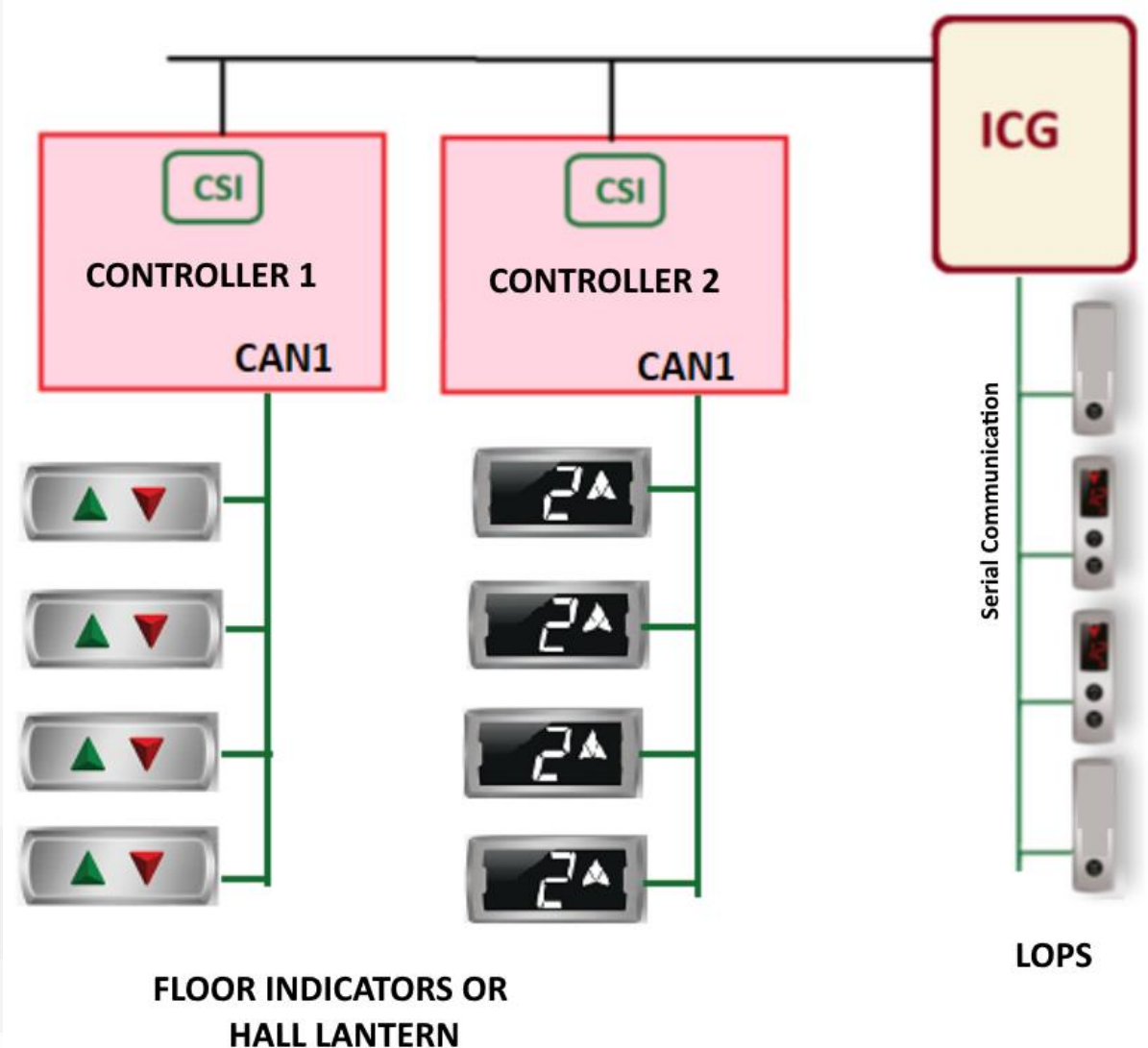
Parameters assigned for group operations
[A07] No NO 0: Simpleks Lift 1..7: Grup Lift: value here is a group number for lift. It is mandatory for group lifts to have different numbers.
[A02] COMMAND SYSTEM 2: Down collective 3: Up collective 4: Full collective Other choices are not allowed in group application. All group members must be set to the same value of command system [A02].
[B12] MISSING FLOOR (GROUP LIFT) This parameter is used only for group operations if the base floors of the group lifts are not at the same level. Otherwise, this parameter must be left as zero. The number of floors above the other lifts in the group should be entered here as data.
[T29] GRUP DOOR WAIT This parameter is used only for group lifts.If a door will not be closed after a door close comment as long as the time in this parameter then this lift will not work as a group lift anymore.
[E09] – GROUP CAN CHANNEL Workgroup is carried out through CAN2 channel and CSI board. If the lift is employed in a group, then CAN2 is used as group communication channel with group manager. In this case you are not allowed to define any other device communications in CAN2. In simplex lift leave this parameter as 3.

[A14] FIRE STANDARD

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

- AE-MAESTRO supports EN81-72 and EN81-73 fire standards.

- If [**A14=0**] is selected then in case of fire the lift travels directly to the fire exit floor, opens the door and waits there without accepting any calls. The lift cannot be used anymore.

- If [**A14**] is selected greater than zero then the lift can be used by fireman as fire-fighter lift in case of a fire.
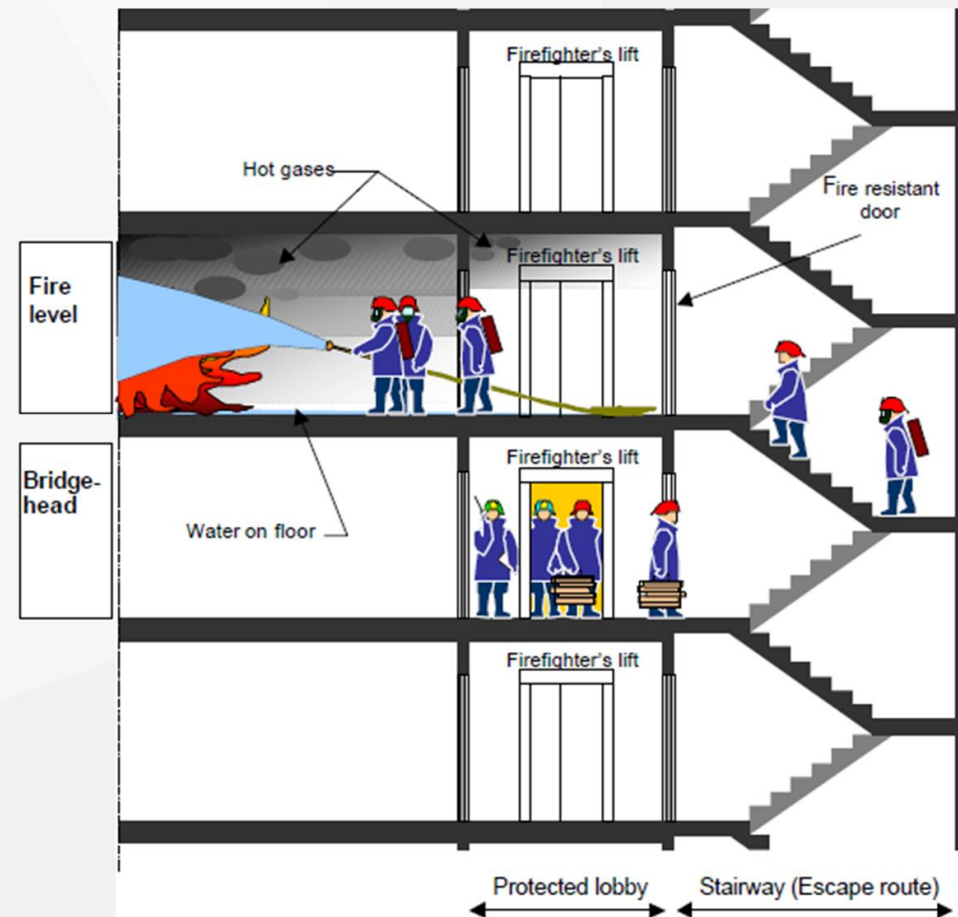
	Input Name	Parameter which stores fire floor
1. Fire Floor	FR1	[B14]
2. Fire Floor	FR2	[B15]
3. Fire Floor	FR3	[B42]
4. Fire Floor	FR4	[B43]

- There are 4 programmable inputs for fire.

- If one of them is activated, lift cancels all calls and travels directly to fire exit floor.

- Fire exit floors for each input FR1, FR2, FR3 and FR4 are defined in parameters B14, B15, B42 and B43 respectively. They show the floors where the passengers inside the cabin will be evacuated.

- If lift is in motion and fire exit floor remains in the opposite direction of the motion, then the lift stops at the nearest floor and then reverses its direction and moves to the fire exit floor.

	Input Name	Parameter which stores fireman access level
1. Fire Floor	FR1	[B14]

- FR1 input is used to start the fire-fighter lift operation.

- If FR1 is activated, then lift cancels all calls and travels directly to the floor stored in parameter B14.

- If lift is in motion and fireman Access level is in the opposite direction of the motion, then the lift stops at the nearest floor and then reverses its direction and moves to the fire exit floor.

Parameter [B40]	Fire alarm is activated.
0	If input FRx is passive, namely not connected to 1000.
1	If input FRx is active, namely connected to 1000.

Parameter [B40], defines status of FR1…FR4 as normally open or closed.

Input No	Input Code	Explanation	Definition	Active State
41	FR1	Fire Input Switch An active signal at this input switches the system to fire mode.	User	Refer to [B40]
42	FR2			
76	FR3			
77	FR4			

Output functions for fire are as follows :

22	Fire Alarm (Fire Operation started)
23	Down in Fire (Down Motion in fire operation)
24	Up in Fire (Up Motion in fire operation)
25	Fire Door Alarm (Slow Closing Signal in fire fighter lift in fire phase 1)
64	Fire No Exit (Car at fire exit floor in EN81-73 standard)

Input Functions for fire are as follows :

Input	Input No	
FRM	43	Fireman Switch at fire fighter access floor
FRC	44	Fireman Switch in car operating panel
AL1	I21	Door open limit switch contact
AL2	I31	Door open limit switch for second door

Parameters related to EN81-72

B39	This parameter defines the number of car doors in fire-fighter lift (EN81-72).

Parameters related to EN81-73

B41	Doors in fire
0	Doors wait open at fire exit.
1	Doors wait closed at fire exit after specified time in [T6] and [T22].

- AE-MAESTRO can be operated in **simulation mode**.

- Simulation can be used for demo, test and training purposes with or without motor connected.

- The device simulates encoder pulses and shaft switches in this mode.

- ML1, ML2, MKD, MKU, 817, 818 switches and encoder are not connected.

- All operations except shaft position magnetic switches and encoder pulses are executed normally in simulation mode.

- **Simulation operation is not allowed when the controller has been connected to the lift motor in the shaft or machine room.**

- Some errors are inhibited depending on the type of the simulation.
- You can simulate motion simply by giving calls.
- The virtual car will move and open its doors at arrival at the target floor.
- Safety line must be closed.
- Door contacts can be simulated by output relays driven by the door open/close signals, if no physical door is used in order to fulfill the requirements of door open test.

[A19] SIMULATOR MODE

0	Not Active Simulation mode is not active.
1	Simulator Motor with free running Motor In this mode the device runs the motor. Everything besides the inputs listed above must be connected.
2	Simulator Without Motor In this mode the device runs without motor. You should leave motor connections. The errors related to the motor operation and motor cabling will be ignored.
3	Simulator Only Device In this mode the device runs without motor and any other external board. No connection to motor as well as car and shaft boards are required. The errors related to the motor operation, motor cabling as well as shaft communication will be ignored.

- The device enters into SIMULATON MODE when the following conditions are met:

- A05-Floor selector parameter must be set as **Motor Encoder** as [**A05 = 2**].

- Any one of the digital inputs must be set as **SIM** (Input Function No: 62).

- This input must be connected to **1000** terminal.

- Parameter A19 must be set as [**A19= 1,2,3**].