



# ARKEL



## **ARL-300**

### **Shaft Learning with Encoder**

### **Installation Manual**

**Publisher**

ARKEL Elektrik Elektronik Ticaret Ltd. Şti.  
Şerifali Mah. Bayraktar Bulvarı Şehit Sok. No:32  
Ümraniye İstanbul TURKIYE

Tel : (+90 216) 540 67 24

Fax : (+90 216) 540 03 09

E-mail: info@arkel.com.tr

www.arkel.com.tr

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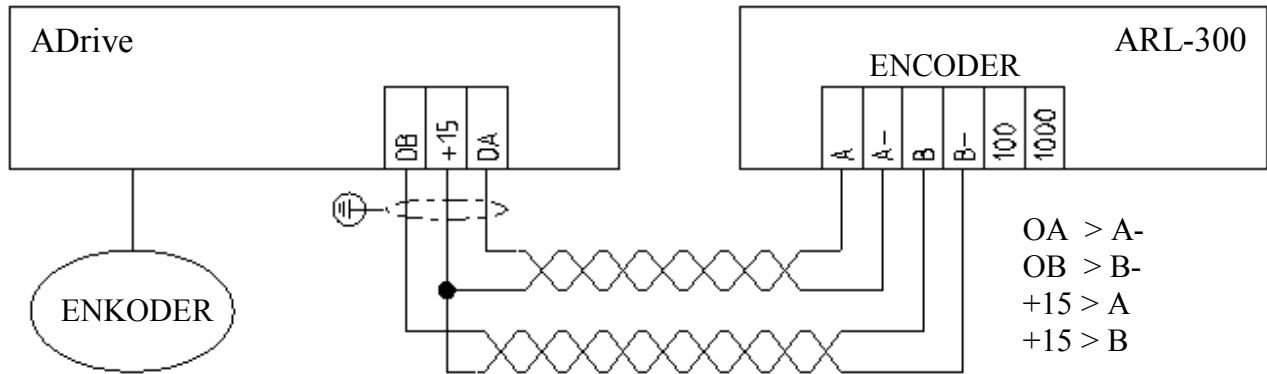
### 1. ENCODER CONNECTION

Encoder input on ARL-300 should be connected to motor encoder, shaft encoder or the encoder of overspeed governor as shown below.

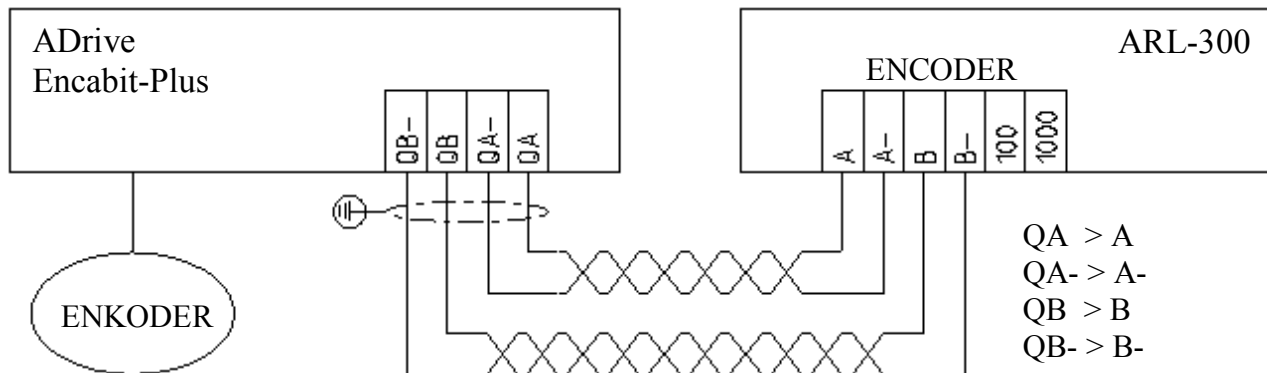
#### 1.1. MOTOR ENCODER CONNECTION (With ADrive)

The encoder signal cable between ADrive inverter and ARL-300 should be shielded if possible. If not, the twisted-pair cable should be preferred. The connection cable should be as short as possible and it should be kept away from other cables that have distortion.

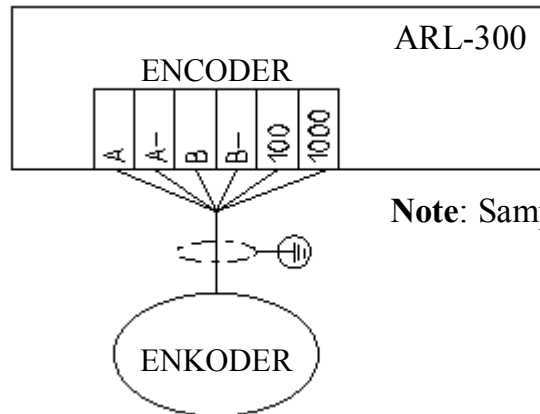
##### a) INCREMENTAL ENCODER CONNECTION



##### b) ABSOLUTE ENCODER CONNECTION (FROM ENCABIT-PLUS MODULE)



#### 1.2. THE CONNECTION OF OVERSPEED GOVERNOR ENCODER/SHAFT ENCODER



**Note:** Sample for 24V encoder supply.

## 2. USING OF MAGNETIC SWITCHES and INSTALLATION OF MAGNETS

In the system if releveling is not required, the magnetic switches and magnets 141 and 142 are not used.

In the system if releveling is required, one of two methods below can be used:

a) Encoder of overspeed governor/shaft encoder are used. The external magnetic switches and magnets are not required for releveling.

b) The level differences that occur during loading and unloading are not sensed via motor encoder. If the shaft encoder will be used for the shaft learning, the magnetic switches 141&142 must be mounted for releveling and the releveling magnets must be installed for every floor.

### 2.1. THERE ARE NO 141 and 142

- MOTOR ENCODER IS USED – NO RELEVELLING

- OVERSPEED GOVERNOR ENCODER / SHAFT ENCODER ARE USED

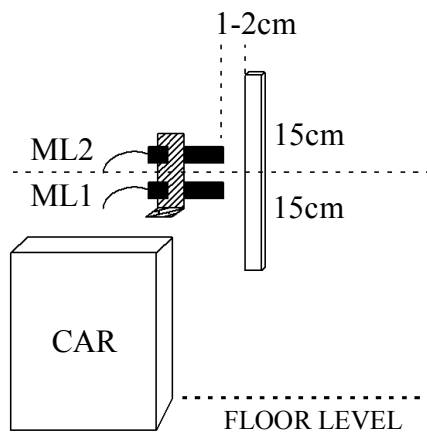
**Monostable** magnetic switches ML1&ML2 and **30 cm** bar magnet in the door opening zone at every floor are used. During the switch observes the magnet, the switch must complete the circuit.

#### Cautions:

- The length of bar magnets in the door opening zone must be **exactly 30 cm!**
- The magnetic switches ML1&ML2 that are used in the operation of bridging the door safety circuit must be in accordance with EN 81-1/2 item 14.1.2.5.

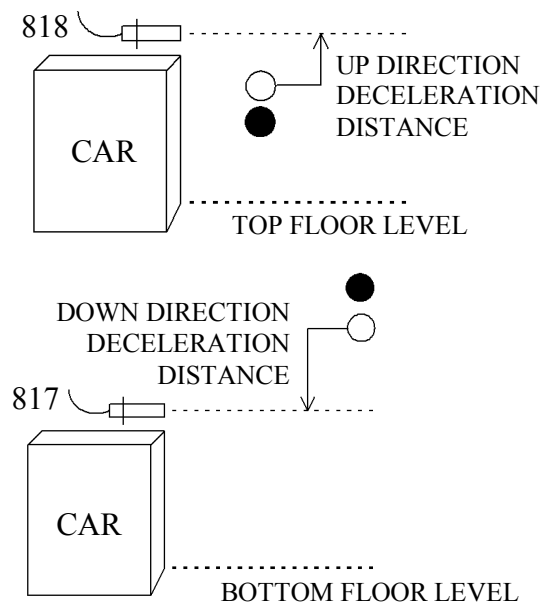
817 (Down) and 818 (Up) forced deceleration **bi-stable** magnetic switches and the round magnets are used at related distances. Magnet ● completes the circuit; magnet ○ cuts the circuit.

The parameter “Selector Type” must be selected as “ENCODER COUNTER”. If releveling will be done by using the overspeed governor encoder/shaft encoder, the parameter “Relevel. Method” must be selected as “With encoder”.



The distance between switches ML1&ML2 is recommended as **5cm !**

Car Speed (m/s)	Recommended Slowing Distance (cm)
0.6	80
0.8	130
1.0	180
1.2	220
1.6	240



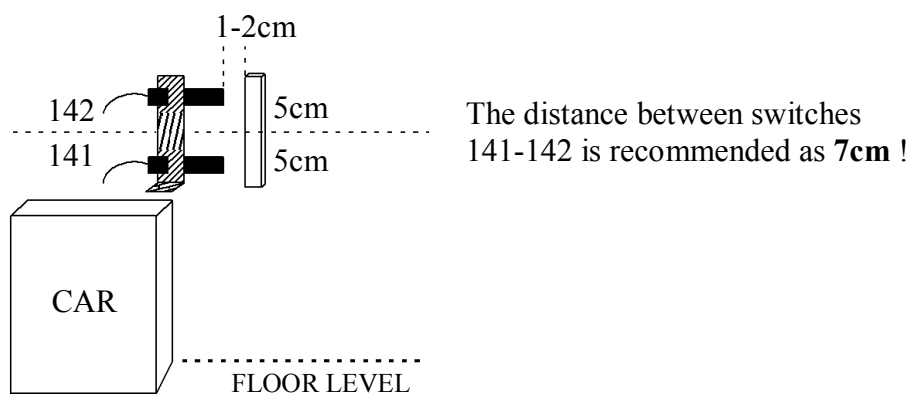
## 2.2. THERE ARE 141 and 142

### MOTOR ENCODER IS USED – THERE IS RELEVELLING

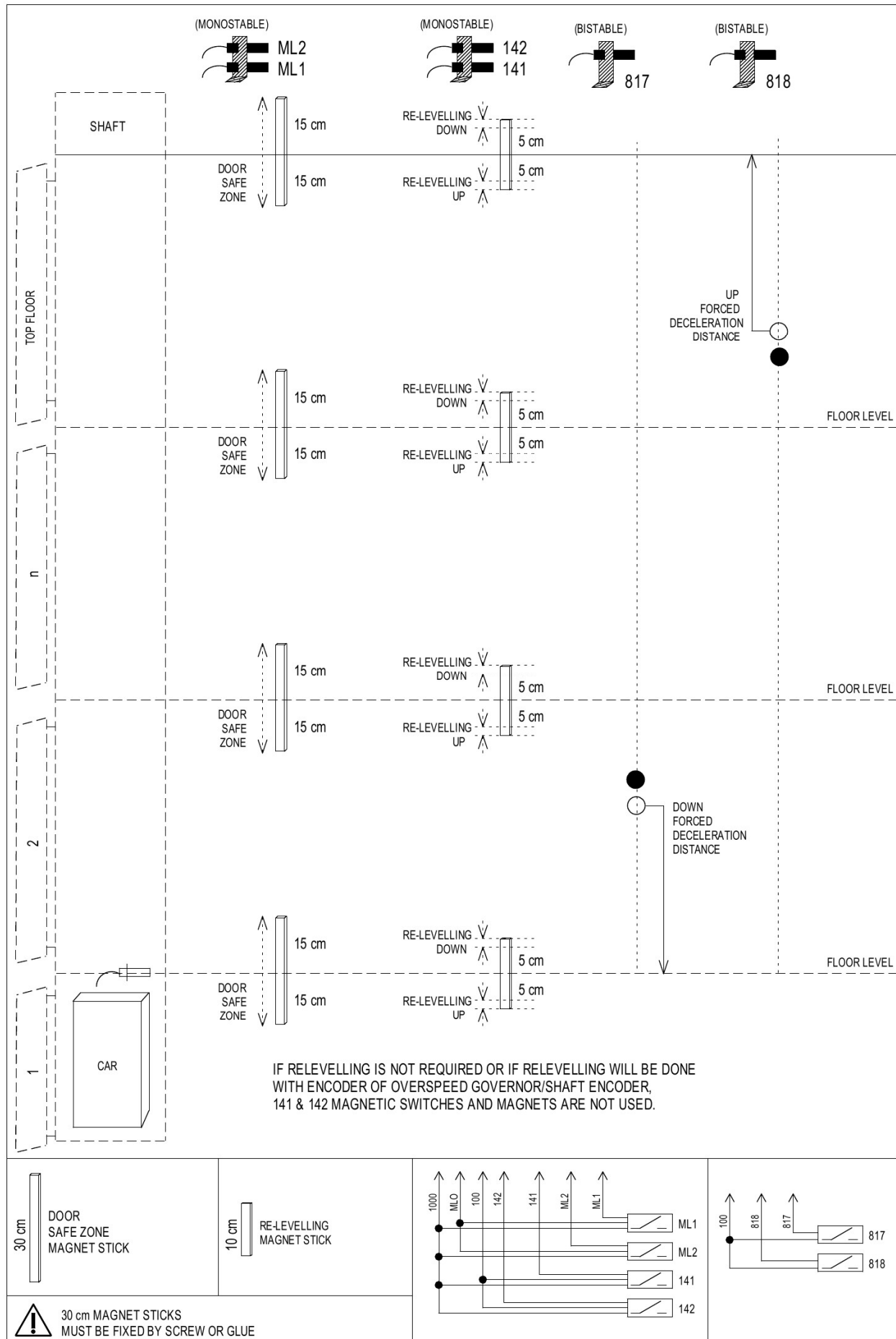
In addition to the switches and magnets ML1-ML2 & 817-818, **monostable** magnetic switches 141-142 and **10cm** bar magnet are used at every floor level. During the switch observes the magnet, the switch must complete the circuit. When signal 142 is off, the relevelling is done downward; when signal 141 is off, the relevelling is done upward.

Installation of the switches 141-142 must be like ML1-ML2. 142 must be on the top; 141 must be on the bottom.

The parameter “Selector Type” must be selected as “ENCODER COUNTER; the parameter “Relevel. Method” must be selected as “With 141&142 sgn”.



### 3. INSTALLATION OF THE SWITCHES – THE GENERAL VIEW



#### 4. PARAMETER SETTINGS

To enter the parameter settings menu, hold down the “left” button for 3 seconds on the main screen. Within the menu, while “left” and “right” buttons are used to navigate between parameter options, “up” and “down” buttons will change the values of parameters.

Make sure the following parameters are set correctly before beginning the shaft learning process.

Selector Type  
ENCODER COUNTER

“Selector type” should be set to “ENCODER COUNTER”.

High Speed Slowing  
200cm

Deceleration distance of the lift is set from “High Speed Slowing” screen.

Slow Spd Stopping  
8 cm

Stopping distance of the elevator is determined from “Slow Spd Stopping” screen. (This value will be calculated automatically during shaft learning process)

Erase Level Tune

If the shaft learning process will be done for the first time, it is necessary to erase all the fine tuning settings. For this, press “up” button from “Erase Level Tune” screen.

ARE YOU SURE ?  
DOWN: YES

Pressing “down” button will erase all fine tuning settings in “ARE YOU SURE ?” screen.

FINE LEVEL TUNE  
ERASED

“FINE LEVEL TUNE ERASED” display indicates that all fine tuning are deleted from the system.

PR Relay function  
2. Motor Control

To get output from PR relay during relevelling process, “2. motor control” function should be selected on “PR Relay function” screen.

EXIT FROM MENU

To exit from the menu, press “up” button on “EXIT FROM MENU” screen.



## 5. SHAFT LEARNING

Up forced deceleration distance magnet (818), down forced deceleration magnet (817) and door zone magnet (30cm) should be lined up in shaft for the process of shaft learning. Disable the inspection mode on main screen and be sure there are no errors in the system.

ARL-300 system, the cabin can be made as soon as possible with the aim of wells learning process will move at high speed. 817 and 818 against the possibility of compulsory work slow to action switches, if desired learning well during high-speed motor drive from the menu, it can temporarily reduced.

In order to complete the shaft learning process in a short time, ARL-300 system will move the cabin at high speed. For against the possibility of failure of 817 and 818 switches, the high speed value can be temporarily reduced from the drivers menu options.

Call Waiting  
100: 24V P:00.02m

An error should not be seen on the main screen. Inspection mode should be disabled.

GROUP STATUS  
[A+] -- -- --

By clicking "left" button once, group status screen can be reached.

CALL SET: 1  
ACTIVE CALL: --

By clicking "left" button once again, call set screen can be reached.

RANDOM CALL: --  
REMAINING: 0

By clicking "left" button once again, random call screen can be reached.

Shaft Learn  
Press Up + Down

By clicking "left" button once again, shaft learning screen can be reached. Pressing "up" and "down" buttons together will start the shaft learning process.

While the process of shaft learning:

- If the cabin is at the bottom floor, it will move up to get out of the forced deceleration zone (817).
- Cabin will move downwards searching down deceleration zone signal (817).
- The lower flag will be detected.
- Bypassing the 2nd stop door zone magnet at low speed, system calculates the flag length.
- Returns to the bottom floor.
- Moving upwards at high speed, system locates and records all the positions of floor flags.
- If the shaft learning is successful "SHAFT LEARN COMPLETED" sign appears in the screen.

## 6. FINE LEVEL TUNING SETTING

There are two methods for fine level tuning setting. Either each fine tune level settings can be set manually or automatically with releveilling method from COP.

### 6.1. MANUAL FINE LEVEL TUNING

Take the cabin to top floor. Give a call to one lower floor. When the cabin reaches the floor level, note the level difference to a piece of paper. This procedure should be repeated until you reached to the bottom floor. When the cabin reaches to bottom floor, give a call to one upper floor. When the cabin reaches the floor level, note the level difference and repeat this procedure until cabin reaches to top floor. Then, set all collected values to “fine level tune” options.

Fine Level Tune

To set the values of fine level tunes, press “up” button on “fine level tune” screen.

UP      DOWN  
F:12 +16mm +8mm

The values will be set to each floor individually.

When the elevator arrives at floor 12;

The example shows fine level tuning at floor 12. When the elevator is moving upwards to floor 12, it is observed that the cabin stopped 16mm below the floor level, and taken upwards 16mm more. Likewise, when the elevator is moving downwards to floor 12, it is observed that the cabin stopped 8mm below the floor level, and taken upwards 8mm more.

## 6.2. FINE TUNING WITH COP

For fine tuning using COP, activate the “LevelTuneFromCOP” and “Releveling” parameters from the menu.

LevelTuneFromCOP  
ACTIVE

Releveling  
ACTIVE

Give calls downwards for every floor individually. In each stop, make the releveling using COP.

Relevelling downwards:

- Hold down the “door close” button.
- Give a call to the bottom floor.
- Lift will start releveling downwards
- Release the “door close” button when cabin reaches floor level.

Give calls upwards for every floor individually. In each stop, make the releveling using COP.

Relevelling upwards:

- Hold down the “door close” button.
- Give a call to 2nd floor.
- Lift will start releveling upwards
- Release the “door close” button when cabin reaches floor level.

When releveling is done " LevelTuneFromCOP" parameter should be set to "DISABLED".

## 7. FREQUENTLY ASKED QUESTIONS

### Q1. Is it appropriate to make the shaft learning with motor encoder?

No. Motor encoder is not suitable for shaft learning, because the motor will stand still while the motor rope stretches. Motor encoder will be enough only for lifts which do not require releveling (e.g. lifts that do not move off more than 2cm during loading and unloading). However, if releveling is necessary, either overspeed governor's encoder should be used or "WITH 141&142 SGN" should be selected from "RELEVELLING METHOD" parameter and the releveling magnets should be placed for each floor.

### Q2. There is no "door close" button on COP. How do I make the releveling from COP?

You can temporarily connect "door open" button to "CLOSE" input on FX\_SERI board. The connection of photocell must continue to remain "OPEN" terminal on FX\_SERI.

**CAUTION:** Do not forget to revert the button connection after releveling process.

### Q3. I can enter maximum "+/- 99mm" distance in fine level tuning, but it is not enough. What should I do?

If the door zone magnets are misplaced more than 99mm, it is not possible to make the fine tuning from the menu. Please relocate door zone magnets and repeat the shaft learning process.

**CAUTION:** Do not delete the old fine tuning settings. Otherwise, you will need to readjust all the floor level setting. For the same reason, do not change "stopping distance" parameter either. Just make a new shaft learning and fine tune only the floor of misplaced door zone magnets.

### Q4. During shaft learning, the cabin goes until top/bottom limit switch. What could be the reason?

You need to increase the distance between 817 and 818. Reducing slowing distance from drivers menu can solve the problem also but it may cause discomfort to the passengers.

### Q5. I am getting "COUNTED DOOR ZONE NUMBER IS WRONG" error. What shall I do?

If it is a 10 stop elevator, the system should count 10 door zone magnets while shaft learning. If this number is estimated to be 9 or 11, something should be wrong.

- There could be a missing door zone magnet in the shaft.
- There could be an extra door zone magnet in the shaft.
- The magnetizations of ML1 or ML2 could be affected from rails magnetic.
- The magnetics of ML1 or ML2 may be damaged.
- The cables of ML1 or ML2 may be damaged.

**Q6. I am getting “ML1, ML2 SIGNAL SEQUENCE IN REVERSE.” Error. What shall I do?**

ML2 should be mounted above ML1. Otherwise, the signal sequence will be in reverse order.

**Q7. At intermediate floors, I adjust slow speed drifting distance by changing “HIGH SPEED SLOWING” parameter but the top and the bottom floors always drift more.**

If the drifting distances are normal in intermediate floors, but more at bottom/top floors, you may have to change the places of 817/818 magnets.

ARKEL Elektrik Elektronik Ticaret Ltd. Şti.  
Şerifali Mah. Bayraktar Bulvarı Şehit Sok. No:32 Umraniye İstanbul TURKIYE  
Tel : (+90 216) 540 67 24  
Fax: (+90 216) 540 03 09  
E-mail : info@arkel.com.tr  
www.arkel.com.tr