MONT30

Door Controller

Starting Guide

V1.0 2023.06

FOREWARD

Thank you for purchasing MONT30 door controller.

This user manual describes how to use MONT30 and its installation wiring, parameter setting, troubleshooting and daily maintenance etc.

Before using the product, please read through this user manual carefully. In addition, please do not use this product until you have fully understood safety precautions.

Note:

- Preserve this manual for future.
- If you need the user manual due to damage, loss or other reasons, please contact distributors of our company or directly contact our Technical Service Center.
- If you still have some problems during use, please contact with our Technical Service Center.
- Due to product upgrade or specification change, and for the purpose of improving convenience and accuracy of this manual, this manual's contents may be modified.

MONT30 Features

Ultra small size	Over 50% smaller than the industry average.
CAN Communication	Support CAN communication, only use 2 cables to realize control commands.
Easy to debug	One-button start self-learning, knobs set speed and torque, fast and efficient.
Mobile phone debug	Onboard Bluetooth module, support Android phone APP debugging.
Silent running	Carrier frequency up to 16kHz, silent and noiseless running.
Record Blocked Point	Automatic record the CD blocked point to avoid the second impact.
Flexible upgrade	OTA upgrade software to quickly solve technical problems on site.
Safe and reliable	Automatically resets common faults to ensure service continuity.

Version and Revision Records

Time: 2023/06

Version: V1.0

Chapter	Contents
	• V1.0 version released.

Safety Information

Safety Definition

Pay attention to contents with following marks in the user manual or on the product.

 **Danger**
Danger: A Danger contains information which is critical for avoiding safety hazards.

 **Warning**
Warning: A Warning contains information which is essential for avoiding a risk of damage to products or other equipements.

Note
Note: A Note contains information which helps to ensure correct operation of the product.

Professional Personnel

Only qualified electrical engineer can perform electrical wiring.

Only a trained and authorized professional person can maintain the product.

Contents

1. Check Product

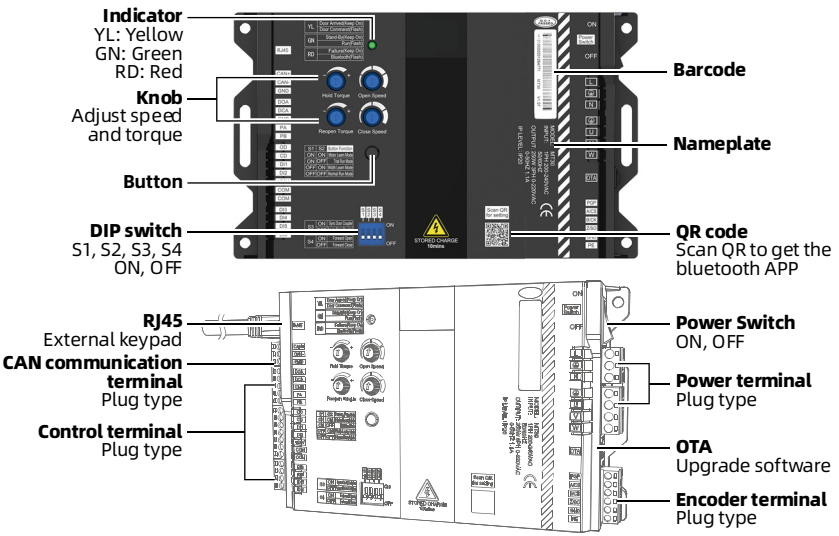
Check model: Consistent with the ordered model.
Check appearance: The product packaging and appearance is not damaged.

1.1 Model

MT30 - 5A
1 2

Code	Description	
1	Product series	• **MT30**: MONT30 door controller
2	Product configuration	• **5A-EN**: ABZ encoder, power supply 5V • **IN**: High bus voltage

1.2 Layout



2. Mechanical Installation

Note:
If you open the package and find that the door controller is incomplete or damaged, please do not install the door controller.

2.1 Confirm Installation Environment

Confirm the installation environment meets the following requirements:

- Do not install in places exposed to direct sunlight, humidity, or water droplets;
- Do not install in places with flammable, explosive, corrosive gas and liquid;
- Do not install in places with oily dust, fiber and metal powder;
- Vertical installed on fire-retardant material with strong support;
- Install at where the vibration is 3.5m/s^2 in 2 - 9Hz, 10m/s^2 in 9 - 200Hz (IEC 60721-3-3);
- Install in places with the humidity is less than 95%RH and no condensation;
- Confirm adequate cooling space for door controller to the running temperature between -10 - +40℃;
- The door controller meets IP20 and pollution level 2 (dry, none conducting dust pollution).

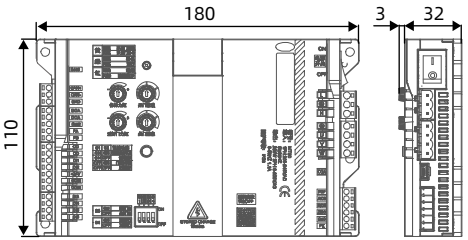
Note:
1. Confirm the running temperature between -10 - +40℃. Installing in well-ventilated places can improve the running reliability of the door controller.
2. If the running temperature exceeds 40℃, the door controller needs to be derated by 2% for every 1℃ increase. The Max. running temperature is 50℃.

2.2 Install MONT30

For wall-mounted installation, see below for steps .

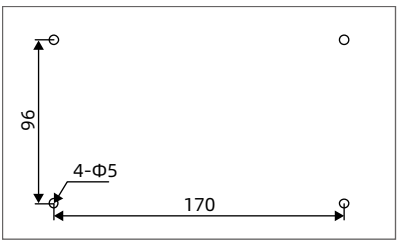
1. Plan the installation space.

   The overall dimensions of the door controller are shown in the figure, and the unit is mm.



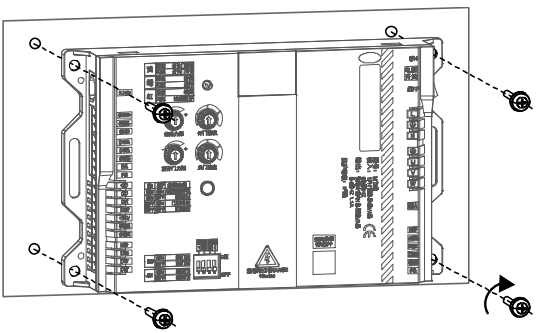
2. Mark the mounting position on the mounting bracket and drill holes.

   The unit is mm.



3. Fix the door controller with 4 × M4 combination screws.

   Tighten the screw clockwise.



3. Electrical Installation

Danger

- Only qualified electrical engineer can perform electrical wiring.
- MONT30 must be reliably powered off for 10 minutes before wiring.
- MONT30 has a leakage current of more than 3mA to ground, depending on the use conditions. To ensure safety, MONT30 and the motor must use independent ground cables, and recommended to install B-type residual current devices (ELCB/RCD).
- When MONT30 is charged, do not touch the wiring terminal of MONT30.
- Do not short circuit between power terminals.

Warning

- Do not do dielectric strength test on MONT30.
- Connect the terminals firmly.
- Prohibit on-off contactors to start and stop MONT30.
- Do not connect the input power to U/V/W terminals of MONT30.
- Do not connect the phase-shifting capacitors to the output circuit.
- Confirm the AC input power supply voltage is the same as rated input voltage of MONT30.

3.1 Controller Terminal Description

3.1.1 Power Terminal Description

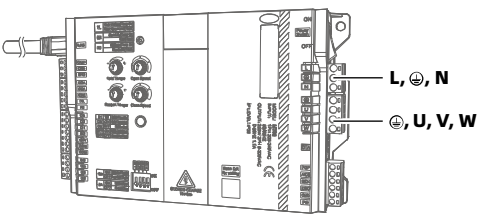


Figure 3-1 Power terminal

Table 3-1 Power terminal description

Power Terminal	Description
L, N	Single phase AC 220V power input terminal
U, V, W	Controller output terminal, connect to motor
⏚	Ground terminal, connected to protective ground

3.1.2 Control Terminal Description

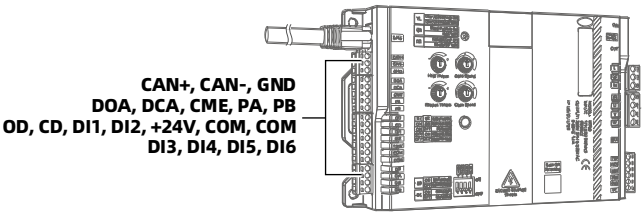


Figure 3-2 Control terminal

Table 3-2 Control terminal description

Control Terminal		Description
CAN+, CAN-, GND	CAN communication	MONT30 communicates with elevator control system • For CAN communication protocol, please contact dealer
DOA, CME	Door open arrived output	Transistor contact capacity: 30VDC/50mA • F06.00 sets NO or NC output
DCA, CME	Door close arrived output	
PA, PB	Relay output	PA, PB normally open (NO) Contact capacity: 250VAC/3A or 30VDC/1A • F06.01 sets function • F06.00 sets NO or NC output
OD, COM	Open door command input	Isolation, support dry contact and NPN input, low level is valid • Input impedance: 4.7kΩ • Input Max. frequency: 1kHz DI1 - DI6: F06.03 - F06.08 set function, NO or NC input
CD, COM	Close door command input	
DI1 - DI6, COM	Digital input	
+24V, COM	+24V power supply	+24V power supply, the Max. output current is 200mA

3.1.3 Encoder Terminal Description

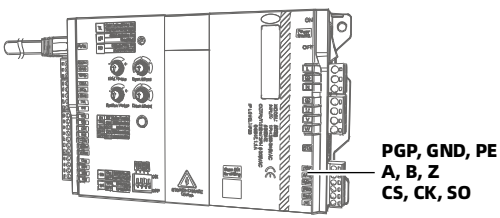


Figure 3-3 Encoder terminal

Table 3-3 Encoder terminal description

Encoder Terminal		Description
PGP, GND	Encoder power supply	Encoder power supply, the Max. output current is 200mA • ABZ encoder: Power supply 24V or 5V • Absolute encoder: Power supply 5V
PE	Shield	Ground
A, B, Z	ABZ encoder signal	ABZ encoder, optocoupler isolated input • Input Max. pulse frequency: 40kHz

Encoder Terminal		Description
CS, CK ,SO	Absolute encoder signal	SPI communication • CS: Chip select input, low level is valid • CK: Clock input • SO: Data output

3.2 Controller Wiring

3.2.1 Confirm the OD and CD Mode (Distance or Speed Control)

Different motors, different control modes, and different wiring modes.

Table 3-4 Confirm the OD and CD mode

Motor	Detect Door Position	Door Control (F00.02)
Syn.	Encoder	Distance control F00.02 = 1
Asyn.	Encoder	Distance control F00.02 = 1
Asyn.	4 travel switches	Speed control F00.02 = 0

3.2.2 Select Power Cable

See the table below for recommended cable diameters.

The ground cable diameter must accord with the requirement in 4.3.5.4 of IEC 61800-5-1.

Table 3-5 Power cable diameter selection

Power Cable (mm^2)	Motor Cable (mm^2)	Ground Cable (mm^2)
0.75	0.5	2.5

3.2.3 Wiring Requirements

- The specification of the control cable is 18AWG.
- The length of the control cable is less than 50m, and the distance from the motor cable is more than 0.3m, which can decrease the interference of the control signal.
- The control cables must use shielded cables.
- The communication cable must use a shielded twisted pair with a twisted wire pitch of 20 - 30mm, and the shielding layer is grounded.
- The encoder must use shielded cable, and the shielding layer must be grounded reliably at one end.

3.2.4 Distance Control Wiring

In distance control, the door position is detected by the encoder.

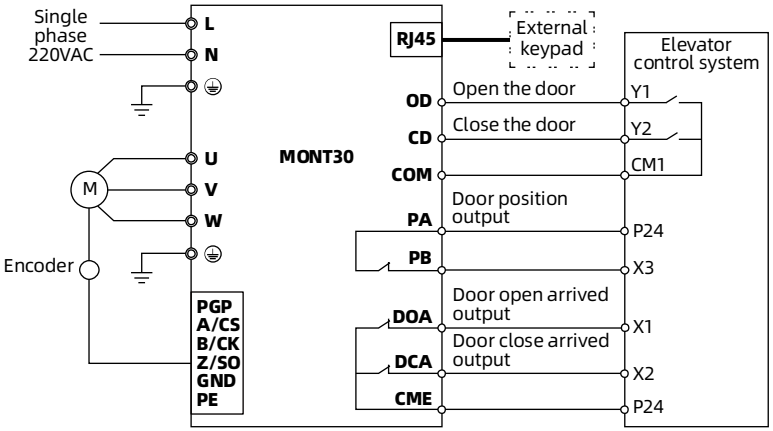


Figure 3-4 Distance control wiring (default)

MONT30 supports ABZ encoder, absolute encoder.

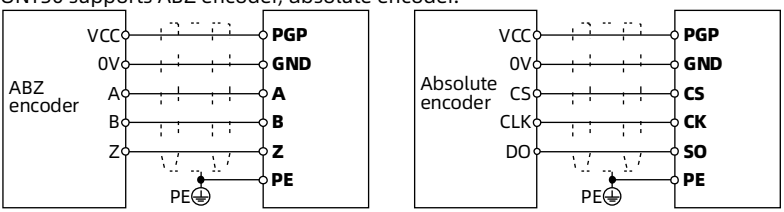


Figure 3-5 Encoder wiring

3.2.5 Speed Control Wiring

In speed control, the door position is detected through 4 travel switches, and the switches are connected to the DI terminal of the MONT30 (default DI1 - DI4, normally closed).

Install the Travel Switch

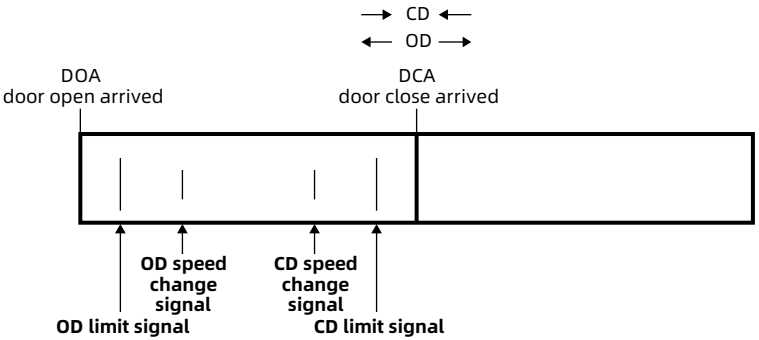


Figure 3-6 Install the travel switch

Wiring

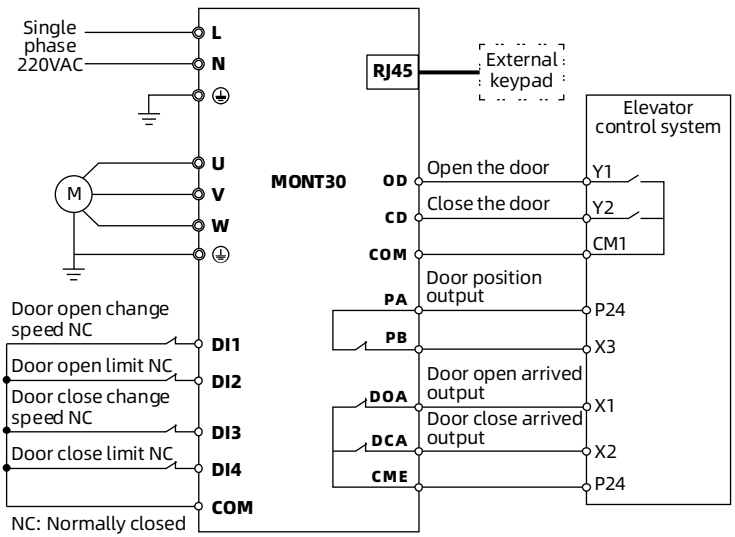


Figure 3-7 Speed control wiring (default)

DI terminal supports dry contact and NPN input.

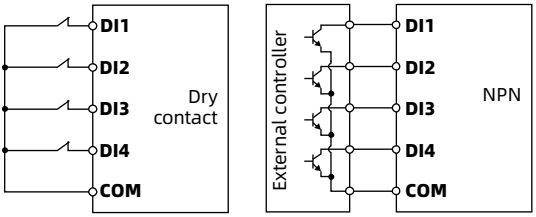


Figure 3-8 DI terminal wiring (connect DI1 - DI4 by default)

4. Power on

Danger

- After **Power Switch** is set to **OFF**, the power input 220V terminal still has high voltage. Before disconnecting the external power supply, forbidden to touch, plug in or pull out the 220V terminal, otherwise there is a danger of electric shock.

Power Switch is set to **ON**, the indicator is always on (green or yellow), and the MONT30 is in stand-by state.

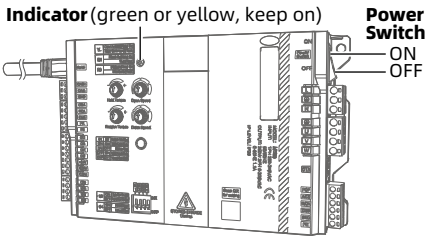


Figure 4-1 Power switch description

5. Debugging

5.1 Debugging Preparation

5.1.1 Confirm Debugging Process

Confirm the debugging process according to the control mode.

Table 5-1 Control mode

Motor	Detect Door Position	Motor Control (F00.06)	Door Control (F00.02)
Syn.	Encoder	Closed-loop vector control F00.06 = 2	Distance control F00.02 = 1
Asyn.	Encoder	Closed-loop vector control F00.06 = 1 Flux vector control F00.06 = 3	Distance control F00.02 = 1
Asyn.	4 travel switches	Flux vector control F00.06 = 3	Speed control F00.02 = 0

Table 5-2 Confirm the debugging process

Debugging Content	Asyn. Motor + Travel Switch	Asyn. Motor + Encoder	Syn. Motor + Encoder
Motor Self-learning (section 5.2)	√	√	√
Door Width Self-learning (section 5.3)		√	√
5.4 Debug OD and CD (section 5.4)	√	√	√

5.1.2 Description of Indicator, Button, Knobs, and DIP Switches

The display or operation instructions of indicator, knobs, button and DIP switches are shown in Table 5-3.

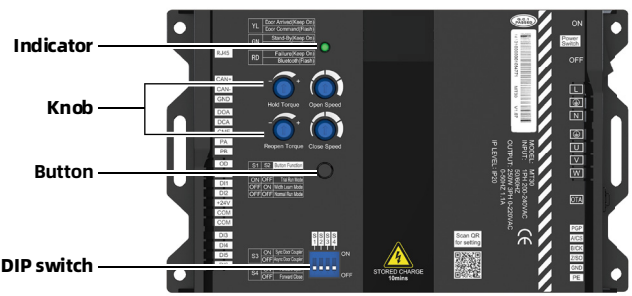
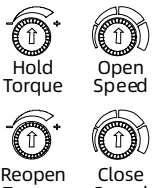
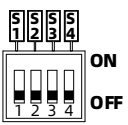


Figure 5-1 Layout description (indicators, knobs, button, DIP switches)

Table 5-3 Display or operating description

<table>
<tr><th colspan="2">Display or Operate</th><th>Description</th></tr>
<tr><td colspan="2">Indicator</td><td>Displays yellow, red, green, and the status description are shown in the table below.
<table>
<tr><th>Display</th><th>Keep On</th><th>Flash</th></tr>
<tr><td>Yellow (YL)</td><td>Door arrived (open / close)</td><td>Door command (open / close)</td></tr>
<tr><td>Green (GN)</td><td>Stand-by</td><td>In normal run model or motor learn model</td></tr>
<tr><td>Red (RD)</td><td>Failure</td><td>Bluetooth connected</td></tr>
</table></td></tr>
<tr><td rowspan="4"> 

Knob</td><td>Hold Torque</td><td>Debug the holding torque of door open or close arrived, there are 20 gears in total.
• Default middle gear. Adjust 2% per gear. Adjust the knob to the left, the torque decreases, otherwise the torque increases.</td></tr>
<tr><td>Reopen Torque</td><td>Debug the reopening torque when the door is blocked during closing the door, there are 20 gears in total.
• Default middle gear. Adjust 2% per gear. Adjust the knob to the left, the torque decreases, otherwise the torque increases.</td></tr>
<tr><td>Open Speed</td><td>When F10.23 hundred = 1, select the gear, 4 gears in total.
When F10.23 hundred = 0 [default], fine tune the 4th gear OD speed.</td></tr>
<tr><td>Close Speed</td><td>When F10.23 hundred = 1, select the gear, 4 gears in total.
When F10.23 hundred = 0 [default], fine tune the 4th gear CD speed.</td></tr>
<tr><td colspan="2">Button</td><td>• DIP switch S1&S2 = ON&ON, press Button for 1s and release button to start motor learn.
• DIP switch S1&S2 = OFF&ON, press Button for 1s and release button to start width learn.
• DIP switches S1&S2 = ON&OFF, long press Button to test the OD and CD effect.</td></tr>
<tr><td> 

DIP switch (default OFF)</td><td>S1, S2, S3, S4</td><td>• S1&S2 combination setting function, as shown in the table below.
<table>
<tr><th>S1</th><th>S2</th><th>Function</th></tr>
<tr><td>OFF</td><td>OFF</td><td>Normal Run Mode [default]</td></tr>
<tr><td>ON</td><td>OFF</td><td>Trial Run Mode</td></tr>
<tr><td>ON</td><td>ON</td><td>Motor Learn Mode</td></tr>
<tr><td>OFF</td><td>ON</td><td>Width Learn Mode</td></tr>
</table>
• S3: Unused
• S4
  • ON (Forward Open): Motor forward to open the door.
  • OFF (Forward Close): Motor forward to close the door, default.</td></tr>
</table>

5.1.3 Self-learning Related Parameters

The following table shows the parameters related to self-learning. Use the keypad settings, see sections 5.2 and 5.3 for details.

Table 5-4 Set parameters

Ref. Code	Function	Setting Range [Default]	Remark
Control parameter			
F00.02	OD and CD mode	0: Speed control [default] 1: Distance control	Syn. motor must be set to 1
F00.06	Motor control mode	1: Asyn. motor closed-loop vector control 2: Syn. motor closed-loop vector control 3: Asyn. motor flux vector control [default]	According to the actual setting • Asyn. motor: Set to 1 or 3 • Syn. motor: Set to 2
Motor parameters			
F01.00	Motor rated power	1 - 250W [50W]	Set according to motor nameplate • F01.05 needs to be set for distance control (with encoder)
F01.01	Motor rated voltage	1 - 300V [220V]	
F01.02	Motor rated current	0.10 - 2.00A [0.55A]	
F01.03	Motor rated frequency	1.00 - 99.99Hz [50.00Hz]	
F01.04	Motor rated speed	1 - 6000rpm [900rpm]	
F01.05	Reduction ratio	1.00 - 9.99 [1.00]	
Encoder parameters			
F02.00	Encoder type	0: ABZ encoder [default] 1: Absolute encoder	Distance control (F00.02 = 1) or Syn. motor, F02.00 and F02.01 must be set
F02.01	Encoder pulses per revolution	0 - 9999 [1024]	

5.2 Motor Self-learning

Asyn. Motor Selt-learning Operation

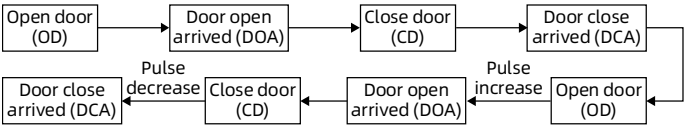
1.	Use the keypad to set parameters, see below or section 5.1.3. • **Control parameters**: F00.02 (OD and CD mode), F00.06 (motor control mode). • **Motor parameters**: F01.00 - F01.04, F01.05 (reduction ratio) needs to be set for distance control. • **Encoder parameters** need to be set for distance control: F02.00 - F02.01.
2.	Set **DIP switch S1&S2 = ON&ON**, press **Button** for 1s and release button, the door controller starts motor self-learning. The indicator is flashing green.
3.	When the indicator does not flash, the self-learning ends, the door controller automatically records F01.07, F01.09 - F01.13. If the indicator is always on (red), the self-learning fails. **Take measures**: Use the keypad to confirm the fault, clear the fault, and start motor self-learning again until success.

Syn. Motor Selt-learning Operation

1.	Do not remove the belt, fully close the door manually.
2.	Use the keypad to set parameters, see below or section 5.1.3. • **Control parameters**: F00.02 (OD and CD mode), F00.06 (motor control mode). • **Motor parameters**: F01.00 - F01.05. • **Encoder parameters**: F02.00 - F02.01.
3.	Set **DIP switch S1&S2 = ON&ON**, press **Button** for 1s and release button, the door controller starts motor self-learning. The indicator is flashing green. The door moves in the OD direction. When the self-learning ends, the door automatically stops moving. If the door does not open, and the door controller report encoder fault. **Take measures**: Stop, change **DIP switch S4**, and start motor self-learning again.
4.	When the indicator does not flash, the self-learning ends, the door controller automatically records F01.08 - F01.13. If the indicator is always on (red), the self-learning fails. **Take measures**: Use the keypad to confirm the fault, clear the fault, and start motor self-learning again until success.
5.	If the encoder is ABZ, record F01.08 (pole angle). Start self-learning again and record F01.08, the difference between the two F01.08 is less than 30°. Otherwise, need to find out the reason, and start self-learning again.

5.3 Door Width Self-learning (Only Distance Control)

Only in distance control, door width self-learning is needed, learn the door width.

1.	Confirm the door movement path is clear of obstacles.
2.	Set **DIP switch S1&S2 = OFF&ON**, press **Button** for 1s and release button, the door controller starts door width self-learning.
3.	Confirm the the door action sequence is correct, check d01.00 to confirm the OD/CD pulse signal is correct (keypad), as shown in the figure below.  After the end, F02.07 and F02.08 record the door width. If abnormality occurs during self-learning, stop (wait for MONT30 to stop automatically), clear the abnormality, and start door self-learning again.
Exception handling:	
1.	The door move in the CD direction at start. **Take measures**: Stop (wait for MONT30 to stop automatically), change **DIP switch S4**, and start door width self-learning again.
2.	During self-learning, the OD pulses decreases and the CD pulses increases. **Take measures**: Change the setting of F02.02 (encoder direction).
3.	During self-learning, the door controller reports E26 fault (door width self-learning fault). **Take measures**: Check the encoder signal. For heavy doors, increase F05.14 (OD/CD switch torque at low speed).
4.	When the Asyn. motor is self-learning, the door controller shakes and then stops. **Possible reasons**: F02.01 (encoder pulses), F02.02 (encoder direction), F01.05 (reduction ratio) are incorrectly set.

5.4 Debug OD and CD

Set **DIP switches S1&S2 = ON&OFF**, long press **Button** to test the OD and CD effect, the door stops running after release **Button**.

If the OD or CD does not meet the requirements, adjust the torque, speed and creep distance according to the site.

- Torque: DOA/DCA final holding torque, reopening torque.
- Speed: OD speed, CD speed.
- Creep distance (Only Distance Control): F11.28 (OD), F11.29 (CD).

Torque Knob Sets the Torque

There are 20 gears to adjust the OD/CD holding torque and the reopening torque, adjust 2% per gear.

Default the middle gear, adjust the knob to the left, the torque decreases, otherwise, the torque increases, as shown in Figure 5-2.

Hold Torque knob: Adjusted on F05.02/F05.06 (DOA/DCA final holding torque), d01.42/d01.43 (OD/CD) check the adjusted torque.

Reopen Torque knob: Adjusted on F05.08/F05.10 (reopening torque at low/high speed), d01.44/d01.45 (low/high speed) check the adjusted reopening torque.

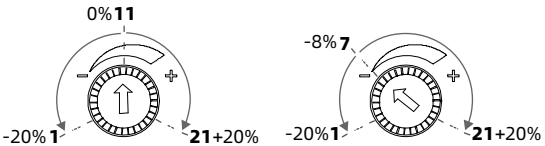


Figure 5-2 Torque knob adjust

Speed Knob Sets the Speed

There are 4 options for door opening curve and door closing curve.

The corresponding parameters of the four gears are shown in Table 5-5 and Table 5-6. The keypad can set each parameter.

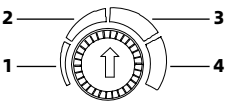


Figure 5-3 Speed knob gear

The speed knob can select gear or fine tune the 4th gear.

- When F10.23 hundred = 1 (select gear), the speed knobs select the gear, as shown in Figure 5-3.
- When F10.23 hundred = 0 (fine tune, default), the speed knobs fine tune the 4th gear speed: OD speed = F11.25 × F03.22, CD speed = F11.26 × F04.22.

Table 5-5 The corresponding parameters of the four gear OD curve

OD Curve Group F03	**1st Gear F03.01 - F03.06**	**2nd Gear F03.07 - F03.12**	**3rd Gear F03.13 - F03.18**	**4th Gear F03.19 - F03.24**
OD start distance (distance) OD start time (speed)	300 pulse 300ms	300 pulse 300ms	300 pulse 300ms	300 pulse 300ms
OD start speed	2.50Hz	3.00Hz	3.50Hz	3.50Hz
OD Acc. time	1.0s	1.2s	1.3s	1.4s
OD high speed	10.00Hz	15.00Hz	20.00Hz	24.00Hz
OD Dec. time	1.4s	1.6s	2.0s	2.0s
OD creep speed	2.00Hz	2.50Hz	3.00Hz	3.00Hz

Table 5-6 The corresponding parameters of the four gear CD curve

CD Curve Group F04	**1st Gear F04.01 - F04.06**	**2nd Gear F04.07 - F04.12**	**3rd Gear F04.13 - F04.18**	**4th Gear F04.19 - F04.24**
CD start distance (distance) CD start time (speed)	0 pulse 0ms	0 pulse 0ms	0 pulse 0ms	0 pulse 0ms
CD start speed	2.50Hz	3.00Hz	4.00Hz	4.00Hz
CD Acc. time	1.2s	1.5s	2.0s	2.0s
CD high speed	8.00Hz	12.00Hz	18.00Hz	22.00Hz
CD Dec. time	1.3s	1.6s	2.0s	2.0s
CD creep speed	1.00Hz	1.50Hz	1.50Hz	2.00Hz

Adjust Creep Distance

In distance control, you can adjust the creep distance of OD or CD.

- Increase the creep distance (Dec. advance), increase F11.28 (OD), F11.29 (CD).
- Decrease the creep distance (Dec. delay), decrease F11.28 (OD), F11.29 (CD).

6. Connect to Elevator Control System

Set **DIP switch S1&S2 = OFF&OFF** (normal run mode), confirm F00.03 = 1 (terminal control), then connect to the elevator control system.