MABARA



User Guide

Fermator PM Door Drive

Integrated Door Operated Controller



MABARA

Date: 05-11-2025

Preface

Thank you for purchasing the MDDPM series integrated door machine controller.

The PM Fermator series integrated door machine controller is a variable frequency controller specialized for driving the door machine system such as elevator door, cold storage door, and subway door.

It integrates door open/close logic control and motor drive, and implements control on the entire door system with door open/close commands from the external system. The MDDPM can drive the permanent magnet motor (PM), and supports two control modes, speed control and distance control. Applicable to various applications, it can meet drive and control requirements of most door systems.

This manual describes correct use of the MDDPM, including product features, safety information and precautions, installation, parameter setting, commissioning, and troubleshooting. Read and understand the manual before using the product, and keep it carefully for future reference and maintenance.

Notes
• The drawings in the manual are sometimes shown without cover or protective guard. Remember to install the cover or protective guard as specified first, and then perform operations in accordance with the instructions. • The drawings in the manual are shown for description only and may not match the product that you have purchased. • The instructions are subject to change due to product upgrade, specification modification, as well as the efforts to increase the accuracy and convenience of the manual. • Contact our regional agent or customer service center if the manual delivered is lost or damaged. • Contact our customer service center if you have problems during the use.Email:mabarasales@gmail.com

Contents

Chapter 1 Safety Information and Precautions 4

1.1 Safety Information 5

1.2 Precautions 8

Chapter 2 Product Information 10

2.1 Designation Rules and Nameplate 11

2.2 Structure 12

2.3 Fermator PM Drive Model 12

2.4 General Specifications 13

2.5 Advantages of Fermator PM Drive.....14

Chapter 3 Electrical Installation 15

3.1 Installation Environment.....16

3.2 Electrical Installation 17

Chapter 4 Operation and Trial Running 20

4.1 Operation Panel ..... .21

4.2 Basic Operations ..... .23

4.3 Open and Closing Operations.....25

Chapter 5 Function Code Table 26

5.1 Program settings..... 27

5.2 Learning data 28

5.3 OBD data.....28

5.4 View data.....28

5.5 Default procedure.....28

Chapter 6 Error data and Recovery list.....29

6.1 Error recover list.....30

6.2 Learning error details and solutions.....31

Chapter 7 Maintenance.....32

7.1 Maintenance.....33

1

Safety Information and Precautions

Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

- DANGER indicates that severe personal injury or even death may result due to improper operation.
- CAUTION indicates that personal injury or equipment damage may result due to improper operation.

Read the following safety notices carefully so that you understand how to install, commission, operate and maintain the equipment. Mabara assumes no liability or responsibility for any injury or loss caused by improper operation of the equipment described in the manual.

Safety Information

■ Before installation

DANGER
• Do not install the equipment if you find the controller damaged upon unpacking. • Do not install the equipment if the packing list does not confirm to the product you receive.
CAUTION
• Do not install the equipment if you find the controller damaged upon unpacking. • Do not install the equipment if the packing list does not confirm to the product you receive.

■ During installation

DANGER
• Do not mount the controller on combustible surface such as metal. Keep it far away from flammable materials. Failure to comply may result in a fire. • Do not loosen the fixed screws of the components, especially the screws with red mark.
CAUTION
• Do not drop wire end or screw into the controller. Otherwise, the controller may be damaged. • Install the controller in locations free from vibration, direct sunlight, rain, water and moisture etc.

■ At wiring

DANGER
• Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. • A circuit breaker must be used to isolate the power supply and the controller. Failure to comply may result in a fire. • Tie the controller to ground properly according to the standard. Failure to comply may result in electric shock.

DANGER
• Never connect the power cables to the output terminals (U,V,W) of the controller. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the controller. • Ensure that the cabling satisfies the EMC requirements and the local codes. Use wire sizes recommended in the manual. Failure to comply may resulting accidents. • Use the shielded cable for the encoder, and ensure that the shield is reliably grounded at one end. • Use a twisted cable with distance of 20−30mm as the communication cable, and ensure that the shield is reliably grounded.

■ Before Power - ON

DANGER
• Check that the following requirements are met: • The voltage class of the power supply is consistent with the rated voltage class of the controller. The input terminals (L, N) and output terminals (U, V, W) are correctly connected. • No short circuit exists in the peripheral circuit. • The wiring is secured,failure to comply will result in damage to the controller. • For the PM, ensure that motor auto-tuning is performed before running for the first time,failure to comply may result in motor run away. • Do not perform the voltage resistance test on any part of the controller because such test has been done in the factory. Failure to comply will result in accidents.

DANGER
• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply may result in personal injury. • Do not change the factory parameters. Otherwise, the equipment may be damaged.

■ After Power - ON

DANGER
• Do not open the cover of the controller after power-on. Failure to comply may result in electric shock. • Do not touch any input or output terminal of the controller with hands. Failure to comply may result in electric shock.

DANGER
• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply may result in personal injury. • Do not change the factory parameters. Otherwise, the equipment may be damaged.

■ During running

DANGER
• Do not touch the fan or the discharging resistor to check the temperature. Otherwise, you may get burnt. • Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the controller.

DANGER
• Avoid objects falling into the controller when it is running. Failure to comply will result in damage to the controller. • Do not start/stop the controller by opening or closing the contactor. Failure to comply will result in damage to the controller.

■ During maintenance

DANGER
• Do not repair or maintain the controller at power-on. Failure to comply will result in electric shock. • Repair or maintenance of the controller must be performed only by qualified personnel. Otherwise, personal injury or equipment damage may result. • Set the parameters again after the controller is replaced. All the pluggable components must be plugged or removed only after power-off.

Precautions

1. Motor Insulation Test

Perform an insulation test on the motor under the following conditions:

- Before the motor is used for the first time
- When the motor is reused after being stored for a longtime
- During periodic inspection

This is to prevent the poor insulation of motor windings from damaging the controller. The motor must be disconnected from the controller during the insulation test. A 500-volt megameter is recommended for this test, and the insulation resistance must not be less than 5 MΩ.

2. Motor Heat and Noise

The output of the controller is pulse width modulation (PWM) wave with certain harmonic wave, and therefore, the motor temperature rise, noise, and vibration are slightly greater than those at running with the mains frequency.

3. Voltage-sensitive device or capacitor on the output side of the controller

The controller outputs PWM voltage, and therefore, do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the controller. Otherwise, the controller may suffer transient overcurrent or even be damaged.

4. Apply rated voltage

The controller must not be used outside the allowable voltage range specified in this manual. Otherwise, components inside the controller may be damaged. If required, use a corresponding voltage step-up or step-down device to match the power voltage to the rated voltage range for the controller.

5. Surge Suppressor

The controller has a built-in varistor for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the controller are switched on or off. If the inductive loads generate very high surge voltage, use a surge suppressor for the inductive load or use a surge suppressor together with a diode.

NOTE
Do not connect the surge suppressor to the output side of the controller.

1. Altitude and De-rating

In places where the altitude is above 1000m and the cooling effect reduces due to thin air, it is necessary to de-rate the controller. Contact Mabara for technical support.

2. Disposal

The electrolytic capacitors in the main circuit and PCB board may explode when they are burnt. Poisonous gases generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

3. Adaptable Motor

- This Drive is designed to operate permanent magnet (PM) motor of mentioned rating. Select the proper Drive model model according to the motor type and ratings.
- To reach better control result, perform motor auto-tuning based on actual conditions. For a PM, motor auto-tuning is mandatory.
- The controller might alarm or be damaged when a short circuit exists on cables or inside the motor. Therefore, perform the insulation short circuit test when the motor and cables are newly installed or during routine maintenance. During the test, disconnect the controller from the tested part.
- Main Frequency 45 to 55Hz.

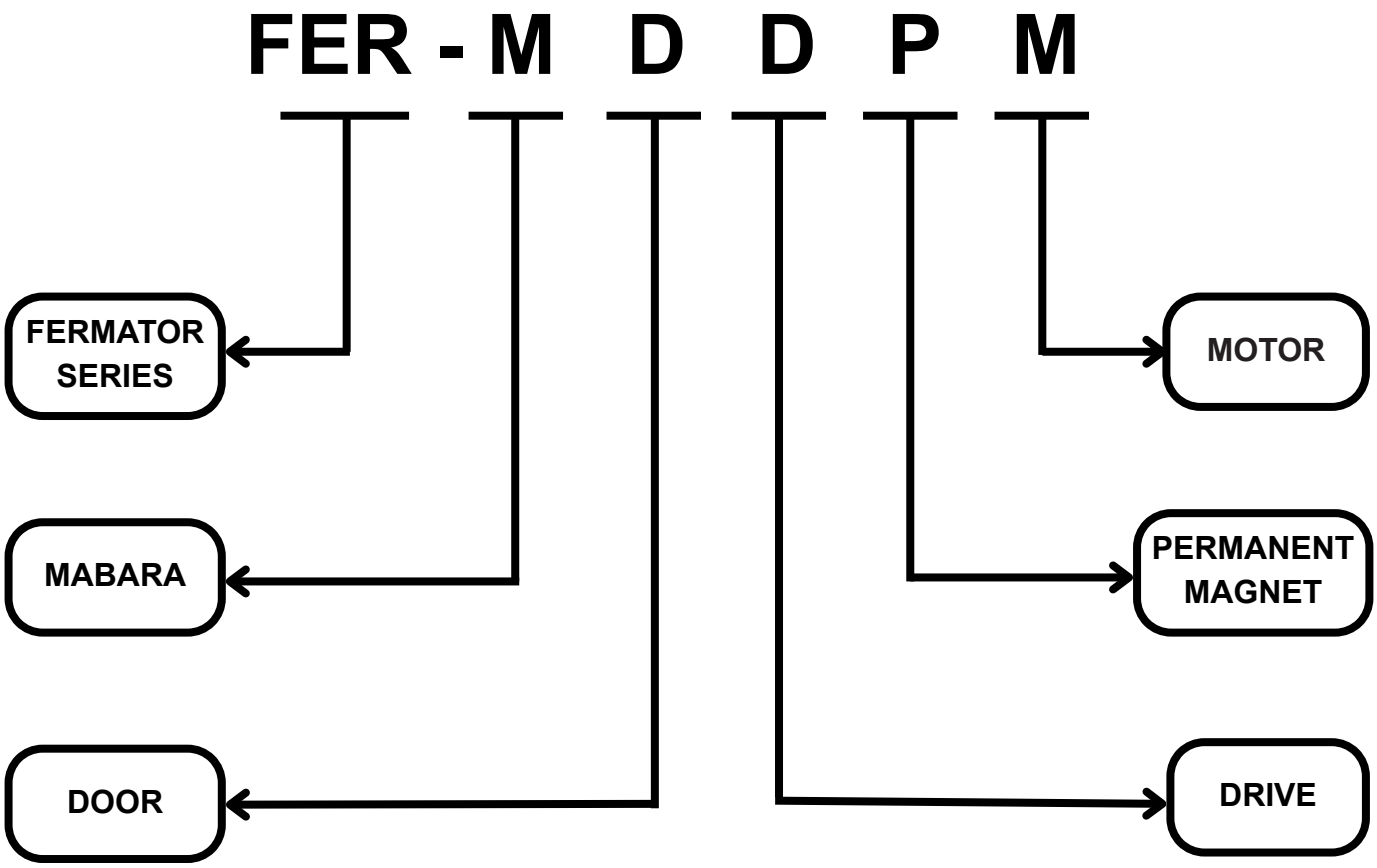
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Product information

PRODUCT INFORMATION

2.1 DESIGNATION RULES AND NAME PLATE

Figure 2-1 Designation rules and name plate of the MDDPM - FERMATOR PM DRIVE



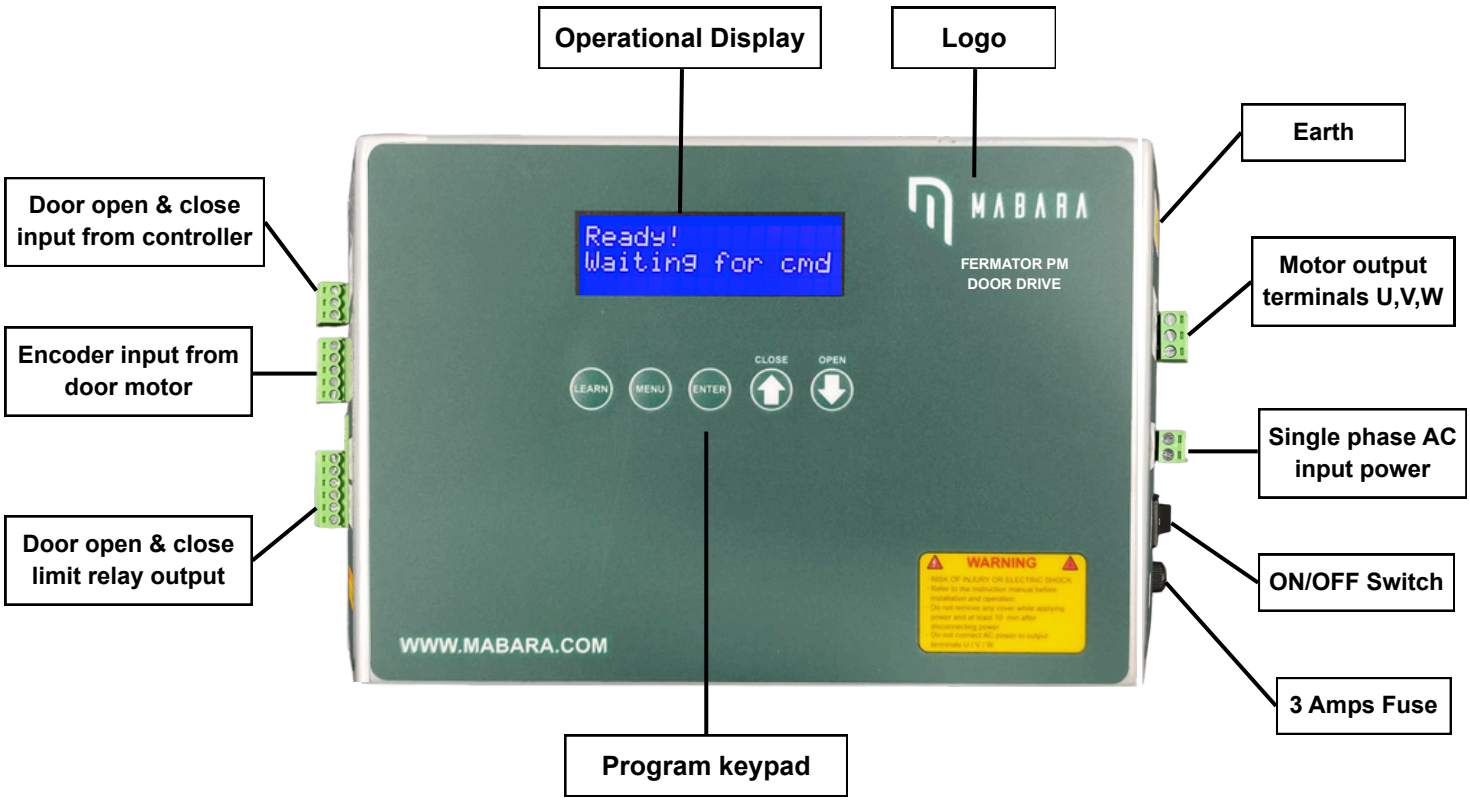


Name plate

Company name →	MABARA FOC Drive
Product name →	FERMATOR PM DOOR DRIVE
Product version →	VERSION : F3. 00. 19
Serial number →	SL NO : 250101XXXXXX
Website →	www.mabara.com QC TESTED

2.2 STRUCTURE

Figure 2-2 Structure of the MDDPM - FERMATOR PM DRIVE



2.3 FERMATOR PM DRIVE MODEL:

Table 2-1 FERMATOR PM DRIVE MODEL:

Model	Input Voltage	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Motor Rating (W)
MABARA PM FERMATOR	SINGLE PHASE 220V (-15% TO 20%)	1	5.4	2.3	400

2.4 General Specifications

Item		Specifications
Basic specifications	Maximum output frequency	300Hz
	Speed range	300RPM
	Speed stability	1%
	Start up torque	3NM
	Frequency resolution	0.1Hz
	Current resolution	0.1A
	Carrier frequency	14khz Center aligned PWM
Major functions		Automatic motor learning, initial rotor position detection
		Automatic door learning
		Intelligent torque adjustment
		Neutral open - 400v no failure
		Auto brake of motor after power fail
		Multiple Scurve option
Protection functions		Over voltage, under voltage, over current, short circuit
		Over temperature

Chapter 2.5 Advantages of Fermator PM drive

Fermator door drive is the most advanced elevator door drive with inbuilt artificial intelligence which adjusts the parameters automatically based on the motor and door conditions and reduces 90% of your tuning efforts.

- Fermator PM drive is equipped with 2 lines display that helps in e-documentation, parameter description, error detailing and recovery documentation, etc.
- Advanced rotor position estimation which greatly minimizes the load during ard operations.
- Motor learning algorithm helps you to run the drive even for a motor with unknown details. Drive automatically detects the poles and encoder counts.
- The intelligent algorithm reduces the motor's heat at the long open and close end as low as 50% compared to other competitor's drives.
- Implemented with the world's first self-tuning algorithm that can automatically adjust its speed and torque s-curve based on the door header's inertia and door friction.
- Drive is designed to withstand 400V in case of neutral open which is common in 3 phase. Such design robustness is possible due to our long years of R & D experience.
- Integrated with standard protections during over-voltage, under-voltage cut-off, output short circuit, etc.
- Anti-pinch parameter setting helps to fine-tune the torque and door press during the sensor operation (sudden door open request while closing).
- Assured installation of door drive tuning in just less than 10mins. (user just needs to know how to operate the program keys.

3

Electrical installation

Chapter 3 Electrical Installation

3.1 Installation Environment

Item	Requirement
Ambient temperature	10 to 55DegC
Heat Dissipation	Mount the controller on the surface of incombustible objects with Sufficient room for heat dissipation. Install the controller base with the screws vertically.
Mounting location	Free from direct sunlight, high humidity and condensation
	Free from corrosive, explosive and combustible gas
	Free from oil dirt, dust and metal powder

3.2 Electrical Installation

Wiring and Description of Main Circuit Terminals

Figure 3 – 5 Main circuit terminal arrangement

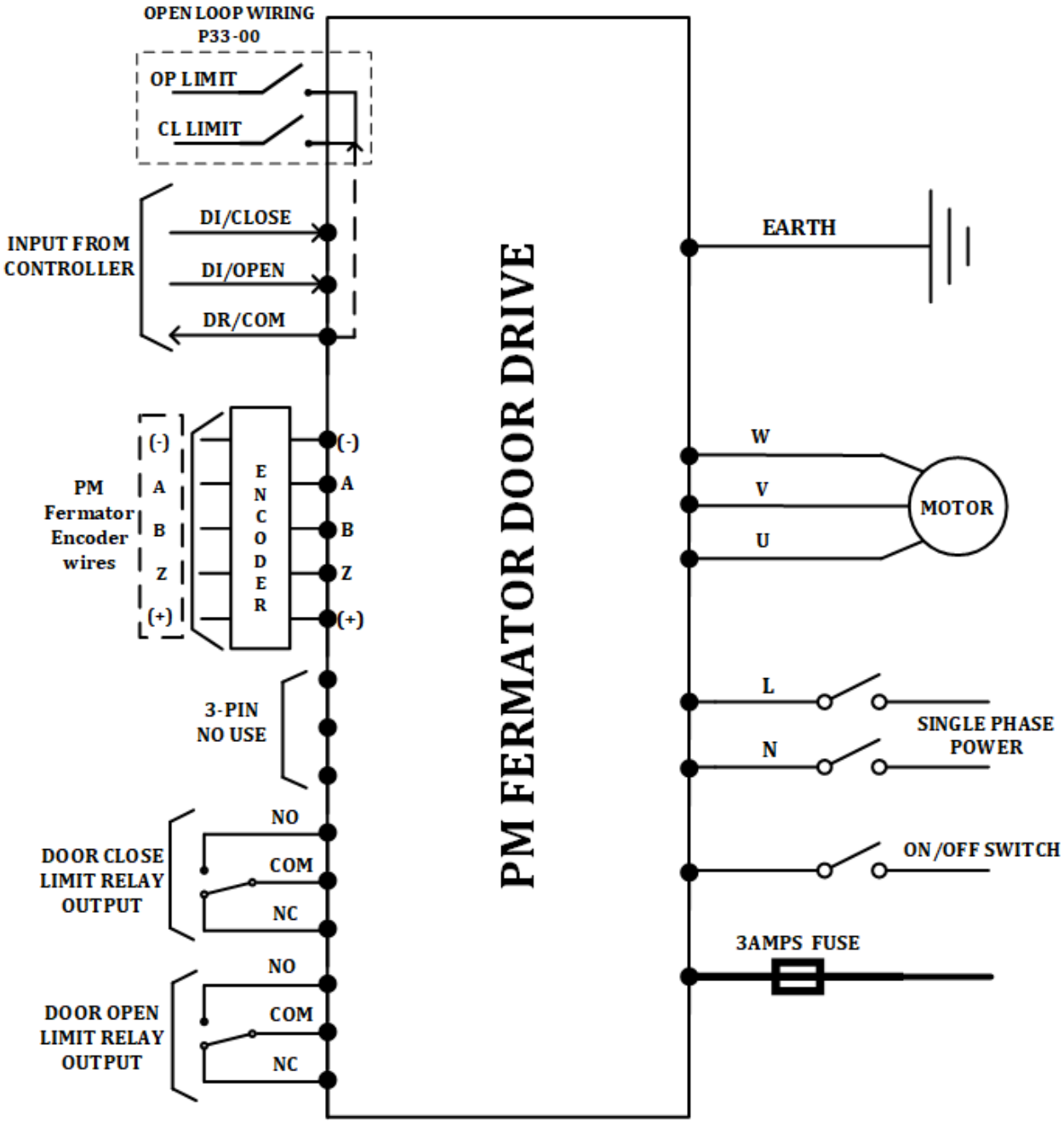


Figure 3 – 6 Main circuit terminal arrangement

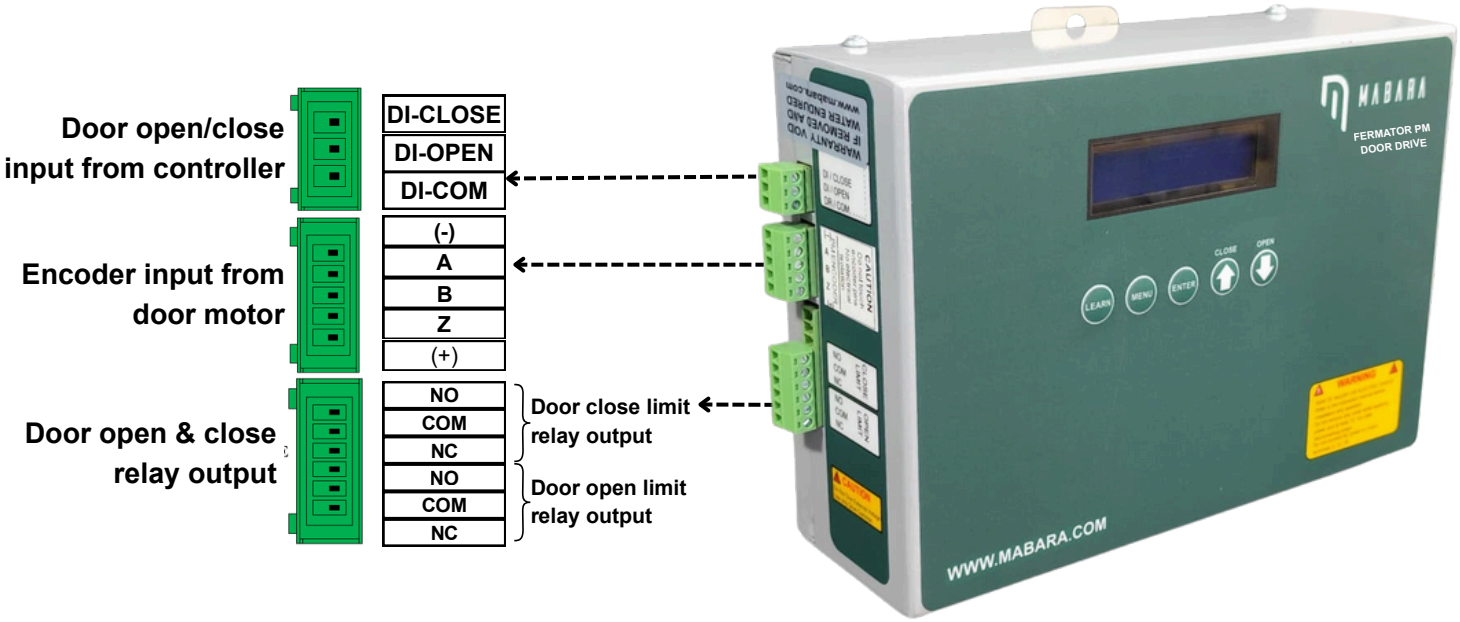


Figure 3 – 7 Main circuit terminal arrangement



Table 3-1 Main circuit terminal description

Terminal	Name	Description
L, N	Single-phase powering input terminals	Provide single-phase 220VAC power supply.
U,V,W	Controller output terminals	Connect the three-phase to motor.
⏚	Earth	Grounding terminal - Must be grounded.
DI CLOSE DI OPEN DRCOM	DI CLOSE/DI OPEN/DR COM	Input from controller
- A,B,Z +	PM ENCODER	Input from Door Motor
NO,COM,NC	RELAY OUTPUT	Door close limit relay output
NO,COM,NC	RELAY OUTPUT	Door open limit relay output
ON/OFF SWITCH	SWITCH	Switch for power on/off.
FUSE	FUSE	3A FUSE

4

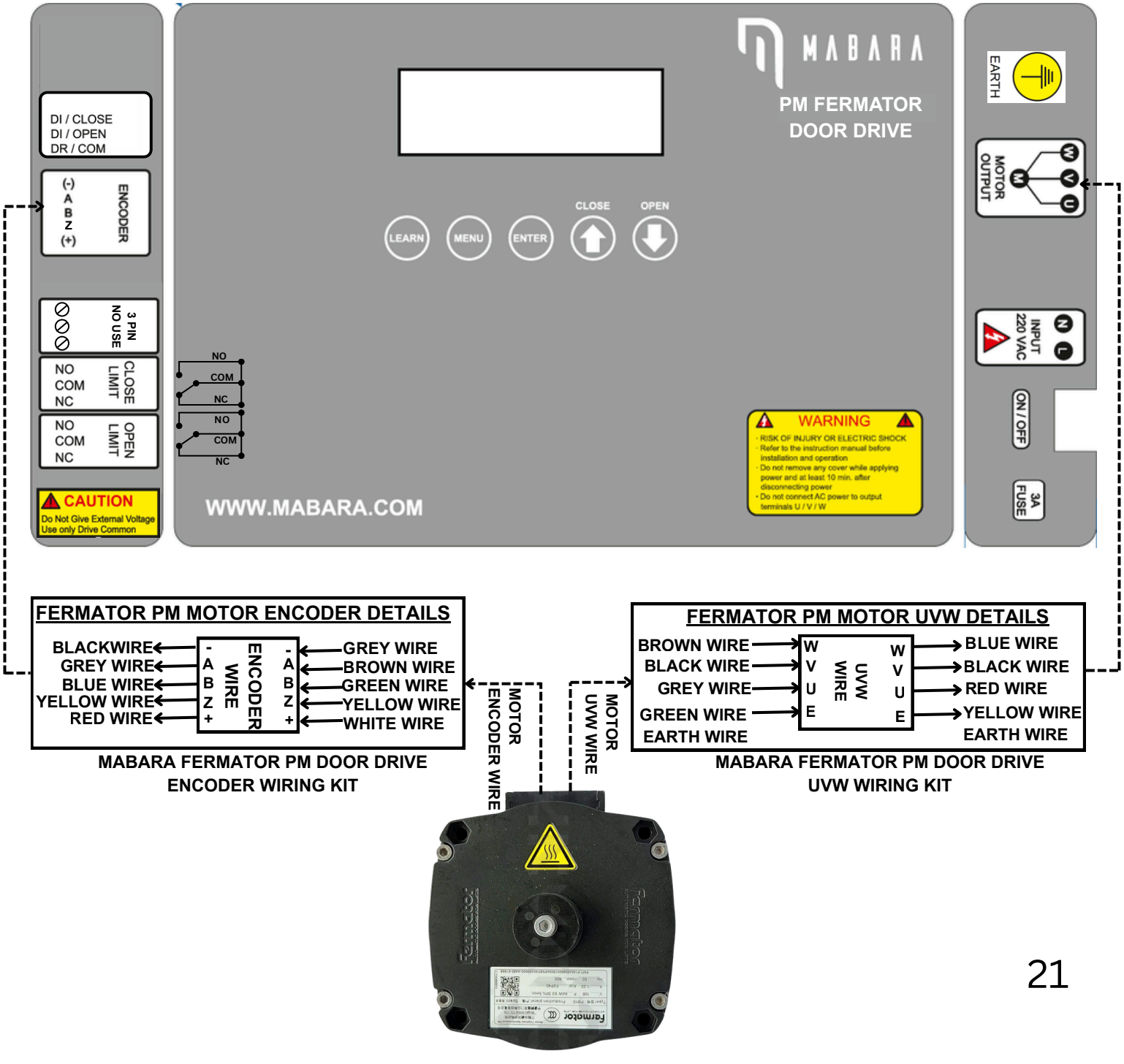
Operation and Trial Running

Chapter 4 Operation and Trial Running

4.1 Operation Panel

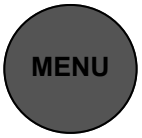
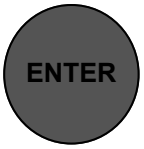
You can modify the parameters, monitor the working status and run or stop the controller by operating the operation panel shown as below:

Figure 4-1 Operation panel diagram



1. Description of Keys on the Operation Panel

Table 4 - 2 Description of keys on the operation panel

Key	Name	Function
	Door Learning	Learning the door. Press Learn button for 3 seconds.
	Menu	Menu to view the program settings.
	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.
Open 	Door open	Open the door in the operation panel operation mode.
Close 	Door close	Close the door in the operation panel operation mode.

4.2 Basic Operations

Operation Procedure of the Operation Panel

There are totally 5 switches in the Drive allows you to change the parameters, and to operate the door motor.

1.Learn:

- Take a car door and Landing door full close & Floor level.
- Remove command D/O, D/C, DR/Com in the drive.
- Now press and hold this which makes the drive to open & close the door once and "learns" the encoder counting.
- This count shall be seen in MAIN MENU → VIEW DATA → A : B : Z

2.Menu:

- This key selects the main menus. (1) Programme Setting, (2) Learning Data, (3) OBD Data, (4) View Data.
- PROG: It allows it set up various parameter settings starting from P00.
- To save the program, press menu button for LONG.
- OBD Data: Input and Output of the signals can be tested.
- View Data: You can see the real time values.
- Other than this menu, the general informations will be displayed all time.

3.Enter:

- To select the menu, press the Enter Button. Select UP/DOWN button can be further used to go inside the submenu contents.

4.Open (or) Up:

- This is used the scroll and change the data's in the submenu..
- Also Door Open operation can be done.

5.Close (or) Down:

- This is used the scroll and change the data's in the submenu..
- Also Door Close operation can be done.

Check the below intructions before power-on to ensure device and personal safety:

- The wiring is performed according to the instructions.
- All switches act reliably.
- Check the inter-phase resistance of the main circuit to ensure that there is no short circuit to ground.
- The mechanical installation is proper.

Connections:

- Connect the 2-pin connector (L, N) to a 220V AC single-phase power supply.
- Must connect the Earth wire in the drive (Yellow wire) and also connect motor earth wire.
- Connect the U, V, W door motor wires to the drive output.
- Connect the motor encoder to the 5-pin connector in the drive [- A B Z (+)].
- Manually open the car doors to 50%.
- Power ON.
- Display shows : "Ready."

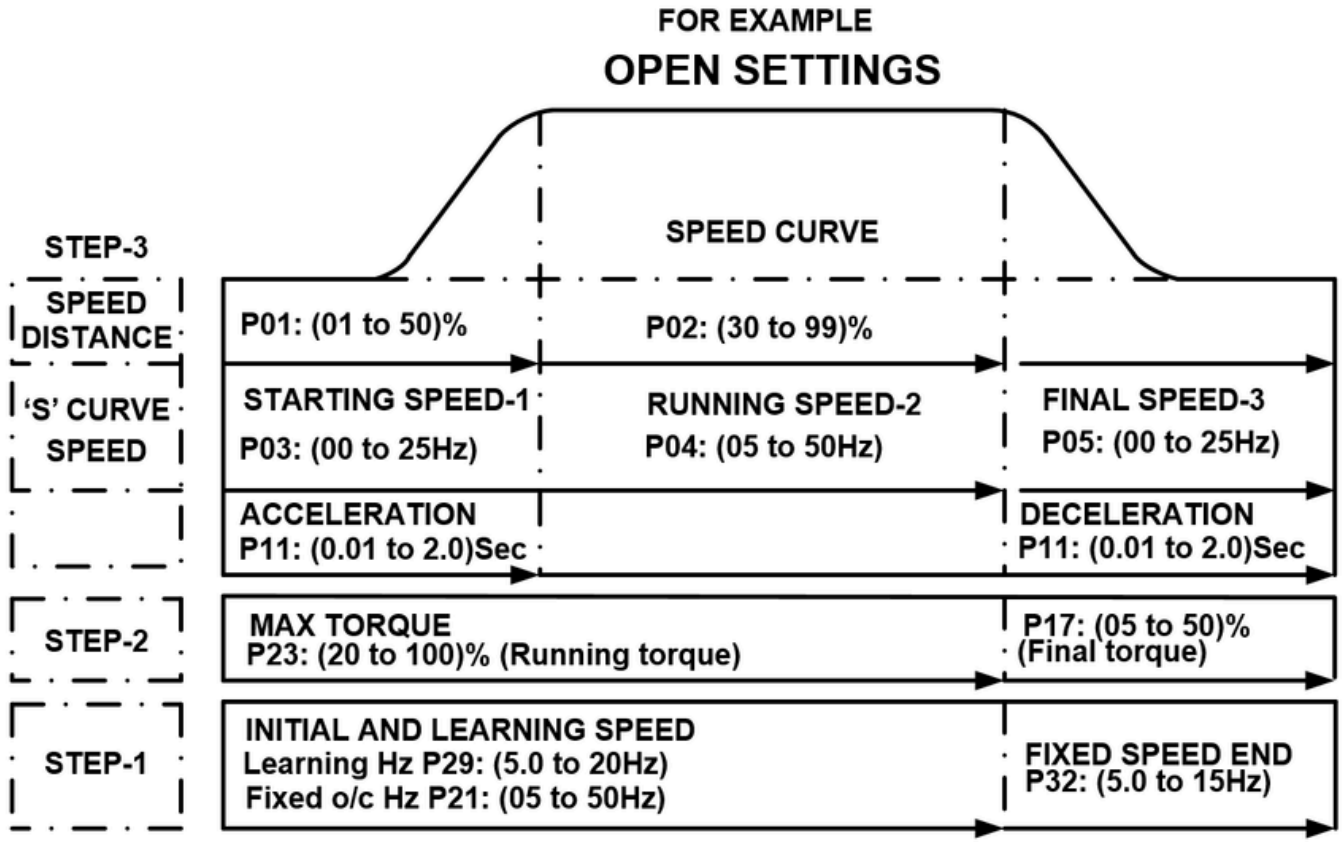
Step 1: Direction Check

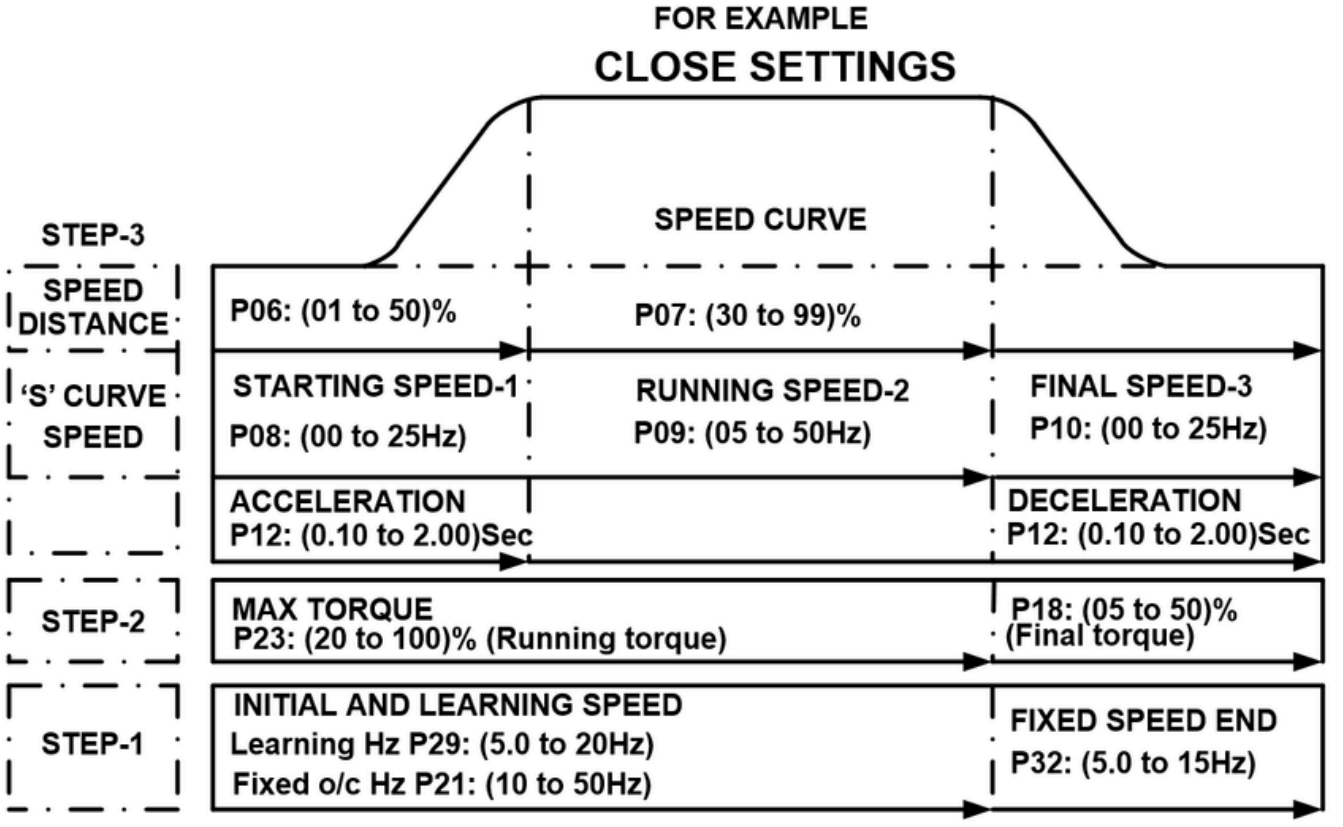
- Confirm the correct movement of the doors by pressing the Open or Close button.
- The doors should open when pressing "Open."
- The doors should close when pressing "Close."
- If an error appears or if the door movement is reversed, interchange any two wires of U, V, W in the drive, as well as Encoder [A, B].
- Again confirm the correct movement of the doors by pressing the Open or Close button.

Step 2: Learning Process

- Power OFF, then Power ON. The display should show "Ready."
- Press the Learn button for 2 seconds and wait until the door completes one full cycle of fully opening and fully closing.
- Data saved. OK.
- The learning process is now complete.
- Perform a trial run by pressing the Open/Close button twice (fully open and close).
- Connect the command input from the controller signals: DR/COM, DI/OPEN, and DI/CLOSE.
- Conduct a normal operation test and ensure proper door opening and closing on all floors.

4.3 Open and Closing Operations





5

Function code table

Chapter 5 Function code table

Chapter 5.1 Program setting

Mabara FOC drive FER PM					
MAIN MENU: 1 / 4 PROGRAM SETTINGS					
S.NO	PARAMETER	DESCRIPTION DISPLAY	USAGE	DEFAULT SETTING	DEFAULT SETTING
				CENTER OPENING	TELESCOPIC (SIDE OPENING)
1	P00	Scurve - User		1	1
2	P01	OpenStart %	S CURVE OPEN	1%	1%
3	P02	OpenEnd %		58%	70%
4	P03	OpenSpeed 1		5.0 HZ	8.0 HZ
5	P04	OpenSpeed 2		30.0 HZ	35 HZ
6	P05	OpenSpeed 3		4.0 HZ	6.5 HZ
7	P06	CloseStart %	S CURVE CLOSE	1%	8%
8	P07	CloseEnd %		60%	65%
9	P08	CloseSpeed 1		23.0 HZ	25 HZ
10	P09	CloseSpeed 2		23.0 HZ	35 HZ
11	P10	CloseSpeed 3		2.0 HZ	8.0 HZ
12	P11	Open Acc Time	TRANSIENT TIME	1.17 s	0.20 s
13	P12	Close Acc Time		1.12 s	1.05 s
14	P13	Final Open %		101%	101%
15	P14	Vac Correction		228 V	228 V
16	P15	Learn Count		10000	10000
17	P16	Trial Run Count	FOR TESTING PURPOSE	OO	OO
18	P17	OpenLock Torque	TORQUE SETTING	33%	42%
19	P18	CloseLock Torque		36%	36%
20	P19	Latch Input		O1	O1
21	P20	Motor POLES		10	10
22	P21	Fixed o/c Hz	FUNCTION ACTIVE ONLY FOR THE INITIAL OPEN/CLOSE SEQUENCE	15.0 HZ	10.0 HZ
23	P22	Align Torque		50%	50%
24	P23	Max Torque		100%	90%
25	P24	Carrier Freq		15KH	15KH
26	P25	Header Length		900 mm	800 mm
27	P26	LongClose Torque	TORQUE SETTING	0.60 fk	0.60 fk
28	P27	Lock Time	OP/CL LOCK DETECTION	0.40 s	0.50 s
29	P28	Motor Type		O2	O2
30	P29	Learning Hz	DOOR LEARN SPEED	10.0 HZ	8.0 HZ
31	P30	Motor Volt		110 V	110 V
32	P31	All PGG Default ?		OO	OO
33	P32	FixedSpeed - End	FUNCTION ACTIVE ONLY FOR THE INITIAL OPEN/CLOSE SEQUENCE	7.0 HZ	5.0 HZ
34	P33	FxOp Acc Time	FOR SENSOR PURPOSE	1.17s	1.17s
35	P34	FxCl Acc Time		1.12s	1.12s

Note: To save the program, press and hold the MENU button for a long press.

Chapter 5.2 Learning Data

MAIN MENU: 2 / 4 LEARNING DATA
Learn Count: • The door opening and closing length will be counted and saved here.

Chapter 5.3 OBD Data

MAIN MENU: 3 / 4 OBD DATA
OBD represents only for production purpose

Chapter 5.4 View data

MAIN MENU: 4 / 4 VIEW DATA
The View Data shows real time values for Motor and Drive like motor pulse, motor pole, etc.

Chapter 5.5 DEFAULT PROCEDURE:

- Switch ON the drive.
- Press the " **MENU** " button, **PROG SETTINGS** then press the " **ENTER** " button.
- Press the " **UP** " arrow until the program setting reaches → **All PGG Default? P18:00.**
- Press the " **ENTER** " button → P18 : 00 will start blinking.
- Press and hold the " **UP** " button until the display shows " **Default done**."
- Press and hold the " **MENU** " button for 2 seconds.
- The display will show " **Memory: PGG Data Saved ! !** "

Note: To save the program, press and hold the MENU button for a long press.

Note: All the frequency settings are normalized to 50Hz for ease of handling different types of motor with different operating frequency. For example 50Hz indicates as max operating output frequency (speed) which is factored based on the motor parameter. So the output frequency not necessarily should be the same as entered value in the functional settings.

6

Error Data & Recovery List

Chapter 6.1 Error recovery list

E-CODE	DESCRIPTION	EFFECT	RECOVERY
E00	HIGH VOLTAGE	MOTOR OFF	• Auto Reset • High voltage 275V AC & Recovery Voltage 265V AC • Normal voltage range 175-265V AC.
E01	LOW VOLTAGE	MOTOR OFF	• Auto Reset • Low voltage 165V AC & Recovery Voltage 175V AC • Normal voltage range 175-265V AC.
E02	HIGH BUS VOLTAGE	MOTOR OFF	• The drive must be turned OFF and then ON • High voltage 470V AC & Recovery voltage 410V AC • Normal voltage range 250-410V AC
E03	LOW BUS VOLTAGE	MOTOR OFF	• The drive must be turned OFF and then ON • Low voltage 100V AC & Recovery voltage 250V AC • Normal voltage range 250-410V AC
E04	HIGH CURRENT	MOTOR OFF	• Check motor current (M00) 80% for 30seconds • Do motor learning
E05	HIGH TEMPERATURE	MOTOR OFF	• Auto Recovery or Reset
E06	RESERVED	--	--
E07	RESERVED	--	--
E08	MEMORY ERROR	--	• Power OFF & ON issue remains, Go to the program settings in P18, set all PGG to default, and save the memory data
E09	RESERVED	--	--
E10	RESERVED	--	--
E11	FUSE FAILED	MOTOR OFF	• Contact the manufacturing company or forward it to the authorized service center for assistance
E12	KEY SWITCH ERROR	Indication	• Contact the manufacturing company or forward it to the authorized service center for assistance
E13	UVW SHORT	Permanent trip	• The drive must be switched OFF and ON • Check UVW wire connection • Check proper earthing condition
E14	RESERVED	--	--
E15	RESERVED	--	--
E16	UVW OPEN?	MOTOR OFF	• Check the UVW wire connection • Check all connector • Check the motor resistor • Restart the drive (Power OFF/ON)
E17	ADC ERROR	MOTOR OFF	• Contact the manufacturing company or forward it to the authorized service center for assistance
E18	RESERVED	RESERVED	--
E19	RESERVED	RESERVED	--

E20	S-CURVE ERROR	S-CURVE ERROR	• If early close lock is detected before the door closes:
			  ◦ Increase P10 (Close Speed 3), or
			  ◦ Increase P18 (Close Torque), or
			  ◦ Increase P27 (Lock Time).
			• If the issue still persists, check mechanical components.
			• Contact the manufacturing company or forward it to the authorized service center for assistance

Chapter 6.2 Learning Error Details and Solutions

For door learning error details:

E-CODE	DISPLAY	DESCRIPTION	EFFECT	RECOVER
LE1	LEARN : ERROR 1 Open Err	LONG OPEN ERROR	MOTOR OFF	• Check the motor belt for any damage or excessive stretching.
LE2	LEARN : ERROR 2 Close Err	LONG CLOSE ERROR	MOTOR OFF	• Check the motor belt for any damage or excessive stretching.
LE3	LEARN : ERROR 3 OP/CL cnt error	OPEN/CLOSE CNT ERROR	MOTOR OFF	• Check the encoder wire connections • Check the UVW wire connections
LE4	LEARN : ERROR 4	LEARNING PROCESS IS NOT COMPLETED	MOTOR OFF	• Do not press the Open or Close button while the learning process is in progress. • If this issue occurs, press the ENTER button and repeat the learning process.

7

Maintenance

Chapter 7.1 Maintenance

Routine Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the components inside the controller, which may cause potential faults or reduce the service life of the controller. Therefore, it is necessary to carry out routine and periodic maintenance.

CAUTION
The filter capacitors till has residual voltage after the power supply is cutoff.Thus do not repair or maintain the controller immediately.Wait atleast 10 minutes and ensure that the bus voltage measured by multimeter is not higher than 36 V.

Routine maintenance involves checking:

- Whether abnormal noise exists during motor running
- Whether the motor vibrates excessively
- Whether the installation environment of the controller changes
- Whether the cooling fan works properly
- Whether the controller overheats Routine cleaning

Involves:

- Keep the controller clean all the time.
- Remove the dust, especially metal powder on the surface of the controller, to prevent the dust from entering the controller.
- Clear the oil stain on the cooling fan of the controller.

Periodic Inspection:

Perform periodic inspection on the items that are difficult to check during running.Periodic inspection involves:

- Check and clean the air filter periodically.
- Check whether the screws become loose.
- Check whether the controller is corroded.
- Check whether the wiring terminals have arc signs.
- Carry out the main circuit insulation test.

MABARA WARRANTY AGREEMENT

Mabara provides an 12-months free warranty to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.
Within the warranty period, maintenance will be charged for the damage caused by the following reasons:

a. Improper use or repair/modification without prior permission
b. Fire, flood, abnormal voltage, natural disasters and secondary disasters
c. Hardware damage caused by dropping or transportation after procurement
d. Operations not following the user instructions
e. Damage out of the equipment (for example, external device factors)

The maintenance fee is charged according to the latest Maintenance Price List of Mabara.
If there is any problem during the service, contact Mabara's agent or Mabara directly.
Mabara reserves the rights for explanation of this agreement.

www.mabara.com

For more information, visit:

🌐 Website:

- www.mabara.com

📲 Facebook:

- https://tinyurl.com/Fermator-PM-facebook

📸 Instagram:

- https://tinyurl.com/Fermator-PM-Drive-Insta

📺 YouTube:

- https://tinyurl.com/Fermator-PM-Drive-Youtube

QR code:

Scan below QR code for Fermator PM drive parameter drive details



📍 **Address:**

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