MONT20

Door Controller

User Manual

FORWARD

Thank you for purchasing MONT20 Door Controller.

This user manual describes how to use MONT20 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.

Version and Revision Records

Time: 2022/03

Version: V1.6

Revised Chapter	Revised Contents
Chapter 3	• Add set the encoder power supply to 24V, refer to 3.3.5

MONT20 Common Function List

Functions	Function Description	Remarks
Syn. and Asyn. integrated control	MONT20 door motor integrated controller can drive AC Asyn. motor and permanent magnet Syn. motor.	F00.06
Self-adaptive door opening holding torque	The output torque keeps the door system dynamic balance: Reduce the energy consumption in the door opening state, and enhance self-adaptive OD holding torque function.	F10.06
Automatic generation of switch door curve	Through the feedback position of the current encoder, the door vane position and the door width learned from the door width, the running speed is automatically selected and the door is switched.	F10.05
Speed control/distance control	Support two modes of operation: Speed control and distance control.	F00.02
Automatic demo running	In the demo mode, press the door open or close key, the controller will automatically cycle the door according to the switch door curve. Instruct to press stop/fault reset key, end the demo running, and record the number of demo runs.	F00.03
Automatic recognition and flexible handling in case of obstruction	According to the setted torque, the system judges the resistance torque during the process of door opening or closing. If the door is blocked, it can be set as two ways: Blocked re-opening and output blocked signal controlled by elevator system. If the door is blocked, open and shut down and output blocked signal can be controlled by elevator system.	F10.07
Automatic recognition of encoder direction	The direction of the encoder and the phase sequence of the output are automatically recognized during the tuning process. Simply change the parameters to change the running direction.	F02.01
Adaptive grid voltage fluctuation	The grid voltage fluctuation will be detected in real time during the running of the door motor, and the controller will automatically adjust output voltage according to bus voltage fluctuation; When the grid surge voltage is detected, the control system will automatically reset the overvoltage fault and put it back into running.	F06.13 unit
Controller running record	Automatically accumulate running time, and the number of switching door.	F09.13 - F09.16
Parameter copy	The parameters can be uploaded and downloaded through the optional keypad.	F00.01

CONTENTS

Chapter 1 Safety Information and Precautions

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.

Chapter 2 Product Information

2.1 Rated Value

Power (kW)	Capacity (kVA)	Rated Input Current (A)	Rated Output Current (A)	G.W. (kg)
0.4	1.0	5.8	2.5	1.7

2.2 Technical Data

Electrical Specification	
Input voltage	Single phase: 200 - 240V Fluctuating within ±5%, imbalance rate <3%
Input frequency	50/60Hz ± 5%
Output voltage	0V - input voltage
Output frequency	0.00 - 99.99Hz
Control Characteristic	
Control mode	SVC; VC
Speed range	1:100 (SVC); 1:1000 (VC)
Speed accuracy	±0.5% (SVC); ±0.05% (VC)
Starting torque	180% rated torque at 0.5Hz (SVC); 180% rated torque at 0Hz (VC)
Frequency setting	Keypad setting
Resolution	Frequency: 0.01Hz; Current: 0.01A
Capacity	150% rated output current for 1 minute, 180% rated output current for 1 second
Function	
Main function	• When controlling AC Asyn. motor, it supports dynamic tuning of motor parameter • When controlling AC PMSM, it supports no-load/load tuning and encoder zero position of motor parameter • Support normal ABZ encoder, achieve closed loop vector control of AC PMSM • Support receiving open collector or push-pull encoder input signal • Distance control and speed control • Support door width self-learning, auto demo loop, resistance auto recognition and parameter upload/download (optional keypad)
Protection	Overload protection, overvoltage protection, under-voltage protection, overcurrent protection, inter-phase short-circuit protection, etc.

Input and Output	
Power supply	+24V, Max. output current is 200mA
Digital input	DI1 - DI5, OD, CD
Relay output	DOA, DCA, PA, PB, PC Contact rating: 125VAC/0.5A or 24VDC/1A
Communication	CAN+, CAN-
Keypad	
Optional LCD keypad	8 keys, 5 digit 8 segment nixie tube display, 5 unit indicators, 5 status indicators
Optional LED keypad	8 keys, 5 LED nixie tube, 5 unit indicators, 5 status indicators
LCD/LED display	Set function parameter, check status parameter, check fault code, etc.
Environment	
Running temperature	-10 - +40℃, Max. 50℃, air temperature fluctuation is less than 0.5℃/min The derating value of output current shall be 2% for each degree centigrade above 40℃. Max. allowed temperature is 50℃
Storage temperature	-40 - +70℃
Applicable place	Indoor, preventing from direct sunlight, no dust, corrosive, flammable gases, oil mist, water vaper, dripping or salt etc.
Altitude	Less than 1000 meters, otherwise it should be derating use
Humidity	Less than 95%RH, non-condensing
Vibration resistance	It is $3.5m/s^2$ in 2 - 9Hz, and $10m/s^2$ in 9 - 200Hz (IEC 60721-3-3)
Protection class	IP20
Pollution level	2 (dry, non conducting dust pollution)
Accessories	
About keypad	LED keypad [HD-LED] 1m extension cable to keypad [HD-CAB-1M]

2.3 Dimension and Installation

The dimension of MONT20 and mounting size is shown as below, the unit is mm.
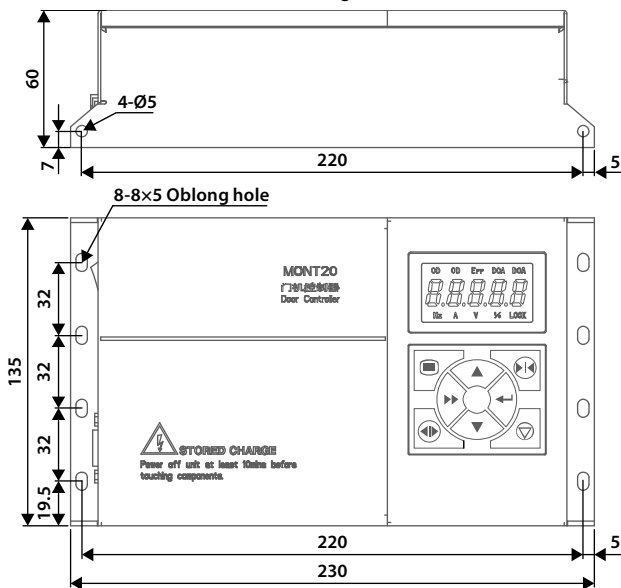
Note:

Do not install if MONT20 is incomplete or impaired upon unpacking.

2.4 Installation Site Requirement

Ensure the Installation Site Meets the Following Requirements:

- Do not install in a place exposed to direct sunlight, humidity, or water droplets;
- Do not install in flammable, explosive, corrosive gas and liquid places;
- Do not install in places with oily dust, fiber and metal powder;
- Be vertical installed on fire-retardant material with a strong support;
- Make sure adequate cooling space for MONT20 to keep ambient temperature between -10 - +40℃;
- 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 place where the humidity is less than 95%RH and there is no condensation;
- Controller meets IP20 and pollution level 2 (dry, none conducting dust pollution).

Note:

1. It needs derating use if running temperature exceeds 40℃. The MONT20 needs to be derated by 2% for every 1℃ increase. Max. allowed environment temperature is 50℃.

2. Keep ambient temperature between -10 - +40℃. It can improve the running performance if install at location with good ventilation or cooling devices.

Chapter 3 Electrical Installation

3.1 Precautions

Danger

- Only qualified electrical engineer can perform wiring job.
- To facilitate the input side over-current protection and outage maintenance, connect MONT20 with supply via the MCCB or fuse.
- Do not do wiring until the power of MONT20 is cut off for more than 10 minutes.
- Check the wiring carefully before connecting emergency stop or safety circuit.
- There is more than 3mA leakage current in MONT20 grounding, depending on the operating conditions. To ensure safety, MONT20 and the motor must connect to separate and independent grounding wire, so as to ground reliably. It must use type B mode when utilize ground leakage protection devices (ELCB/RCD).
- Do not touch the wire terminals of MONT20 when it is charged. The main circuit terminals are neither allowed connected to the enclosure nor short-circuiting.
- The bare portions of the power cables must be bound with insulation tapes.

Warning

- Do not do dielectric strength test on MONT20.
- Connect the terminals firmly.
- Do not start or stop MONT20 by connect/disconnect the contactor.
- Do not connect the input power to U, V, W terminals of MONT20.
- Do not connect the phase-shifting capacitors to the output circuit.
- Be sure the AC input power supply voltage is the same as rated input current of MONT20.

3.2 Electrical Requirement

The recommended specifications of cables are shown as below table.

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

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

Ground Wiring

| |
|---|
| ⚠️
Danger |
| • Connect the ground terminal of MONT20 to ground reliably before power on. |

There is current leakage to ground in MONT20. The grounding terminals PE must be connected to ground properly and be as close to grounding point as possible. The grounding area should be as large as possible. The grounding resistance should be less than 10Ω.

Do not share the grounding wire with other devices (A). MONT20 can share grounding pole with other devices (C). It achieves the best effect if MONT20 and other devices use dedicated grounding poles (B).


A. Sharing grounding wire   **B. Dedicated grounding pole**   **C. Sharing grounding pole**
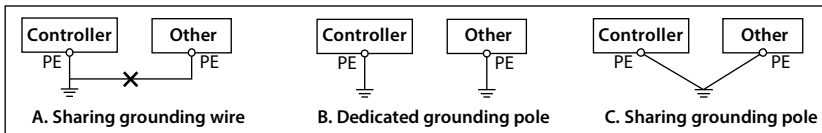
Cable Wiring

In order to avoid interference inter coupling, it is recommended to separate the power supply cables, motor cables and the control cables, and keep enough distance among them, especially when the cables are laid in parallel and are long enough.

The signal cables should cross the power supply cables or motor cables, keep it perpendicular (90°) as shown in the figure below.

Distribute the power supply cables, motor cables and control cables in different pipelines.
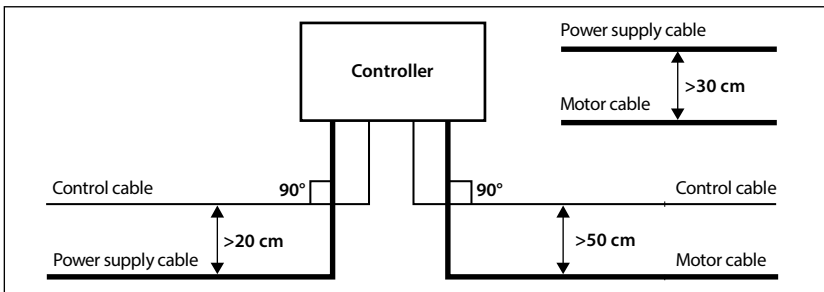
Power Supply Cable

<table>
<tr><td align="center">⚠
Warning</td></tr>
<tr><td>
• Do not connect the input power to U, V, W terminals of MONT20.

• Do not connect the phase-shifting capacitors to the output circuit.

• Be sure the AC input power supply voltage is the same as rated input current of MONT20.
</td></tr>
</table>

Refer to page 7 for the selection of power supply cable.

Motor Cable

Refer to page 7 for the selection of motor cable.

The longer motor cable is, the higher frequency leakage current will be, causing higher harmonic output current to increase. This may affect peripheral devices.

Control Cable

To reduce the interference and attenuation of control signal, length of control cable should be limited to 50m.

The control cable must be shielded cable. The analog signal cable must be shielded twisted pair.

Shielded cable should use high frequency low impedance shielded cable. For example: Copper net, aluminum net or iron net.

3.3 Interface Description

3.3.1 Power Switch

The power switch of MONT20 is designed to improve convenient debugging and maintenance of door motor, as shown below.


Power switch

MONT20

⚠️
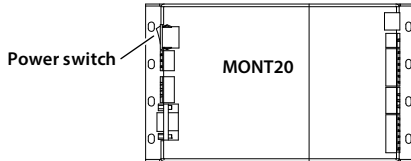
Danger

• When power switch of MONT20 is switched off, high voltage exists in input 220V terminal. It's strictly forbidden to touch connect or disconnect this terminal before external power supply is completely off. Otherwise electrical shock may occur.

3.3.2 Power Terminal

The power terminals are pictured at right.

Terminal	Description
L, N	Single phase AC 220V input
U, V, W	Output terminal of MONT20, connect to motor
PE	Ground terminal, connect to protective ground

Power terminal

| U	PE
V	L
W	N
PE	

MONT20
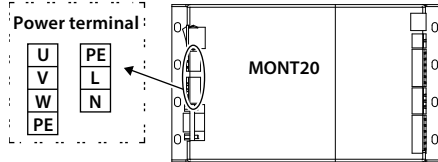
3.3.3 Control Terminal

Warning

- If the control circuit is connected to the external device with an accessible port during power on, pay attention to add an additional insulation protection isolation device to ensure that the original voltage level of the external device is not changed.
- If connect the communication terminal of the control circuit to the PC, choose RS485/232 isolating converter which meets the safety requirement.
- It is strictly forbidden to connect control terminals other than relay terminals to AC 220V voltage.
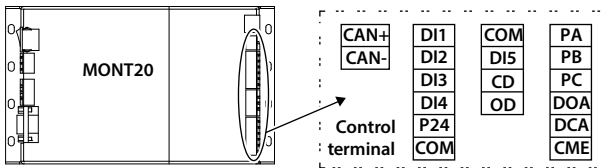

Terminal		Description
CAN+, CAN-	CAN input	CAN communication terminal port
DI1 - DI5	Digital input	Optical-cupler isolated input signal
OD	Open door command input	Connect to COM (ON): Command is valid
CD	Close door command input	Disconnect to COM (OFF): Command is invalid
P24	+24V power supply	• Use F06.03 - F06.07 to set DI1 - DI5 function
COM	Input reference ground	+24V power supply, Max. output current is 200mA
PA, PB, PC	Replay output	Contact rating: 125VAC/0.5A or 24VDC/1A • F06.01 set the function • F06.00 set low level or high level is valid • PA, PB: Normally closed; PA, PC: Normally open
DOA, CME	Complete OD relay	DOA, DCA: Normally closed; CME is isolated from COM
DCA, CME	Complete DC relay	• F06.00 sets low level or high level is valid

3.3.4 Connecting Encoder

DB9 of MONT20 is for connecting encoder.

Pin		Description
1	COM	Encoder power ground
2	A	A/B phase signal of encoder, there is 90° difference which is used to judge the rotary speed and direction
6	B	
3, 7	Z	Z phase signal of encoder, the falling edge is valid, used for positioning the datum point
5	Encoder power supply	+24V, Max. output current is 100mA, optional 12V
4, 8, 9		Reserved
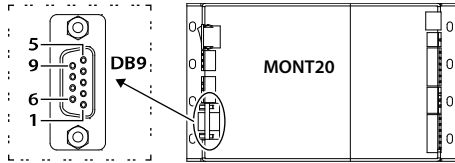
3.3.5 Set the Encoder Power Supply to 12V

The encoder power supply defaults to 24V and optionally 12V, and the operation is shown in the following table.

1.	Remove the cover and loosen the 4 screws on the left and right sides.
2.	Set jumpers. Short-circuited to pin 1, 2 of jumper J1 - J4.
3.	Install the cover.
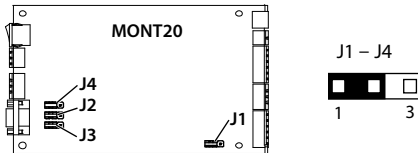
3.3.6 External Keypad

MONT20 can set and view the parameters through the external keypad of the keypad terminal. The connection is shown in the right figure. Refer to Chapter 4, on page 13 for more details.

The external keypad is HD-LED. If needed, please order goods.
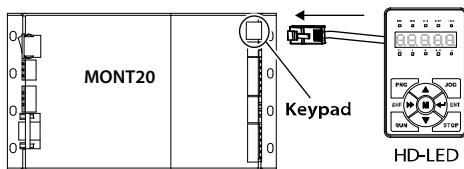
Chapter 4 Operation

4.1 Keypad Description

MONT20 is equipped with LCD keypad as standard, and HD-LED keypad is optional.

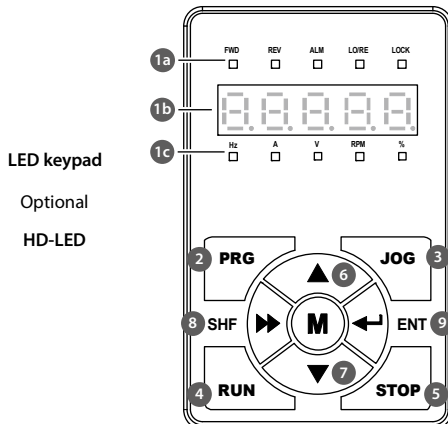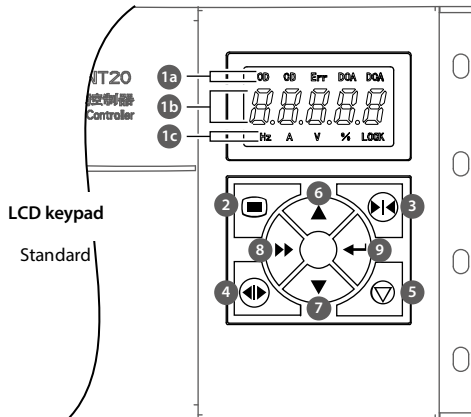The LCD keypad can't be dismantled. Connection of LED keypad is shown in section 3.3.5, on page 12.

LCD keypad

Standard

LED keypad

Optional

HD-LED

No.	Description
1	a, c. **Indicator**: Display the current status or unit.

LCD	LED	Name	Status
OD	FWD	Open door running status	On: MONT20 is in door open status Flashing: MONT20 is in stop status
CD	REV	Close door running status	On: MONT20 is in door close status Flashing: MONT20 is in stop status
Err	ALM	Warning status	On: MONT20 has fault
DOA	/	Complete OD status	On: MONT20 is complete door open status
/	LO/RE	Remote/local status	On: MONT20 is controlled by terminal Off: MONT20 is controlled by keypad
DCA	/	Complete CD status	On: MONT20 is complete door close status
/	RPM	Rotory speed unit	On: The unit is rpm
Hz	Hz	Frequency unit	On: The unit is Hz
A	A	Current unit	On: The unit is A
V	V	Voltage unit	On: The unit is V
%	%	Percentage unit	On: The unit is %
LOCK	LOCK	Password status	On: MONT20 has password

b. **Display area**: Display parameter in normal condition; Fault code will flash when fault occurs.

Display	Meaning	Display	Meaning	Display	Meaning	Display	Meaning
	0		A		J		U
	1		b		L		u
	2		C		n		y
	3		c		o		-
	4		d		P		Dot
	5		E		q		Full display
	6		F		r		No display
	7		H		S		Flash modifiable
	8		h		T		
	9		i		t		

No.			Description
2	▣	**PRG**	**Program/exit key:** Enter or exit key; Switch between programming status and monitoring status.
3	◉◀	**JOG**	**Close key:** CD command when controlled by keypad.
4	◀▣▶	**RUN**	**Open key:** OD command when controlled by keypad.
5	▽	**STOP**	**Stop/reset key:** Stop MONT20 by using keypad; Reset the fault when detecting a fault.
6	▲		**Increase key:** Increase parameter when selecting it; Increase value when setting parameter.
7	▼		**Decrease key:** Decrease parameter when selecting it; Decrease value when setting parameter.
8	▶▶		**Shift key:** When selecting parameter or setting parameter, shift to the next value.
9	◀┘		**Enter/confirm key:** Enter lower menu; Save the value when setting parameter.

4.2 Display on Keypad

Display of Stop or Run Parameter

When MONT20 is in stop or run status, the keypad displays stop or run status parameters, as shown on the right.

Press ▶▶ key to display stop status parameter cyclically:

d01.03 (setting frequency), d01.00 (door position pulse), d01.08 (bus voltage), d01.01 (door position percentage), d01.02 (fully open/close signal of door).

Press ▶▶ key to display the running status parameter cyclically:

d01.03 (setting frequency), d01.04 (output frequency), d01.05 (output voltage), d01.06 (output current), d01.07 (output torque), d01.00 (door position pulse).

OD CD Err **DOA** DCA
2 1.0 0
Hz   A   V   %   LOCK

Stop para. d01.03

OD CD Err **DOA** DCA
0 0.0 0
Hz   A   V   %   LOCK

Run para. d01.03

Fault Alarm Display

When MONT20 alarms fault, the keypad enters fault alarm display status and fault code flashes, as shown on the right.

Enter group F09 to check the fault records.

Reset the fault by pressing ▽ on the keypad (**STOP** key) or external reset terminal.

OD CD **Err** DOA DCA
E 0 0 2 3
Hz   A   V   %   LOCK
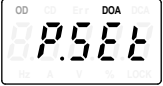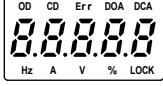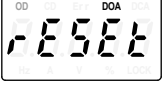
Refer to 7.1 Troubleshooting, on page 53 for fault display contents.
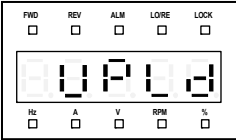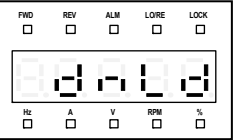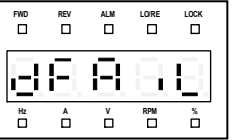
Special Display Status

The special display status is shown as following:

LCD display

P.uLoc	P.CLr	P.SEt
Unlock password success	Clear password success	Set password success
8.8.8.8.8	tunE	rESEt
Power on initialization	Parameter auto-tuning	Reset factory setting

LED display

UPLd	dnLd	dFAiL
Uploading parameters	Downloading parameters	Downloading fail

Parameter Editing Display

When MONT20 is in stop or run or fault status, press ▣ (**PRG** key) to enter parameter editing status (if password had been set, refer to F00.00 and section 4.4).

Using 4-level menu: **Mode setting (first-level)** → **function parameter group setting (second-level)** → **function parameter setting (third-level)** → **parameter setting (fourth-level)**. Take LCD keypad as an example:
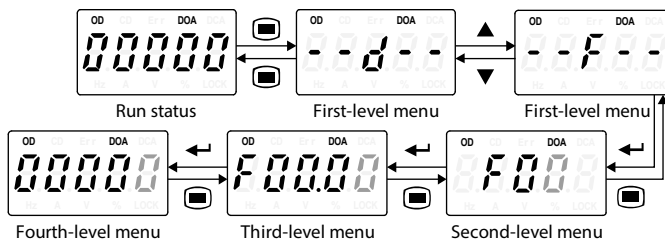
Key	First-level Menu	Second-level Menu	Third-level Menu	Fourth-level Menu
▣ PRG	Fault, return to fault display; Fault cleared, return to run or stop status display	Return to first-level menu	Return to second-level menu	Do not save the present value and return to third-level
↵	Enter second-level menu	Enter third-level menu	Enter fourth-level menu	Save the present value and return to third-level
▲	Select function group. Cycle according to d-F-y	Modify No. function. Increase by 1 when press this key one time	Modify the internal No. of function group. Increase by 1 according to the present modified bit	Modify function value. Increase by 1 according to the present modified bit
▼	Select function group. Cycle according to y-F-d	Modify No. function. Decrease by 1 when press this key one time	Modify the internal No. of function group. Decrease by 1 according to the present modified bit	Modify function value. Decrease by 1 according to the present modified bit
▶▶	Invalid	Invalid	Switch unit and ten	Switch unit, ten, thousand, ten thousand

When setting fourth-level menu, if the parameter is not flashing, it indicates that this parameter can't be modified. The possible reasons are as follows:

- The parameter can't be modified, such as actual detected parameters or recorded parameters etc.
- Only when the controller stops can the function parameter be modified.
- Only unlock password can the function parameter be edited due to the valid password.

4.3 Reset Default Parameter

Set F00.01 = 1 and restore F00 - F08 to default value, the display is showing as following:
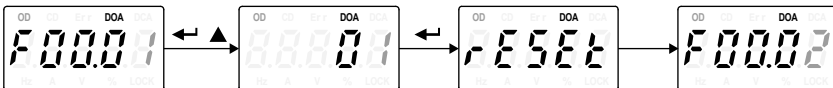
4.4 User's Password

Set F00.00 ≠ 0, if no key operation is detected within 5 minutes, the user password will take effect. The "LOCK" indicator of keypad will be lighting. Now user can check the parameter but not modify it.

Unlock User's Password

To modify parameter, unlock the password according to the following steps, take password = "00004" as an example.
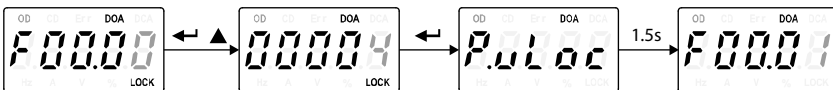
Modify User's Password

If password had not been set, set password as "02004", modify F00.00 according to following steps.

If password had been set, unlock it and then set new password according to following steps.
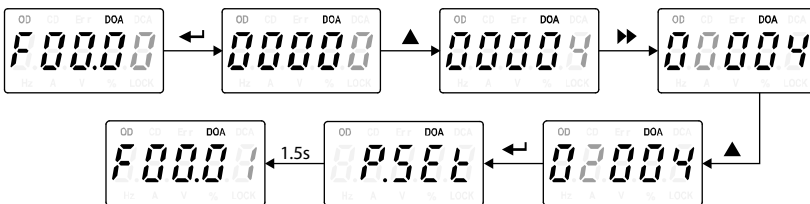
Clear User's Password

To clear the password, unlock it and clear according to following steps.
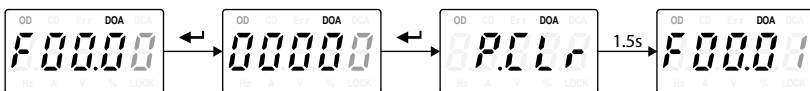
4.5 Upload and Download Parameter

Upload and download can only be done when using optional HD-LED keypad.

Upload

When F00.01 = 4, the keypad displays "UPLd" (as right figure). It will enter stop status automatically after uploading is finished.
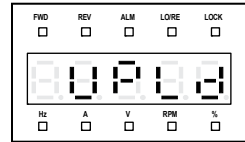
Download

When F00.01 = 5, the keypad displays "dnLd" (as right figure). It will enter stop status automatically after downloading is finished.
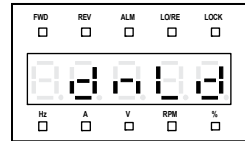
Uploading parameters

Note:

1. To download the parameter, firstly upload the parameter.

2. When downloading parameters, it displays "dFAiL", means that the storage parameters of keypad do not match with function parameters of MONT20. Firstly upload the correct parameters and then download.

3. When uploading or downloading parameters, it displays "E0022" and flashes, means EEPROM of keypad is faulty. It will jump to next function code 10 seconds later. The troubleshooting is in 7.1 Troubleshooting, on page 53.

Downloading parameters

Chapter 5 Function Introduction

5.1 Group d: Display Parameters

Group d is status display parameters.

5.1.1 d00: System Parameters

Ref. Code	Function Description	Setting Range [Default]
d00.00	Controller series	[T20]
	Display MONT20.	
d00.01	Controller rated power	[400W]
d00.02	Controller rated current	[2.5A]
d00.03	Controller software version	[Actual value]
d00.04	Controller special software version	[Actual value]
d00.05	External keypad software version	[Actual value]

5.1.2 d01: Drive Status Parameters

Ref. Code	Function Description	Setting Range [Default]
d01.00	Door position pulse	[Actual value]
	Display pulse status of current door position. The Max. pulse corresponds to complete door open position, and the Min. pulse corresppnds to complete door close position.	
d01.01	Door position percentage	[Actual value]
	Display the percentage of current front door position and the whole door width. 100.0% is complete door open position, and 0.0% is complete door close position.	
d01.02	Fully open/close signal of door	[Actual value]
	Display complete OD/CD signal. • Display by 4 digits (from right to left): Complete OD pulse, complete CD pulse, complete OD torque, complete CD torque. • 0: Not complete. • 1: Complete. • Take "0101" as an example in the right figure.	
d01.03	Set frequency	[Actual value]
d01.04	Output frequency	[Actual value]
d01.05	Output voltage	[Actual value]
d01.06	Output current	[Actual value]

Ref. Code	Function Description	Setting Range [Default]
d01.07	**Output torque**	**[Actual value]**
d01.08	**Bus voltage**	**[Actual value]**
d01.09	**Input terminal status 1**	**[Actual value]**

Display input terminal status. Each bit represents one terminal.
- 0: The corresponding terminal disconnects with common terminal;
- 1: The corresponding terminal connects with common terminal.

Ten thousand	Thousand	Hundred	Ten	Unit
DI5	DI4	DI3	DI2	DI1

Ref. Code	Function Description	Setting Range [Default]
d01.10	**Input terminal status 2**	**[Actual value]**

Display input terminal status. Each bit represents one terminal.
- 0: The corresponding terminal disconnects with common terminal;
- 1: The corresponding terminal connects with common terminal.

Ten	Unit
CD	OD

Ref. Code	Function Description	Setting Range [Default]
d01.11	**Output terminal status**	**[Actual value]**

Display output terminal status. Each bit represents one terminal.
- 0: The corresponding terminal disconnects with common terminal;
- 1: The corresponding terminal connects with common terminal.

Hundred	Ten	Unit
PA	DCA	DOA

Ref. Code	Function Description	Setting Range [Default]
d01.12	**Factory debug parameter**	
d01.13	**Z signal pulse**	**[Actual value]**
d01.14	**Z signal correction pulse deviation**	**[Actual value]**
d01.15	**Z signal correction error times**	**[Actual value]**
d01.16	**Z signal Max. correction deviation**	**[Actual value]**
d01.17	**Encoder counter**	**[Actual value]**
d01.18 - d01.29	**Factory debug parameter**	
d01.30	**U phase zero offset**	**[Actual value]**
d01.31	**V phase zero offset**	**[Actual value]**
d01.32	**W phase zero offset**	**[Actual value]**
d01.33 - d03.39	**Factory debug parameter**	

5.2 Group F: General Function Parameter

5.2.1 F00: Basic Parameters

Ref. Code	Function Description	Setting Range [Default]
F00.00	**User's password**	**00000 - 65535 [00000]**
	XXXXX: After setting the user password (non-zero), the password protection function takes effect. At this time, only the function parameters can be viewed through the keypad. • To change the parameters, input correct password. 00000: Invalid password. If user unlocks the password, it means clearing the user's password. **Setting password:** Once the password is set, and no key operation is detected within 5 minutes, the user's password will be valid.	
F00.01	**Parameter batch selection**	**00 - 30 [00]**
	0: Invalid, set parameters manually. 1: Restore to default parameter. F00 - F08 are restored to default. 2: Clear fault information. Clear F09.00 - F09.12 fault information. 3: Unused. 4: Upload parameter to external keypad (F00 - F08). 5: Download parameter from external keypad to MONT20 (F00 - F08). 6: Restore customer customized parameter of Syn. motor. 7: Restore customer customized parameter 2 of Syn. motor. 8, 9: Unused. 10: Restore customized speed control parameter of customer Asyn. motor. 11: Restore customized speed control parameter 2 of customer Asyn. motor. 12 - 30: Unused.	
F00.02	**OD/CD mode selection**	**0, 1 [0]**
	0: Speed control (with 4 switches). 1: Distance control (with encoder).	

Ref. Code	Function Description	Setting Range [Default]
F00.03	**Run command selection**	**0 - 4 [0]**
	0: Keypad (manual).	
	• Run and stop are controlled by keypad. Press ⊕ (**RUN** key) to open the door and press ⊕ (**JOG** key) to close the door. Press ⊘ (**STOP** key) to stop.	
	1: Terminal (automatic).	
	• MONT20 opens/closes the door by OD/CD command of control system.	
	• Adjust the OD/CD curve to the optimum, and set F00.03 = 1, MONT20 integrates into elevator system and executes the OD/CD command that given by the elevator controller.	

Open door command (OD terminal) priority Unit of F06.12 = 0 (default)			Close door command (CD terminal) priority Unit of F06.12 = 1		
OD	**CD**	**Command**	**OD**	**CD**	**Command**
0	0	Stop	0	0	Stop
0	1	Close	0	1	Close
1	0	Open	1	0	Open
1	1	Open	1	1	Close

	2: Demo loop running. Without controlled by the system, the automatic demo mode is used to demonstrate door motor and trial operation in factory.	
	• In keypad control mode (F00.03 = 0), demo running will start automatically after adjusting the running curve of door motor.	
	• Group F08 can set the intervals and times of OD/CD demo. Press ⊘ (**STOP** key) to stop MONT20.	
	• Press ⊕ (**RUN** key)/ ⊕ (**JOG** key) or connect external terminals OD/CD with COM to start demo running. Press ⊘ (**STOP** key) to stop demo running.	
	3: Factory debugging mode. Special function of door motor is invalid.	
	4: CAN communication.	
F00.04	**Max. output frequency**	**1.00 - 99.99 [50.00Hz]**
	Define Max. output frequency of MONT20.	
F00.05	**Running curve selection**	**0, 1 [0]**
	0: Line.	
	1: S curve.	
F00.06	**Control selection**	**0 - 3 [3]**
	0: Asyn. motor open-loop vector control.	
	1: Asyn. motor closed loop vector control.	
	2: Syn. motor closed loop vector control.	
	3: Asyn. motor flux vector control.	

5.2.2 F01: Motor Parameters

Ref. Code	Function Description	Setting Range [Default]
F01.00	**Motor rated power**	**1 - 750 [250W]**
F01.01	**Motor rated voltage**	**1 - 300 [220V]**
F01.02	**Motor rated current**	**0.10 - 2.50 [0.55A]**
F01.03	**Motor rated frequency**	**1.00 - 99.99 [50.00Hz]**
F01.04	**Motor rated Rpm**	**1 - 6000 [900rpm]**
	In order to ensure the control performance, the motor should match the power level of MONT20.	
F01.05	**Reduction ratio**	**1.00 - 9.99 [1.00]**
	Generally, F01.05 = 1.00. If the encoder is not installed on the motor axis, user should set F01.05 according to actual condition. • F01.05 is valid only for Asyn. motor closed loop vector control (F00.06 = 1).	
F01.06	**Motor parameter auto-tuning**	**0, 1 [0]**

	0: No action.
	1: Motor parameter auto-tuning.
	  • Set F00.03 = 0, and correctly set motor nameplate parameter (F01.00 - F01.04).
	  • Set F01.06 = 1, and press (**RUN** key) to start motor parameter auto-tuning. Press (**STOP** key) to stop auto-tuning; When auto-tuning is finished, F01.06 restores to 0 automatically.
	  • When Syn. motor is auto-tuning, the motor will recognise the pole angle and direction of encoder. When Asyn. motor is auto-tuning, the belt pulley must be taken off.
	  • Refer to section 6.1, on page 41 for details about motor parameter auto-tuning.	

F01.07	**No load current**	**0.01 - 2.50 [0.36A]**
	Only valid for Asyn. motor, i.e, when F00.06 = 0 (Asyn. motor open-loop vector control) or 1 (Asyn. motor closed loop vector control).	
F01.08	**Magnetic pole position angle**	**0.0 - 359.9 [0.0]**
	Only valid for Syn. motor, i.e, when F00.06 = 2 (Syn. motor closed loop vector control).	
F01.09	**Stator resistance**	**0.00 - 99.99Ω [Depend on MONT20]**
F01.10	**Rotor resistance**	**0.00 - 99.99Ω [Depend on MONT20]**
F01.11	**Stator inductance**	**0 - 9999mH [Depend on MONT20]**
F01.12	**Rotor inductance**	**0 - 9999mH [Depend on MONT20]**
F01.13	**Mutual inductance**	**0 - 9999mH [Depend on MONT20]**
F01.14	**Slip compensation gain**	**50.0 - 200.0 [100.0%]**

5.2.3 F02: Encoder Door Width Parameter

Ref. Code	Function Description	Setting Range [Default]
F02.00	**Pulse per rpm of encoder**	**0 - 9999 [1024]**
F02.01	**Encoder direction setting**	**0, 1 [1]**
	0: Same direction. 1: Opposite direction.	
F02.02	**Slow running speed setting**	**0.01 - 15.00 [7.00Hz]**
	When the low speed signal (No.6 function) set by DI is valid and receiving OD/CD command, door motor runs at F02.02.	
F02.03	**Initial running speed after power on**	**0.01 - 15.00 [7.00Hz]**
	Define the initial running speed of door motor after power on. • Since the door motor does not know the actual position of the door when it is powered on for the first time, when it receives a running command, it runs at F02.03 for positioning.	
F02.04	**Door width self-learning speed**	**0.01 - 15.00 [4.00Hz]**
	Define the running speed when door motor is self-learning the door width. • To reduce deviation of door width when self-learning, the speed of self-learning should not be too high, otherwise complete door open/close will cause the door bumping.	
F02.05	**Door width self-learning enable**	**0 - 2 [0]**
	0: Invalid. 1: Door width self-learning mode 1 is valid. 2: Door width self-learning mode 2 is valid. • Refer to section 6.2.2, on page 44 for details about door width self-learning. • Set F00.03 = 0, F02.05 = 1, press ⊕ (**RUN** key) or ⊕ (**JOG** key) to start door width self-learning. Press ⊘ (**STOP** key) to stop self-learning. When self-learning is finished, F02.05 restores to 0 automatically. • Set F00.03 = 0, F02.05 = 2, press ⊕ (**RUN** key) or ⊕ (**JOG** key) to start the door width self-learning and door vane self-learning, press ⊘ (**STOP** key) to stop self-learning; After self-learning, F02.05 automatically restores to 0 (this method requires a hall door).	
F02.06	**Low bit of door width**	**0 - 9999 [780]**
F02.07	**High bit of door width**	**0 - 9999 [0]**
	The low bit of door width pulse number (lower than ten thousand) gained by self-learning is saved to F02.06, high bit (higher than ten thousand) is saved to F02.07. • Door width calculating: Door width = F02.07 × 10000 + F02.06. • Keypad can modify the door width pulse number gained by self-learning.	
F02.08	**CD limit open/close position pulse**	**0 - 9999 [0]**
	When DI terminal has close door limit open/close (No.4 or No.14 function), and hundreds of F06.12 = 1, door motor will learn the CD limit position pulse during door width self-learning. The data will be saved automatically after learning is finished. In normal runnning, this signal corrects the position of door motor.	

5.2.4 F03: OD Curve Parameter

Refer to 6.2.4 Distance Control OD Running, on page 46 for details.

Ref. Code	Function Description	Setting Range [Default]
F03.00	**OD start distance/OD start time**	**0 - 9999 [1000]**
	At distance control: Start distance (unit: pulse number). At speed control: Start time (unit: ms).	
F03.01	**OD start speed**	**0.00 - 15.00 [3.50Hz]**
F03.02	**OD Acc. time**	**0.1 - 99.9 [1.3s]**
	Define the Acc. time from zero frequency to Max. frequency during OD process.	
F03.03	**OD speed**	**0.00 - F00.04 [20.00Hz]**
	Define the high running speed (frequency) during OD process.	
F03.04	**OD Dec. point position**	**50.0 - 90.0 [65.0% door width]**
	When pulse number ≥ F03.04 × door width, door motor decelerates from F03.03 (OD speed) to F03.06 (creeping speed at OD ending). • The bigger F03.04 is set, the shorter F03.04 is to complete door open.	
F03.05	**OD Dec. time**	**0.1 - 99.9 [1.4s]**
	Define the Dec. time from Max. frequency (F00.07) to zero frequency.	
F03.06	**Creeping speed at OD ending**	**0.00 - 15.00 [3.00Hz]**
	Define the low creeping speed (frequency) of door motor during OD process.	
F03.07	**OD limit point position**	**80.0 - 99.9 [95.0% door width]**
	When door position pulse > F03.07 × door width, door motor outputs complete OD signal.	
F03.08	**High-speed area of re-opening curve**	**10.0 - 90.0 [90.0% door width]**
	F03.08 defines high-speed area of re-opening curve at re-opening. • May improve the re-opening efficiency. **Example:** F03.08 = 70.0% and 100 - 70 = 30, it means that when the door position is within the range of 0 - 30%, it will automatically accelerate to high speed when the door is re-opened; When the door position is within the range of 30 - 100%, the operating curve will be automatically converted according to the current position when the door is re-opened.	

5.2.5 F04: CD Curve Parameters

Refer to 6.2.5 Distance Control CD Running, on page 47 for details.

Ref. Code	Function Description	Setting Range [Default]
F04.00	**CD start distance/CD start time**	**0 - 9999 [0]**
	At distance control: Start distance (unit: pulse number).	
	At speed control: Start time (unit: ms).	
F04.01	**CD start speed**	**0.00 - 15.00 [4.00Hz]**
F04.02	**CD Acc. time**	**0.1 - 99.9 [1.4s]**
	Define the Acc. time from zero frequency to Max. frequency during CD process.	
F04.03	**CD speed**	**0.00 - F00.07 [18.00Hz]**
	Define the high running speed (frequency) during CD process.	
F04.04	**CD Dec. point position**	**50.0 - 90.0 (door width) [62.0%]**
	When pulse number ≥ (1 - F04.04) × door width, door motor will decelerate from F04.03 (CD speed) to F04.06 (creeping speed at CD ending).	
	• The bigger F04.04 is set, the shorter F04.04 is to complete door close.	
F04.05	**CD Dec. time**	**0.1 - 99.9 [1.3s]**
	Defines the Dec. time from Max. frequency to zero frequency.	
F04.06	**Creeping speed at CD ending**	**0.00 - 15.00 [3.00Hz]**
	Define the low creeping speed (frequency) of door motor during CD process.	
F04.07	**Door vane acting position at CD ending/running time at CD ending creeping speed**	**1 - 5000 [0]**
	Distance control: Starting distacnce (unit: pulse number).	
	• When pulse number ≤ F04.07, the related process of executing CD ending door vane action.	
	Speed control: Running time at CD ending creeping speed (unit: ms).	
F04.08	**Door vane action speed at CD ending**	**0.00 - 15.00 [0.00Hz]**
	Define the door motor running speed (frequency) of door vane action position within range of F04.07 during CD process.	
F04.09	**CD limit point position**	**1 - 500 [60]**
	When the door position is within the CD limit point, door motor will output fully close signal of door.	
F04.10	**CD ending speed of Asyn.**	**0.00 - 5.00 [0.00Hz]**
F04.11	**CD ending range of Asyn. door vane CD/running time of CD ending Asyn. door vane action speed**	**0 - 5000 [0]**
	Distance control: Starting distance (unit: pulse number).	
	• When pulse number ≤ F04.11 setting pulse number, CD ending door vane action will be processed.	
	Speed control: Running time of CD ending Asyn. door vane action speed (unit: ms).	

5.2.6 F05: Torque Parameters

Ref. Code	Function Description	Setting Range [Default]
F05.00	**OD switching torque**	**20.0 - F07.07 [50.0%]**
	In OD process of door motor, if the running pulse counts to F03.07 × door width, door motor continues creeping run at low speed of CD ending. When reaching the limit position, door motor will be locked-rotor. When locked-rotor torque ≥ F05.00 × motor rated torque, switch to complete OD torque holding status until door motor runs in opposite direction or stops.	
F05.01	**OD holding torque**	**30.0 - F07.07 [45.0%]**
	In OD running of door motor, the OD limit is valid. And when locked-rotor torque ≥ F05.00 × motor rated torque, door motor keeps holding torque (F05.01 × motor rated torque) at the complete OD position.	
F05.02	**Final holding torque at complete OD**	**0.0 - F07.07 [35.0%]**
F05.03	**Switching time from OD holding torque to final holding torque**	**0.1 - 999.9 [30.0s]**
	Define the torque holding status in door motor OD phase. • Torque holding status: OD holding torque (F05.01) waits until switching time (F05.03) is finished, and reaches final holding torque (F05.02).	
F05.04	**CD switching torque**	**20.0 - F07.07 [50.0%]**
F05.05	**CD holding torque**	**30.0 - F07.07 [45.0%]**
F05.06	**Final holding torque of complete CD**	**0.0 - F07.07 [35.0%]**
F05.07	**Switching time from CD holding torque to final holding torque**	**0.1 - 999.9 [60.0s]**
	F05.04 - F05.07 is the CD torque, similar to the OD torque, refer to F05.00 - F05.03.	
F05.08	**Torque setting at low speed CD resistance**	**0.0 - F07.07 [80.0%]**
F05.09	**Time at low speed CD resistance**	**0 - 4999 [1000ms]**
F05.10	**Torque setting at high speed CD resistance**	**0.0 - F07.07 [80.0%]**
F05.11	**Time of high speed CD resistance**	**0 - 4999 [1000ms]**
F05.12	**Low speed setting at CD resistance**	**0.00 - F00.07 [5.00Hz]**
F05.13	**High speed setting at CD resistance**	**5.00 - F00.07 [15.00Hz]**
	The setted value of F05.08/F05.10 is relative to the motor rated torque. The smaller the value, the smaller the resistance that the door can withstand. • During CD process, door motor outputs fully close signal of door and will not detect the CD resistance. • When CD is resisted, door motor decelerates according to resistance Dec. time (F06.10), and opens door when the speed is zero. The CD resistance of door motor is shown as below:	

Ref. Code	Function Description	Setting Range [Default]
F05.14	Switching torque of low speed OD/CD	30.0 - F07.07 [70.0%]
	Define the torque switching value between door width self-learning and torque at initial power on. The setted value is percentage of motor rated torque.	
F05.15	Torque at OD resistance	0.0 - F07.07 [100.0%]
F05.16	Time at OD resistance	0 - 4999 [1600ms]
	F05.15 corresponds to motor rated torque. The smaller value is, the smaller resistance. • When F05.15 = 0, it's invalid. • During OD process, door motor outputs fully open signal of door and will not detect OD resistance. • When OD is resisted, door motor stops responding to OD command. It will respond until time of F05.16 is finished. • When OD is resisted, if there is CD command, door motor responds to it and closes the door.	
F05.17	Stop time at OD resistance	0 - 9999 [3000ms]
	Defines that after the door opening is resisted, the time of F05.17 can re-respond to the door opening signal. • When F05.17 = 9999ms, the door motor does not respond to the door open command. Only after responding to the door closing command, it will respond to the door open command again.	

5.2.7 F06: Boost Parameters

Ref. Code	Function Description	Setting Range [Default]
F06.00	DOA, DCA, PA output pole selection	0, 1 [1]
	0: The signal connects which represents fully OD/CD and door position output (equal to the relay normally closed contact). 1: The signal disconnects which represents fully OD/CD and door position output (equal to the relay normally open contact).	
F06.01	PA function selection	0 - 19 [0]
	0: Door position output. 1: Re-opening signal outputs at CD resistance. • Set F06.01 = 1, the re-opening signal is valid. When the CD resistance signal is valid, the re-opening signal starts to output. When fully re-open, the re-opening signal will stop output. 2: Complete OD. 3: Complete CD. 4: Fault output. 5: Running (normally open).	6: Door vane solenoid valve output (normally open). 7 - 9: Unused. 10: Door position output (normally closed). 11: Closed door resistance re-opening door signal output (normally closed). 12: Complete OD (normally closed). 13: Complete CD (normally closed). 14: Fault output (normally closed). 15: Running (normally closed).

Ref. Code	Function Description	Setting Range [Default]

	16: Door vane solenoid valve output (normally closed).
	  • Door vane solenoid function (No.6 or No.16) is used to control the door vane solenoid valve to open.
	  • Fit with F10.00 (electromagnetic valve vane opening delay time) F10.01 (electromagnetic valve vane closing delay time).
	  • When the door open command is given, the control relay opens the door vane solenoid valve and maintains zero speed operation within F10.00. After this time delay, it runs according to the normal curve.
		• When the door closing command is given, the door is closed to the door closing position and the zero speed operation is maintained, after F10.01, the control relay closes the door vane solenoid valve to close.
		17 - 19: Unused.

F06.02	Input terminal filter time	2 - 300 [10ms]
	Set the sensitivity of DI input terminal. If the DI terminal is interfered and leads to unexpected action, increase value of F06.02 to improve the immunity from interferance, but that will reduce the sensitivity of DI.	
F06.03	DI1 funtion selection	0 - 22 [11]
F06.04	DI2 funtion selection	0 - 22 [12]
F06.05	DI3 funtion selection	0 - 22 [13]
F06.06	DI4 funtion selection	0 - 22 [14]
F06.07	DI5 funtion selection	0 - 22 [0]
	0: No funtion. 1: OD speed switching NO (normally open) input. 2: OD limit NO input. 3: CD speed switching NO input. 4: CD limit NO input. 5: Light curttain, contact board NO input. 6: Low speed signal (SS). 7: OD command (OD). 8: CD command (CD). 9: Fault reset (RST). 10: Motor overheating normally open input.	11: OD speed switching NC (normally closed) input. 12: OD limit NC input. 13: CD speed switching NC input. 14: CD limit NC input. 15: Light curtain, touch board NC input. 20: Motor overheating NC input. 21: The door lock signal is normally open. 22: The door lock signal is normally closed. • When the No. 21, 22 function is selected, the door motor in-position signal output must be output after the door lock signal is closed.
F06.08	DC resistance Aux. detection time	0 - 4999 [0ms]

	If pulse does not change within the time of F06.08, DC is resisted.
	• Below conditions should be met:
	  • 1. F00.02 = 1 (distance control);
	  • 2. F00.06 = 0 (Asyn. motor open-loop vector control) or F00.06 = 3 (Asyn. motor flux vector control).
	• F06.08 < 1000ms, do not detect DC resistance.
	• There is no relationship between DC resistance detection and DC torque resistance (F05).	

Ref. Code	Function Description	Setting Range [Default]
F06.09	**Percentage of door position output**	**0.1 - 99.9 [90.0%]**
	When door position > F06.09, the door position output signal (PA) is valid. • Only valid when F06.01 = 0 (door position output).	
F06.10	**Resistance Dec. time**	**0.1 - 2.0 [0.5s]**
	Define the time when CD resistance occurs, the current CD speed will decelerate to zero speed. • If F06.10 is too small, the door will shake violently at Dec. process. If F06.10 is too big, the Dec. of door will be too slow.	
F06.11	**Action selection of door motor when revoke run command**	**0 - 2 [2]**
	0: The torque is maintained during complete OD/CD, and runs at zero speed in other positions. 1: Stop running. 2: Only maintain the torque during complete OD/CD.	
F06.12	**Auxiliary parameter 1**	**00000 - 11111 [00000]**
	Ten thousand: Detect CD resistance 1/3 distance from CD acts • 0: Detect CD resistance. • 1: Not detect CD resistance. **Thousand: Function of stop key in terminal control** • 0: Invalid. • 1: Valid. During running, continuously press ⊘ (**STOP** key), the system stops, and "STOP" will display on LCD. Press ⊘ (**STOP** key) again, the system returns to normal. **Hundred: CD limit switching mode** • 0: Do not learn the CD limit position during door width self-learning. • 1: Learn the CD limit potision during door width self-learning. When this signal is valid, the system can reset to current position automatically.	 **Ten: Demo mode enable** • 0: Enable manually. • 1: Enable automatically. **Unit: OD/CD priority selection** • 0: OD priority. • 1: CD priority.
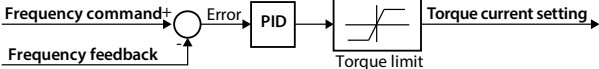
Ref. Code	Function Description	Setting Range [Default]
F06.13	**Auxiliary parameter 2**	**00000 - 11111 [00001]**
	Ten thousand: Abnormal shutdown protection is opened	
	• 0: Open.	
	• In the process of closing the motor, if the complete CD signal has not been output before, then when the total number of blocked CD is more than 20 times and the complete CD signal is not detected, it will alarms E0012 (abnormal closing fault).	
	• The motor stops for 20 minutes after the fault and the fault is automatically reset.	
	• 1: Not open.	
	Thousand: Current slope rise **Ten: Over-current auto reset enable**	
	• 0: Start current direct setting. • 0: Not enable.	
	• 1: Start current slope rise. 1: Enable.	
	Hundred: Speed loop amplification **Unit: Over-vloatge auto reset enable**	
	• 0: KP is original value. • 0: Not enable.	
	1: KP amplify by 4 times. • 1: Enable.	
F06.14	**On board LCD brightness adjustment**	**0 - 100 [70%]**
	0%: Darkest.	
	100%: Brightest.	
F06.15	**Carrier frequency**	**4 - 16 [8k]**
F06.16	**Running speed when prising door for Asyn. motor open-loop**	**2.50 - 15.00 [4.00Hz]**
F06.17	**CD time protection**	**0 - 30 [0s]**
	When setting time ≤ 2s, do not protect CD.	
	When setting time > 2s, time counts from the minute giving CD command. If complete CD signal is not received during this process, it will re-open the door.	
F06.18	**Flux vector voltage compensation**	**0 - 40 [10%]**
F06.19	**Flux vector complete CD holding frequency**	**0.01 - 5.00 [1.00Hz]**
F06.20	**Flux vector complete OD holding frequency**	**0.01 - 5.00 [1.00Hz]**
F06.21	**Delay switching time of flux vector speed switching to torque**	**100 - 3999 [2500ms]**
F06.22	**Frequency range of flux vector no detection OD/CD resistance**	**0.10 - 15.00 [7.00Hz]**
F06.23	**Flux vector OD voltage compensation**	**0 - 8 [0%]**
	When closing, flux vector voltage compensation = F06.18.	
	When opening, flux vector voltage compensation = F06.18 + F06.23.	
F06.24	**Cut-off point of flux vector voltage compensation frequency**	**10.00 - 50.00 [50.00]**

Ref. Code	Function Description	Setting Range [Default]
F06.25	**Auxilliary parameter 3**	**00000 - 11111 [00000]**

	Unit: OD signal keeping when first time power up under distance control
	• 0: Do not keep.
	• 1: Keep. When first time power up under distance control and DO command keeps for more than 2.5s, if DO command is cancelled and not received complete OD signal, door motor will keep open. It will not close until fully OD signal outputs.
	Ten: Address setting under CAN control
	• 0: Front door.
	• 1: Rear door.
	Hundred: Electric angle search for permanent magnet Syn. motor (PMSM)
	• 0: Current method.
	• 1: Pulse method.
	Thousand: Motor overload protection shield
	• 0: No shield.
	• 1: Shield.
	Ten thousand: OD abnormal shutdown protection open
	• 0: Open.
	  • During the opening process of the motor, if it detects that the door is blocked for more than 10 times in total, and the complete OD signal is not detected, it will alarm E0010 (OD abnormal fault).
	  • After the fault, the motor stops for 20 minutes and the fault is automatically reset.
	• 1: Not open.	

5.2.8 F07: Vector Control Parameter

Ref. Code	Function Description	Setting Range [Default]
F07.00	High speed ASR KP	10 - 3000 [500]
F07.01	High speed ASR KI	0 - 1000 [100]
F07.02	Low speed ASR KP	10 - 3000 [500]
F07.03	Low speed ASR KI	0 - 1000 [100]
F07.04	ASR switching frequency	0.00 - F00.04 [8.00Hz]
	F07.00 - F07.04 sets PID parameter of ASR. The structure of ASR is shown as below: • The system response can be expedited by increasing F07.00, F07.02 (KP), but oscillation may occur if KP is too high. • The system response can be expedited by increasing F07.01, F07.03 (KI), but oscillation and high overshoot happen easily if the KI is too high. • If KI = 0, the speed loop works merely as a propotional regulator. • Generally, adjust KP first to increase KP as much as possible under the premise that the system does not oscillate, and then adjust KI to make the system have fast response characteristics and little overshoot. • To improve the dynamic response characteristics in low frequency running, it is necessary to increase KP and reduce KI.	
F07.05	Current loop KP	10 - 9999 [100]
F07.06	Current loop KI	0 - 9999 [100]
	F07.05 and F07.06 define the PI regulator parameter of current loop. • Increasing the current loop KP or KI can speed up the system's dynamic response to the output torque; Reducing KP or KI can enhance the stability of the system. • If the current loop KP or KI is too large, the system is prone to oscillation; If KP or KI is too small, the system torque output capacity will be affected. *Note: For most occations, there is no need to adjust the PI parameters of the current loop. It is recommended that users change this group of parameters carefully.*	
F07.07	Torque limit	0.0 - 200.0 [120.0%]
	Define the torque current output by MONT20. The setted value is relative to the percentage of motor rated current (F01.02).	
F07.08	Speed filter time constant	0 - 7 [2]
	It is used to filter the output of ASR regulator. • F07.08 = 0, the speed-loop filter is disabled.	

5.2.9 F08: Demo Running Parameter

Ref. Code	Function Description	Setting Range [Default]
F08.00	Demonstrate the retention time of running complete OD	1.0 - 999.9 [2.0s]
F08.01	Demonstrate the retention time of running complete CD	1.0 - 999.9 [2.0s]
F08.02	Demonstrate the running times records	0 - 65535 [0]
F08.03	Demonstrate the nominated running times	0 - 65535 [0]
	Demonstrate the record of running times. F08.02 is saved at power off automatically. When completely re-power on, value of F08.02 adds one by each door opening. The demo mode is used in demonstrating and aging test. It starts by pressing ⊕ (**RUN** key) or ⊕ (**JOG** key) or receiving OD/CD command from external terminal. • After starting, the door motor opens/closes the door at low speed, after completely open/close, it opens/closes door according to running curve. • Time starts to count after completey door open. When time of F08.00 is finished, it runs in opposite CD automatically; After finishing door closing, the CD retention time reaches F08.01, and opens the door in forward direction. This process is repeated and not stop until pressing ⊘ (**STOP** key) or the running times > F08.03. Value of F08.02, F08.03 can be modified.	

5.2.10 F09: Fault Record Parameters

Ref. Code	Function Description	Setting Range [Default]
F09.00	NO.5 fault type	[Actual value]
F09.01	NO.4 fault type	
F09.02	NO.3 fault type	
F09.03	NO.2 fault type	
F09.04	NO.1 fault type	
	-Lu-: DC bus under-voltage. E0001: MONT20 over-voltage. E0002: Hardware of MONT20 is over-current. E0003: Software of MONT20 is over-current. E0004: Encoder Z signal of PMSM is lost. E0006: Motor parameter auto tuning failed. E0007: MONT20 overloaded. E0008: Permanent magnet Syn. motor first current detection is too small. E0009: Motor overload fault. E0010: Abnormal opening fault.	E0011: Motor overheating fault. E0012: Abnormal closing fault. E0014: Read/write fault of MONT20 EEPROM. E0015: Speed deviation is too large. E0016: Overspeed fault. E0017: Module fault. E0018: Current detection circuit fault. E0022: Read/write fault of keypad EEPROM. E0023: Encoder fault. E0024: Wrong logic. E0026: Door width self-learning failed.
F09.05	Bus voltage at last fault	[Actual value]
F09.06	Output current at last fault	
F09.07	Running frequency at last fault	
F09.08	Setting frequency at last fault	
F09.09	Door position at last fault	
F09.10	Input terminal status 1 at last fault	
F09.11	Input terminal status 2 at last fault 2	
F09.12	Output terminal status at last fault	
F09.13	Low bit of OD/CD times record	
F09.14	High bit of OD/CD times record	
F09.15	Runnning hours record	
F09.16	Running days record	
F09.17	Controller software version	
F09.18	Keypad software version	

5.2.11 F10: Advanced Parameters

Ref. Code	Function Description	Setting Range [Default]
F10.00	Electromagnetic valve door vane opening delay time	0 - 9999 [0ms]
F10.01	Electromagnetic valve door vane closing delay time	0 - 9999 [0ms]
	F06.01 adds the function of No.6 and No.16, which used to control the door vane solenoid valve to open. This function is used together with F10.00 (electromagnetic valve door vane opening delay time) and F10.01 (electromagnetic valve door vane closing delay time). • When the OD command is given, the control relay opens the door vane solenoid valve and maintains zero speed running within F10.00. After this time delay, it runs according to the normal curve. • When the CD command is given, when the door is closed to the door closing position and the zero speed running is maintained, after the F10.01 time, the control relay closes the door vane solenoid valve to close.	
F10.02	OD creeping time	0.0 - 5.0 [0.7s]
F10.03	CD creeping time	0.0 - 5.0 [0.7s]
F10.04	Door vane distance	0 - 9999 [0 pulse]
	There are two ways to get it: • 1: The door width automatic learning with hall door (F02.05 is set to 2). • 2: The door vane distance can also be obtained by the group d through the monitoring pulse d01.00.	
F10.05	Automatical generation of switch door curve Dec. point	0, 1 [0]
	0: By parameter setting. 1: Automatic calculation by software.	
F10.06	Open the door to maintain torque automatically calculated	0, 1 [0]
	0: By parameter setting. 1: Automatic calculation by software. • When F10.06 = 1, the software automatically calculates the switch door Dec. point. • F10.02 and F10.03 can set the creeping time at the end of the switch door, and F10.04 is the actual door vane distance.	
F10.07	OD blocked	0, 1 [0]
	0: Door opening stop. 1: After being blocked, keep the door open, the multi-function output can output the blocked signal, and the elevator control system can freely choose to open or close the door according to the blocked signal. • When it is set to 1, after the door motor is blocked, the Max. output torque is 1.1 times the resistance torque of door opening.	
F10.08	CD blocked mode	0, 1 [0]
	0: Blocked and re-open the door. 1: After being blocked, keep the door close, the multi-function output can output the blocked signal, and the elevator control system can freely choose to open or close the door according to the blocked signal. • When it is set to 1, after the door motor is blocked, the Max. output torque is 1.1 times the resistance torque of door opening.	

Ref. Code	Function Description	Setting Range [Default]
F10.09	Internal star-delta relay working mode	0, 1 [1]
	0: Operate when it's faulty. 1: Operate when fault or stop.	
F10.10	Current zero offset parameter acquisition method	0 - 2 [0]
	0: Get automatically when powering-on. 1: Get by F10.11 - F10.13. 2: Store the zero offset value after power-on to F10.11 - F10.13, and use the value of F10.11 - F10.13 as the current bias. • When F10.10 = 2, it will automatically change to 1.	
F10.11	U phase zero offset setting	1700 - 2200 [1950]
F10.12	V phase zero offset setting	1700 - 2200 [1950]
F10.13	W phase zero offset setting	1700 - 2200 [1950]
F10.14	Door vane self-learning current judgment	0.01 - 0.50 [0.05A]
F10.15	Speed deviation protection range	5 - 50 [20%]
F10.16	Speed deviation protection detection time	0.0 - 2.0 [0.5s]
F10.17	Overspeed range setting	105 - 120 [110%]
F10.18	Overspeed detection time	0.0 - 2.0 [0.5s]
F10.19	Fermator Syn. motor	0, 1 [0]
	0: Normal Syn. door motor. 1: Fermator Syn. door motor. *Note: The control of the Fermator Syn. door motor requires the ordering of non-standard Mont20-FMT (changing non-standard hardware and software are customized products).*	
F10.20	Syn. motor Z signal detection	0, 1 [0]
	0: Fault detection is allowed. 1: Fault detection shielding.	
F10.21	Zt (zhete) Syn. motor	0, 1 [0]
	0: Normal Syn. door motor. 1: Zt (zhete) Syn. door motor. *Note: When it set to 1, the Syn. door motor Z signal is a special signal with duty cycle.*	

Ref. Code	Function Description	Setting Range [Default]
F10.22	**Auxiliary parameter 3**	**00000 - 11111 [0]**
	Unit: Slow signal command	**Hundred: Switch door command mode**
	• 0: Used with the OD/CD command.	• 0: Non-pulse triggered.
	• 1: The slow signal is separately turned off.	• 1: Pulse triggered.
	Note: When set it to 1 instead, as long as the slow signal is valid, a slow closing action is performed.	**Thousand: Pre-operation detection output phase loss**
	Ten: Power off function	• 0: Not detected.
	• 0: Does not work.	• 1: Detect.
	• 1: Works.	**Ten thousand: Complete OD output**
	Note: When set it to 1 instead, as long as the bus voltage is detected to be lower than 200V, the door motor performs a slow closing action.	• 0: The door open output is only related to the door position.
		• 1: The door command cancels the door open output signal.
F10.23	**Auxiliary parameter 4**	**00 - 11 [0]**
	Unit: Language selection	
	• 0: Chinese.	
	• 1: English.	
	Note: This parameter is used to externally operate the keypad MT70-LCD-D operation voice.	
	Ten: Keypad UP/DN start door width self-learning	
	• 0: Keypad UP/DN is allowed to start self-learning by 5s at the same time.	
	• 1: Keypad UP/DN is not allowed to start self-learning by 5s at the same time.	
F10.24 - F10.29 Factory debug parameters		

5.3 Group y: Manufacturer Parameters

Group y is manufacturer parameters group for debugging at the factory before delivery.

Chapter 6 Application Debugging

6.1 Motor Parameter Auto-tuning

MONT20 adopts high performance vector control technology to control the door motor. Before controlling the motor, start motor parameter auto-tuning to achieve correct motor parameter. That can ensure fine running efficiency.

Note:

*In motor parameter auto-tuning, press $\bigtriangledown$ (**STOP** key) on the keypad to reset if it shows fault.*

Asyn. Motor Auto-tuning

1.	Remove the belt to free of load.
2.	Set F00.03 = 0 (keypad control mode). Set F00.06 = 0 (open-loop distance control) or 1 (closed loop distance control) or 3 (flux vector control).
3.	Set F01.00 (rated power), F01.02 (rated current), F01.03 (rated frequency), F01.04 (rated RPM), F01.05 (reduction ratio) according to motor nameplate. F01.05 is not set when F00.06 = 3.
4.	Set F01.06 = 1 (motor parameter auto-tuning).
5.	Press (**RUN** key) or (**JOG** key) to start auto-tuning, the keypad will display "tunE". • During self-tuning, make sure the motor shaft rotates towards the door opening direction. • When auto-tuning is finished, check F01.06 restores to 0.
Note:	
1.	During self-tuning, motor shaft rotates towards the door opening direction. **Countermeasure**: User wait until auto-tuning is finished, then switch any two of U, V, W of MONT20.

Syn. Motor Auto-tuning

1.	Remove the belt to free from load.
	If the belt is not removed, please manually slide the door to close status.
2.	Confirm the encoder wiring is correct, check parameter:
	• d01.00: Monitor the encoder pulse.
	• d01.13: Z pulse signal, turn a circle with a Z pulse.
3.	Set F00.03 = 0 (keypad control mode).
	Set F00.06 = 2 (closed loop distance control).
4.	Set F01.00 (rated power), F01.02 (rated current), F01.03 (rated frequency) and F01.04 (rated rpm) according to motor nameplate.
5.	Set encoder parameter F02.00 (pulse per rpm of encoder) and F02.01 (encoder direction setting).
6.	Set F01.06 = 1 (motor parameter auto-tuning).
7.	Press ⊕ (**RUN** key) or ⊕ (**JOG** key) to start auto-tuning, the keypad will display "tunE".
	• When Syn. motor is auto-tuning, confirm the direction of the motor shaft or door.
	• Remove the belt: Confirm that the motor shaft rotates in the direction of opening the door.
	• Without removing the belt: Confirm that the door moves in the door opening direction, and the door automatically stops moving when the auto-tuning is over.
	• After finishing, check and record F01.08 (magnetic pole position angle).
8.	Repeat the auto-tuning (step 6 and 7), and record F01.08, compare with the last record of F01.08, the difference should be less than 5°. Otherwise, user need to find the cause and repeat the auto-tuning.
Note:	
1.	During auto-tuning when the belt is removed, the motor shaft rotates in the closing direction.
	Countermeasure: When auto-tuning is finished, exchange any two phases that connect MONT20 and the motor.
2.	Auto-tuning without removing the belt, the door cannot open and alarm encoder fault.
	Countermeasure: Stop MONT20, and switch any two phases of U, V, W of MONT20, and restart auto-tuning.

6.2 Distance Control

Use encoder to measure door position.

Main Debugging Steps

1.	Self-learn door width.
2.	Set OD/CD curve.
3.	Confirm complete signal of door motor (F06.00) (F06.00 = 1, relay NC; F06.00 = 0, relay NO, NC is default) according to elevator main control panel.
4.	Set F00.03 = 1 (terminal control mode), and integrates into elevator system.

6.2.1 Wiring
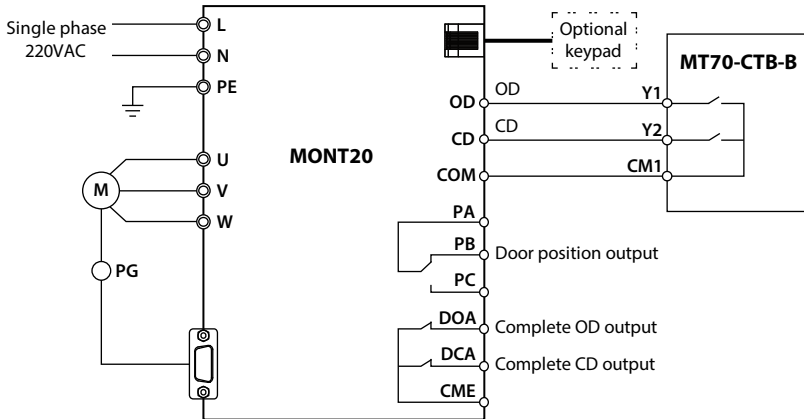
Wiring requirements:

- To reduce the interference and attenuation of control signal, length of control cable should limit within 50m. There should be more than 0.3m between the control cable and the motor cable.
- The control cable must be shielded cable.
- The communication cable must be shielded twisted pair, 20 - 30mm shielded distance, and the shielded layer must be grounded.
- The encoder must use shielded cable, and one terminal of the shielded layer must be grounded firmly.

6.2.2 Door Width Self-learning

The door width of door motor is the basis for controlling the distance of the door motor, adjusting the OD/CD running curve and judging complete OD/CD. The accurate acquisition of the door width is the prerequisite for the normal realization of the distance control.

Note:

1. During the door width self-learning process, the direction of the door action will automatically change, so please ensure personal safety before operating, otherwise it may cause personal injury.

2. Before door width self-learning, please make sure that there are no obstacles during the operation of the door. If there are obstacles, the door width cannot be measured correctly.

Setting Door Width Self-learning

1.	Set F00.02 = 1 (distance control), F00.03 = 0 (keypad control).
2.	Choose self-learning method.

• Without a hall door: Set F02.05 = 1 (door width self-learning is valid).
  • Press ⊕ (**RUN** key) or ⊕ (**JOG** key) to start self-learning. After completion, check F02.05 = 0.
  • The door width data is recorded in F02. 06 and F02.07.
• With a hall door: Set F02.05 = 2 (door width self-learning is valid), the door vane distance can be learned.
  • Press ⊕ (**RUN** key) or ⊕ (**JOG** key) to start self-learning. After completion, check F02.05 = 0, F10.04 ≠ 0.
  • The door width data is recorded in F02.06 and F02.07, and the door vane data is recorded in F10.04.
When an abnormality occurs during the door width self-learning process, press ⊘ (**STOP** key) to stop. Then press ⊕ (**RUN** key (or ⊕ **JOG** key) restart the self-learning.
The normal operation of self-learning is as the figue below.

Exception handling:	
1.	Giving door width self-learning command, the first running direction is CD.
	Countermeasure: Stop MONT20 and exchange any two phases of U, V, W.
2.	Check the CD pulse signal in self-learning. The CD pulse number increases if the OD pulse number decreases.
	Countermeasure: Modify the setting value of F02.01 (encoder direction).
3.	During self-learning, alarms E0026 fault (door width self-learning failed).
	Countermeasure: Check encoder signal. For heavy load type, increase F05.14 (OD/CD switching torque).
4.	When the Asyn. motor is self-learning, the door motor jitters and stops.
	Possible reason: F02.00 (encoder pulse number), F02.01 (encoder direction), and F01.05 (deduction rate) setting error.

6.2.3 Trial Operation

Trial Operation (Manual Operation)

1.	Set F00.03 = 0 (keypad control).
2.	Press ⏻ (**RUN** key) to perform the opening action, ⏻ (**JOG** key) to perform the closing action.
	• Confirm that there is no abnormal situation during the OD and CD, such as door opening and knocking, door closing and knocking, etc.

Trial Operation (Automated Demo)

It is used for door motor demonstration and trial operation in factory, without system control.

The interval and times of door opening and closing demonstration are set by group F08.

1.	Set F00.03 = 2 (demonstration operation).
2.	Press ⏻ (**RUN** key) or ⏻ (**JOG** key) perform demonstration run, the controller will repeatedly switch the door.

• Confirm that there is no abnormal situation during the door opening and closing process, such as door opening and knocking, door closing and knocking, etc.

• If it does not meet the run requirements, it can automatically generate the parameters listed in the curve of the switch door (software version V1.09), make fine-tuning of the curve.

Ref. Code	Function	Parameter Range	Factory Value
F10.02	Open door crawl time	0.0 - 5.0s	0.7s
F10.03	Close door crawl time	0.0 - 5.0s	0.7s
F10.04	Door vane distance	0 - 9999 pulse	0 pulse
F10.05	Automatical generation of OD/CD curve Dec. point	0: Set by F03.04/F04.04 1: Automatic calculation by software	0
F10.06	OD holding torque automatically calculated	0: Set by parameters 1: Automatic calculation by software	0

6.2.4 Distance Control OD Running
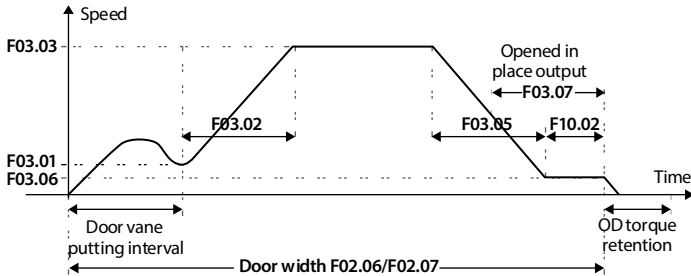
Figure 6-1 Distance control OD process

Door Vane Opening Action	When receiving the open command, the controller will automatically calculate the cutting curve according to the current door position, the actual cutting distance (F10.04), the Acc. and Dec. time (F03.02, F03.05), the starting speed (F03.01).
OD Running	When the door opening area is away from the open vane section, the door starting speed (F03.01) is accelerated to the door opening speed (F03.03) after the Acc. time (F03.02). Automatically calculate the Dec. point according to the current distance and the current running speed, the door opening Dec. time (F03.05). When the Dec. point position is reached, it is decelerated to the creeping speed (F03.06) according to the door Dec. time (F03.05), where F10.02 is used to adjust the creep time length parameter.
OD Keeping	When the door motor reaches the door opening limit point (F03.07) during the crawling phase, it outputs complete OD signal. When the door motor torque ≥ door opening switching torque (F05.00) × motor rated torque, the door motor enters the door opening torque holding state. The door opening torque has the following two modes: **Open Door Holding Torque is Automatically Calculated [F03.07 = 0]** **Maintaining torque changes by parameters** When the door motor torque ≥ door opening switching torque (F05.00) × motor rated torque, the door motor enters the door opening torque holding state. Keep the opening torque (F05.01) after the switching time (F05.03), switch to a smaller final torque of complete OD (F05.02). It not only saves energy, but also prevents the motor from heating, while ensuring that the door has a certain opening force. **Open Door Holding Torque is Automatically Calculated [F03.07 = 1]** **Automatic calculation by software** It is not necessary to set OD torque. The door controller automatically adjusts the output torque according to the actual load, which saves energy, prevents the motor from heating, while ensuring the door has a certain opening force.

6.2.5 Distance Control CD Running

Figure 6-2 Distance control CD process

CD Running	When receiving the close command, the Acc. time (F04.02) is accelerated to the CD speed running (F04.03). The creeping distance obtained from the current running speed, creeping speed at CD ending (F04.06) and the CD creep time (F10.03). And the Dec. distance and the door cutting distance (F10.04) are automatically obtained. When the Dec. point is reached, the door motor decelerates according to the Dec. time (F04.05).
Door Vane Closing Action	If only the CD ending speed (F04.10) is set and CD speed (F04.08) is zero, In the closing interval, the optimal speed and Dec. point will be automatically calculated according to the above-mentioned door closing operation logic. When the Dec. point is reached, the Dec. time (F04.05) will be decelerated, and the door motor ends the creeping according to the closing speed (F04.10). If the CD ending speed and CD speed (F04.08) are not defined, the CD action will run at CD creeping speed (F04.06). If the CD ending speed (F04.10) and CD speed (F04.08) are set, it will run according to the defined door vane running parameters, refers to the distance control CD speed running curve.
CD Keeping	When the door motor reaches the CD limit point (F04.09) in the creeping, it outputs complete CD signal. When the output torque ≥ switching torque (F05.04) × the rated motor torque, the door motor enters the closing torque holding state.

6.3 Speed Control

With four external limit switches, MONT20 can realize speed control, no longer need external encoder to detect the door position. The installation position of each limit switch (signal connection) are shown in Figure 6-3.
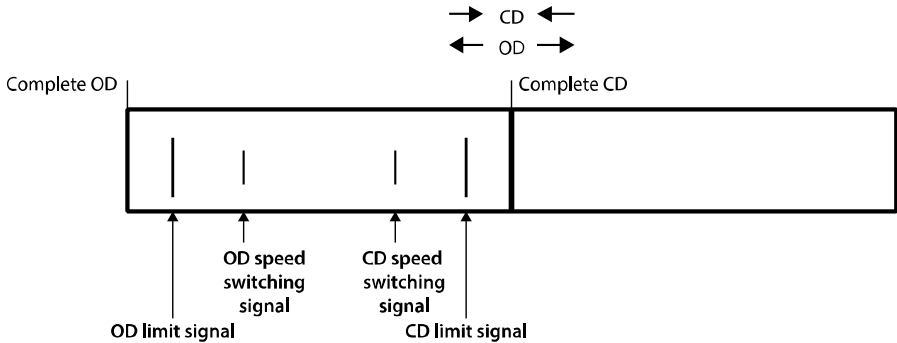
Figure 6-3 Speed control switches and their installation

Main Steps:

1.	Connect OD limit, OD speed switch, CD limit and CD speed switch to DI1 - DI4 respectively, and connect common terminal to COM.
2.	Then turn on the power supply switch of MONT20.
3.	Manually open and close the door, observe the d01.09 (input terminal status 1) by the keypad, confirm the limit switches and signals are normal. If the external switch is normally open (NO), it needs set DI1 - DI4 function (group F06) to be NO.
4.	Refer to section 6.3.2 and section 6.3.3 for the debugging of OD/CD curve.
5.	Confirm the fully signal of door motor according to elevator main control panel (F06.00 = 1, relay NO; F06.00 = 1, relay NC, default).
6.	Set F00.03 = 1 (terminal control mode), and integrate into elevator system.
Note:	
1.	Observe d01.09, which shows the signal change is abnormal. **Countermeasure**: Check the switch installation and the connection of switches and MONT20. Make sure they are correct and then proceed to step 3 and 4.

6.3.1 Connection
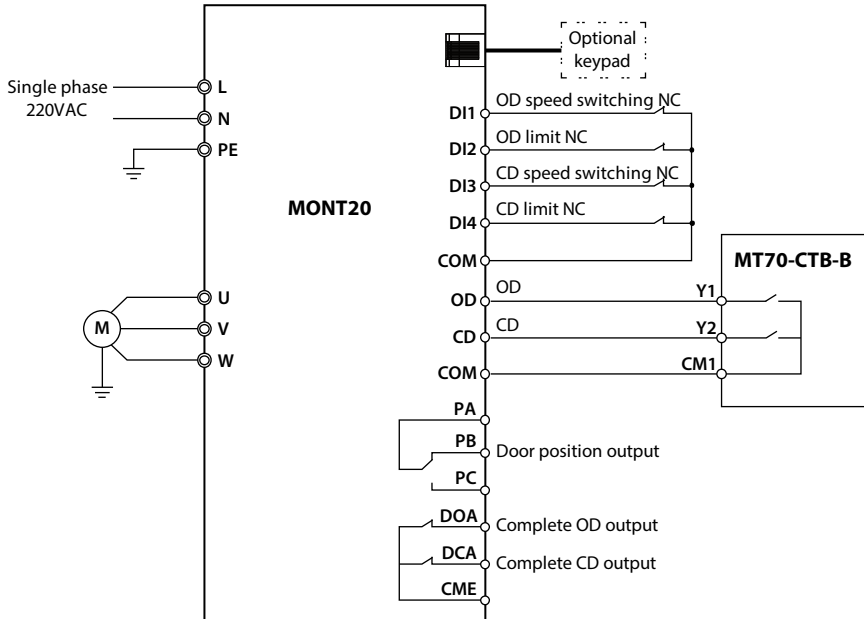
Wiring requirements:

- To reduce the interference and attenuation of control signal, length of control cable should limit within 50m, and the distance between the control cable and the motor cable should be more than 0.3m.
- The control cable must be shielded cable.
- The communication cable must be shielded twisted pair, with 20 - 30mm twisted distance, and the shielded layer should be grounded.

6.3.2 Speed Control OD Running

Set parameters of group F03 and F05 that relates to speed control. Define speed switching contact (F03.04) and limit signal (F03.07) accurately. They are a premise for MONT20 to output perfect OD curve. The OD running speed curve is shown in Figure 6-4.
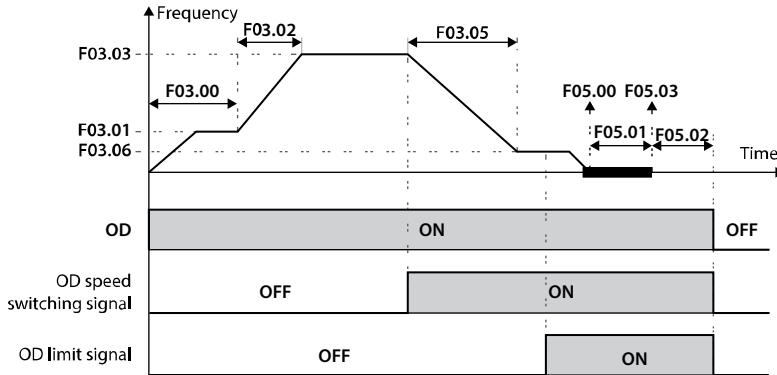
Figure 6-4 Speed control OD process

Process Description:

1.	When OD command is valid, door motor Acc. to starting speed (F03.01) and runs at constant speed.
2.	Time counts from OD starting. When time reaches starting time (F03.00), door motor Acc. to OD speed (F03.03) with Acc. time (F03.02) and runs at F03.03.
3.	When OD speed switch signal is valid, door motor Dec. to creeping speed at OD ending (F03.06) with OD Dec. time (F03.05) and runs at F03.06.
4.	**F00.06 = 0 (open-loop vector control of Asyn. motor):** • When OD limit signal is valid, door motor runs at creeping speed (F03.06); • Start timing when output torque ≥ switching torque (F05.00) × motor rated torque, or OD limit signal is valid, when the time exceeds F06.21, enter the OD torque holding state; The OD torque (F05.01) waits until switching time (F05.03) is finished, and then switch to final holding torque of complete OD (F05.02), the OD process is finished. **F00.06 = 3 (flux vector control of Syn. motor):** • When OD limit signal is valid, door motor runs at crepping speed (F03.06); • Time counts from OD limit signal is valid. When the time exceeds F06.21, door motor enters OD torque holding status, and F06.20 sets output frequency; OD torque (F05.01) waits until switching time (F05.03) is finished, and switches to final holding torque of complete OD (F05.02), the OD process is finished.
5.	When OD command is invalid, OD torque judges the action according to F06.11 (door motor action when running command is cancelled).

6.3.3 Speed Control CD Running

Correctly set the parameters related to speed control in groups F04 and F05, and accurately defining the speed switching point (F04.04) and limit signal (F04.07) are the prerequisites for ensuring the MONT20 to output a perfect opening curve. CD running speed curve is shown as Figure 6-5.
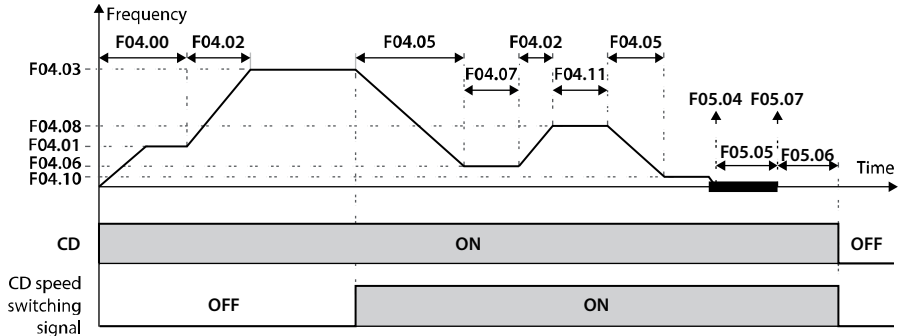
Figure 6-5 Speed control CD process

Description:

1.	When CD command is valid, the door motor accelerates to start speed (F04.01) and runs at F04.01.
2.	Time counts from CD running, after reaching the start time (F04.00), door motor accelerates to CD speed (F04.03) with Acc. time (F04.02), and then runs at constant speed.
3.	When CD speed switching signal is valid, door motor decelerates to CD ending creeping speed (F04.06) with CD Dec. time (F04.06), and then runs at constant speed.
4.	When running duration of CD ending speed (F04.11) ≠ 0, after door motor runs to F04.07 (creeping speed running time) at creeping speed (F04.06), door motor accelerates to CD action speed (F04.08) with Acc. time (F04.02) and wait until F04.11 is finished. Door motor decelerates to Asyn. CD ending speed (F04.10) with Dec. time (F04.05), running stops; • If running duration of CD ending speed (F04.11) = 0, door motor stops running at creeping speed (F04.06).

5.	**F00.06 = 0 (open-loop vector control of Asyn. motor):**
	• When CD limit signal is valid, if CD ending speed (F04.10) ≠ 0, door motor runs at F04.10; If F04.10 = 0, and CD action speed (F04.08) ≠ 0, door motor runs at F04.08; If F04.10 and F04.08 = 0, it runs at F04.06;
	• Time counts from CD output torque ≥ switching torque (F05.04) × motor rated torque or OD limit signal is valid, when the time exceeds F06.21, door motor enters CD torque holding state; CD holding torque (F05.05) waits until switching time (F05.07) is finished, and switches to final holding torque of complete OD (F05.06), CD process is finished.
	F00.06 = 3 (flux vector control of Asyn. motor):
	• When CD limit signal is valid, if CD ending speed (F04.10) ≠ 0, door motor runs at F04.10; If F04.10 = 0, and CD action speed (F04.08) ≠ 0, door motor runs at F04.08; If F04.10 and F04.08 = 0, it runs at F04.06;
	• Time counts from when CD limit signal is valid. When the time exceeds F06.21, door motor enters CD torque holding state, F06.19 sets output frequency; CD holding torque (F05.05) waits until switching time (F05.07) is finished, and switches to final holding torque of complete OD (F05.06), CD process is finished.
6.	When CD command is invalid, CD torque judges action according to F06.11 (door motor action when running command is cancelled).

Chapter 7 Troubleshooting and Maintenance

7.1 Troubleshooting

If fault occurs, the keypad will display the fault alarm. Meanwhile, faulty relay acts, accordingly MONT20 stops output and the motor coasts to stop.

When fault alarm occurs, user should record the fault in detail and take proper action according to following table.

Fault		Reason	Countermeasure
-Lu-	DC bus undervoltage	• Power-on initial state, power-down end state • Input voltage is too low • Improper wiring leads to undervoltage of hardware	• Normal power-on/power-down state • Check input power voltage • Check wiring and wire MONT20 properly
E0001	DC bus over voltage	• Input voltage is too high • Dec. time is too short • Improper wiring leads to overvoltage of hardware	• Check power input • Set proper Dec. time (F03.05, F04.05) • Check wiring and wire MONT20 properly
E0002	MONT20 output instantaneous overcurrent (hardware)	• Improper connection of MONT20 and motor • Improper motor parameter • Wrong encoder signal • Improper wiring leads to overcurrent of hardware • Acc. or Dec. time is too short	• Connect MONT20 and motor correctly • Set proper motor parameter (F01.00 - F01.04) • Check the connection of encoder and make sure the signal is correct • Check the system wiring and wire properly • Set proper Acc. time (F03.02, F04.02) or Dec. time (F03.05, F04.05)
E0003	MONT20 output overcurrent (software)		
E0004	Encoder Z phase signal of PMSM lost	• Auto-tuning of PMSM did not detect Z signal	• Check encoder signal
E0006	Motor parameter auto-tuning failed	• Improper motor parameter setting • Improper motor wiring • Z phade signal of encoder is lost	• Set proper motor parameter (F01.00 - F01.04) • Check the motor wiring and wire properly • Check the encoder

Fault		Reason	Countermeasure
E0007	MONT20 overloaded	• Load of door motor is too large • Door motor is resisted by obstacle	• Adjust the mechanical device • Check mechanical device for anything resisting it
E0008	Permanent magnet Syn. motor first current detection is too small	• When the first power-on mode of the permanent magnet Syn. motor is selected as the pulse method (F06.25 hundred = 1), the detected current is too small	• Check the motor wiring and wire properly • Check if the door controller output is normal
E0009	Motor overload fault	• Excessive load on door motor • A foreign object blocked the door motor	• Adjust mechanism • Check mechanical devices to remove foreign object • Improper parameter setting of door controller
E0010	Abnormal opening fault	• The motor was blocked for 10 consecutive times	• Adjust mechanism • Check mechanical device to remove foreign object • Improper parameter setting of door controller
E0011	Motor overheating fault	• External motor overheating signal is detected	• Motor overheating switch action
E0012	Abnormal closing fault	• After the motor is powered on, the CD complete signal is never detected, and the number of CD blocked exceeds 20 times	• Adjust mechanism • Check mechanical devices to remove foreign object • Improper setting of door controller parameters
E0014	Read/write fault of controller EEPROM	• Memory circuit fault of controller EEPROM	• Contact the supplier for repairing
E0015	Speed deviation is too large	• In the range of F10.16, the actual speed is greater than the given speed and exceeds the set value of F10.15	• Check if the F10.15 - F10.16 are set properly • Check encoder wiring • Redo self-tuning
E0016	Overspeed fault	• The actual speed detected in the range of F10.18 is greater than the motor rated frequency F10.17	• Check if the F10.17 - F10.18 are set properly • Check encoder wiring • Redo self-tuning

Fault		Reason	Countermeasure
E0017	Module fault	• Short circuit between phases • Short circuit to ground • Output current is too high	• Check the encoder wiring and wire properly • Check the encoder wiring and wire properly • Check electrical wiring and mechanism
E0018	Current detection circuit fault	• The detection error of current detection circuit is too large	• Contact the supplier for repairing
E0022	Read/write fault of keypad EEPROM	• Memory circuit fault of keypad EEPROM	• Replace the kaypad • Contact the supplier for repairing
E0023	Encoder fault	• Encoder is damaged • Encoder pulse setting error • Improper setting of pulse per rpm	• Check the encoder and replace it • Check the encoder wiring and wire properly • Set proper pulse per rpm (F02.00)
E0026	Door width self-learning failed	• Encoder is faulty • Improper encoder connection • Improper setting of self-learning speed or torque parameter	• Check the encoder and replace it • Check the encoder wiring and wire properly • Set proper self-learning speed (F02.04) and OD/CD switching torque (F05.14)

7.2 Reset Fault

After the fault is eliminated, reset MONT20 by any of the following methods:

• Press ⊘ (**STOP** key) on the keypad.
• External reset terminal (DI terminal = No.9 function).
• Switch on MONT20 after completely power off.

7.3 Maintenance

Factors such as ambient temperature, humidity, PH, dust, oscillation, internal component aging, wear and tear will give rise to the occurrence of potential faults. Therefore, it is necessary to conduct daily maintenance to the controller.

- If MONT20 has been transported for a long distance, check whether the components of the controller are complete and the screws are well tightened.
- Periodically clean the dust inside MONT20 and check whether the screws are loose.

Danger
• Only a trained and qualified professional person can maintain the controller.
• The maintenance personnel must remove the metal jewelry before maintenance. Clothing and tools that meet insulation requirements must be used for maintenance.
• High voltage exists when the controller is powered up or running.
• Checking and maintaining can only be done after AC power of MONT20 is cut off and wait at least 10 minutes.

Warning
• For MONT20 with more than 2 years storage, please use voltage regulator to increase the input voltage gradually.
• Do not leave wires, tools, screws and other mental objects inside MONT20.
• Do not modify the inside of the controller without authorization.
• There are IC components sensitive to static electricity inside MONT20, please do not touch them directly.

Daily Maintenance

MONT20 must be operated in specified environment, refers to section 2.3, on page 5.

Please do the daily maintenance work according to the following table, so as to find abnormal phenomena in time and extend the service life of the MONT20.

Items	Content	Criteria
Running environment	Temperature and humidity	-10 - +40℃, derating at 40 - 50℃ Less than 95%RH, non-condensing
	Dust and water dripping	No conductive dust, no water dripping
	Gas	No strange smell
MONT20	Oscillation and heating	Stable oscillation and proper temperature
	Noise	No abnormal sound

Periodical Maintenance

According to the operating environment, the controller shall be inspected regularly within 3-6 months to eliminate the hidden trouble and ensure the long-term stable operation of the equipment with high-performance.

General Inspection:

- Check whether the screws of control terminals are loose. If so, tighten them with a screw driver;
- Check whether the power terminals are firmly in contact, whether the copper bar and main cables are overheated;
- Check whether the power cables and control cables are damaged, check especially for any wear on the cable tube;
- Check whether the insulating tapes around the cable lugs are stripped, and for signs of overheating near terminations;
- Clean the dust on PCBs and air ducts with a vacuum cleaner.

Note:

1. Dielectric strength test of MONT20 has already been conducted in the factory. Do not do the test again. Otherwise, improper testing may damage MONT20.

2. When testing the insulation of the motor, the U / V / W terminal of the controller must be disconnected to test the motor separately. Otherwise, MONT20 will be damaged.

3. For MONT20 that have been stored for a long time, they must be powered up every 2 years. When supplying AC power to the controller, use a voltage regulator to gradually raise the input voltage to rated input voltage at least 5 hours.

Replacing Damaged Parts

Electrolytic capacitors of filter are easily damaged.

Generally, life of electrolytic capacitors is 40, 000 - 50, 000 hours.

Due to high ambient temperature and frequent load jumps, the pulsating current increases and the electrolyte is aging.

Criteria: Check if frequent over-current or overvoltage faults occur during controller start-up with load. Check if there is any leakage of liquids. Check if the safety value protrudes. Measure the static capacitance and insulation resistance.

Scrap Disposal

- The capacitors may explode if they are burnt.
- Poisonous gas may be generated when the plastic parts like front covers are burnt.
- Please dispose of as industrial waste.

Appendix A Parameter

Property Modification:

"*": It denotes that the value of this parameter is the actual value which cannot be modified.

"×": It denotes that the setting of this parameter cannot be modified when MONT20 is in run status.

"○": It denotes that the setting of this parameter can be modified when MONT20 is in run status.

Ref. Code	Function	Setting Range	Default	Attribute	Setting
d00: System Parameters, on page 21					
d00.00	Controller series	MONT20	0x0020	*	
d00.01	Controller rated power	200 - 400W	400W	*	
d00.02	Controller rated current	0.01 - 9.99A	2.50A	*	
d00.03	Controller software version	1.00 - 9.99	Actual	*	
d00.04	Controller non-standard software version	1.00 - 9.99	Actual	*	
d00.05	External keypad software version	1.00 - 9.99	Actual	*	
d01: Drive Status Parameters, on page 21					
d01.00	Door position pulse	0 - Max. door width	Actual	*	
d01.01	Door position percentage	0.0 - 100.0%	Actual	*	
d01.02	Complete OD/CD signal	From right to left: Complete OD pulse, complete CD pulse, complete OD torque, complete CD torque • 0: Not complete • 1: Complete	Actual	*	
d01.03	Set frequency	0.00 - 99.99Hz	Actual	*	
d01.04	Output frequency	0.00 - 99.99Hz	Actual	*	
d01.05	Output voltage	0 - 999V	Actual	*	
d01.06	Output current	0.00 - 9.99A	Actual	*	
d01.07	Output torque	0.0 - 200.0%	Actual	*	
d01.08	Bus voltage	0 - 999V	Actual	*	
d01.09	Input terminal status 1	Unit - ten thousand correspond to DI1 - DI5 0: Terminal disconnects with common terminal 1: Terminal connects with common terminal	Actual	*	

Appendix A Parameter

Ref. Code	Function	Setting Range	Default	Attribute	Setting
d01.10	Input terminal status 2	Unit - ten correspond to OD and CD 0: Terminal disconnects with common terminal 1: Terminal connects with common terminal	Actual	*	
d01.11	Output terminal status	Unit - hundred corresponds to DOA, DCA and PA 0: Terminal disconnects with common terminal 1: Terminal connects with common terminal	Actual	*	
d01.12	Factory debug parameter				
d01.13	Z signal pulse	00000 - 65535	Actual	*	
d01.14	Z signal correction pulse deviation	00000 - 65535	Actual	*	
d01.15	Z signal correction error times	00000 - 65535	Actual	*	
d01.16	Z signal Max. correction deviation	00000 - 65535	Actual	*	
d01.17	Encoder counter	00000 - 65535	Actual	*	
d01.18 - d01.29 Factory debug parameter					
d01.30	U phase zero offset	00000 - 65535	Actual	*	
d01.31	V phase zero offset	00000 - 65535	Actual	*	
d01.32	W phase zero offset	00000 - 65535	Actual	*	
d01.33 - d03.39 Factory debug parameter					
F00: Basic Parameter, on page 23					
F00.00	User's password	00000 - 65535	0	○	
F00.01	Parameter batch selection	0: Invalid, set parameters manually 1: Restore to default parameter 2: Clear fault information 3: Unused 4: Upload parameter to external keypad 5: Download parameter from external keypad to MONT20 6: Restore customer customized parameter of Syn. motor 7: Restore customer customized parameter 2 of Syn. motor 8, 9: Unused 10: Restore customized speed control parameter of customer Asyn. motor	0	×	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
		11: Restore customized speed control parameter 2 of customer Asyn. motor 12 - 30: Unused			
F00.02	OD/CD mode selection	0: Speed control (with 4 switches) 1: Distance control (with encoder)	0	×	
F00.03	Run command selection	0: Keypad (manual) 1: Terminal (automatic) 2: Demo loop running 3: Factory debugging mode 4: CAN communication	0	×	
F00.04	Max. output frequency	1.00 - 99.99Hz	50.00Hz	×	
F00.05	Running curve selection	0: Line 1: S curve	0	×	
F00.06	Control selection	0: Asyn. motor open-loop vector control 1: Asyn. motor closed loop vector control 2: Syn. motor closed loop vector control 3: Asyn. motor flux vector control	3	×	
F01: Motor Parameter, on page 25					
F01.00	Motor rated power	1 - 750W	250W	×	
F01.01	Motor rated voltage	1 - 300V	220V	×	
F01.02	Motor rated current	0.10 - 2.50A	0.55A	×	
F01.03	Motor rated frequency	1.00 - 99.99Hz	50.00Hz	×	
F01.04	Motor rated Rpm	1 - 6000rpm	900rpm	×	
F01.05	Reduction ratio	1.00 - 9.99	1.00	×	
F01.06	Motor parameter auto-tuning	0: No action 1: Motor parameter auto-tuning	0	×	
F01.07	No load current	0.01 - 2.50A	0.36A	×	
F01.08	Magnetic pole position angle	0.0 - 359.9	0.0	×	
F01.09	Stator resistance	0.00 - 99.99Ω	Depend on MONT20	×	
F01.10	Rotor resistance	0.00 - 99.99Ω		×	
F01.11	Stator inductance	0 - 9999mH		×	
F01.12	Rotor inductance	0 - 9999mH		×	
F01.13	Mutual inductance	0 - 9999mH		×	
F01.14	Slip compensation gain	50.0 - 200.0%	100.0%	×	

Appendix A Parameter

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F02: Encoder Door Width Parameter, on page 26					
F02.00	Pulse per rpm of encoder	0 - 9999	1024	×	
F02.01	Encoder direction setting	0: Same direction 1: Opposite direction	1	×	
F02.02	Slow running speed setting	0.01 - 15.00Hz	7.00Hz	○	
F02.03	Initial running speed after power on	0.01 - 15.00Hz	7.00Hz	○	
F02.04	Door width self-learning speed	0.01 - 15.00Hz	4.00Hz	○	
F02.05	Door width self-learning enable	0: Invalid 1: Door width self-learning mode 1 is valid 2: Door width self-learning mode 2 is valid	0	×	
F02.06	Low bit of door witdh	0 - 9999 (pulse number)	780	×	
F02.07	High bit of door witdh	0 - 9999 (pulse number)	0	×	
F02.08	CD limit open/close position pulse	0 - 9999	0	×	
F03: OD Curve Parameter, on page 27					
F03.00	OD start distance/OD start time	Distance control: 0 - 9999 (pulse number) Speed control: 0 - 9999 (ms)	1000	○	
F03.01	OD start speed	0.00 - 15.00Hz	3.50Hz	○	
F03.02	OD Acc. time	0.1 - 99.9s	1.3s	○	
F03.03	OD speed	0.00Hz - F00.04	20.00Hz	○	
F03.04	OD Dec. point position	50.0 - 90.0% (door width)	65.0%	○	
F03.05	OD Dec. time	0.1 - 99.9s	1.4s	○	
F03.06	Creeping speed at OD ending	0.00 - 15.00Hz	3.00Hz	○	
F03.07	OD limit point position	80.0 - 99.9% (door width)	95.0%	○	
F03.08	High-speed area of re-opening curve	10.0 - 90.0% (door width)	90.0%	○	
F04: CD Curve Parameters, on page 28					
F04.00	CD start distance/CD start time	Distance control: 0 - 9999 (pulse number) Speed control: 0 - 9999 (ms)	0	○	
F04.01	CD start speed	0.00 - 15.00Hz	4.00Hz	○	
F04.02	CD Acc. time	0.1 - 99.9s	1.4s	○	
F04.03	CD speed	0.00Hz - F00.07	18.00Hz	○	
F04.04	CD Dec. point position	50.0 - 90.0% (door width)	62.0%	○	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F04.05	CD Dec. time	0.1 - 99.9s	1.3s	○	
F04.06	Creeping speed at CD ending	0.00 - 15.00Hz	3.00Hz	○	
F04.07	Door vane acting position at CD ending/running time at CD ending creeping speed	Distance control: 1 - 5000 (pulse number) Speed control: 1 - 5000 (ms)	0	○	
F04.08	Door vane action speed at CD ending	0.00 - 15.00Hz	0.00Hz	○	
F04.09	CD limit point position	1 - 500	60	○	
F04.10	Door vane retiring end speed of Asyn. CD	0.00 - 5.00Hz	0.00Hz	○	
F04.11	CD ending range of Asyn. door vane CD/running time of CD ending Asyn. door vane action speed	Distance control: 0 - 5000 (pulse number) Speed control: 0 - 5000 (ms)	0	○	
F05: Torque Parameter, on page 29					
F05.00	OD switching torque	20.0% - F07.07	50.0%	○	
F05.01	OD holding torque	30.0% - F07.07	45.0%	○	
F05.02	Final holding torque at complete OD	0.0% - F07.07	35.0%	○	
F05.03	Switching time from OD holding torque to final holding torque	0.1 - 999.9s	30.0s	○	
F05.04	CD switching torque	20.0% - F07.07	50.0%	○	
F05.05	CD holding torque	30.0% - F07.07	45.0%	○	
F05.06	Final holding torque of complete CD	0.0% - F07.07	35.0%	○	
F05.07	Switching time from CD holding torque to final holding torque	0.1 - 999.9s	60.0s	○	
F05.08	Torque setting at low speed CD resistance	0.0% - F07.07	80.0%	○	
F05.09	Time at low speed CD resistance	0 - 4999ms	1000ms	○	
F05.10	Torque setting at high speed CD resistance	0.0% - F07.07	80.0%	○	
F05.11	Time of high speed CD resistance	0 - 4999ms	1000ms	○	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F05.12	Low speed setting at CD resistance	0.00Hz - F00.07	5.00Hz	○	
F05.13	High speed setting at CD resistance	5.00Hz - F00.07	15.00Hz	○	
F05.14	Switching torque of low speed OD/CD	30.0% - F07.07	70.0%	○	
F05.15	Torque at OD resistance	0.0% - F07.07 0.0%: Invalid	100.0%	○	
F05.16	Time at OD resistance	0 - 4999ms	1600ms	○	
F05.17	Stop time at OD resistance	0 - 9999ms	3000ms	○	
F06: Boost Parameters, on page 30					
F06.00	DOA, DCA, PA output pole selection	0: Signal connects 1: Signal disconnects	1	×	
F06.01	PA function selection	0: Door position output 1: Re-opening signal outputs at CD resistance 2: Complete OD 3: Complete CD 4: Fault output 5: Running (normally open) 6: Door vane solenoid valve output (normally open) 7 - 9: Unused 10: Door position output (normally closed) 11: CD resistance re-opening signal output (normally closed) 12: Complete OD (normally closed) 13: Complete CD (normally closed) 14: Fault output (normally closed) 15: Running (normally closed) 16: Door vane solenoid valve output (normally closed) 17 - 19: Unused	0	×	
F06.02	Input terminal filter time	2 - 300ms	10ms	×	
F06.03	DI1 funtion selection	0: No funtion 1: OD speed switching normally open (NO) input	11	×	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F06.04	DI2 funtion selection	2: OD limit NO input 3: CD speed switching NO input 4: CD limit NO input 5: Light curttain, contact board NO input	12	×	
F06.05	DI3 funtion selection	6: Low speed signal (SS) 7: OD command (OD) 8: CD command (CD) 9: Fault reset (RST)	13	×	
F06.06	DI4 funtion selection	10: Motor overheating normally open input 11: OD speed switching NC input 12: OD limit NC input 13: CD speed switching NC input 14: CD limit NC input	14	×	
F06.07	DI5 funtion selection	15: Light curtain, touch board NC input 20: Motor overheating NC input 21: The door lock signal is normally open 22: The door lock signal is normally closed	0	×	
F06.08	DC resistance Aux. detection time	0 - 4999ms	0ms	×	
F06.09	Percentage of door position output	0.1 - 99.9%	90.0%	○	
F06.10	Resistance Dec. time	0.1 - 2.0s	0.5s	○	
F06.11	Action selection of door motor when revoke run command	0: The torque is maintained during complete OD/CD, and runs at zero speed in other position 1: Stop running 2: Only maintain the torque during complete OD/CD	2	○	
F06.12	Auxiliary parameter 1	Ten thousand: Detect CD resistance 1/3 distance from CD acts 0: Detect CD resistance 1: Not detect CD resistance Thousand: Function of stop key in terminal control 0: Invalid 1: Valid	00000	○	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F06.12	Auxiliary parameter 1	Hundred: CD limit switching mode 0: Do not learn the CD limit position during door width self-learning 1: Learn the CD limit potision during door width self-learning Ten: Demo mode enable 0: Enable manually 1: Enable automatically Unit: OD/CD priority selection 0: OD priority 1: CD priority	00000	○	
F06.13	Auxiliary parameter 2	Ten thousand: Abnormal shutdown protection is opened 0: Open 1: Not open Thousand: Current slope rise 0: Start current direct sets 1: Start current slope rise Hundred: Speed loop amplification 0: KP is original value 1: KP amplify by 4 times Ten: Over-current auto reset enable Unit: Over-vlotage auto reset enable 0: Not enable 1: Enable	00001	○	
F06.14	On board LCD brightness adjustment	0 - 100%	70%	○	
F06.15	Carrier frequency	4 - 16k	8k	×	
F06.16	Running speed when prising door for Asyn. motor open-loop	2.50 - 15.00Hz	4.00Hz	○	
F06.17	CD time protection	0 - 30s	0s	○	
F06.18	Flux vector voltage compensation	0 - 40%	10%	×	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F06.19	Flux vector complete CD holding frequency	0.10 - 5.00Hz	1.00Hz	○	
F06.20	Flux vector complete OD holding frequency	0.10 - 5.00Hz	1.00Hz	○	
F06.21	Delay switching time of flux vector speed switching to torque	100 - 3999ms	2500ms	×	
F06.22	Frequency range of flux vector no detection OD/CD resistance	0.10 - 15.00Hz	7.00Hz	×	
F06.23	Flux vector OD voltage compensation	0 - 8%	0%	×	
F06.24	Cut-off point of flux vector voltage compensation frequency	10.00 - 50.00	50.00	×	
F06.25	Auxilliary parameter 3	Unit: DO signal keeping when first time power up under distance control 0: Do not keep 1: Keep Ten: Address setting under CAN control 0: Front door 1: Rear door Hundred: Electric angle search for permanent magnet Syn. motor (PMSM) 0: Current method 1: Pulse method Thousand: Motor overload protection shield 0: No shield 1: Shield Ten thousand: Open door abnormal shutdown protection open 0: Open 1: Not open	00000	×	
F07: Vector Control Parameter, on page 35					
F07.00	High speed ASR KP	10 - 3000	500	○	
F07.01	High speed ASR KI	0 - 1000	100	○	

Appendix A Parameter

Ref. Code	Function	Setting Range	Default	Attribute	Setting
		0: No action			
F07.02	Low speed ASR KP	10 - 3000	500	○	
F07.03	Low speed ASR KI	0 - 1000 *0: No action*	100	○	
F07.04	ASR switching frequency	0.00Hz - F00.04	8.00Hz	○	
F07.05	Current loop KP	10 - 9999	100	○	
F07.06	Current loop KI	0 - 9999	100	○	
F07.07	Torque limit	0.0 - 200.0% (motor rated current)	120.0%	○	
F07.08	Speed filter time constant	0 - 7	2	×	
F08: Demo Running Parameter, on page 36					
F08.00	Demonstrate the retention time of running complete OD	1.0 - 999.9s	2.0s	○	
F08.01	Demonstrate the retention time of running complete CD	1.0 - 999.9s	2.0s	○	
F08.02	Demonstrate the running times record	0 - 65535	0	○	
F08.03	Demonstrate the nominated running times	0 - 65535	0	○	
F09: Fault Record Parameters, on page 37					
F09.00	NO.5 fault type	-Lu-: DC bus under voltage E0001: MONT20 over-voltage E0002: Hardware of MONT20 is over-current E0003: Software of MONT20 is over-current	Actual value	*	
F09.01	NO.4 fault type	E0004: Encoder Z signal of PMSM is lost E0006: Motor parameter auto-tuning failed E0007: MONT20 overloaded E0008: Permanent magnet Syn. motor first current detection is too small			
F09.02	NO.3 fault type	E0009: Motor overload fault E0010: Abnormal opening fault E0011: Motor overheating fault E0012: Abnormal closing fault			
F09.03	NO.2 fault type	E0014: Read/write fault of MONT20 EEPROM E0015: Speed deviation is too large E0016: Overspeed fault E0017: Module fault			

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F09.04	NO.1 fault type	E0018: Current detection circuit fault E0022: Read/write fault of keypad EEPROM E0023: Encoder fault E0024: Wrong logic E0026: Door width self-learning failed			
F09.05	Bus voltage of last fault	0 - 999V	Actual	*	
F09.06	Output current of last fault	0.00 - 99.99A	Actual	*	
F09.07	Running frequency of last fault	0.00 - 99.99Hz	Actual	*	
F09.08	Setting frequency of last fault	0.00 - 99.99Hz	Actual	*	
F09.09	Door position of last fault	0 - 65535	Actual	*	
F09.10	Input terminal status 1 of last fault	00000 - 11111	Actual	*	
F09.11	Input terminal status 2 of last fault	000 - 111	Actual	*	
F09.12	Output terminal status of last fault	000 - 111	Actual	*	
F09.13	Low bit of OD/CD times record	0 - 9999	Actual	*	
F09.14	High bit of OD/CD times record	0 - 9999	Actual	*	
F09.15	Runnning hours record	0 - 23	Actual	*	
F09.16	Running days record	0 - 9999	Actual	*	
F09.17	Controller software version	1.00 - 99.99	Actual	*	
F09.18	Keypad software version	1.00 - 99.99	Actual	*	
F10: Advanced Parameters, on page 38					
F10.00	Electromagnetic valve door vane opening delay time	0 - 9999ms	0ms	○	
F10.01	Electromagnetic valve door vane closing delay time	0 - 9999ms	0ms	○	
F10.02	OD creeping time	0.0 - 5.0s	0.7s	○	
F10.03	CD creeping time	0.0 - 5.0s	0.7s	○	
F10.04	Door vane distance	0 - 9999 pulse	0 pulse	○	
F10.05	Automatical generation of switch door curve Dec. point	0: By parameter setting 1: Automatic calculation by software	0	○	
F10.06	OD holding torque automatically calculated				

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F10.07	OD blocked	0: Door opening stop 1: After being blocked, keep the door open, the multi-function output can output the blocked signal, and the elevator control system can freely choose to open or close the door according to the blocked signal	0	○	
F10.08	CD blocked mode	0: Blocked and re-open the door 1: After being blocked, keep the door close, the multi-function output can output the blocked signal, and the elevator control system can freely choose to open or close the door according to the blocked signal	0	○	
F10.09	Internal star-delta relay working mode	0: Operate when fault 1: Operate when fault or stop	1	×	
F10.10	Current zero offset parameter acquisition method	0: Get automatically when power-on 1: Get by F10.11 - F10.13 2: Store the zero offset value of power-on to F10.11 - F10.13, and use the value of F10.11 - F10.13 as current bias	0	×	
F10.11	U phase zero offset setting	1700 - 2200	1950	×	
F10.12	V phase zero offset setting	1700 - 2200	1950	×	
F10.13	W phase zero offset setting	1700 - 2200	1950	×	
F10.14	Door vane self-learning current judgment	0.01 - 0.50A	0.05A	×	
F10.15	Speed deviation protection range	5 - 50%	20%	×	
F10.16	Speed deviation protection detection time	0.0 - 2.0s	0.5s	×	
F10.17	Overspeed range setting	105 - 120%	110%	×	
F10.18	Overspeed detection time	0.0 - 2.0s	0.5s	×	
F10.19	Fermator Syn. motor	0: Normal Syn. door motor 1: Fermator Syn. door motor	0	×	
F10.20	Syn. motor Z signal detection	0: Fault detection is allowed 1: Fault detection shielding	0	×	
F10.21	Zt (zhete) Syn. motor	0: Normal Syn. door motor 1: Zt (zhete) Syn. door motor	0	×	

Ref. Code	Function	Setting Range	Default	Attribute	Setting
F10.22	Auxiliary parameter 3	Unit: Slow signal command 0: Use with the door open/close command 1: The slow signal is separately turned off Ten : Power off function 0: Does not work 1: Works Hundred: Switch door command mode 0: Non-pulse triggered 1: Pulse triggered Thousand: Pre-operation detection output phase loss 0: Not detected 1: Detect Ten thousand: Open door in place output 0: The door open output is only related to the door position 1: The door command cancels the door open output signal	0	×	
F10.23	Auxiliary Parameter 4	Unit: Language selection 0: Chinese 1: English Ten: Keypad UP/DN start door width self-learning 0: Keypad UP/DN is allowed to start self-learning by 5s at the same time 1: Keypad UP/DN is not allowed to start self-learning by 5s at the same time	0	×	
F10.24 - F10.29 Factory debug parameters					