



MONT70 Series

Elevator Intergrated Controller

Starting Guide



V1.0 2015.06

MONT70 Starting Guide

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1 Information

MONT70 is a comprehensive elevator controller which is fit for most elevator systems around the world; furthermore, it is very convenient for extending, based on customer requirement.

Many advanced technologies and features were integrated into this controller, include:

- Direct stop calculation technology
- 34 basic + 22 advance features
- 32 bit DSP CPU
- CAN & Modbus network applied
- Comprehensive protection (~60 reference code)
- No load parameter auto-tuning
- Auto-torque compensation (no weighing device)
- Support both synchronous motor and asynchronous motor
- Up to 48 floors
- Speed up to 4m/s
- Max 8 units group control

1.1 Features

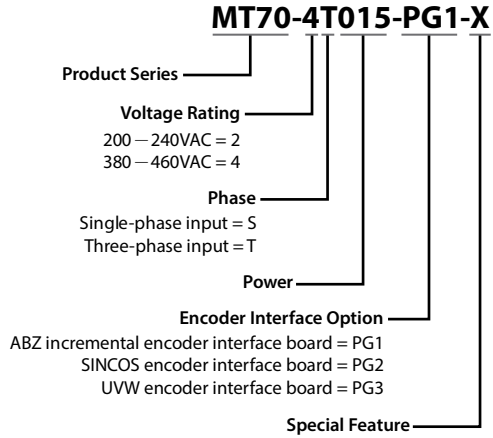
There are 34 basic features.

| No. | Function Name | No. | Function Name |
|-----|---|-----|---|
| 1 | Full Automatic Operation | 28 | Car Light and Fan Automatic Turn Off |
| 2 | Attendant Operation | 29 | Terminal Car Call Cancelation |
| 3 | Inspection Operation | 33 | Door Re-open by Hall Call Button |
| 4 | Self-rescue Re-leveling Operation | 34 | Car Door Open Button |
| 5 | Fire Return | 35 | Door Open Automatically When Power Recovery |
| 6 | Fireman's Operation | 37 | Door Nudging Feature With Buzzer |
| 7 | Independent Operation | 38 | Door Close Button |
| 11 | Built-in Duplex Operation | 40 | Keep Door Open Function |
| 12 | Door Control Under Inspection Operation | 44 | Service Floor Selection |
| 14 | Automatic Main Floor Homing | 45 | Car Arrival Chime |
| 15 | Manual Parking Operation | 46 | Hall Arrival Lantern |
| 19 | Full Collective | 47 | Hall Arrival Chime |
| 20 | Up Collective | 50 | Starting Compensation by Weighing Signal |
| 21 | Down Collective | 51 | Supplementary Car Operational Panel |
| 25 | Shaftway self-Learning Function | 52 | Automatic Car Position Rectification |
| 26 | Full Load By-pass | 54 | Earthquake Operation |
| 27 | Car Overload Protection | 56 | VIP Service Floor |

And there are 22 advance features.

| No. | Function Name | Description |
|-----|--|--|
| 8 | Advanced Door Opening | Elevator starts to open the door before car completely landing. |
| 9 | Re-leveling with Door Open | Elevator re-leveling automatically to rectify the level different under door open status. |
| 10 | Endurance Test Operation | Comprehensive selections on elevator endurance test. |
| 13 | Keypad Door Control | Keypad's RUN key to perform door open & STOP key to perform door close. |
| 16 | Predetermined Time Parking | Elevator park automatically according to the time predetermined. |
| 17 | Anti-nuisance Function | Cancel all registered calls according to: 1. Ratio between loading & no. of call. 2. Door curtain didn't actuated in last 3 stops. |
| 18 | Predetermined Time Service Floor Selection | Predetermined Time for the service floor during peak hour. |
| 22 | Distributed Standby | Elevator will standby at free floor under duplex or group control. |
| 23 | Automatic Busy Floor Determination | Free elevator will assigned to a floor which continually 3 times departure call was registered. |
| 24 | Real-time Clock Management | Build in real-Time clock and battery can maintain 2 years without recharge. |
| 30 | Front & Rear Door Service Selection | Easy to set the service floors for the front or rear door. |
| 31 | Door Force Control | Setting for the door machine number, machine service floor & holding torque. |
| 32 | Through Door Control Mode Selection | Support 4 types of through door control modes. |
| 36 | Repeated Door-close | Door will repeatedly open and close until the obstacle is cleared from doorway. |
| 39 | Comprehensive Door Waiting Time Setting | Door waiting time can be adjusted according to the type of call or main floor. |
| 41 | Car Call Cancelling | Car call will be canceled by continually push for twice. |
| 42 | Floor Display Character Setting | Rich of selection on the character for floor display to meet customer needs. |
| 43 | Hall Display Format Selection | Display can set the as scroll or fixed as well as size of arrow. |
| 48 | Dual Landing Call in Through Door | Dual hall calls can be set when rear door located on the same floor. |
| 49 | Hall Call Adhesion Recognition | When hall call adhesion was identified, system will ignore such button automatically. |
| 53 | Non-default Parameter List | Users can find the system parameters which are different from the factory default. |
| 55 | Current Aslant Remove | For a stopped Syn. motor, the maintaining current was removed by the slope way to avoid unnecessary noise. |

1.2 Model



1.3 Power and Rating

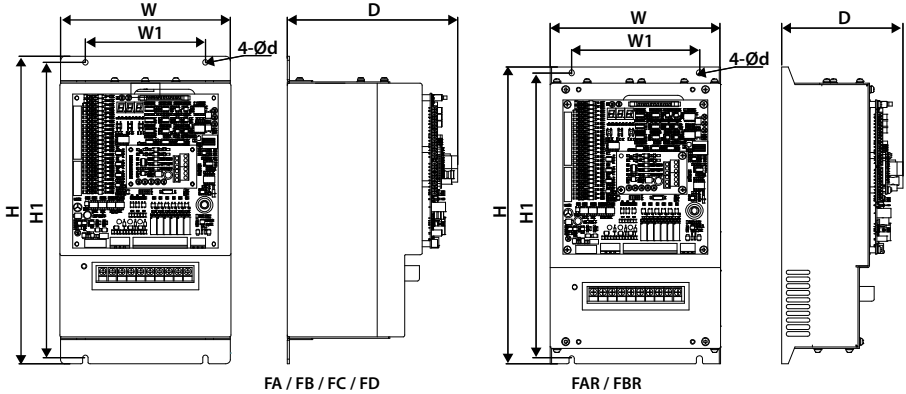
The AC supply to the drive must be installed with suitable protection against overload and short-circuits, i.e. MCCB (molded case circuit breaker) or equivalent device.

The recommended specification of MCCB, contactor & cables were shown as following tables.

The size of earth wire should not be smaller than the requirement in 4.3.5.4 of IEC61800-5-1.

| MONT70 Integrated Controller | | | Power Selection | | | External Wiring | | | | | |
|------------------------------|---------------|------------|----------------------|-------------------------|--------------------------|-----------------|---------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|
| Size | Model | Motor (kW) | Rated Capacity (kVA) | Rated Input Current (A) | Rated Output Current (A) | MCCB (A) | Contactor (A) | Power Cable (mm ²) | Motor Cable (mm ²) | Ground Cable (mm ²) | Torque of Power Terminals (N.M) |
| FA / FAR | MT70-2S2P2/-R | 2.2 | 3.8 | 24.1 | 10.3 | 32 | 20 | 6 | 2.5 | 2.5 | 1.2-1.5 |
| FA / FAR | MT70-2S3P7/-R | 3.7 | 5.9 | 40 | 17 | 63 | 32 | 16 | 4 | 16 | 1.2-1.5 |
| FA | MT70-2T3P7 | 2.2 | 5.9 | 19 | 17 | 40 | 32 | 6 | 4 | 2.5 | 1.2-1.5 |
| FB | MT70-2T5P5 | 3.7 | 8.5 | 29 | 27 | 63 | 40 | 10 | 10 | 2.5 | 2.5-3.0 |
| FB | MT70-2T7P5 | 7.5 | 11 | 35 | 33 | 63 | 40 | 10 | 10 | 2.5 | 2.5-3.0 |
| FC | MT70-2T011 | 11 | 16 | 47 | 45 | 100 | 63 | 25 | 16 | 16 | 4.0-5.0 |
| FC | MT70-2T015 | 15 | 21 | 62 | 55 | 125 | 100 | 35 | 25 | 16 | 4.0-5.0 |
| FC | MT70-2T018 | 18.5 | 24 | 77 | 70 | 160 | 100 | 35 | 35 | 16 | 4.0-5.0 |
| FD | MT70-2T022 | 22 | 30 | 92 | 80 | 200 | 125 | 35 | 35 | 16 | 9.0-10.0 |
| FD | MT70-2T030 | 30 | 39 | 113 | 110 | 200 | 125 | 50 | 50 | 25 | 9.0-10.0 |
| FA / FAR | MT70-4T2P2/-R | 2.2 | 3.4 | 7.3 | 5.1 | 16 | 10 | 1.5 | 0.75 | 2.5 | 1.2-1.5 |
| FA / FAR | MT70-4T3P7/-R | 3.7 | 5.9 | 11.9 | 9 | 25 | 16 | 2.5 | 2.5 | 2.5 | 1.2-1.5 |
| FA / FAR | MT70-4T5P5/-R | 5.5 | 8.5 | 15 | 13 | 32 | 25 | 4 | 4 | 2.5 | 1.2-1.5 |
| FB / FBR | MT70-4T7P5/-R | 7.5 | 11 | 20 | 18 | 40 | 32 | 6 | 6 | 2.5 | 2.5-3.0 |
| FB / FBR | MT70-4T011/-R | 11 | 16 | 29 | 27 | 63 | 40 | 10 | 10 | 2.5 | 2.5-3.0 |
| FB / FBR | MT70-4T015/-R | 15 | 21 | 35 | 33 | 63 | 40 | 16 | 16 | 16 | 2.5-3.0 |
| FC | MT70-4T018 | 18 | 24 | 41 | 39 | 100 | 63 | 16 | 16 | 16 | 4.0-5.0 |
| FC | MT70-4T022 | 22 | 30 | 50 | 48 | 100 | 63 | 25 | 25 | 16 | 4.0-5.0 |
| FC | MT70-4T030 | 30 | 39 | 62 | 60 | 125 | 100 | 25 | 25 | 16 | 4.0-5.0 |
| FC | MT70-4T037 | 37 | 49 | 77 | 75 | 160 | 100 | 25 | 25 | 16 | 4.0-5.0 |
| FD | MT70-4T045 | 45 | 59 | 93 | 91 | 200 | 125 | 35 | 35 | 16 | 9.0-10.0 |

1.4 Dimension and Weight



| Size | Dimension (mm) | | Mounting Size (mm) | | | | GW (kg) |
|------|----------------|-----|--------------------|-------|-------|------|---------|
| | W | H | W1 | H1 | D | d | |
| FA | 200 | 358 | 140 | 344 | 200 | 6.5 | 6.3 |
| FAR | 200 | 347 | 150 | 334.5 | 143 | 6.5 | 5.5 |
| FB | 223 | 348 | 150 | 334.5 | 203 | 6.5 | 7.2 |
| FBR | 223 | 347 | 150 | 334.5 | 164.5 | 6.5 | 6.5 |
| FC | 290 | 555 | 235 | 541.5 | 216 | 6.5 | 15.4 |
| FD | 380 | 598 | 260 | 576 | 290 | 10.0 | 37.0 |

1.5 System Configuration

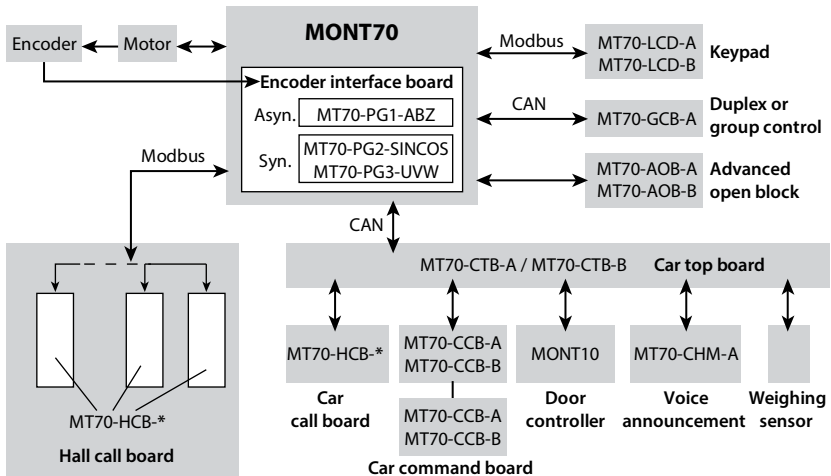
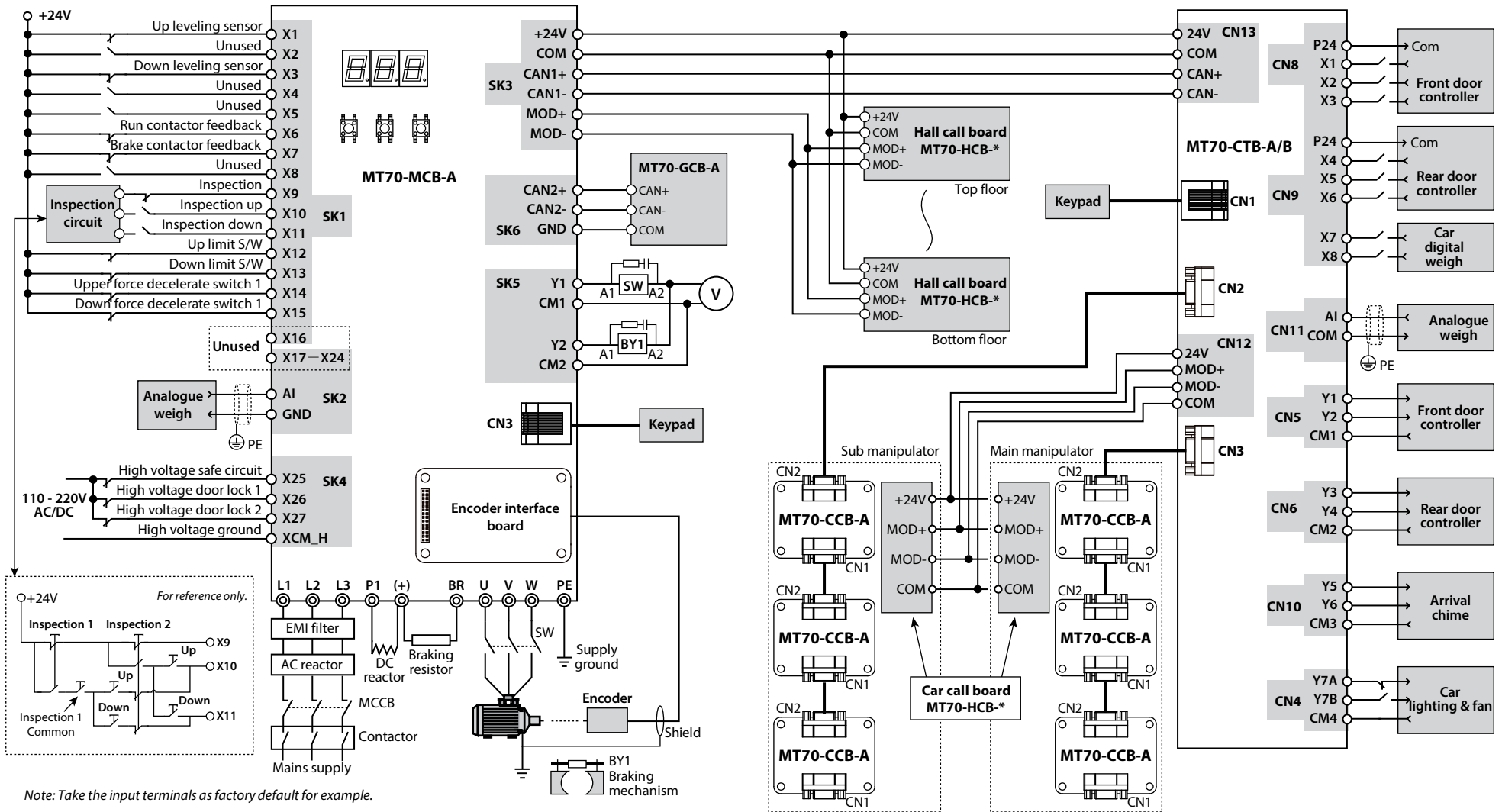


Figure 1-1 MONT70 system configuration



Note: Take the input terminals as factory default for example.

1.6 Supply and Motor Connection

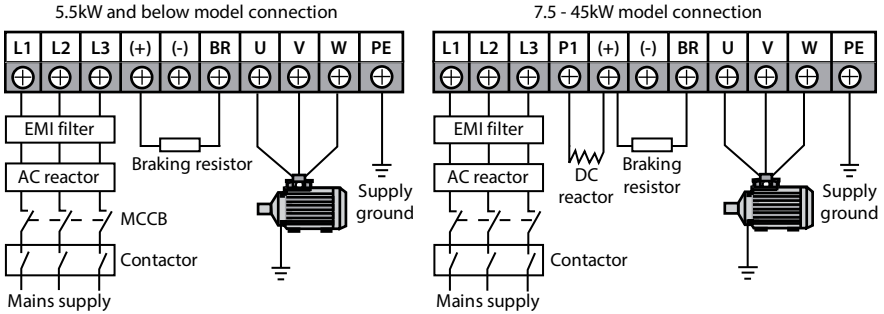


Figure 1-2 MONT70 supply and motor connection

1.7 Main Control Board (MT70-MCB-A)

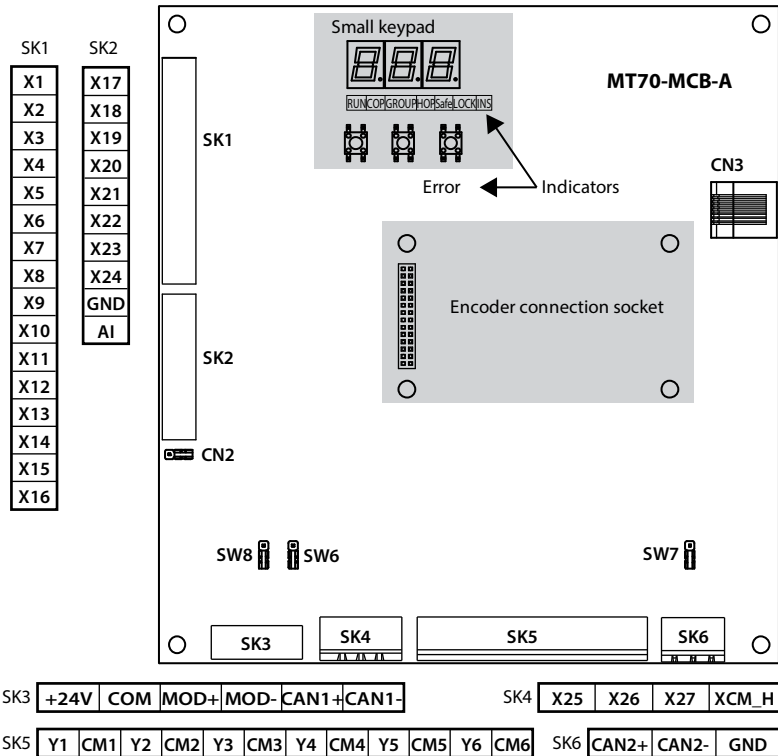


Figure 1-3 Main control board (MT70-MCB-A)

Terminal Definition

| Terminal | | Description |
|-----------------|--------------------------------------|---|
| X1-X24 | Input Signal (low voltage) | Input voltage 0 - 30VDC, input impedance 4.7kΩ Programmable function setting by F12.01 - F12.24 (Bipolar optional optocoupler-isolated input signals) |
| AI / GND | Analogue input | Input voltage -10V - 10V, input impedance 34kΩ |
| 24V / COM | +24V power supply | External provide +24V power, as I/O circuits and communication circuit power. |
| MOD+ / MOD- | Modbus communication | Used with hall call indicator board (MT70-HCB-*) |
| CAN1+ / CAN1- | CAN communication | Used with car top board (MT70-CTB-A/B) |
| X25-X27 / XCM_H | High voltage input | Input voltage 110 - 220VAC/DC, input impedance 22kΩ Programmable function setting by F12.25 - F12.27 (Optocoupler-isolated input signals) |
| Y1-Y6 / CM1-CM6 | Relay contact output | Max. contact rating: 250VAC/3A or 30VDC/1A Programmable function setting by F12.28 - F12.33 |
| CAN2+ / CAN2- | CAN communication | For CAN communicating with group control board (MT70-GCB-A), or CAN communicated with main control board (MT70-MCB-A) which is duplex. |
| CN3 | Modbus communication terminal (RJ45) | Connect to operation keypad (optional), for checking operation status and modifying elevator parameters. |

Indicator

| Indicator | | Description |
|-----------|------------------------------------|---|
| RUN | Elevator operation indicator | Flashing at run, on at stop |
| COP | CTB CAN communication indicator | Flashing at normal communication, off at abnormal |
| GROUP | GCB CAN communication indicator | Flashing at normal communication, off at abnormal |
| HOP | HCB Modbus communication indicator | Flashing at normal communication, off at abnormal |
| Safe | Safety circuit indicator | On at close circuit, off at open circuit |
| LOCK | Door lock indicator | On at close circuit, off at open circuit |
| INS | Inspection indicator | On at inspection mode, off at other modes |
| Error | Fault indicator | On at serious fault, flashing at general fault, off at no fault |

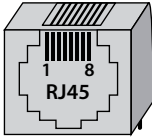
DIP Switch and Jumper

| DIP Switch or Jumper | Description | |
|----------------------|---|--------------|
| DIP switch SW6 | Modbus communication (hall call) resistor connection. Setting should be same with hall call board MT70-HCB-*. 1: resistor disconnected; ON: resistor connected (factory setting). | ON ■ 1 |
| DIP switch SW7 | CAN2 communication (group control) resistor connection. Setting should be same with group control board MT70-GCB-A. 1: resistor disconnected; ON: resistor connected (factory setting). | ON ■ 1 |
| DIP switch SW8 | CAN1 communication (car top) resistor connection. Setting should be same with car top board MT70-CTB-A. 1: resistor disconnected; ON: resistor connected (factory setting). | ON ■ 1 |

| DIP Switch or Jumper | Description |
|----------------------|---|
| Jumper CN2 | Digital input terminal X1 - X24 are high level / low level selections: When pin 1 and pin 2 are short-connected, the low level is valid; When pin 2 and pin 3 are short-connected, the high level is valid (factory setting). |



Modbus Communication Terminal (RJ45)



| Pin | 1,3 | 2 | 4 - 6 | 7 | 8 |
|------------|-----|------|-------|------|--------|
| Definition | +5V | MOD+ | GND | MOD- | Unused |

Optional keypad to check and modify the parameter of main control board (MT70-MCB-A).

Connection

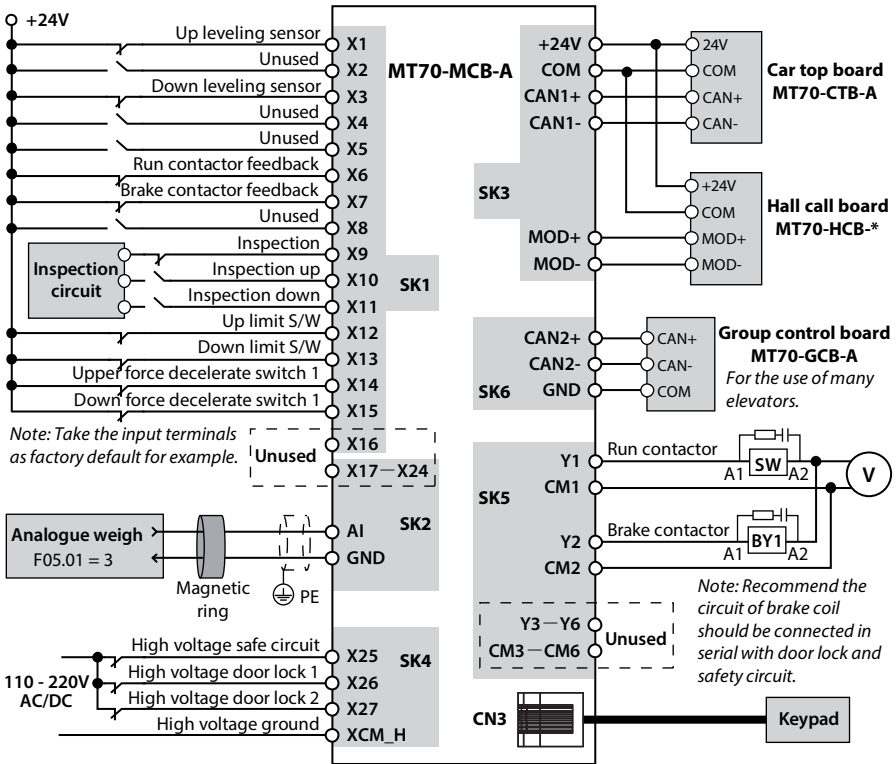


Figure 1-4 Connection (factory setting)

1.8 Car Top Board (MT70-CTB-A/B)

MT70-CTB-A/B is a communication board between MONT70 and car cage devices, which is an important transfer station for collecting and sending control signals between main board to other boards.

The difference between MT70-CTB-A and MT70-CTB-B is that, the usage mode of MT70-CTB-B is vertical plug in, while MT70-CTB-A is horizontal. Except this, they are identical boards.

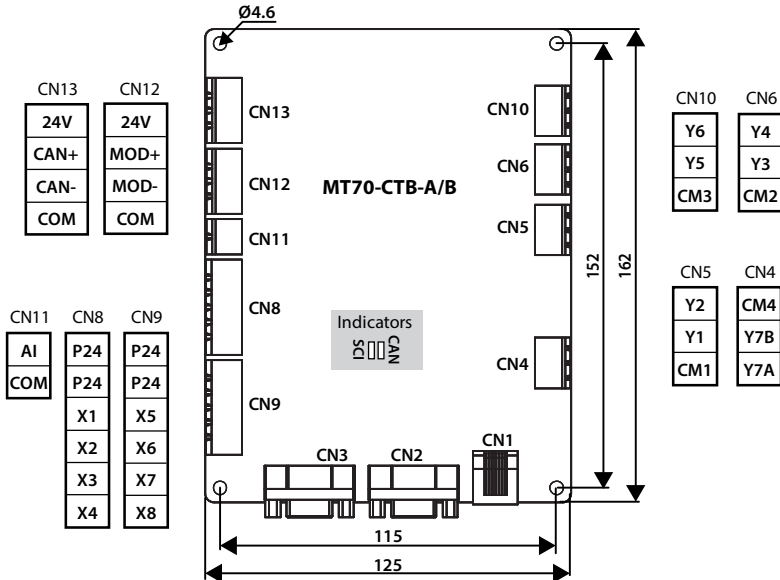


Figure 1-5 Car top board (MT70-CTB-A/B)

Terminal Definition

| Terminal | | Description |
|-----------------|----------------------|---|
| 24V / COM | +24V power supply | External DC24V power supply for CTB board operation |
| CAN+ / CAN- | CAN communication | Connect with main control board (MT70-MCB-A) |
| MOD+ / MOD- | Modbus communication | Connect with hall call indicator board (MT70-HCB-*) |
| AI / COM | Analogue input | Input voltage 0V - 10V, input impedance 34kΩ |
| P24 | +24V power supply | Digital input common terminal |
| X1-X8 | Digital input | Input voltage 0 - 30VDC, input impedance 4.7kΩ Programmable function setting by F13.01 - F13.08 (Bipolar optional optocoupler-isolated input signals) |
| Y1-Y7 / CM1-CM4 | Relay contact output | Programmable output, set by F13.25 - F13.31 Y1-Y6 contact rating: MAX. 250VAC/5A or 30VDC/5A Y7A normally closed, contact rating: MAX. 250VAC/3A or 30VDC/3A Y7B normally open, contact rating: MAX. 250VAC/5A or 30VDC/5A |
| CN2 / CN3 | CCB communication | CN2 & CN3 connect with main & sub car command board (CCB) respectively |

| Terminal | | Description |
|----------|--------------------------------------|---|
| CN1 | Modbus communication terminal (RJ45) | Connect to operation keypad (optional), for checking operation status and modify elevator parameters. |

Indicator

CAN: CAN communication indicator with main control board, twinkling with constant speed during faultless communication.

SCI: Modbus communication indicator with car call board, twinkling with constant speed during faultless communication.

Connection

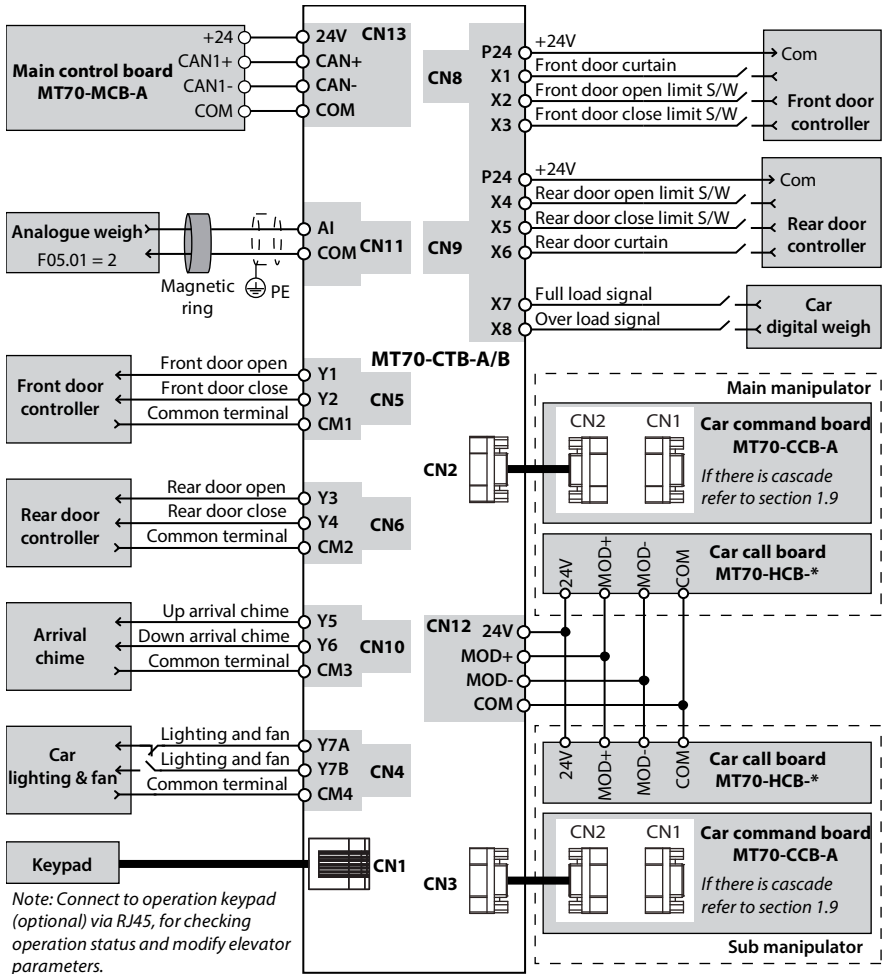


Figure 1-6 Connection (factory setting)

1.9 Car Command Board (MT70-CCB-A)

MT70-CCB-A is a communication board between car top board (MT70-CTB-A/B) and car buttons.

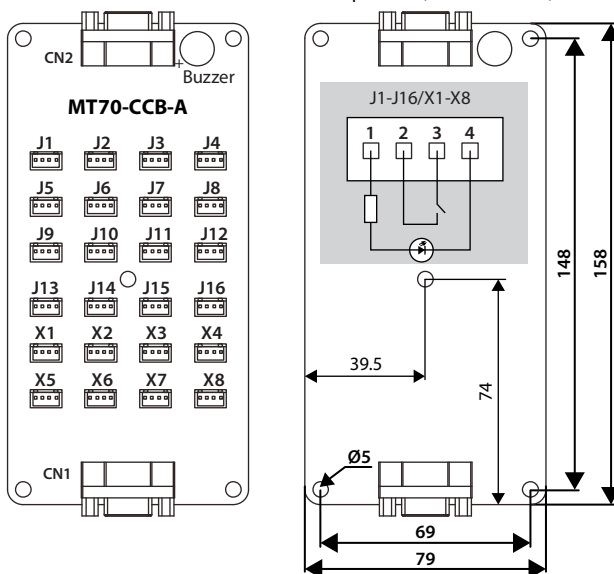


Figure 1-7 Car command board (MT70-CCB-A)

J1 - J16 and X1 - X8 are used for button command input and button indicator output.

J1 - J16

Fixed-floor button interfaces are corresponding to 1st to 16th floor button signal input and button indicator output.

Each CCB support 16 floors. Use second CCB for the button from 17th to 32nd floor and third CCB for 33rd to 48th floor.

X1 - X8

X1 - X8 are programmable signal interfaces defined via parameters of F13.09 - F13.16 (main input) / F13.17 - F13.24 (sub input) / F13.32 - F13.39 (main output) / F13.40 - F13.47 (sub output).

| Terminal | Input (Factory Setting) | Output (Factory Setting) |
|----------|--|---|
| X1 | F13.09 = 9: Door open button (DOB1) | F13.32 = 10: Door open button indicator (DOB1) |
| X2 | F13.10 = 10: Door close button (DCB1) | F13.33 = 11: Door close button indicator (DCB1) |
| X3 | F13.11 = 11: Door open delay button (DDOB) | F13.34 = 12: Door open delay button (DDOB) |
| X4 | F13.12 = 12: By-pass button (NSB) | F13.35 = 13: Full load signal (LWX) |
| X5 | F13.13 = 13: Attendance S/W (ATS) | F13.36 = 14: Attendance signal (ATS) |
| X6 | F13.14 = 14: Change direction button (ACB) | F13.37 = 15: Attendance direction signal (ACB) |
| X7 | F13.15 = 15: Independent S/W (ISS) | F13.38 = 16: Independent indication (ISS) |
| X8 | F13.16 = 16: Fireman switch (FIRS2) | F13.39 = 17: Fire operation indication (FIRE) |

Note:

If more than one CCB was used, only the first CCB X1-X8 will be enabled.

CN1 and CN2

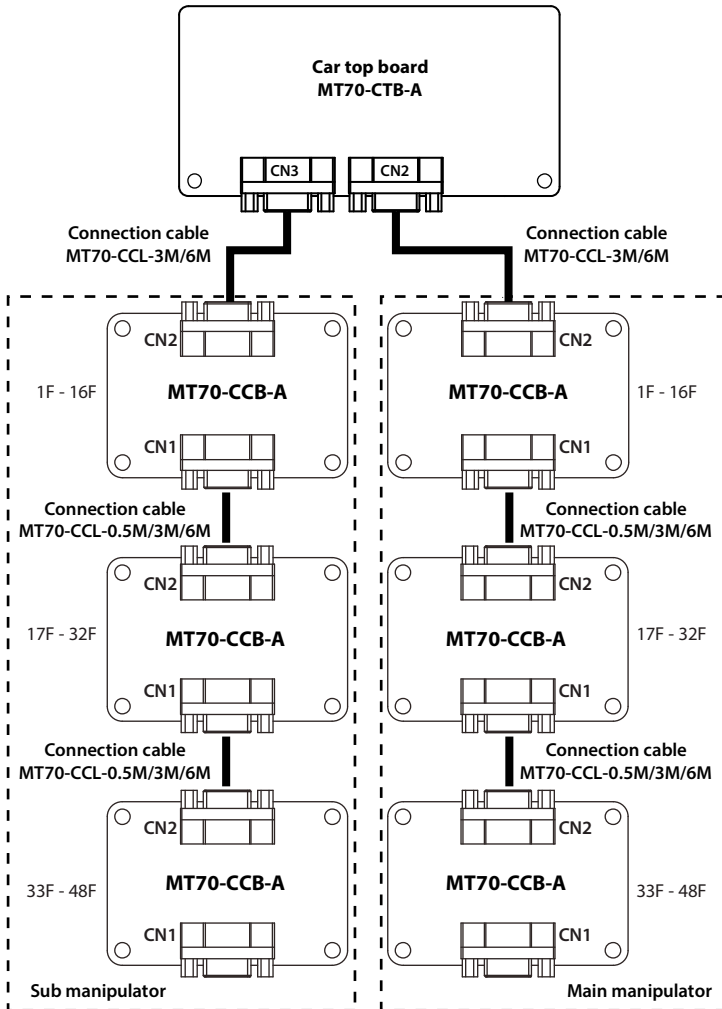


Figure 1-8 Car command board (MT70-CCB-A) connection

1.10 Hall Call Indicator Board

Hall call indicator board includes LED dot matrix and LCD display.

- Hall call board: receive hall call command, display lift location and direction.
- Car call board: receive car call command, display lift location and direction.

Please refer to “MONT70 Hall Call Board Selection Guide” for the specification and others in detail.

1.10.1 MT70-HCB-H (LED dot matrix display)

Features

1. W × H: 70 × 144mm.
2. DC24V input, Modbus communication.
3. Vertical LED dot matrix display.
4. Character & indicator function can be modified according to customer need.

Dimension and Size

The unit of size is mm.

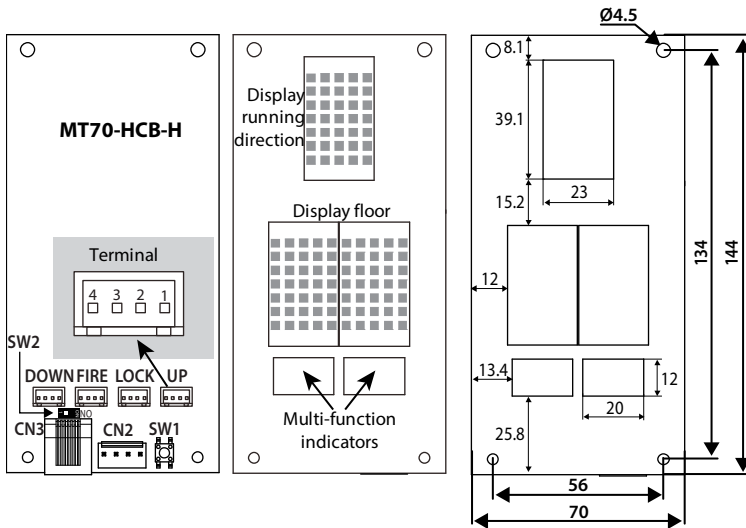


Figure 1-9 MT70-HCB-H

Function Description and Terminal Definition

Display and Indicator

- Three 5×7 dot matrix: display the elevator running direction and the present floor.
- Multi-function indicators: set the multi-function indicator via F26.37 - F26.40.

Terminal Definition

| Terminal | | Description |
|----------|----------------------------|---|
| UP | Up call | 1,2: 24V power supply 3: up button input 4: button indicator output |
| DOWN | Down call | 1,2: 24V power supply 3: down button input 4: button indicator output |
| LOCK | Parking | 1,2: 24V power supply 3: parking switch input 4: up arrival chime indicator output |
| FIRE | Fire | 1,2: 24V power supply 3: fire switch input 4: down arrival chime indicator output |
| CN2 | Power supply communication | From left to right: +24V, MOD+, MOD-, COM |
| CN3 | RJ45 | When the address is set as zero, it is as car call board, the external keypad can modify the parameters of MCB in the car |

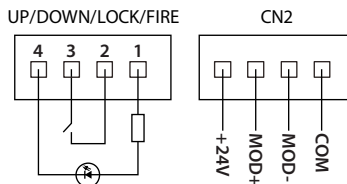



Figure 1-10 Terminal definition

Floor Address Setting

1. Press SW1 button continuously, floor display start to twinkle. 3s later, the twinkle will stop, then change the floor address by up / down button.
2. After floor address set, press SW1 or waiting for 5s without any action. The floor display will twinkle again, this means hall call address setting is success, 3s later, the floor display return to normal status.

Modbus Communication Resistor Setting

| SW2 | Setting |
|---|---|
|  | Modbus communication resistor selection: 1: resistor disconnected (factory setting); ON: resistor connected. |

1.10.2 MT70-HCB-U1 (LCD display)

Features

1. W × H: 74 × 147mm.
2. DC24V input, Modbus communication.
3. Vertical LCD segment display.
4. It will enter energy saving mode automatically after idle period.

Dimension and Size

The unit of size is mm.

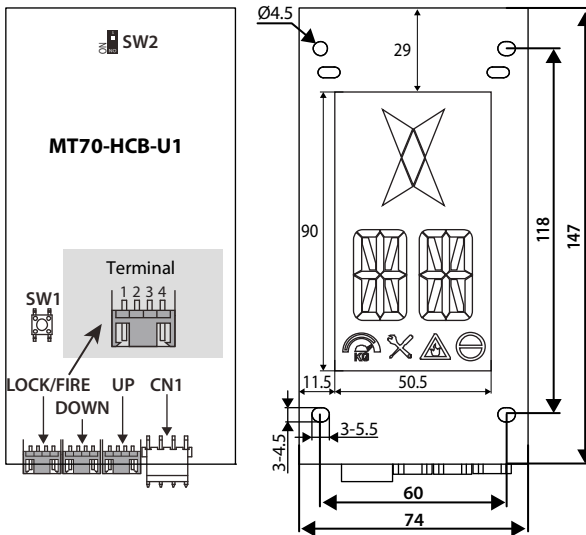


Figure 1-11 MT70-HCB-U1

Function Description

Display



Figure 1-12 MT70-HCB-U1 state display description

Terminal Definition

| Terminal | | Description |
|----------|----------------------------|---|
| UP | Up call | 1,2: 24V power supply 3: up button input 4: button indicator output |
| DOWN | Down call | 1,2: 24V power supply 3: down button input 4: button indicator output |
| LOCK | Parking | 2,3: 24V power supply 1: parking switch input |
| FIRE | Fire | 4: fire switch input |
| CN1 | Power supply communication | From left to right: +24V, MOD+, MOD-, COM |

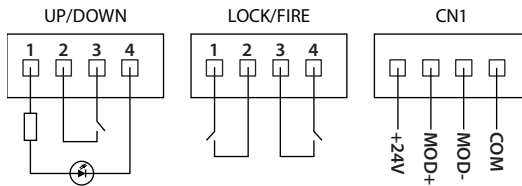



Figure 1-13 Terminal definition

Floor Address Setting

1. Press SW1 button continuously, floor display start to twinkle. 3s later, the twinkle will stop, then change the floor address by up / down button.
2. After floor address set, press SW1 or waiting for 5s without any action. The floor display will twinkle again, this means hall call address setting is success, 3s later, the floor display return to normal status.

Modbus Communication Resistor Setting

| SW2 | Setting |
|--|---|
|  | Modbus communication resistor selection: 1: resistor disconnected (factory setting); ON: resistor connected. |

1.11 Advanced Open Block (MT70-AOB-A/B)

MT70-AOB-A/B is an accessory of MONT71; it has two functions re-leveling and advance-open.

Re-leveling Function:

When elevator stopped in level, the car weight was changed by loading and unloading heavy objects. In this case, the wire rope will be elongated or shrink and car leveling error may be happened. This error might cause hazards to the passenger who goes in and out the car.

MT70-AB-A/B can let elevator move under re-leveling speed (F04.04) to leveling position even door was opened.

Advance-open Function:

When elevator move approaching to floor level within door zone and the creeping speed is less than the setting of advanced-open speed (F04.05), MT70-AOB-A/B will short the circuit of door-lock contactor and open the door in advance to improve elevator efficiency.

MT70-AOB-A/B is shown in Figure 1–14, and the unit of size is mm.

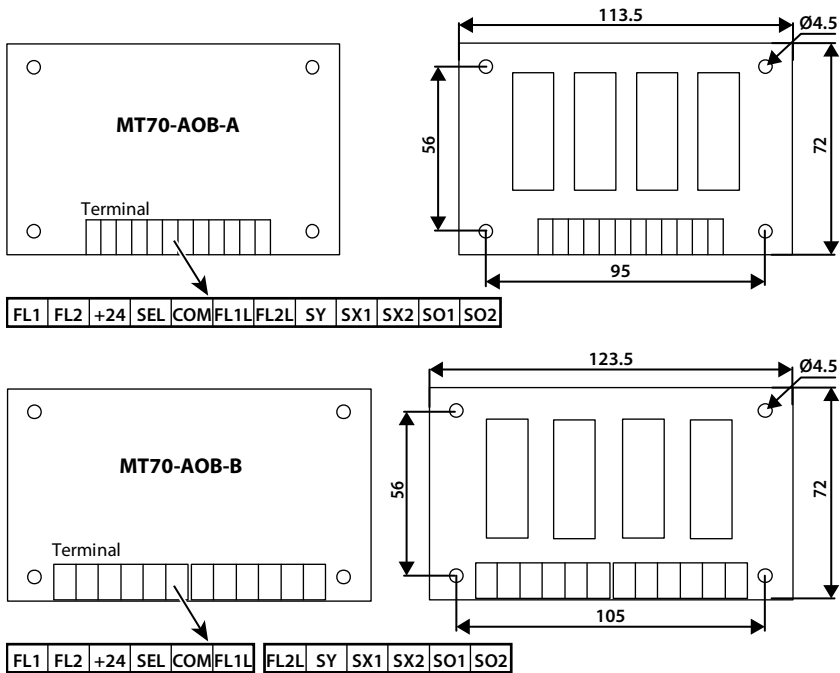


Figure 1–14 MT70-AOB-A/B

Terminal Definition

| Terminal | | Description |
|------------|---|---|
| +24 / COM | +24V power supply | +24V power supply from outside |
| FL1L / FL1 | Re-leveling door zone switch 1 | Refer to terminal connection introduction. FL1L and FL2L is used in door zone signal low level on; FL1 and FL2 is used in door zone signal high level on. |
| FL2L / FL2 | Re-leveling door zone switch 2 | |
| SY | Locked door contactor | When re-leveling or advanced-open conditions was satisfied, the short "door lock" contactor will be actuated. |
| SX1 | Door zone output | SEL wiring decide SX1 and SX2 state. When SEL connect to +24, SX1 and SX2 are high level; When SEL connect to COM, SX1 and SX2 are low level. |
| SX2 | Short "door lock" contactor output status | |
| SEL | SX1, SX2 common terminal | |
| SO1 / SO2 | Locked door circuit | |

Switch Installation

There are two switches installation configuration of MT70-AOB-A/B as shown in Figure 1–15 below.

- Four leveling switches applied: up leveling switch, up re-leveling door zone switch (connect to terminal FL1L / FL1), down re-leveling door zone switch (connect to terminal FL2L / FL2), down leveling switch.
- Three leveling switches applied: up leveling switch, re-leveling door zone switch (up and down sharing), down leveling switch.

Note:

1. The leveling switch must be installed in specified order; otherwise function re-leveling and advanced-open are invalid.
2. The re-leveling door zone switch must be normally open contact.

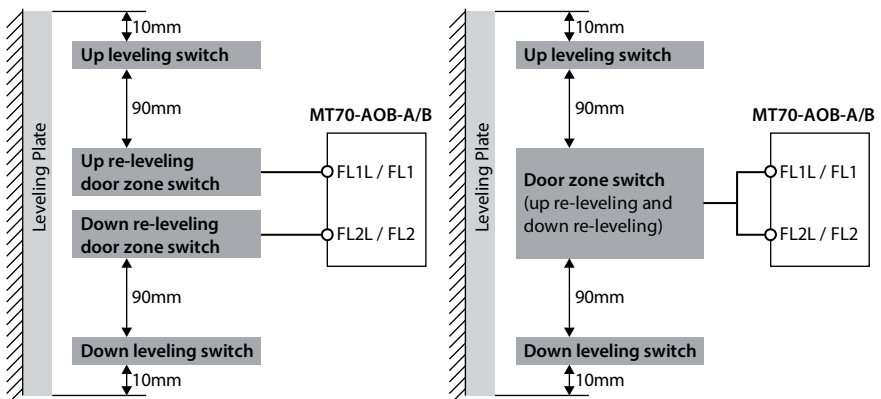


Figure 1–15 Switch installation

Connection

Input Signal of Re-leveling Door Zone switch is Low Level

- When the door zone switch is NPN photoelectric switch, connect FL1L and FL2L to its collector, connect COM to its emitter, and then connect FL1 and FL2 to +24.
- When the door zone switch is dry contact, connect FL1L and FL2L to one end, while connect COM to the other end, and then connect FL1 and FL2 to +24.

Input Signal of Re-leveling Door Zone switch is High Level

- When the door zone switch is NPN photoelectric switch, connect FL1 and FL2 to its collector, connect +24 to its emitter, and then connect FL1L and FL2L to COM.
- When the door zone switch is dry contact, connect FL1 and FL2 to one end, while connect +24 to the other end, and then connect FL1 and FL2 to COM.

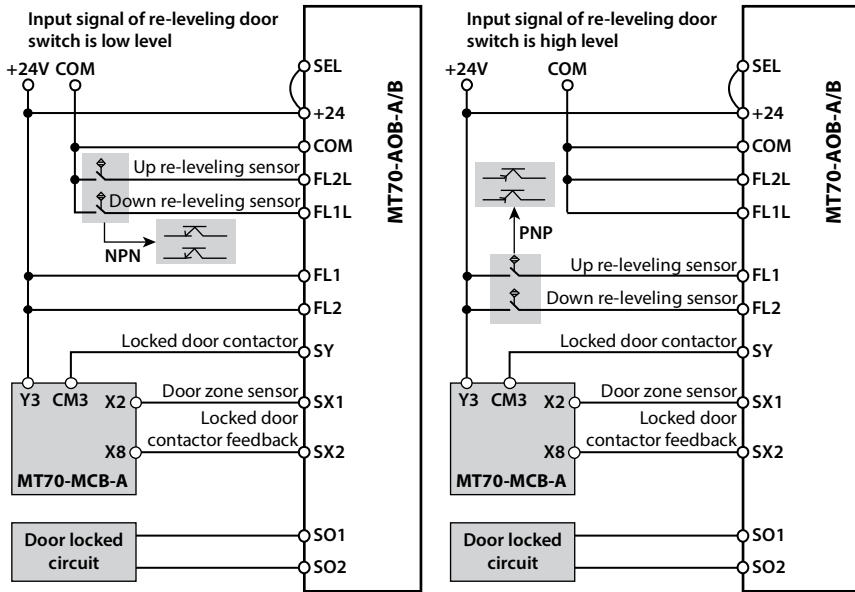


Figure 1-16 Connection (4 switches)

Parameters Setting

Scenario 1

Four leveling switches configuration:

- Connect the up leveling switch and down leveling switch to X1 and X3 of MT70-MCB-A respectively.
- Connect the two re-leveling door zone switch to the terminal FL1L (FL1) and FL2L (FL2) of MT70-AOB-A/B.
- On elevator up running, when the up leveling signal, FL1L (FL1) signal and FL2L (FL2) signal are effective in sequence, the elevator will response them, open door in advanced; on elevator down running, when the down leveling signal, FL1L (FL1) signal and FL2L (FL2) signal are effective in sequence, the elevator will response them, open door in advanced.

Parameters setting as shown in the table below.

| Reference Code | Terminal (MT70-MCB-A) | Setting Value |
|----------------|-----------------------|-----------------------------------|
| F12.02 | X2 | 3 (Door zone sensor) |
| F12.01 | X1 | 1 (Up leveling sensor) |
| F12.03 | X3 | 2 (Down leveling sensor) |
| F12.08 | X8 | 29 (Door locked for Adv. opening) |
| F12.30 | Y3 | 3 (Locked door) |

Scenario 2

Three leveling switches configuration:

- Connect the up leveling switch and down leveling switch to X1 and X3 of MT70-MCB-A respectively.
- Disconnect the door zone switch with terminal X2 of main control board first, then connect it with FL1L (FL1) and FL2L (FL2) together.
- On elevator up running, after the up leveling signal is effective, FL1L (FL1) signal and FL2L (FL2) signal are effective simultaneously, the elevator will response them, open door in advanced; on elevator down running, after the down leveling signal is effective, FL1L (FL1) signal and FL2L (FL2) signal are effective simultaneously, the elevator will response them, open door in advanced.

Parameters setting are same as scenario 1.

Note:

1. For 3 switches configuration; FL1L (FL1) and FL2L (FL2) should be connect together, which need be operated by professional people.
2. Considering safety & reliability, scenario 1 (4 switches) is recommended.

1.12 Encoder Interface Board

Wiring Requirement:

1. Encoder card wire should be laid separately and kept distance from power cables and forbidden to parallel with them.
2. Encoder card wire should be shield wire, and shield layer should connect to PE near controller (in order to avoid interference, shield layer only connected to PE in one side).
3. Encoder card wire should be install inside a separated metal conduits and connected to ground firmly.

1.12.1 MT70-PG1-ABZ

Features

1. Apply to asynchronous motor.
2. Support ABZ signal and pulse output.
3. 12V input.

Function Description

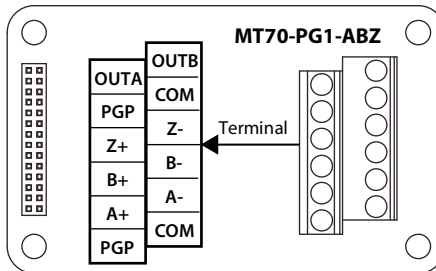


Figure 1-17 MT70-PG1-ABZ

Terminal Definition

Table 1-1 Terminal description

| Terminal | Description | Terminal | Description |
|----------|---------------------------------|----------|----------------------------------|
| PGP | +12V power supply output | Z+ / Z- | Z+ / Z- signals of encoder |
| COM | Power ground, isolated from GND | OUTA | Output A signal, OC output |
| A+ / A- | A+ / A- signals of encoder | OUTB | Output B signal, OC output |
| B+ / B- | B+ / B- signals of encoder | COM | Output ground, isolated from GND |

Connection

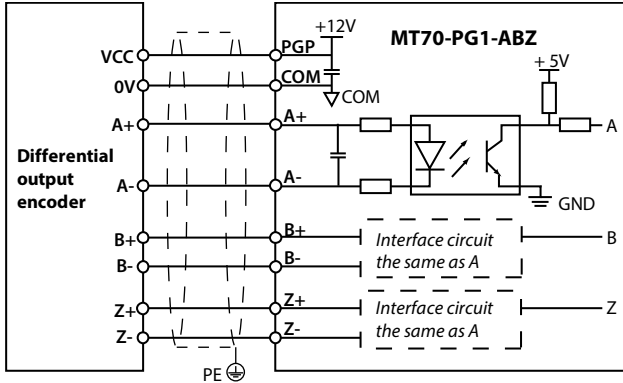


Figure 1-18 Connection of differential output encoder

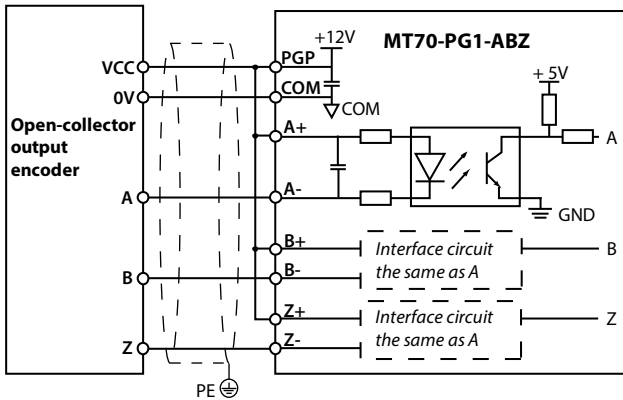


Figure 1-19 Connection of open-collector output encoder

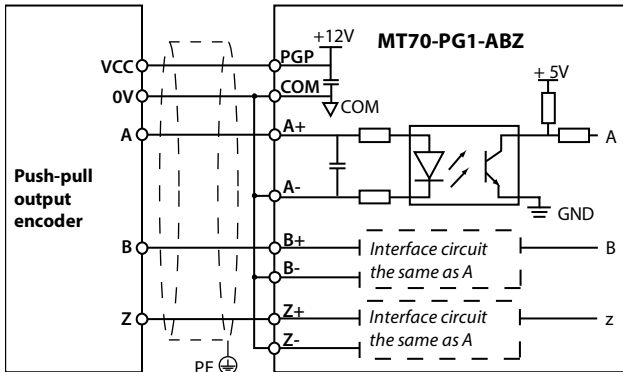


Figure 1-20 Connection of push-pull output encoder

1.12.2 MT70-PG2-SINCOS

Feature

1. Apply to synchronous motor.
2. Support SINCOS signal and pulse output.
3. 5V input.

Function Description

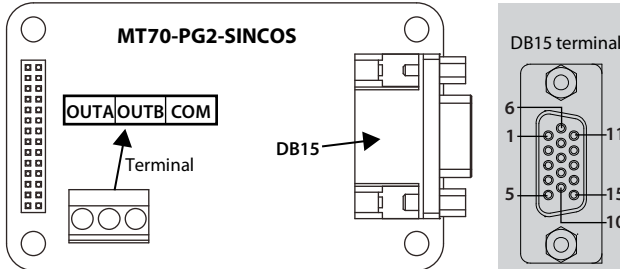


Figure 1-21 MT70-PG2-SINCOS

Terminal Definition

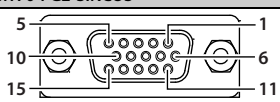
Table 1-2 DB15 and output terminal description

| Terminal | Description | Terminal | Description |
|----------|-------------|-------------|----------------------------------|
| 1 / 8 | B- / B+ | 12 / 13 | D+ / D- |
| 3 / 4 | R+ / R- | 2 / 14 / 15 | Unused |
| 5 / 6 | A+ / A- | | |
| 7 | PGGND | OUTA | Output A signal, OC output |
| 9 | PGVCC | OUTB | Output B signal, OC output |
| 10 / 11 | C+ / C- | COM | Output ground, isolated from GND |

Connection

Recommend HEIDENHAIN ERN1387 encoder for use and shown as Table 1-3.

Table 1-3 1387 double-socket and DB15 terminal relation

| Double-socket of ERN1387 Encoder | | DB15 of MT70-PG2-SINCOS | | | | | | | | | | | | | | | |
|---|---------|-------------------------|-------|----|----|----|----|----|----|----|----|----|----|----|----|---|--|
| <table border="1" style="margin: auto;"> <tr> <td>1b</td><td>2b</td><td>3b</td><td>4b</td><td>5b</td><td>6b</td><td>7b</td> </tr> <tr> <td>1a</td><td>2a</td><td>3a</td><td>4a</td><td>5a</td><td>6a</td><td>7a</td> </tr> </table> | | 1b | 2b | 3b | 4b | 5b | 6b | 7b | 1a | 2a | 3a | 4a | 5a | 6a | 7a |  | |
| 1b | 2b | 3b | 4b | 5b | 6b | 7b | | | | | | | | | | | |
| 1a | 2a | 3a | 4a | 5a | 6a | 7a | | | | | | | | | | | |
| 5a | B- | 1 | B- | | | | | | | | | | | | | | |
| 4b | R+ (Z+) | 3 | R+ | | | | | | | | | | | | | | |
| 4a | R- (Z-) | 4 | R- | | | | | | | | | | | | | | |
| 6b | A+ | 5 | A+ | | | | | | | | | | | | | | |
| 2a | A- | 6 | A- | | | | | | | | | | | | | | |
| 3a+5b | 0V | 7 | PGGND | | | | | | | | | | | | | | |
| 3b | B+ | 8 | B+ | | | | | | | | | | | | | | |

| Double-socket of ERN1387 Encoder | | DB15 of MT70-PG2-SINCOS | |
|----------------------------------|-----------|-------------------------|-------|
| 7a+1b | 5V | 9 | PGVCC |
| 7b | C+ (SIN-) | 10 | C+ |
| 1a | C- (SIN+) | 11 | C- |
| 2b | D+ (COS+) | 12 | D+ |
| 6a | D- (COS-) | 13 | D- |

Note:

The signal phase sequence of C+ / C- and D+ / D- in the parameter auto-tuning will automatically learn the wiring mode, and there is no special requirement for its wiring.

I.e. C+ / C- can be exchanged for C- / C+, while D+ / D- can be exchanged for D- / D+.

1.12.3 MT70-PG3-UVW

Feature

1. Apply to synchronous motor.
2. Support both ABZ and UYW signal.
3. Support pulse output.
4. 5V input.

Function Description

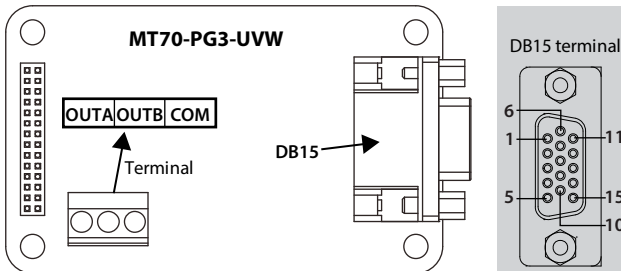


Figure 1-22 MT70-PG3-UVW

Terminal Definition

Table 1-4 DB15 and output terminal description

| Terminal | Description | Terminal | Description | | |
|----------|-------------|-----------------------------|-------------|-------|----------------------------------|
| 1 / 2 | A+ / A- | Differential signal A+ / A- | 13 | PGVCC | +5V power supply |
| 3 / 4 | B+ / B- | Differential signal B+ / B- | 14 | PGGND | Power supply ground |
| 5 / 6 | Z+ / Z- | Differential signal Z+ / Z- | 15 | NC | Unused |
| 7 / 8 | U+ / U- | Differential signal U+ / U- | OUTA | | Output A signal, OC output |
| 9 / 10 | V+ / V- | Differential signal V+ / V- | OUTB | | Output B signal, OC output |
| 11 / 12 | W+ / W- | Differential signal W+ / W- | COM | | Output ground, isolated from GND |

1.12.4 MT70-PG4-SC

Feature

1. Apply to asynchronous motor.
2. Support Endat (serial communication) signal.
3. Support frequency demultiplication pulse output.
4. 5V input.

Function Description

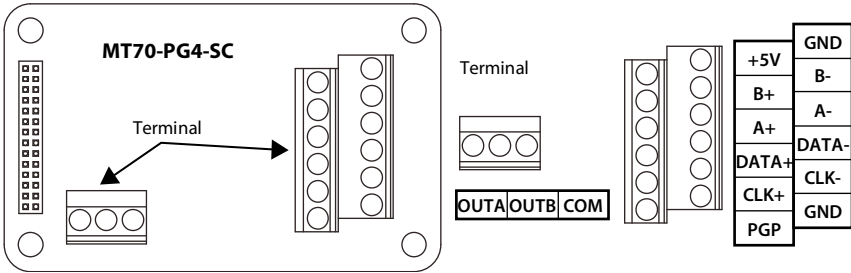


Figure 1-23 MT70-PG4-SC

Terminal Definition

Table 1-5 Terminal description

| Terminal | Description | Terminal | Description |
|----------|----------------------------------|---------------|---|
| PGP | +5V power supply output | A+ / A- | Encoder differential SINCOS analog signal A |
| +5V | +5V power supply output (sensor) | B+ / B- | Encoder differential SINCOS analog signal B |
| GND | +5V power supply ground | CLK+ / CLK- | Encoder differential clock signal (CLK) |
| OUTA | Output A signal, OC output | DATA+ / DATA- | Encoder differential data signal (DATA) |
| OUTB | Output B signal, OC output | | |
| COM | Output ground, isolated from GND | | |

Connection

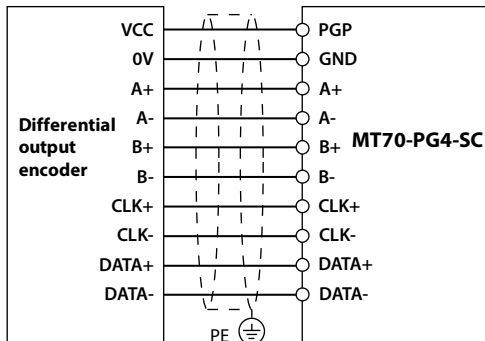


Figure 1-24 Connection of differential output encoder

2 Application

This chapter describes MONT70 series elevator integrated controller applied to an elevator control system, system design scheme and parameter setting.

Since MONT70 has completed installation and wiring, please start debug process in accordance with the step in Figure 2-1.

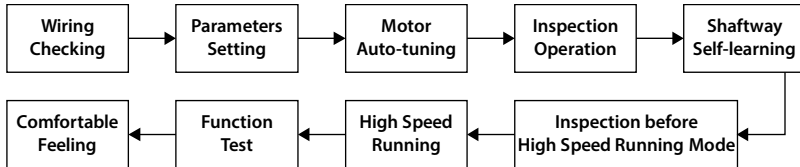


Figure 2-1 MONT70 debugging process

2.1 Wiring Checking

Check the input / output wiring of the drive after control system wiring is completed.

1. Check the electrical wiring and mechanical installation, make sure they are faultless.
2. Make sure each connections are consistent with User Manual. More than two staffs are required in debugging. Cut off the power supply immediately once emergency appeared.
3. Check the component models in the system are consist with user manual; ensure the safety circuit and door lock circuit are both conductive and faultless.
4. Make sure the shaftway is safe and no people in the car, ensure the circumstance is safe for elevator running.
5. Make sure the power supply wiring and motor wiring is correct.
6. For safety consideration, make sure ground wiring of control cabinet, motor, car and hall are all work well.

Note:

Control cabinet and motor should be grounded separately.

7. Check the short-circuiting. If there is short-circuit happen, please don't power the drive until resolve it.
 - Short circuit between input phases, short circuit between input phases to ground;
 - Motor wire short circuit to ground;
 - 220V supply short circuit to ground;
 - Switch power supply 24V short circuit to ground;
 - Communication wire short circuit to ground;
 - Encoder wire short circuit to ground.

8. Make sure the following items are reliably grounded.

- The control cabinet is grounded;
- The motor is grounded;
- The car is grounded;
- The door machine is grounded;
- The pipeline is grounded;
- The shielded encoder and motor are grounded.

Note:

The encoder's shielded cable is grounded firmly on one side of MONT70.

9. Check wirings of communication, encoder and power supply.

- Shaftway communication wire is twisted pair and twisted distance is <35mm;
- Car's communication wire is twisted pair and twisted distance is <35mm;
- Duplex or group control communication wire is twisted pair and twisted distance is <35mm (only fit for duplex and group control elevator);
- Encoder wire and power supply wire should be separated from each other;
- Communication wire and power supply wire should be separated from each other;
- Duplex / group control communication wire and power supply wire should be separated from each other (only fit for duplex and group control elevator).

2.2 Parameters Setting (Please follow step by step)

Restore MONT70 controller parameters to default value: set F01.02 to 1 (restore default value), and pressed ENT key.

Refer to the following table. Check corresponding state of MCB I/O terminal function by function parameter Group D.

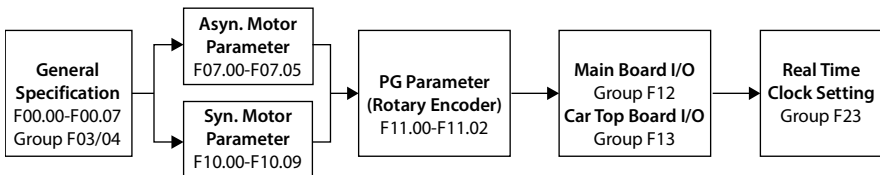


Figure 2-2 Parameters setting

General & Motor Parameter

| Ref. Code | Function | Default [Range] | Descriptions |
|-----------------|--------------|-----------------|---|
| General Setting | | | |
| F00.00 | Motor type | 0 [0-1] | 0: Asynchronous motor. 1: Synchronous motor. |
| F00.01 | Control mode | 2 [0-2] | 0: Asyn. motor, for trial run, inspection mode only. 1: Asyn. motor open-loop (no Encoder). Auto-tuning required. 2: Asyn. or syn. motor close-loop (with Encoder). Auto-tuning required. |

| Ref. Code | Function | Default [Range] | Descriptions | | | |
|------------------------|------------------------------------|--------------------|---|---------|---------|---------|
| F00.03 | Rated speed | 1.5 [0.25-4.0] | The elevator nominal rated speed (m/s). | | | |
| F00.04 | Rated load | 1000 [100-50000] | The elevator nominal rated load (kg). | | | |
| F00.05 | Maximum frequency | 50 [5-100] | Controller max output frequency, input rated frequency according to the nameplate of motor (Hz). | | | |
| F00.07 | Operating mode | 1 [0-1] | 0: Keypad control mode, for testing or motor parameter auto-tuning only. 1: Normal operation mode. <i>Must be set as 1 before normal operation.</i> | | | |
| F00.10 | Run direction | 0 [0-1] | 0: Same as command direction. 1: Reverse command direction. <i>Same as the result of swap motor cables, reverse running direction.</i> | | | |
| Asyn. Motor | | | | | | |
| F07.00 | Rated power (kW) | [0.2-500] | According to the nameplate of asynchronous motor but cannot exceed the capacity of controller. | | | |
| F07.01 | Rated voltage (V) | [0-999] | | | | |
| F07.02 | Rated current (A) | [0.0-999.9] | | | | |
| F07.03 | Rated frequency (Hz) | 50 [1.00-F00.05] | | | | |
| F07.04 | Rated speed (rpm) | 1440 [1-24000] | | | | |
| F07.05 | Power factor | 0.85 | | | | |
| F07.06 | Auto-tuning | 0 [0-2] | 0: No action. 1: Static auto-tuning. 2: Rotational auto-tuning. | | | |
| Syn. Motor | | | | | | |
| F10.01 | Rated power (kW) | [0.4-400] | According to the nameplate of synchronous motor but cannot exceed the capacity of controller. | | | |
| F10.02 | Rated voltage (V) | [0-999] | | | | |
| F10.03 | Rated current (A) | [0.0-999.9] | | | | |
| F10.04 | Rated frequency (Hz) | 19.2 [1.00-F00.05] | | | | |
| F10.05 | Rated speed (rpm) | 96 [1-24000] | | | | |
| F10.10 | Auto-tuning | 0 [0-2] | 0: No action. 1: Static auto-tuning. 2: Rotational auto-tuning. | | | |
| PG (R. Encoder) | | | | | | |
| Signal type | | Incremental | UWV | SINCOS | Endat | |
| Example | | ABZ | T552XNXNX | ERN1387 | ECN1313 | |
| F11.00 | PG interface board | [1-3] | 1 (PG1) | 2 (PG3) | 3 (PG2) | 4 (PG4) |
| F11.01 | Plus per revolutions | [1-9999] | Encoder nameplate | 8192 | 2048 | -- |
| F11.02 | Direction | [0-1] | 0 or 1 | 0 or 1 | 0 or 1 | 0 or 1 |
| F11.03 | Filter coefficient | [00-99] | 11 | 11 | 11 | 11 |
| F11.05 | Wire disconnect detecting time (s) | [0-2] | 1 | 1 | 1 | 1 |

Main Control Board Input and Output Terminal Function Parameter

If hundred digit setted to 0, normally open input selected, if setted as 1, normally closed input selected.

| Ref. Code | Terminal | Default [Range] | Descriptions |
|---------------------------|-----------------|-----------------|--|
| MCB Input Terminal | | | |
| F12.00 | | 10 [2-40] | MCB input terminal filter time (ms) |
| F12.01 | SK1-X1 | 101 [0-143] | 0: Unused |
| F12.02 | SK1-X2 | 0 [0-143] | 1 / 2: Up / Down leveling sensor (DZU) |
| F12.03 | SK1-X3 | 102 [0-143] | 3: Door zone sensor (SX1) |
| F12.04 | SK1-X4 | 0 [0-143] | 4 / 5: Safety circuit 1 / 2 (JT1 / JT2) |
| F12.05 | SK1-X5 | 0 [0-143] | 6: Door locked circuit 1 (DLC1) |
| F12.06 | SK1-X6 | 108 [0-143] | 7: Door locked circuit 2 (DLC2) |
| F12.07 | SK1-X7 | 109 [0-143] | 8: Run contactor feedback signal (SW) |
| F12.08 | SK1-X8 | 0 [0-143] | 9: Brake contactor feedback (BZK) |
| F12.09 | SK1-X9 | 110 [0-143] | 10: Inspection (INS) |
| F12.10 | SK1-X10 | 11 [0-143] | 11: Inspection up (UP) |
| F12.11 | SK1-X11 | 12 [0-143] | 12: Inspection down (DN) |
| F12.12 | SK1-X12 | 113 [0-143] | 13: Up limit S/W (LSU) |
| F12.13 | SK1-X13 | 114 [0-143] | 14: Down limit S/W (LSD) |
| F12.14 | SK1-X14 | 118 [0-143] | 15: Parking (LOCK) |
| F12.15 | SK1-X15 | 119 [0-143] | 16: Overload (LWD) |
| F12.16 | SK1-X16 | 0 [0-143] | 17: Full load (LWX) |
| F12.17- F12.24 | SK2- X17-X24 | 0 [0-143] | 18 / 19: Upper / Down force decelerate switch 1 (ULS1 / DLS1) 20 / 21: Upper / Down force decelerate switch 2 (ULS2 / DLS2) 22 / 23: Upper / Down force decelerate switch 3 (ULS3 / DLS3) 24: Fire signal (FIRS1) |
| Hi. Vol. In | | | |
| F12.25 | SK4-X25 | 1 [0-99] | 0: Unused |
| F12.26 | SK4-X26 | 2 [0-99] | 1: High voltage safe circuit (JT) |
| F12.27 | SK4-X27 | 3 [0-99] | 2: High voltage door lock 1 (DS1) |
| | | | 3: High voltage door lock 2 (DS2) 4-99: Reserved |
| MCB Relay Output | | | |
| F12.28 | SK5-Y1 | 1 [0-24] | 0: Reserved |
| F12.29 | SK5-Y2 | 2 [0-24] | 1: Run contactor (SW) |
| F12.30 | SK5-Y3 | 0 [0-24] | 2: Brake contactor (BZK) |
| F12.31 | SK5-Y4 | 13 [0-24] | 3: Locked door (FM) |
| F12.32 | SK5-Y5 | 0 [0-24] | 4: Syn. Motor star end contactor (FX) |
| F12.33 | SK5-Y6 | 0 [0-24] | 5: Brake forced output (KMZ) 6: Front door open (OD1) 7: Front door close (CD1) 8: Rear door open (OD2) 9: Rear door close (CD2) 10: Lighting and fan output (FAN) 11: Error output (ERROR) |
| | | | 15: Electric lock output (LOCK) 16: Non-door zone parking output (UNSTOP) 17: Out of service (OUTSERVICE) 18: Brake, run contactor output normally (BZKSWOK) 19: Integrated machine run output (RUN) 20: Up run signal output (UPRUN) 21: Down run signal output (DNRUN) 22: The car which parked in leveling zone move without control |

| Ref. Code | Terminal | Default [Range] | Descriptions |
|-----------|----------|-----------------|--|
| | | | 12: Power failure emergency run is enabled (UPC) 13: Fire linkage output (FIRE) 14: Medical disinfection output (HOSPITAL) |
| | | | (LayerMove) 23: Emergency run is complete (UPSOVER) 24: buzzer sound during emergency running (UPSBUZZ) |

Car Top & Car Command Board Input and Output Terminal Function Parameter

If hundred digit setted to 0, normally open input selected, if setted to 1, normally closed input selected.

| Ref. Code | Terminal | Default [Range] | Descriptions |
|----------------------------|----------|-----------------|---|
| F13.00 | | 61 [0-99] | MCB input terminal filter time |
| CTB Input Terminal | | | |
| F13.01 | CN8-X1 | 1 [0-125] | 0: Unused 1: Front door curtain "NO" input (EDP1) 2: Front door open limit S/W (OLT1) 3: Front door close limit S/W (CLT1) 4: Rear door open limit S/W (OLT2) 5: Rear door close limit S/W (CLT2) 6: Rear door curtain "NO" input (EDP2) 7: Full load signal (LWX) 8: Over load signal (LWD) 9: Door open button (DOB1) 10: Door close button (DCB1) 11: Door open waiting time delay button (DDOB) |
| F13.02 | CN8-X2 | 2 [0-125] | |
| F13.03 | CN8-X3 | 3 [0-125] | |
| F13.04 | CN9-X4 | 4 [0-125] | |
| F13.05 | CN9-X5 | 5 [0-125] | |
| F13.06 | CN9-X6 | 6 [0-125] | |
| F13.07 | CN9-X7 | 7 [0-125] | |
| F13.08 | CN9-X8 | 8 [0-125] | |
| CCB Input Terminal (Main) | | | |
| F13.09 | X1 | 9 [0-125] | 12: By-pass button (NSB) 13: Attendance S/W (ATS) 14: Change direction button (ACB) 15: Independent S/W (ISS) 16: Fireman switch (FIRS2) 17: Light loading (LWL) 18: Rear door open button (DOB2) 19: Front door safety edge (EDK1) 21: Rear door close button (DCB2) 22: Through door, opening swap S/W (GABS) 23: Rear open waiting time delay button(DDOB2) 24: Rear door restricted (DNA2) 25: Car call limitation (CaFI) |
| F13.10 | X2 | 10 [0-125] | |
| F13.11 | X3 | 11 [0-125] | |
| F13.12 | X4 | 12 [0-125] | |
| F13.13 | X5 | 13 [0-125] | |
| F13.14 | X6 | 14 [0-125] | |
| F13.15 | X7 | 15 [0-125] | |
| F13.16 | X8 | 16 [0-125] | |
| CCB Input Terminal (Sub) | | | |
| F13.17-F13.24 | X1-X8 | 0 [0-125] | |
| CTB Output Terminal | | | |
| F13.25 | CN5-Y1 | 1 [0-27] | 0: Unused 14: Attendance signal (ATS) 15: Attendance direction signal (ACB) 16: Independent indicator (ISS) 17: Fire operation indicator (FIRE) 18: Rear door open button indicator (DOB2) 19: By-pass indicator (NSB) 20: Up arrival pre-chime (CHMPUP) 21: Down arrival pre-chime (CHMPDN) |
| F13.26 | CN5-Y2 | 2 [0-27] | |
| F13.27 | CN6-Y3 | 3 [0-27] | |
| F13.28 | CN6-Y4 | 4 [0-27] | |
| F13.29 | CN10-Y5 | 5 [0-27] | |
| F13.30 | CN10-Y6 | 6 [0-27] | |
| F13.31 | CN4-Y7 | 7 [0-27] | |
| CCB Output Terminal (Main) | | | |
| | | | 8: Buzzer output (BUZ) 9: Over load signal output (LWD) |

| Ref. Code | Terminal | Default [Range] | Descriptions |
|---------------------------|----------|-----------------|---|
| F13.32 | X1 | 10 [0-27] | 10: Door open button indicator (DOB1) 11: Door close button indicator (DCB1) 12: Opening delay button indication (DDOB) 13: Full load signal output (LWX) 22: Rear door close button indicator (DCB2) 23: Rear opening delay button indication (DDOB2) 24: Front door forced closing (FCD1) 25: Rear door forced closing (FCD2) 26: Arrival chime (CHM) 27: The car which parked in leveling zone move without control (LayerMove) |
| F13.33 | X2 | 11 [0-27] | |
| F13.34 | X3 | 12 [0-27] | |
| F13.35 | X4 | 13 [0-27] | |
| F13.36 | X5 | 14 [0-27] | |
| F13.37 | X6 | 15 [0-27] | |
| F13.38 | X7 | 16 [0-27] | |
| F13.39 | X8 | 17 [0-27] | |
| CCB Output Terminal (Sub) | | | |
| F13.40-F13.47 | X1-X8 | 0 [0-27] | |

Note:

Press ENT key to confirm the setting success.

2.3 Motor Auto-tuning

Asynchronous Motor _ Parameter Auto-tuning

- Set F00.07 to 0 (keypad control).
- Set F07.06 to 1 (static auto-tuning) or 2 (rotational auto-tuning), then press RUN key to start parameter auto-tuning. The motor will rotate at rotational auto-tuning, while it will not rotate at static auto-tuning.
- Set F00.07 to 1 (distance control) after auto-tuning finished.

Note:

- In static auto-tuning, the controller will open the run brake contactor automatically; but in rotational auto-tuning, for the safety consideration, the brake contactor should be opened manually.
- In static auto-tuning, motor will make a howling sound which last for 30s.
- In rotational auto-tuning, once over current or violent vibration of motor happened, please press STOP to stop auto-tuning.
- The auto-tuning of asynchronous motor needn't learn encoder magnetic pole angle. Start inspection operation after auto-tuning complete, if the controller report fault E0030 (encoder reverse direction), it may be caused by wrong direction of encoder A & B signal.

Take measure: Please change the encoder signal direction (F11.02).

Synchronous Motor _ Rotational Auto-tuning

A/B/Z/U/V/W Encoder Configuration

1. Set F00.07 to 0 (keypad control).
2. Set F07.06 to 2 (rotational auto-tuning), then press **RUN** key to start auto-tuning.
3. Auto-tuning process: Power the controller with DC supply, it will locate the motor magic pole at a fixed direction, and then run the motor at a slow speed. The motor will stop running once auto-tuning complete and the relevant motor parameter F10.12 (motor initial angle) and F11.02 (encoder direction) is get.

SINCOS Encoder Configuration

1. Set F00.07 to 0 (keypad control).
2. Set F07.06 to 2 (rotational auto-tuning), then press **RUN** key to start auto-tuning.
3. Auto-tuning process: Power the controller with DC supply, it will locate the motor magic pole at a fixed direction, and then run the motor at a slow speed, the motor will stop running after one circle finished, by this way, the controller get relevant motor parameter F10.14 - F10.17 (encoder parameters), F10.12 (motor initial angle) and F11.02 (encoder direction).

Note:

1. The brake contactor need be opened manually during step 2 and step 3.
 2. If the system has synchronous motor star end contactor (FX), ensure it works faultless, otherwise the controller will report over-current fault for the output phase short-circuit.
 3. During rotational auto-tuning, the controller can detect encoder signal direction by itself.
 4. Encoder wiring should be strictly conform to the encoder wiring rules, otherwise even if A/B/Z connections are correct, motor will run abnormally because U/V/W wiring or phases C/D connection is fault.
 5. For SINCOS encoder, the auto-tuning need do three times, check the results. There are two criterion, one is F10.12 less than 5°, another is: get these 3 number (test result) subtract pairwise, get the number compare with the multiple integer value of "360° divide motor pole pairs", the difference should less than 5°. Auto-tuning need to start again if the results match none of the two criterions mentioned above.
If: The motor pole pairs are 12, do auto-tuning for 3 times, the results are 241.1°, 59.8° and 120.2°, these results are ok.
For: Subtract pairwise: $241.1^\circ - 59.8^\circ = 181.3^\circ$, calculate $360^\circ / 12 = 30^\circ$, and 30° multiply 6 is 180° . The difference between 180° and 181.3° is 1.3° , 1.3° is less than 5° ; equally $120.2^\circ - 59.8^\circ = 60.4^\circ$ and 30° multiply 2 is 60° , the difference is 0.4° which is less than 5° .
 6. For A/B/Z/U/V/W encoders, F10.12 is electrical angle, it should be less than 30° after each auto-tuning, otherwise auto-tune should be start again.
 7. If something abnormal happened during auto-tuning, press **STOP** to stop it.
 8. After finish parameter auto-tuning, F00.07 (operation mode) should be set to 1 (distance control).
 9. During auto-tuning, once the controller report fault E0030 (encoder reverse direction) or E0031 (encoder disconnection), you can try reducing KP and KI of ASR (Group F08).
-

Synchronous Motor _ Static Auto-tuning

A/B/Z/U/V/W Encoder Configuration

1. Set F10.12 (initial angle of synchronous motor) to 0.
2. Set F00.07 to 1 (distance control), set F10.10 to 1 (static angle auto-tuning).
3. Controller send inspection and direction signals to terminal, during auto-tuning, the controller send a series of pulse voltage to motor, and the motor make a humming sound. Once the humming is over, the motor start inspection mode, run for one circle, then stop, auto-tuning is complete by now, the controller get parameter F10.12 (initial angle of synchronous motor) information.
4. The inspection direction command can be removed as the keypad doesn't display auto-tuning information.

SINCOS Encoder Configured

1. Set F10.12 (initial angle of synchronous motor) to 0.
2. Set F00.07 to 1 (distance control), set F10.10 to 1 (static angle auto-tuning).
3. Controller send inspection and direction signals to terminals, during auto-tuning, the controller send a series of pulse voltage to motor, and the motor make a humming sound. Once the humming is over, the motor run at slow speed, and stop automatically after one circle, by now, auto-tuning is complete, the controller get parameter information F10.14 - F10.17 (encoder parameters) and F10.12 (initial angle of synchronous motor).
4. The inspection direction command can be removed as the keypad doesn't display auto-tuning information.

Note:

1. If the system has synchronous motor star end contactor (FX), ensure it works faultless, otherwise the controller will report over-current fault for the output phase short-circuit.
2. The preset rotary direction of motor is inconsistent with actual direction.
Take measures: Set the reverse value of F00.10 (elevator run direction), then start auto-tuning again.
3. During auto-tuning process, if over-current or encoder reverse fault occur, it may be caused by reverse direction of encoder.
Take measures: Set F11.02 to 1 (the reverse direction) to re-start auto-tuning.
4. Since the static auto-tuning of SINCOS encoder is over, start inspection mode again to check whether the controller work well. If it report fault or out of control, check the phase sequence of SINCOS encoder phase C/D.
5. For the SINCOS encoder, the deviation of F10.12 should be less than 5° every time.
6. For the A/B/Z/U/V/W encoders, F10.12 is electrical angle, and deviation of F10.12 should be less than 30° every time, otherwise it need to do auto-tuning again.
7. If F10.12 (synchronous motor initial angle) is zero, the elevator cannot run.
8. Before start static auto-tuning, please make sure both the door lock circuit and the safety circuit are closed.
9. If abnormal situation occurs during auto-tuning process, press the emergency stop button to stop auto-tuning.
10. During auto-tuning, when the controller report fault E0030 (encoder reverse direction) or E0031 (encoder disconnection), you can try changing the encoder direction (F11.02), if it doesn't work, reducing the KP and KI of ASR (Group F08).

2.4 Inspection Operation

Preparation before Inspection Operation

Please confirm following items before start the controller:

1. Ensure the service switch of control cabinet is in “inspection” position, and the service switch of car top is in “normal” position.
2. Ensure the machine room safety circuit and shaftway are faultless, and door lock circuit is effective.

Note:

Don't short circuit safety circuit to door lock circuit.

3. Encoder is installed correctly and with proper wiring.
4. Ensure MONT70 display is faultless after power-on, parameter settings are correct, MCB's INS indicator is on, set the keypad to display “status display interface”, make sure the elevator state is “inspection”.
5. Ensure the motor brake cable is properly connected to the corresponding terminals in control cabinet.
6. Ensure the deceleration switch of upper / down terminal and car top inspection circuit are both work well.

Machine Room Inspection Operation

1. Check the motor moving direction, if not correct, please check up / down input terminal wiring and parameter setting, if wiring is correct, please set F00.10 to 1 (elevator running direction).
2. During the course elevator up or down slowly, if the motor speed feedback is unsteady or major deviation from set value, please check the wiring between encoder and encoder card.
 - Make sure all wirings are correct. If the encoder signal is a differential one, the shielded twisted pair cable should be used; otherwise, you can use general shielded cable.
 - Make sure all wiring is reasonable. The encoder cable and the power supply line must be separated from each other strictly, which cannot go with the same conduit.
 - Make sure the shielded wire and the shielded network are grounded reliably.
3. Inspect up / down leveling switches and the wiring of door zone signal. If the signal order is wrong, please check the external wiring. The correct signal order is:
 - When elevator goes up at slow speed, effective signal in sequence is: up leveling signal, door zone signal and down leveling signal.
 - When elevator goes down at slow speed, effective signal in sequence is: down leveling signal, door zone signal and up leveling signal.

Note:

1. In many occasions, set machine room at slow speed running, it is not inspect operation but emergency electrical operation. At this time, the safety gear switch in safety circuit, the governor switch, the up over speed protection switch, the up and down terminal limit switch and the buffer reset switch etc are short circuit at slow speed running, so particular attention is needed.
 2. Restart shaftway self-learning once changing F00.10 (elevator running direction), even if shaftway self-learning is completed.
 3. In inspection running mode, if the related switch in shaftway is not set in place, the system may report fault, it can be disabled by the function parameter F26.12 (inspection parameter settings).
-

Car Top Inspection Operation

Please don't start car top inspection until machine room inspection mode is complete and faultless.

For the first time, a slow inspection speed should be set.

These parameters should be set: F03.06 (inspection acc speed), F04.00 (inspection run speed), F22.16 (detect CD arrival at inspection) and F26.12 (inspection parameter setting).

1. Set the automatic and inspection switch of car top to the inspection position, and confirm the up and down buttons in machine room control cabinet are invalid.
2. Jog the up and down buttons of car top, confirm the run direction given by jog button is accordance with car running direction.
3. Start elevator a round trip from up to down with one people stand on car top, observe the shaftway carefully, to confirm that no obstacle hinder the car running throughout the shaftway.
4. By means of car top inspection operation mentioned above, ensure the shaftway end terminal deceleration switch act properly, and its act location is correct.
5. By means of car top inspection operation mentioned above, ensure shaftway leveling switch and leveling plate are proper installed; at each leveling position, its switch act at right position.

Note:

1. *During car top inspection operation, special attention should be paid to observe whether there is obstacles would hinder the car. If so, stop in time.*
 2. *In inspection running mode, when the relevant shaftway switch is founded not installed properly, the system may report fault, it could be shielded by function parameter F26.12 (inspection parameter setting).*
-

2.5 Shaftway Self-learning

The elevator must complete shaftway self-learning before high speed running.

1. Set the total number of floors by function parameter F19.00 in the elevator inspection status.
2. Run the elevator to reach the down limit position, effective the down force decelerate switch, the controller will set the present floor as floor 1.

Note:

1. *Self-learning for a two floors shaftway, please make sure that the down leveling switch is under the leveling plate.*
2. *For the number of total floors is more than two, please make sure there is at least one leveling switch is in the leveling plate.*

-
3. Start shaftway self-learning mode, there are three methods, first, setting F26.01 to 1 (start shaftway self-learning) by keypad; second, using small keypad on main board, set it display "F07", then press "SET", change it from 0 to 1 (start shaftway self-learning); third, using small keypad on main board, set it display "F0", then press "SET" and "UP" together for more than 5s.
 4. During shaftway self-learning, the elevator run at self-learning speed (F04.03); record the leveling plate length, each floor height and the position of up / down force decelerate switch.
 5. Elevator will stop automatically when it runs to the up limit. If there is no fault report, it completes self-learning process.

Note:

1. *Check parameter F19.12 - F19.17, to confirm it gets proper force decelerate position; check function parameters Group F20, to confirm it gets correct floor data.*
 2. *Check parameters D04.02 (distance of lowest floor) and D04.03 (distance of highest floor); make sure they are consistent with the actual situation.*
 3. *Check parameters D06.06 (leveling switch number), D06.07 (length between leveling switches) and D06.08 (leveling plate length), make sure they are consistent with the actual situation.*
 4. *Shaftway must restart self-learning run, once you change the leveling plate or the force decelerate switch position.*
 5. *The shaftway self-learning will be interrupted in the following cases: 1) change the inspection switch to "normal run"; at this time, the controller will report self-learning fault; 2) operation fails appeared.*
 6. *If the shaftway failed in self-learning, please refer to user manual chapter 3 Troubleshooting for more information.*
-

2.6 Inspection before High Speed Running Mode

Check System Communication

1. CAN1+ and CAN1- of MCB's SK3 terminal are connected respectively to CAN+ and CAN- of car top board (CTB).

MOD+ and MOD- of MCB's SK3 terminal are connected respectively to that of hall call board (HCB).

2. Impedance between CAN1+ and CAN1- should be 60Ω , in power off status.

If there is a short circuit happened, only by resolve it to continue the steps following; if the impedance is wrong, please check the selective switch for terminal resistor on each boards.

3. Power on the controller, inspect communication status via the LED indicators located below MCB's small keypad.

LED twinkling with constant speed means controller work well:

- "COP" show communication status between MCB and CTB;
- "HOP" show communication status between MCB and HCB.

Set Hall and Car Call Board Address

Set Hall Call Board Address of MT70-HCB-H and MT70-HCB-U1

1. Press SW1 button continuously, floor display start to twinkle. 3s later, the twinkle will stop, then change the floor address by up / down button.

2. After floor address set, press SW1 or waiting for 5s without any action. The floor display will twinkle again, this means hall call address setting is success, 3s later, the floor display return to normal status.

Set Hall Call Board Address of MT70-HCB-I

1. Short circuit floor setting jumper wires, the indictor will start to twinkle, then unplug the short circuit wire, wait for a moment, until the twinkle stop, then change the floor address by up / down button.

2. After floor address setting, wait for 5s, the floor indictor will twinkle again, this means hall call address setting is success, 3s later, it will return to normal display.

Note:

For single elevator, the needed floor address is actual floor number;

For duplex or group control, if the elevator bottom floor locations are inconsistent, please refer to section 2.10.

Set Car Call Board Address

Address setting of car call board is same as hall call board, just set the address to 0.

In function parameter Group D, inspect hall / car call signal status, communication status and communication interference status etc, as following table show.

| Parameter | Parameter | Parameter | Parameter |
|-----------|--|-----------|--|
| D04.00 | Present floor | D04.10 | Registration state of down hall call floor 16-1 |
| D04.01 | Present height | D04.11 | Registration state of down hall call floor 32-17 |
| D04.02 | Distance of lowest floor | D04.12 | Registration state of down hall call floor 48-33 |
| D04.03 | Distance of highest floor | D04.13 | Communication state of HCB floor 16-1 |
| D04.04 | Registration state of car call floor 16-1 | D04.14 | Communication state of HCB floor 32-17 |
| D04.05 | Registration state of car call floor 32-17 | D04.15 | Communication state of HCB floor 48-33 |
| D04.06 | Registration state of car call floor 48-33 | D04.16 | Car communication state display |
| D04.07 | Registration state of up hall call floor 16-1 | D04.17 | Hall call Modbus communication interference evaluation |
| D04.08 | Registration state of up hall call floor 32-17 | D04.18 | Car top CAN communication interference evaluation |
| D04.09 | Registration state of up hall call floor 48-33 | D04.19 | Parallel CAN communication interference evaluation |

Open / Close Door Debug

1. Start inspection mode by inspection switch. Set door controller parameters properly, ensure it work on reasonable running curve, and output OD / CD arrival signal is faultless.
2. According to system configuration, connect OD / CD arrival signal of the door controller to the relevant terminal in control system.
3. Select two terminals in CTB multifunction output terminals, define them as OD and CD, and then connect them to the input terminals of door controller which is used for send running command.
4. Run the elevator to arrive at leveling area during inspection mode.
5. OD / CD command is realized by following methods:
 - Receive up or down command, elevator closes the door automatically; received up and down command together, elevator opens the door automatically.
 - Press **RUN** continuously to open door via keypad; press **STOP** continuously to close door.
 - Press the OD / CD button inside the car.
6. Ensure door controller running direction is correct, OD / CD arrival signal is faultless, and the light curtain and touch board signals are both effective.

Note:

1. Debug keypad via RJ45 interface of MCB or CTB or car call board.
2. Look up function parameter D05.00 and D05.01 by keypad, monitor door controller OD / CD arrival signal, light curtain signal and safe touch board signal etc.
3. In inspection mode, light curtain and safe touch board are effective, but the door won't open, in this mode, we can monitor these control signals state is right or not.

2.7 High Speed Running

High Speed Running Precondition

1. Door lock circuits are connected.
2. There is no level 2 or 3 fault in elevator.
3. Door controller CD arrival signal is effective.
4. Floor storey data is correct.
5. F10.12 (synchronous motor initial angle) is not equal to 0.
6. No over-load signal input.

High Speed Commissioning

High speed commissioning could only be start when these two steps are complete, first, inspection running have been verified faultless; second, shaftway self-learning is success.

When the shaftway self-learning is completed, the system will calculate the speed curve automatically, to adapt the elevator floor distance, and store to F19.07 - F19.11 (highest speed of curve) automatically, no need to modify it manual.

1. Slide the inspection switch, set it to normal work status.
2. Using keypad to set function parameter F26.00 (call elevator floor), run the elevator at different working condition respectively, include: single-floor, double-floor, multi-floor and full-floor.
3. Make sure the elevator run without fault during these course: open / close door, acceleration and deceleration, call elevator and parking.

Safe test running

Safe Circuit Test

In elevator ready mode, disconnect safe circuit, the elevator cannot run and report E0041 (safe circuit disconnection);

In elevator running mode, disconnect safe circuit, the elevator will stop immediately and report E0041 (safe circuit disconnection).

Once safe circuit closes, fault reset automatically.

Door Locked Circuit Test

In elevator ready mode, disconnect door locked circuit, the elevator cannot run;

In elevator running mode, disconnect door locked circuit, the elevator will stop immediately and report E0042 (door lock disconnection during running).

Once safe circuit closes, fault reset automatically.

Contactors Adhesion Protection

For these contactors in the system, i.e. running contactor, brake contactor, synchronous star end contactor and lock door contactor; they must be protected once adhesion happened, so we need to do some tests simulate adhesion happen during running test.

Running Timeout Protection Test

In inspection mode, run the elevator to non-leveling floor area, and remove the leveling signal.

Slide inspection switch to normal position, the elevator returns to leveling floor with inspection speed.

When its running time exceeds the time set by function parameter F23.02 (largest floors run interval), the system will stop immediately and report E0040 (elevator run timeout).

Note:

Within the time set by function parameter F23.02 (largest floors run interval), once elevator detects E0058 (leveling signal abnormal), the system will not report E0040 (elevator run timeout), for this is normal situation, for the detection module could always receive the leveling signal.

Take measure: Set F23.02 to 10s. After the fault reset, re-start running timeout protection test. It will report E0040 (elevator run timeout), after that, set F23.02 to factory value (45s).

Overload and Full Load Function Test

Test requirements: once the elevator overload switch overturns, the elevator should keep the door open, the buzzer inside the car is effective, and car call board displays fault “overload”.

MONT70 provide several methods for feedback input overload and full load signals.

Set relevant function parameters correctively when use these methods:

- Use the input terminal DI (digital input): set the input terminals on MCB / CTB with overload / full load function; change the terminal property (normally open / normally closed) to match different types of switches.
 - Use the input terminal AI (analogue input): employ the analog weighing signal, select terminal AI on MCB (main control board), and set F05.01 to 3; or select terminal AI on CTB (car top board), and set F05.01 to 2.
 - When the value of this input terminal signal (analog weighing signal) exceeds 80% of the whole capacity, the car is considered full load; if exceeds 110%, the car is considered over load.
-

Note:

Only one board could be used to receive full load / overload signal, MCB or CTB, you mustn't set both input terminals on MCB and CTB to receive this signal.

Terminal DI (digital signal) can be used together with terminal AI (analog signal for analogue weighing).

Split-level Protection Test

Run elevator to middle floors (not top or bottom floors) and modify F19.01 (present floor) to other floors. Run the elevator again, confirm that when elevator reach to top or bottom floor, it can slow down and then stop, without overshoot.

Test 1: change F19.01 to a small number, call the elevator from the highest floor.

Test 2: change F19.01 to a bigger number, call the elevator from floor one.

Note:

1. Don't set F19.01 to 1 or the highest floor; otherwise it will report E0039 (force decelerate switch disconnection) or E0038 (upper force decelerate switch disconnection).
2. In status "force change speed", elevator will creep to the end station leveling area at a speed 0.100m/s. Once leveling signal is effective, adjust F03.14 (forced stop Dec jerk) by manual to realize a proper leveling accuracy (generally, F03.14 will automatically update after the shaftway self-learning, no need to adjust by manual).
3. If enable the position deviation too large detection function (F26.24 = 1), when the elevator detect that position deviation is greater than the preset reference value (F26.25), it will immediately slow down, and creep to leveling area at a speed 0.100m/s. After open the door, the elevator will automatically return to the base station at a speed 0.200m/s.

2.8 Function Test

According to customer requirement, set function parameter Group F26 (elevator functions), adjust function parameter Group F21: parking base station (F21.00), fire base station (F21.01), lock-lift base station (F21.02), service floor (F21.07 - F21.09), time-sharing service (F21.10 - F21.19), peak time control (F21.20 - F21.25) and collective control (F21.26 - F21.33).

Full automatic Operation Test

Press some buttons on HCB inside the Car.

Confirm the elevator run without fault, i.e. close door, start, run at high speed, decelerate at adjacent floors which summon for stop, stop, eliminate floor indicate (the floor eliminated should be the same with the one stopped) and open the door.

Press some buttons (up / down) on hall call HCB.

Confirm the elevator run without fault, i.e. close door, start, run at high speed, stop, slow down, eliminate floor indicate and open the door.

Attendant Operation Test

Start attendant operation by set function parameter F26.02 (attendant operation) which is enabled defaulted.

Change the switch to driver state inside car, press some buttons on HCB inside the car.

Check the car run without fault:

Pressing button CD continuously will make elevator close the door (if you release the button CD before door closed, door will change status immediately, from close to open, until the door open completely).

Elevator start to run automatically after the door is closed.

Run at high speed, slow down in recent registered instruction floors, stop, eliminate floor indicate and open the door.

Press some buttons (up / down) on hall call HCB.

Pressing button CD continuously will make elevator close the door (if you release the button CD before door closed, door will change status immediately, from close to open, until the door open completely).

Elevator start to run automatically after the door is closed.

Run at high speed, interception, decelerate, eliminate floor indicate and open the door.

Independent Operation Test

Start independent operation by set function parameter F26.07 (independent operation) which is invalid in defaulted setting.

Change the switch to independent state inside car, the display of hall call HCB should be black (or display “disable” and so forth), call buttons is invalid.

Press some buttons on HCB inside the car, pressing button CD continuously will make elevator close the door (if you release the button CD before door closed, door will change status immediately, from close to open, until the door open completely).

Elevator start to run automatically after the door is closed.

Run at high speed, interception, decelerate, eliminate floor indicate and open the door.

Fire Return Test

Start fire return operation by set function parameter F26.03 (fire function) which is enabled defaulted.

Set function parameter F21.01 (fire base station) based on customer requirement. Firefighting switch can be connected to firefighting input terminals on HCB, or to input terminals X1 - X24 (F12.01 - F12.24 setting) on MCB.

Slide the firefighting switches, make sure the elevator can return to base station and keep door opening after arrived.

More advance parameter can be set by Bit3 and Bit6 of F26.16 (elevator enhanced function).

Fireman's Operation Test

Start attendant operation by set function parameter F26.03 (fire function) which is enabled defaulted.

Fireman input terminals are defaulted as input terminals X8 on CTB manipulator, which can be also set to input terminal X1 - X24 (F12.01 - F12.24 setting) on MCB.

After elevator return to fire protection base station, slide fireman running switch (that means start fireman running state), the elevator will not open or close the door automatically.

In open door arrival state, you can press close door (CD) button continuously to close the door, until the door closed completely; and then the door will keep closed. If you released CD button before the door is closed completely, the door will changed state to open until open arrival signal effective. In the fireman running mode, only one car call can be responded every time. Once a call is responded, the elevator will auto-start immediately with high speed, decelerate and stop at the call floor. The elevator won't open the door at the stop, you must press button OD continuously until OD arrival to open the door. If you release OD button halfway, elevator will immediately change state from open to close until the door is closed completely. In fireman operating state, the hall call button is invalid. The elevator recover to

normal working state only in this condition: elevator stopped at fire protecting base station, and OD arrival signal effective, reset the firefighting and fireman switch.

More advance parameter options can be set by Bit4 and Bit5 of F26.16 (elevator enhanced function).

Self-rescue Re-leveling Operation Test

Because of fault or other reasons, elevator stops at non-leveling area, will run to the nearest leveling area at a speed of 0.200m/s, on condition that its running condition is met. Once the elevator arrived at leveling area (one switch is actuated while the other isn't), its running speed change to re-leveling speed (F04.04); when the two leveling floor switches are effective, after the delay time F26.30 (return leveling and stop delay), it will accelerate to stop at a speed of 0.500m/s².

Relevant parameters should be set as table below.

| Reference Code | Name | Recommended | Remark |
|----------------|--------------------------------|-------------|-------------------------------------|
| F04.04 | Re-leveling speed | 0.040m/s | |
| F26.30 | Return leveling and stop delay | 0.100s | Update after shaftway self-learning |

2.9 Comfortable Feeling

Machinery Factor

1. If the flatness and verticality of guide rail is not very well, shake or vibrate will be appeared on the elevator, even horizontal shaking will be arised somewhere.
2. If guide shoe is too tight, you will feel the elevator paused during its start and stop. If guide shoe is too loose, the car will waggle during running. You'd better make the car guide shoe bear the least resistance, to achieve a comfortable feeling during elevator running.
3. Steel rope tightness is an important factor which affect ride feeling too.
4. Motor brake will also affect the operation of elevator.

Start Torque Compensation

Pre-torque auto-compensation (apply to all types of encoders).

Set F05.00 to 3 (pre-torque auto-compensation).

Even if MONT70 does not install weighing device, its torque can be automatically adjusted to prevent elevator out of control at starting moment.

Function parameter F05.16 - F05.18 could be set to adjust the comfort of start moment.

Debug weighting device to achieve a comfortable feeling of start moment.

The weighing device can be classified to two types: analogue and digital. Their specific settings are as follows:

- Analogue weigh compensation (F05.00 = 1)

1. Confirm that weighing sensor signal is connected correctly.
2. Set F05.01 (weighing input selection) correctly, according to which board (MCB or CTB) receive the weighing sensor signal.

3. Self-learning of weighing device compensation without load.

Operating steps: Elevator stops at base station and there is no load in car. Set F05.03 to 1 (no-load self-learning), then press **ENT**, the system will check weighing sensor voltage and save in F05.04 (car no-load).

4. Self-learning of weighing device compensation with load.

Operating steps: Elevator stops at base station, loaded with N% in the car. Set F05.06 as N% and F05.03 as 2 (other load self-learning), then press **ENT**, the system will automatically calculate the weighing sensor voltage at car full load and save in F05.05 (car full load).

5. After self-learning of weighing device compensation, you can set torque compensation to prevent the car from slipping at the start.

- Digital weighing compensation (F05.00 = 2)

1. Confirm that light load and full load signals are connected to CTB input terminals.

2. Set F05.13 / F05.14 (light / heavy load digital weighing signal) to proper value.

3. Set F05.01 to 1 (weighing input signal is received from CTB digital signal).

4. After complete the steps above, system will do weighing compensation to prevent the car from slipping at the start, according to the load status which is get from weighing signal.

Timing Sequence Adjustment at the Start / Stop

Adjust function parameter start and stop control parameters (Group F02). Make sure that at starting, motor release brake after its zero-speed start; at stopping, motor close brake after it slow down to zero-speed.

If release brake or close brake at non-zero speed, there will be a strong sense of pause at the start and stop moment. Generally, use defaulted parameters, you can get a correct timing sequence of starting and stopping. Set function parameter Group F02 when the timing sequence does not meet your demand.

Acc / Dec Curve (S-curve) Adjustment

MONT70 acceleration and deceleration adopt mode S-curve, to minimize the impact bring by acceleration and deceleration, and get a relatively stable status at starting and stopping.

However, different applications need different Acc / Dec curve. If the Acc / Dec speed is too fast, comfortable feeling will be less; if the speed is too slowly, elevator operating efficiency will be less.

Please adjust the function parameter according to actual requirement. When you need slower acceleration and deceleration, please decrease the parameter in F03.00 - F03.05; on the contrary, please increase the parameter in F03.00 - F03.05.

- Acc / Dec speed (F03.00 / F03.03): rate of speed change.
- Acc jerk / Dec jerk (F03.01, F03.02 / F03.04, F03.05): Acc / Dec rate.

PI parameter Adjustment

The speed-loop parameters (Group F08) are used for setting speed-loop PID regulator. PID regulator have a big affect on system's quick response, overshoot and deviation, therefore proper PID parameters is very important for elevator comfortable feeling.

Please set speed-loop PI parameters based on actual requirement.

Leveling Accuracy Adjustment

1. First, ensure leveling plate installed at proper place, and the lengths of each leveling plate are same.
2. Speed-loop parameters (Group F08) have affect on leveling adjustment accuracy, so please make sure there is no overshoot during elevator run.
3. The encoder affect leveling adjustment accuracy badly when it received noisy signal, so please make sure that encoder signal is faultless.

Leveling accuracy adjustment method during elevator run:

1. Set F19.06 to 0 (direct parking mode 0), F19.03 (leveling distance adjustment) could be used for tiny adjustment.

At elevator stopping, if it is over leveling, reduce F19.03; if under leveling, increase F19.03.

2. Set F19.06 to 1 (direct parking mode 1), first, ensure that elevator creeps for a short distance (creep distance is set by F19.03), set function parameter F03.13 (stop Dec jerk) and F04.02 (creeping speed) to adjust leveling accuracy slightly.

At elevator stopping, if it is over leveling, increase F03.13; if under leveling, reduce F03.13.

Generally, F03.13 needn't set manually; it will be renewed automatically after shaftway self-learning, to adapt the leveling accuracy of shaftway.

Fatigue Test for New Elevator

After installed, the new elevator should start run-in test on its mechanical device and motor.

Group F25 is used for set elevator run times, under both running mode "random floor call" and "specified floor call".

Leveling Adjustment Method (Suitable for MCB version V1.10 and above)

When F03.17 (up / down leveling adjust) is 0, set parameter F19.03 to adjust all leveling parameters uniformly.

When F03.17 (up / down leveling adjust) is 1, set parameter F03.15 to adjust upper leveling parameters uniformly, and set F03.16 to adjust down leveling parameters uniformly.

Adjust Leveling Slightly (Every Floor)

Set F27.01 as different parameter, you get different methods for adjust leveling parameters:

- Set F27.01 to 0: For parameter F27.02 - F27.25, each parameter can adjust two floor leveling parameters (F27.02 - F27.25 can adjust 48 floors totally).
- Set F27.01 to 1: For parameter F27.02-F27.25, each parameter adjusts one floor leveling parameter only (F27.02 - F27.25 can adjust 24 floors totally).

For example:

When set F27.01 to 0, F27.02 records the leveling parameter of 1st and 2nd floor;

When set F27.01 to 1 (MCB version V1.10 and above), F27.02 records the upper / down leveling parameter of 1st floor, while F27.03 records the upper / down leveling parameter of 2nd floor.

This rest can be done in the same manner.

2.10 Parallel Description

MONT70 has parallel control function. Two MONT70 control system handle two elevators information together with CAN, respond hall call together, and improve the elevator efficiency.

- MONT70 system's control strategy is integrated multi way solution; give consideration to many factors which include: hall call responding time, elevator efficiency, passengers waiting time in car, etc, develops the ability of integrated controller fully.

When effective hall call has been registered, MONT70 system will calculate the response time of the two elevators (consider these influencing factors: distance, car draw up and door open / close, etc.), and then decide which elevator to respond the call. By this way, reduce passenger's waiting time greatly.

- MONT70 parallel program also includes these functions: duplex off, peak hour's services, service floor management, collect selective management function and so on. For more detail please refer to Group F21.

Two elevators in a parallel system, one is main elevator, the other is subordinate. When an effective hall call is registered, on responding it, two elevators condition is completely same, MONT70 system will calculate the number of run times of the two elevators, and then set the less one respond this hall call. By this way, MONT70 system achieves a balance control on two elevators.

Physical Floor Description

Physical floor is defined based on the leveling plate location in shaftway, distinguish with the floor we daily called.

The floor installed the lowest leveling plate is called "physical floor 1st", the floors above are increased seriatim, until and the top floor which installed the highest leveling plate.

The floors mentioned in Group F21 and Group F22 are both refer to physical floor.

Elevator's physical floor is counted from the bottom leveling plate to top leveling plate.

Parameter Setting of Floor Offset and Hall Call Address

In elevator duplex control and group control system, sometimes, the bottom floor of each elevator is different, this parameter should be used.

- This parameter is always zero in single elevator.
- At group control or duplex, once the bottom floor of each elevator is different, you need to set this parameter.

Give an example below.

There are two elevators in parallel in a building, elevator A and elevator B. Elevator A controls 15 floors overground, no basement; while elevator B controls 15 floors overground and 2 floors underground.

Set elevator A total floors number as 15, set "floor offset" as 2, then its lowest floor address is 3, and the lowest hall call is from floor 3rd too.

Set elevator B "total floors number" as 17, set "floor offset" as 0, then its lowest floor address is 1, and the lowest hall call is from floor 1st too.

Parallel Control Instruction

Suppose that there are two elevators in parallel, elevator 1 stops at Floor B2, Floor B1, Floor 1, Floor 2, Floor 4 and Floor 5; and elevator 2 stops at Floor 1, Floor 3, Floor 4, and Floor 5; their function parameters should be set as table below:

| Setting Parameter | Elevator 1 | | | Elevator 2 | | |
|--------------------|--|-------------------|----------------|--|-------------------|----------------|
| Parking floor | Floor B2, B1, 1, 2, 4, 5 | | | Floor 1, 3, 4, 5 | | |
| Group control | F21.05 = 2 (duplex) | | | F21.05 = 2 (duplex) | | |
| Elevator number | F21.06 = 1 (main elevator) | | | F21.06 = 2 (sub elevator) | | |
| Offset real floors | F21.04 = 0 | | | F21.04 = 2 | | |
| Total floor | F19.00 = 7 | | | F19.00 = 5 | | |
| Service floor | F21.07 = 1111 1111 1110 1111 <i>This parameter is refer to absolute address of this elevator. Therefore Floor 3 won't parked, its absolute floor address is 5 and its Bit4 is set as 0.</i> | | | F21.07 = 1111 1111 1111 1101 <i>This parameter is refer to absolute address of this elevator. Therefore Floor 2 of building is not parked and Bit1 is set to 0.</i> | | |
| User Floor | Hall Call Address | Hall Call Display | Physical Floor | Hall Call Address | Hall Call Display | Physical Floor |
| B2 | 1 | 1102 | 1 | 1 | | |
| B1 | 2 | 1101 | 2 | 2 | | |
| 1 | 3 | 1901 | 3 | 3 | 1901 | 1 |
| 2 | 4 | 1902 | 4 | This floor won't parked, but leveling plate still needed | 1902 | 2 |
| 3 | This floor won't parked, but leveling plate still needed | 1903 | 5 | 5 | 1903 | 3 |
| 4 | 6 | 1904 | 6 | 6 | 1904 | 4 |
| 5 | 7 | 1905 | 7 | 7 | 1905 | 5 |

Parallel Connection

Duplex Control

CAN2+ and CAN2- of one MCB's SK4 terminal are respectively connected to CAN2+ and CAN2- of another MCB's SK4 terminal.

Note:

For two elevators sharing up / down call button, their PGND (protective ground) should be connected together in control cabinet.

Group Control

Refer to Group Control Board MT70-GCB-A User Manual.

- "GROUP" is an indicator light; reflect the status of duplex and group control communication, twinkling with constant speed during normal communication.
- Check communication interference by parameter D04.19.

2.11 Description of Overload and Full Load

MONT70 supplies several methods for feedback over load and full load signal.

Set corresponding parameters when use certain method. Two main methods are introduced below.

Use the Digital Input Terminal DI

Set the digital input terminals on MCB or CTB with overload / full load function, change the terminal property (normally open / normally closed) to match different types of switches.

Use the Analogue Weighing Input Terminal AI

MONT70 has two analog input terminals, terminal AI on MCB or CTB.

Analog signal can do weighing self-learning, for more detail please refer to Group F05.

When the value of this signal (analog weighing signal) exceeds 80% of the whole capacity, the cars considered full load; if it exceeds 110%, the car is considered over load.

Note:

Only one board could be used to receive the full load / overload signal, MCB or CTB, you mustn't set both input terminals on MCB and CTB to receive this signal.

The analogue signal could be used together with analog weighing signal.

3 Troubleshooting

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|---|---|--|
| Lu | DC bus under voltage | 1: The power-up initial status or the power-down end status 2: Input voltage is too low 3: Fault wiring result in hardware under voltage 4: Model is set incorrectly | 1: Normal power up / down status, normal correctly 2: Check the input supply voltage 3: Check the wiring and regulate it 4: Set the model (Y00.01) correctly |
| E0001 | Controller output Acc over current | 1: Output terminal is grounded 2: Output terminal is short circuited 3: The motor has not done parameter auto-tuning 4: Load is too heavy 5: Encoder signal is wrong 6: Serious interference on encoder signal 7: Acceleration curve is too steep | 1: Check whether the output terminals are grounded, output terminals are short-circuited 2: Check whether the power line is damaged, or wiring is strong enough 3: Check whether the motor exist short circuit inside itself, or short to ground 4: Whether the contactor of output side is malfunction 5: Whether star end contactor result in short-circuit happened 6: Set proper motor parameters (Group F07 / Group F10) 7: Restart motor parameter auto-tuning (Group F07 / Group F10) 8: Check whether the brake is malfunction 9: Check whether the mechanical is malfunction 10: Check the elevator balance coefficient is correct 11: Check the encoder wirings are faultless |
| E0002 | Controller output Dec over current | 1: Output terminal is grounded 2: Output terminal is short circuited 3: The motor has not done parameter auto-tuning 4: Load is too heavy 5: Encoder signal is wrong 6: Serious interference on encoder signal 7: Deceleration curve is too steep | 12: Set the correct encoder parameters (Group F11) 13: Encoder is installed faultless 14: Check whether the encoder wire is in a tube independent, whether the shielded cable is grounded by itself, whether the wire distance is too long or not 15: Check whether the acceleration / deceleration curve (Group F03) is too steep |
| E0003 | Controller output constant speed over current | 1: Output terminal is grounded 2: Output terminal is short circuited 3: The motor has not done parameter auto-tuning 4: Load is too heavy 5: Abnormal encoder signal 6: Serious interference on encoder signal | |
| E0004 | DC bus Acc overvoltage | 1: The voltage of power supply is too high 2: Acceleration curve is too steep 3: Brake resistance is too large 4: Braking unit is abnormal 5: Energy feedback unit is abnormal | 1: Adjust the power supply voltage, check whether the bus voltage (D01.06) is ok 2: Check the balance coefficient 3: Select appropriate braking resistor |
| E0005 | DC bus Dec overvoltage | 1: The voltage of power supply is too high 2: Deceleration curve is too steep 3: Brake resistance is too large 4: Braking unit is abnormal 5: Energy feedback unit is abnormal | 4: When take use of braking unit or energy regenerative unit, ensure the related equipment setting is correct |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|-----------------------------------|--|--|
| E0006 | DC bus constant speed overvoltage | 1: The voltage of power supply is too high 2: Brake resistance is too large 3: Braking unit is abnormal 4: Energy feedback unit is abnormal | |
| E0008 | Power module fault | 1: Short circuit happened between output terminal, pairwise or short circuit to ground 2: Motor wire is too long 3: Work environment is too hot 4: Power module is damaged | 1: Check the wiring and regulate it 2: Install inductor or filter 3: Check whether the fan and the air flue are ok 4: Please contact the supplier for repairing |
| E0009 | Heatsink overheated | 1: Ambient temperature exceeds specifications 2: The controller not ventilate enough 3: Fan is fault 4: Temperature detection circuit is fault | 1: Use the controller with derating and increase power 2: Improve the ventilation 3: Replace the fan 4: Seek for technical support |
| E0010 | Braking unit fault | The braking circuit is fault | Seek for technical support |
| E0011 | CPU fault | CPU is abnormal | 1: Power off the controller, wait for 10 mins, then power on again to exam the CPU 2: Seek for technical support |
| E0012 | Parameter auto-tuning fault | 1: Parameter auto-tuning timeout 2: The current is too big in parameter auto-tuning 3: In the distance control mode (set F00.07 to 1) start rotational auto-tuning (set F10.10 to 2) | 1: Check the motor wiring 2: Set correct motor parameters (Group F07 / Group F10) 3: Start rotational auto-tuning by the keypad (set F00.07 to 0) |
| E0013 | Soft start failed | 1: Contactor fault 2: Control circuit fault | 1: Replace the contactor 2: Seek for technical support |
| E0014 | Current detected circuit fault | 1: Current detected circuit damaged 2: Motor is out of control | 1: Please contact the supplier for repairing 2: Check the brake signal |
| E0015 | Input phase loss | For three-phase input controller, one or two input phase is disconnect | 1: Check the input terminal 2: Check the settings of parameter F17.00 and F17.01 |
| E0016 | Output phase loss | 1: The output wire is broken or phase loss 2: Serious imbalance happened on the load side | 1: Check the wire between controller and motor 2: Check the motor 3: Check the parameter settings of F17.02 and F17.03 |
| E0017 | Controller overloaded | 1: Brake circuit is fault 2: Load is excessive 3: Encoder feedback signal is abnormal 4: Motor parameter is wrong 5: Check motor wire | 1: Check the brake circuit 2: Reduce the load 3: Check the encoder feedback signal 4: Check the motor parameters and restart the parameter auto-tuning (Group F07 / Group F10) 5: Check the power line |
| E0018 | Excessive speed deviation of | 1: Contactor fault 2: Encoder pulse number is set | 1: Check the brake contactor or the run contactor |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|----------------------------------|---|---|
| | motor | incorrectly 3: Excessive deviation on detected value and irrational time setting 4: Controller output torque is not enough 5: Speed-loop PI parameter is improper 6: Abnormal encoder signal 7: Irrational motor parameter 8: F10.12 error | 2: Set plus per revolutions (F11.01) properly 3: Set F04.11 (detected value) and F04.12 (detected time) properly 4: Select a bigger controller 5: Set speed-loop PI parameter (F08) properly 6: Check encoder wiring and installation 7: Check the motor parameter 8: Restart parameter auto-tuning |
| E0019 | Motor overload | 1: Brake circuit is abnormal 2: Motor overload protect factor is incorrectly 3: Excessive Load | 1: Check the brake circuit 2: Set motor overload protect factor (F17.04) correctly 3: Reduce the load |
| E0020 | Motor overheat | 1: Motor is overheat 2: Motor overheating signal acts 3: Motor parameter is set wrong | 1: Reduce the load 2: Check whether the overheating signal is real 3: Set motor parameter (Group F07 / Group F10) correctly |
| E0021 | MCB EEPROM read / write fault | EEPROM circuit of main control board (MCB) is fault | Contact the supplier for repairing |
| E0022 | Keypad EEPROM read / write fault | EEPROM circuit of keypad is fault | 1: Replace the keypad 2: Contact the supplier for repairing 3: Reset the keypad manually , it could be used in normal use (exclude parameter upload and download) |
| E0023 | Parameter setting fault | 1: For asynchronous motor, start the parameters auto-tuning not in the keypad mode 2: Synchronous motor selects ABZ encoder 3: For synchronous motor, start static auto-tuning with keypad 4: Motor current is set to zero 5: For asynchronous motor, no-load current value is set bigger than rated current 6: The creeping speed at distance control (F04.02) is bigger than highest speed of running curve (F19.07 - F19.11) 7: $0.000\text{m/s} < F19.07 - F19.11 < 0.100\text{m/s}$ 8: Firefighting base station, lock lift base station and idle base station are set to non-service floor 9: Door service floors of firefighting base station, lock lift base station and idle base station are set as service | 1: At asynchronous motor parameter auto-tuning, set F00.07 to 0 (keypad control) 2: For the synchronous motor, F11.00 (encoder card selection) should be set to 2 (UVW encoder card) or 3 (SINCOS encoder card) 3: At synchronous motor static auto-tuning, set F00.07 to 1 (distance control) 4: Set motor current (F07.02 / F10.03) correctly 5: Set asynchronous motor no-load current (F07.11) correctly 6: Restart to set F04.02 7: Restart to set F21.07 - F21.09 8: Change the door service floors (F22.01 - F22.06) to service allowed |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|---|---|--|
| | | prohibit | |
| E0024 | Input voltage detection failure | DC bus voltage detect is faultless, while the line voltage detection circuit is abnormal | 1: Power-down 2: Contact to factory for repairing |
| E0030 | Encoder reverse direction | 1: The preset direction and actual direction is inconsistent 2: Load is too large 3: Controller output torque is not enough 4: Brake circuit fault 5: Run contactor fault | 1: At elevator commissioning, reverse F11.02 (encoder direction) ; during normal running, do not modify F11.02 2: Reduce the load current 3: Select bigger controller 4: Check the brake circuit 5: Check the run contactor |
| E0031 | Encoder disconnection | 1: Encoder with no input 2: Brake circuit fault | 1: Check the encoder wiring and its installation 2: Check the brake circuit |
| E0032 | Motor over speed | 1: Improper encoder pulse number 2: Controller output torque is not enough 3: Improper speed-loop PI parameter 4: Encoder signal is wrong 5: F10.12 fault 6: Motor parameter fault | 1: Set encoder plus per revolutions (F11.01) proper 2: Select bigger power controller 3: Set speed-loop PI parameter (Group F08) correctly 4: Check the encoder wiring and encoder installation 5: Restart parameter auto-tuning 6: Check motor parameter |
| E0033 | Loss of Z signal of ABZ encoder | 1: Wiring problem 2: Serious interference | Check the wiring |
| E0034 | UVW encoder, signal UVW is wrong | UVW encoder sector is wrong | Whether the wiring of UVW signal is correct |
| E0035 | SINCOS encoder, phase CD is wrong | 1: Encoder fault 2: Encoder disconnection | 1: Check the encoder 2: Check the wirings of encoder phase C and D |
| E0036 | Shortest distance ultrahigh | 1: Speed curve setting is improper 2: Acceleration / deceleration setting is improper | 1: Set speed curve (F19.07 - F19.11) properly 2: Set Acc / Dec curve parameters (F03.00 - F03.05) properly |
| E0037 | Abnormal control board logic | The main control board logic is incorrect | Please contact the supplier for changing the main control board |
| E0038 | Upper force decelerate switch disconnection | When the elevator is on the top floor, upper force decelerate switch is turned off | 1: Check the upper force decelerate switch 2: Restart shaftway self-learning 3: Check the leveling switch signal |
| E0039 | Down force decelerate switch disconnection | When the elevator is on the bottom floor, down force decelerate switch is turned off | 1: Check the down force decelerate switch 2: Restart shaftway self-learning 3: Check the leveling switch signal |
| E0040 | Elevator run timeout | Leveling signal has no change within the time specified by F23.02 | 1: Elevator speed is too low, or floor height is too high 2: Leveling signal is abnormal 3: Steel wire rope slips |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|---|---|--|
| E0041 | Safe circuit disconnection | No safe circuit signal feedback | <ol style="list-style-type: none"> 1: Check safe circuit switch one by one, and also their working status 2: Check the power supply of safe circuit 3: Check the contactor signal of safe circuit 4: Check the characteristics of safe circuit contactor (normally open or normally closed) |
| E0042 | Door lock disconnect during running | During elevator running, the door lock signal is lost | <ol style="list-style-type: none"> 1: Check whether the hall and car door lock is ok 2: Check whether the door lock act right 3: Check the characteristics of door lock (normally open or normally closed) 4: Check the power supply of door lock 5: If there is MT70-AOB-A/B, check its signal is correct or not |
| E0043 | Up limit signal lost | <ol style="list-style-type: none"> 1: Up limit signal is loss in elevator upward running 2: Wrong elevator position caused by interference on encoder signal | <ol style="list-style-type: none"> 1: Check the up limit switch is on its position or not 2: Check the characteristics of up limit switch (normally open or normally closed) 3: The position of Up limit switch is too low, it will slide when the car reach to the top layer during normal run 4: Check encoder wiring and installation |
| E0044 | Down limit signal lost | <ol style="list-style-type: none"> 1: Down limit signal is loss in elevator downward running 2: Wrong elevator position caused by interference on encoder signal | <ol style="list-style-type: none"> 1: Check that the down limit switch is ok 2: Check the characteristics of down limit switch (normally open or normally closed) 3: The position of Down limit switch is too high, it will act when the car reach to the bottom layer in normal run 4: Check encoder wiring and installation |
| E0045 | Upper / down force decelerate switch disconnect | Upper force decelerate switch and down force decelerate switch disconnected simultaneously | <ol style="list-style-type: none"> 1: Check whether upper / down force decelerate switches are ok 2: Check the characteristics of upper / down force decelerate switch (normally open or normally closed) 3: Set Bit4 in F26.12 (inspection parameter setting) to 1 |
| E0046 | Re-leveling abnormal | <ol style="list-style-type: none"> 1: Elevator actual speed is bigger than re-leveling speed + 0.050m/s 2: Re-leveling running is not happened in the leveling area | <ol style="list-style-type: none"> 1: Check the encoder signal 2: Check the leveling signal 3: Check the advanced open door block |
| E0047 | Lock door contactor abnormal | Lock-door contactor feedback signal is abnormal | <ol style="list-style-type: none"> 1: Check the characteristics of door lock contactor (normally open or normally closed) 2: Check whether the door lock contactor is act as normal 3: Check the feedback signal of door lock contactor 4: Check whether the advanced open door block is act as normal |
| E0048 | OD fault | The time of non-arrival OD continuous exceed F22.09 | <ol style="list-style-type: none"> 1: Check the door controller system 2: Check whether the CTB is act as normal |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|------------------------------|--|---|
| | | | 3: Check the OD arrival signal is as normal |
| E0049 | CD fault | The time of non-arrival CD continuous exceed F22.09 | 1: Check the door controller system 2: Check whether the CTB is act as normal 3: Check whether the CD arrival signal is as normal 4: Check the door lock circuit |
| E0050 | Shaftway self-learning fault | <p>At the beginning of learning, if any of the following conditions is met, the controller will report fault:</p> <ol style="list-style-type: none"> 1. The present floor is not the bottom floor 2. The self-learning direction is not upward running 3. Down force decelerate switch signal is abnormal 4. Initial angle of the synchronous motor is 0 5. The up limit signal is valid 6. For two floors shaftway, the down leveling sensor doesn't break away from the leveling plate <p>Running to the second floor, fault will be report if following condition is meet:</p> <p>In self-learning, get the leveling adjustment distance of 2nd floor, which is bigger than 50cm</p> <p>When reach to the top floor, fault will be report when any of following conditions is meet:</p> <ol style="list-style-type: none"> 1. The present floor is inconsistent with the preset max floor, at the condition that upper force decelerate switch1 is effective and the car is in the door zone 2. The upper force decelerate switch 1 doesn't act when the elevator reach the preset floor and the car is in the door zone 3. The height of total floor get in self-learning is less than 50cm 4. The upper / down force decelerate switch1 positions is 0, which is get in self-learning 5. When force decelerate switches level 2 and level 3 is installed, the upper / down force decelerate switch position is 0, which is get in self-learning | <ol style="list-style-type: none"> 1: Check the upper / down force decelerate switch signal 2: Whether actual floor is consistent with preset floor (F19.01) 3: Whether synchronous motor has complete auto-tuning running 4: Check the motor run direction is correct or not 5: Check the leveling plate installed correct or not 6: Check the leveling switch setting (open / closed status) is correct or not 7: Check the up / down limit signal is correct or not |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|---|---|---|
| | | <p>6. The controller will report fault when select multi force decelerate switch signals, and they doesn't meet the following conditions:</p> <p>Down force decelerate switch position $1 < \text{down force decelerate switch position } 2 < \text{down force decelerate switch position } 3$</p> <p>Upper force decelerate switch position $1 > \text{upper force decelerate switch positio}2 > \text{upper force decelerate switch position } 3$</p> | |
| E0051 | CAN communication fault | CAN communication not received correct data | <ol style="list-style-type: none"> 1: Check the communication cable 2: Check the CTB power supply 3: Check the 24V power supply 4: Check if there is interference on D04.18 communication 5: Check the matching resistor switch work well or not |
| E0052 | Hall call communication fault | Hall call communication not received correct data | <ol style="list-style-type: none"> 1: Check the communication cable 2: Check the 24V power supply 3: Check whether the HCB addresses are conflicts from each other 4: Check if there is interference on D04.17 communication |
| E0053 | Lock door short-circuit fault | OD arrival signal and door lock signal are effective simultaneous | <ol style="list-style-type: none"> 1: Check whether the door lock circuit act as normal 2: Check the door locked contactor feedback is as normal 3: Check the door controller OD arrival signal 4: F26.12 (inspection parameter setting) of Bit3 is set to 1 |
| E0054 | Synchronous motor star end contactor feedback fault | Synchronous motor star end contactor feedback is abnormal | <ol style="list-style-type: none"> 1: Check whether the contactor feedback contact is consistent with MCB parameter setting (normally open or normally closed) 2: Check whether the indicator on MCB output side is consistent with contactor action 3: Once the contactor acts, check whether the corresponding feedback is effective, and MCB feedback signal is effective 4: Check whether contactor output is consistent with MCB corresponding signal 5: Check the contactor coil circuit |
| E0055 | Next landing fault | This floor does not receive OD arrival signal when elevator is in automatic running mode | <ol style="list-style-type: none"> 1: Check the door machine OD arrival signal is effective or not 2: Check the door mechanical system is as normal |
| E0056 | Run contactor feedback fault | Run contactor feedback is abnormal | <ol style="list-style-type: none"> 1: Check whether the contactor feedback contact is consistent with MCB parameter setting (normally open or normally closed) |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|--|--|---|
| | | | 2: Check whether the indicator on MCB output side is consistent with contactor action 3: Once the contactor acts, check whether the corresponding feedback is effective, and MCB feedback signal is effective 4: Check whether contactor output is consistent with MCB corresponding signal 5: Check the contactor coil circuit 6: When F26.17 is set to 1, the fault will reset by itself |
| E0057 | Brake contactor feedback fault | 1: The feedback signal from brake contactor is abnormal 2: The feedback from brake mechanical switch is abnormal 3: The feedback from brake forced contactor is abnormal | 1: Check whether the contactor feedback contact is consistent with MCB parameter setting (normally open or normally closed) 2: Check whether the indicator on MCB output side is consistent with contactor action 3: Once the contactor acts, check whether the corresponding feedback is effective, and MCB feedback signal is effective. After the contactor acts, check whether the corresponding feedback contact and MCB corresponding feedback input point act 4: Check contactor output is consistent with MCB corresponding signal 5: Check the contactor coil circuit 6: Check the feedback signal from brake mechanical switch 7: Check the feedback signal from brake forced contactor 8: Check the brake forced contactor coil 9: When F26.17 is set to 1, the fault will reset by itself |
| E0058 | Leveling signal fault | The switches on leveling and door zone are adhesive or disconnect | 1: Check whether leveling inductor and door zone inductor are work as normal 2: Check the position of leveling plate 3: Check the MCB input signal |
| E0059 | Receive OD and CD arrival signals simultaneous | Receive door machine OD and CD arrival signals at the same time | 1: Check the door controller 2: Check OD / CD arrival signal characteristics (normally open or normally closed) 3: In inspection mode, shield the fault by set Bit5 of F26.12 (inspection parameter setting) to 1 |
| E0060 | Distance of force decelerate is too short | The distance for force decelerate is too short | 1: Check the position of upper / down force decelerate switch 1 2: Check the speed of force decelerate (F03.12) |
| E0061 | Duplex group control communication fault | CAN communication do not receive the correct data | 1: Check the communication cable 2: Check the duplex parameter setting 3: Check the communication interference by function parameter D04.19 |
| E0062 | Over current | During inspection running, the current | 1: Reduce the load |

| Fault Code | Fault Name | Fault Cause | Countermeasure |
|------------|--------------------------|--|---|
| | during inspection run | exceed 110% rated current | 2: F26.12 of Bit1 is set to 0 3: The encoder angle of synchronous motor isn't match with physical truth, restart parameter auto-tuning 4: The signal from encoder is abnormal 5: Brake circuit is abnormal |
| E0063 | Advanced open door fault | 1: Speed is greater than advanced open speed + 0.050m/s 2: Advanced open operation is not happened in the leveling area | 1: Check the encoder signal is correct or not 2: Check the leveling signal is correct or not 3: Check the advanced open block (MT70-AOB-A/B) work well or not |