L6 Series Electric Drive Products

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Shenzhen Megmeet Electrical Co., Ltd. provides professional technical support for our customers. You can contact the local branch office or customer service center, or directly contact the company headquarters.

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Foreword

Thank you for choosing L6 series electric drive products manufactured by Shenzhen Megmeet Electric Co., Ltd.

L6 series electric drive products have the following features for low voltage motors:

1. Optimized PID control algorithm implementation;

2. Adopt the electric differential speed control, which saves the front axle and differential and makes the control more flexible;

3. Advanced pulse width modulation technology to ensure high efficiency of battery utilization and reduce loss of motor energy consumption and torque conversion;

4. The online programming of the product can guarantee the upgradability of the product;

5. Through accurate speed closed loop and position closed loop control, tire wear can be minimized and the service life of the equipment can be extended;

6. Using the CAN bus communication technology used in the automobile, it has the characteristics of large communication data, fast communication speed, good fault tolerance and high reliability;

7. By detecting the steering angle of the steering wheel and different vehicle speeds, the control strategy independently developed by MEGMEET is used to realize different functions such as turning, speed limiting and braking recovery. In addition, according to the different needs of customers, ESP electronic body stabilization function can be realized;

8. Battery electrode reverse connection protection, output drive short circuit, charging fault alarm, overheat protection, contactor adhesion alarm provides protection for motor and electronic control;

9. With the development of automation and intelligence in the future, the technology and products can be applied to high-power AGV systems, automatic forklift control systems, battery touring buses, golf carts, lawn mowers, cleaning vehicles, etc., realizing intelligent, unmanned development;

10. It can be directly connected to the host computer to monitor the running status of the vehicle in real time;

11. The product is completely autonomous design and can be customized according to customer needs. Highlight the customer's product features;

12. Compared with foreign products, this product has higher cost performance and the overall cost can be close to the counterbalance forklift, but the flexibility is better than the counterbalance forklift.

The relevant precautions during the installation, wiring, parameter setting, troubleshooting and daily maintenance will be detailed in this manual. To ensure the correct installation and operation of the L6 series electric drive products as well as its high performance, please read carefully this user manual before installing the equipment. This manual shall be kept properly and delivered to the actual users of the product.

Precautions for unpacking inspection

Please check carefully when unpacking the product:

- Whether the product has the damage signs;
- Whether the rated value in the nameplate is consistent with your order requirement.

We have implemented strict inspection on the manufacturing, package and delivery of the product. If there is any error, please contact us or your distributor immediately.

We are engaged in the continuous improvement of the product. The relevant manuals provided by us are subject to change without prior notice.

Safety precautions

Operation without following instructions can cause death or severe personal injury.

Operation without following instructions can cause medium or slight personal injury or damage to the product and other equipment.

- Please install the product on the incombustible materials (e.g., metal), otherwise, fire may be caused.
- Do not place any combustible material near the product, otherwise, fire may be caused.
- Do not install the product in the environment with explosive gas, otherwise, explosion may be caused.
- Only qualified personnel can wire the product, otherwise, electric shock may be caused.
- Never wire the product unless the input AC supply is completely disconnected, otherwise, electric shock may be caused.
- The grounding terminal of the product must be reliably grounded, otherwise, electric shock may be caused.
- The cover must be properly closed before power-up, otherwise, electric shock and explosion may be caused.
- When powering up the product that has been stored for over 2 years, the input voltage must be gradually increased with the voltage regulator, otherwise, electric shock and explosion may be caused.
- Do not touch the terminals when the product is powered up, otherwise, electric shock may be caused.
- Do not operate the product with wet hands, otherwise, electric shock may be caused.
- Maintenance operation can not be conducted until 10 minutes has passed after disconnecting the power supply. Meanwhile, be sure to confirm that the charge LED is completely off and the DC bus voltage is below 36V, otherwise, electric shock may be caused.
- Only qualified personnel can replace the components. Do not leave any wire or metal parts inside the

product, otherwise, fire may be caused.

- After changing the control board, the parameters must be properly set before operating the product, otherwise, property damage may be caused.
- The bare parts of the terminal lugs in the main circuit must be wrapped with insulation tape, otherwise, electric shock may be caused.

WARNING

- When carrying the product, protect the operation panel and the cover against any stress, otherwise, the product may drop and cause human injury or property damage.
- Please install the product on the place that can withstand the weight of the product, otherwise, the product may drop and cause human injury or property damage.
- Do not install the product in the environment with water splash (e.g., near the water pipe), otherwise, you may suffer the property loss.
- Take care not to drop any foreign objects, such as the screws, gaskets and metal bars, into the product, otherwise, fire and property damage may be caused.
- Do not install and operate the product if it is damaged or its components are not complete, otherwise, fire and human injury may be caused.
- Do not install the product in the place exposed to direct sunlight, otherwise, property damage may be caused.
- Cable lugs must be firmly connected to the terminals of main circuit, otherwise, property damage may be caused.

Contents

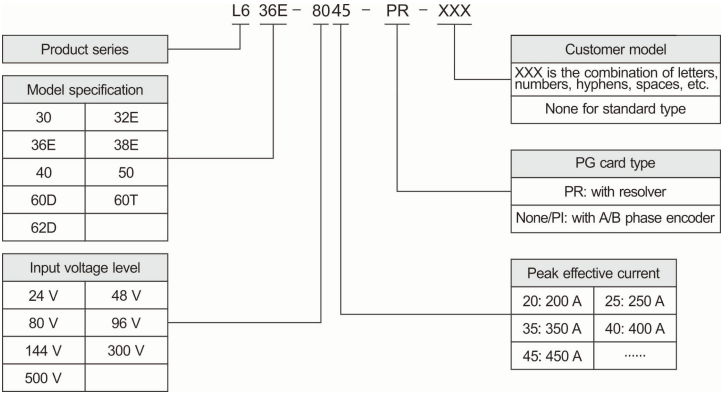
Chapter 1 Introduction of L6 Series Electric Drive Products

1.1 Product introduction

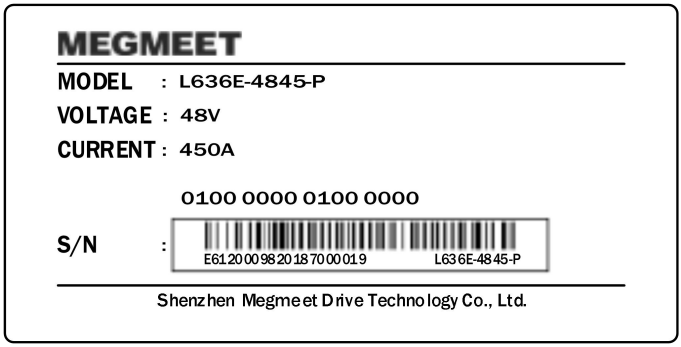
This series of electric drive products is a low voltage DC input, high current output AC motor electric drive product, powered by a battery system, can be used in electric forklifts, battery touring buses, golf carts, lawn mowers, cleaning cars, AGV cars and various small passenger cars.

1.2 Product model

The description of the electric drive product model on the nameplate indicates the information of the product, such as product series, voltage class of power supply, power class, the software/hardware code of customized product, etc.



1.3 Product nameplate



1.4 Product series

Table 1-1 Product name and model

Model	Voltage level	Operating voltage range	Power supply starting voltage	Output current				DC pump output current	IP rating	Cooling method
				1 hour	2 min	1 min	30 s	2 min		
L630-2424-Z	24VDC	20V~28V	18V	80A	240A	*	*	*	IP65	Natural cooling
L630-2428	24VDC	20V~28V	18V	84A	280A	*	*	*	IP65	Natural cooling
L630-2428-Z	24VDC	20V~28V	18V	84A	280A	*	*	*	IP65	Natural cooling
L632E-2420	24VDC	20V~28V	18V	150A	200A	*	*	*	IP65	Natural cooling
L632E-2437	24VDC	20V~28V	18V	185A	375A	*	*	*	IP65	Natural cooling
L632E-4827	48VDC	33V~60V	28.8V	120A	275A	*	*	*	IP65	Natural cooling
L632E-4835	48VDC	33V~60V	28.8V	150A	350A	*	*	*	IP65	Natural cooling
L636E-4845	48VDC	33V~60V	28.8V	175A	450A	*	*	*	IP65	Natural cooling
L636E-8025	80VDC	56V~96V	48V	100A	250A	*	*	*	IP65	Natural cooling
L636E-8035	80VDC	56V~96V	48V	120A	350A	*	*	*	IP65	Natural cooling
L636E-8040	80VDC	56V~96V	48V	135A	400A	*	*	*	IP65	Natural cooling
L636E-8045	80VDC	56V~96V	48V	150A	450A	*	*	*	IP65	Natural cooling
L636E-9620	96VDC	72V~120V	65V	90A	200A	*	*	*	IP65	Natural cooling
L636E-1420	144VDC	105V~165V	100V	90A	200A	*	*	*	IP65	Natural cooling
L638E-4865	48VDC	33V~60V	28.8V	200A	650A	*	*	*	IP65	Natural cooling
L638E-8050	80VDC	56V~96V	48V	155A	500A	*	*	*	IP65	Natural cooling
L638E-8065	80VDC	56V~96V	48V	200A	650A	*	*	*	IP65	Natural cooling
L638E-9650	96VDC	72V~120V	65V	155A	500A	*	*	*	IP65	Natural cooling
L638E-1435	144VDC	105V~175V	96V	100A	350A	*	*	*	IP65	Natural cooling
L638E-1450	144VDC	105V~175V	96V	135A	*	500A	*	*	IP65	Natural cooling
L640-4D12	300VDC	250V~410V	*	53A	*	110A	*	*	IP67	Natural cooling
L640-4D20	300VDC	250V~410V	*	96A	*	192A	*	*	IP67	Air cooling

L640-4D30	320VDC	250V~410V	*	120A	*	*	260 A	*	IP67	Water cooling
L650-5D60	500VDC	450V~600V	*	150A	*	*	300 A	*	IP67	Water cooling
L650-5D90	500VDC	450V~600V	*	225A	*	*	450 A	*	IP67	Water cooling
L650-5DB0	500VDC	450V~600V	*	300A	*	*	600 A	*	IP67	Water cooling
L660D-2420	24VDC	20V~28V	18V	2*80A	2*200A	*	*	*	IP65	Natural cooling
L660D-2424	24VDC	20V~28V	18V	2*85A	*	2*240A	*	*	IP65	Natural cooling
L660D-2428	24VDC	20V~28V	18V	2*90A	*	2*280A	*	*	IP65	Natural cooling
L660T-2420	24VDC	20V~28V	18V	2*80A	2*200A	*	*	280A	IP65	Natural cooling
L660T-2424	24VDC	20V~28V	18V	2*85A	*	2*240A	*	280A	IP65	Natural cooling
L660T-2428	24VDC	20V~28V	18V	2*90A	*	2*280A	*	280A	IP65	Natural cooling
L662D-4827	48VDC	33V~60V	28.8V	2*100A	2*270A	*	*	*	IP65	Natural cooling
L662D-4835	48VDC	33V~60V	28.8V	2*120A	2*350A	*	*	*	IP65	Natural cooling
L662D-4840	48VDC	33V~60V	28.8V	2*130A	2*400A	*	*	*	IP65	Natural cooling
L662D-4845	48VDC	33V~60V	28.8V	2*150A	2*450A	*	*	*	IP65	Natural cooling
L662D-8025	80VDC	56V~96V	48V	2*100A	2*250A	*	*	*	IP65	Natural cooling
L662D-8035	80VDC	56V~96V	48V	2*120A	2*350A	*	*	*	IP65	Natural cooling
L662D-8040	80VDC	56V~96V	48V	2*130A	2*400A	*	*	*	IP65	Natural cooling
L662D-8045	80VDC	56V~96V	48V	2*150A	2*450A	*	*	*	IP65	Air cooling

Note: * indicates that there is no such parameter.

1.5 Technical specifications of product

Table 1-2 Technical specifications of product

Control features	Control mode	Closed loop vector, IF mode, VF mode
	Maximum output frequency	300Hz
Product functions	Basic frequency	0Hz~300.0Hz
	Startup frequency	0Hz~60.00Hz
	PWM frequency	16kHz
	Logic port DI input current	10mA
	Over temperature protection	Pre-alarm at 75° C, cut off at 95° C

	Radiator insulation strength	500Vac
	Protection degree	IP65
	Cooling mode	Natural cooling (vehicle large heat sink), otherwise forced air cooling is required
	Application place	Used for a variety of electric vehicles, including material handling vehicles, industrial vehicles, golf carts, off-highway vehicles and other low-speed vehicles.
	Battery status	Have
	Timer function	Have
	Host computer detection function	Waveform status detection, IO port status detection, parameter online upload, download
	CANopen communication	High-speed CAN communication, stable and timely monitoring of the working status of the electric drive product
	Handheld controller	Programmable control of the electric drive product through the handheld controller
Protection function	Over-voltage protection; over-current protection; over-temperature protection; power-on open circuit protection; tire angle sensor fault; accelerator pedal fault; overload protection; contactor suction fault; contactor open fault; long charging time protection; charging failure protection; current detection abnormal protection; KSI startup abnormal protection; encoder fault; CAN communication fault.	
Environment	Operating site	No condensation, icing, rain, snow, hail, etc., solar radiation is less than 700W/m2, air pressure is 70~106kPa.
	Altitude	Used at the place lower than 1000m (derated at the place above 1000m, derated 1% for every increase of 100m)
	Ambient temperature	-30℃~+50℃ (derated when used in the ambient temperature of 40℃~50℃)
	Humidity	5%~95%RH, non-condensing
	Vibration	Less than 9.8m/s^2(1g)
	Storage temperature	-40℃~+70℃

1.6 Outline, mounting dimensions and gross weight of the product

The dimensions of the electric drive product are as follows:

L630-2424-Z model

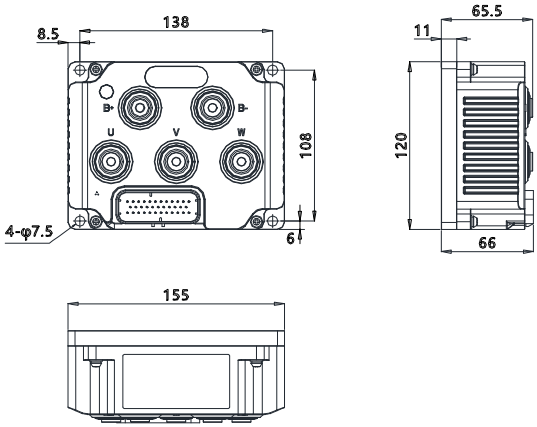


Fig.1-1 Outline, mounting dimensions of L630-2424-Z

L630-2428 model

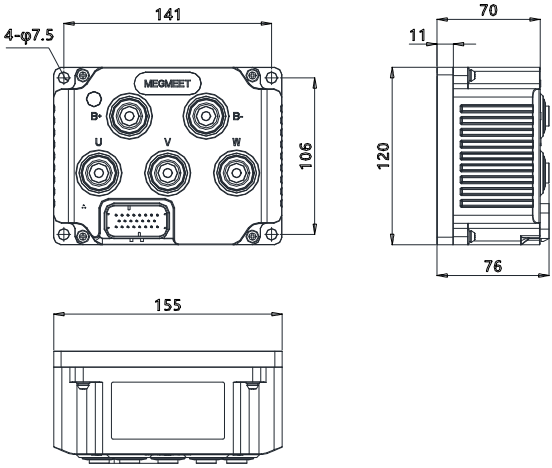


Fig.1-2 Outline, mounting dimensions of L630-2428

L630-2428-Z model

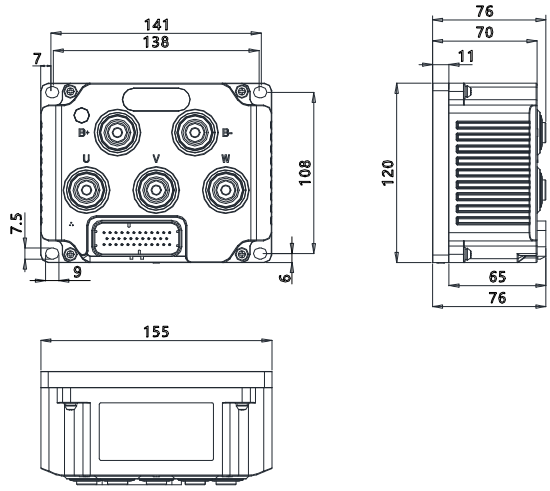


Fig.1-3 Outline, mounting dimensions of L630-2428-Z

L632E model

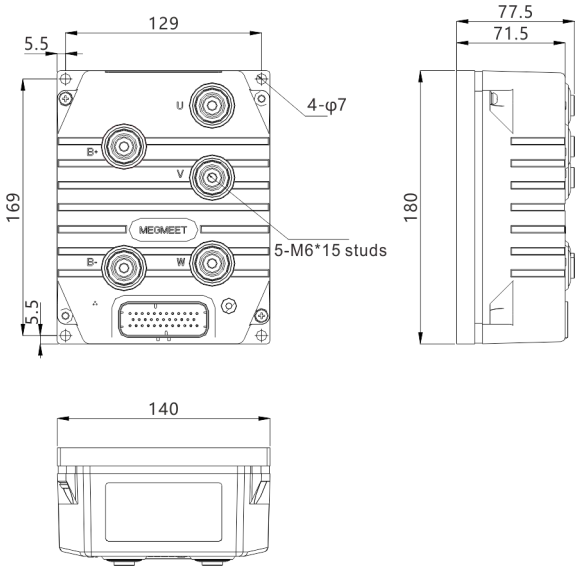


Fig.1-4 Outline, mounting dimensions of L632E

L636E model

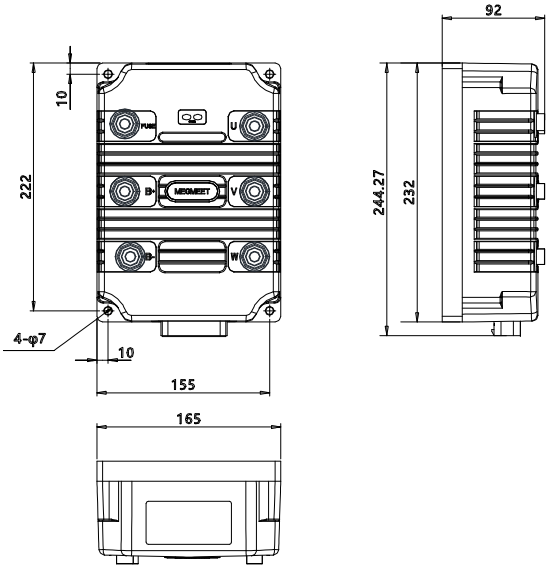


Fig.1-5 Outline, mounting dimensions of L636E

L638E model

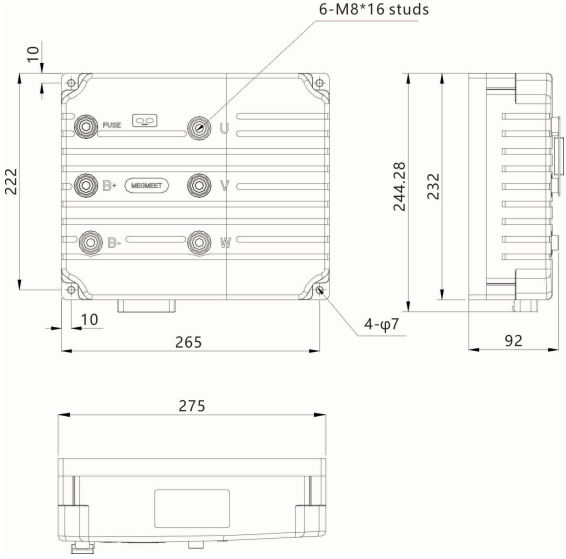


Fig.1-6 Outline, mounting dimensions of L638E

L640 model (natural cooling)

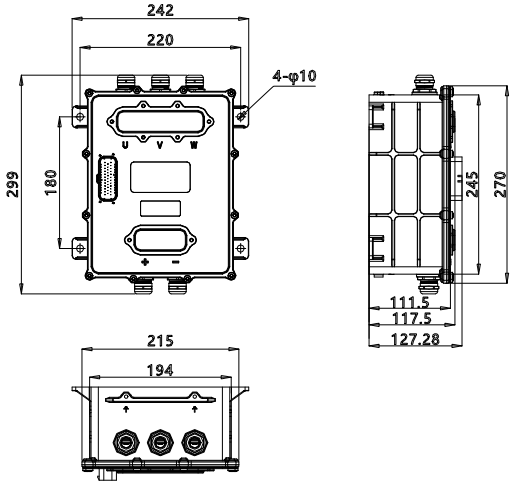


Fig.1-7 Outline, mounting dimensions of L640 (natural cooling)

L640 model (air cooling)

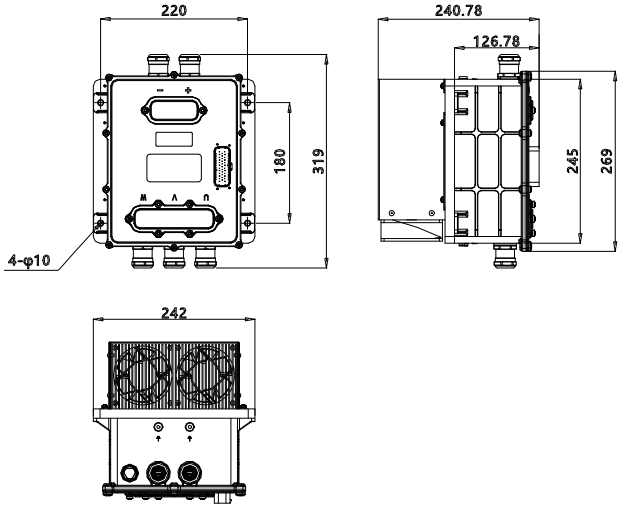


Fig.1-8 Outline, mounting dimensions of L640 (air cooling)

L640 model (water cooling)

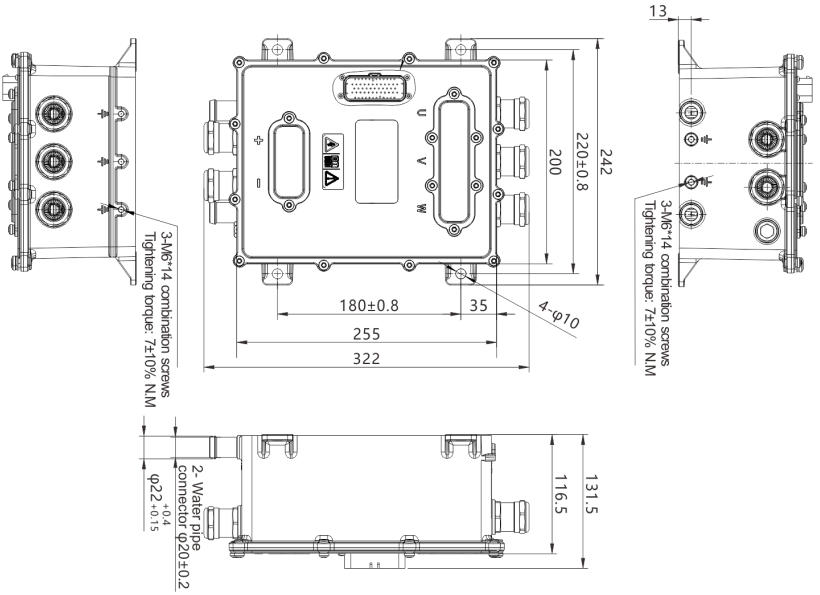


Fig.1-9 Outline, mounting dimensions of L640 (water cooling)

L650 model

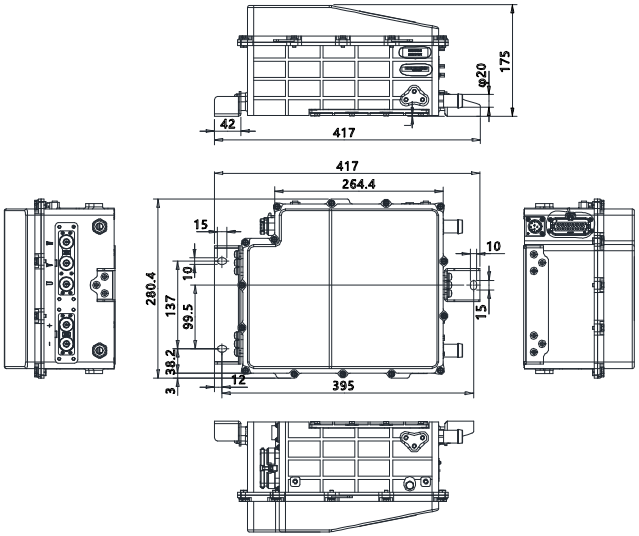


Fig.1-10 Outline, mounting dimensions of L650

L660D/T model

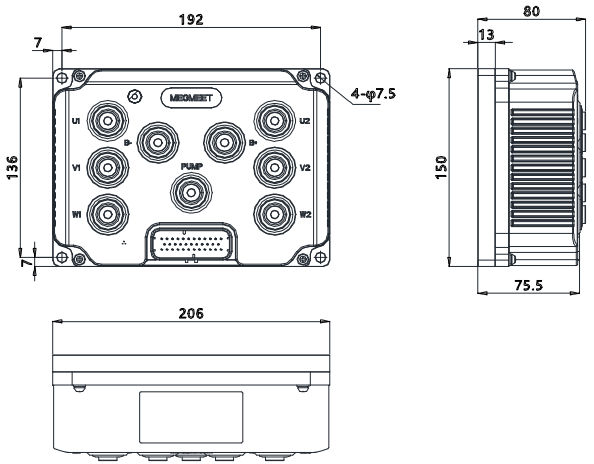


Fig.1-11 Outline, mounting dimensions of L660D/T

L662D model

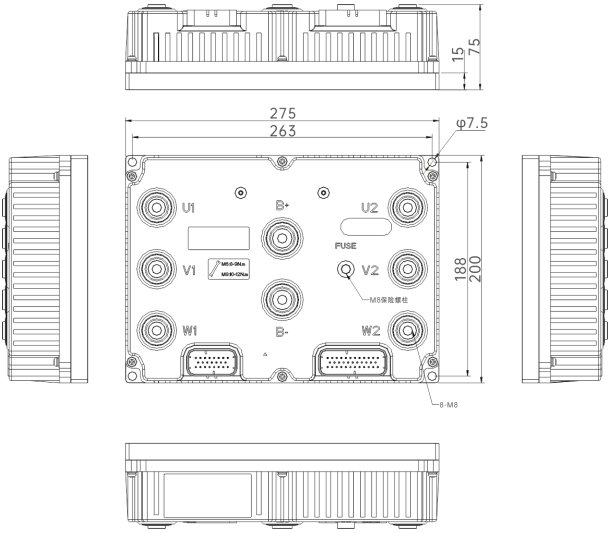


Fig.1-12 Outline, mounting dimensions of L662D

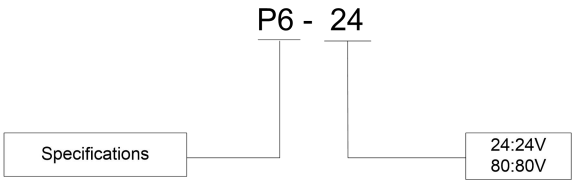
Table 1-3 Outline, mounting dimensions and gross weight

Model	Gross weight (kg)	Dimension (mm)
L630-2424-Z	1.25	155*120*66

L630-2428	1.5	155*120*76
L630-2428-Z		
L632E-2420	2.23	180*140*73.5
L632E-2437		
L632E-4827		
L632E-4835		
L636E-4845	4.12	232*165*92
L636E-8025		
L636E-8035		
L636E-8040		
L636E-8045		
L636E-9620		
L636E-1420		
L638E-4865	6.37	232*275*92
L638E-8050		
L638E-8065		
L638E-9650		
L638E-1435		
L638E-1450		
L640-4D12	5.6	299*242*127.28
L640-4D20	5.6	319*242*240.78
L640-4D30	5.4	322*242*131.5
L650-5D60	11.5	417*280.4*175
L650-5D90		
L650-5DB0		
L660D-2420	2.48	206*150*69.3
L660D-2424		
L660D-2428		
L660T-2420		
L660T-2424		
L660T-2428		
L662D-4827	5.36	275*200*75
L662D-4835		
L662D-4840		
L662D-4845		
L662D-8025		
L662D-8035		
L662D-8040		
L662D-8045		

1.7 MEGMEET electric drive product instrumentation

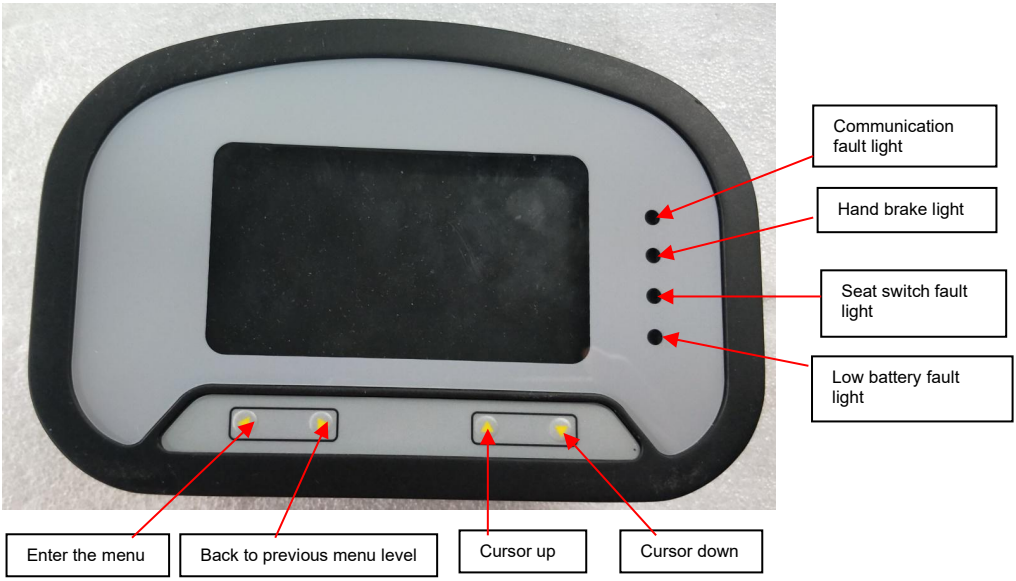
1.7.1 Product model description



1.7.2 Product series

Model	Voltage level	Operating voltage range	Power supply starting voltage	IP rating	Operating ambient temperature	Cooling method
P6-24	24VDC	11V~48V	11V	IP65	-20℃~+70℃	Natural cooling
P6-80	80VDC	48V~90V	48V			

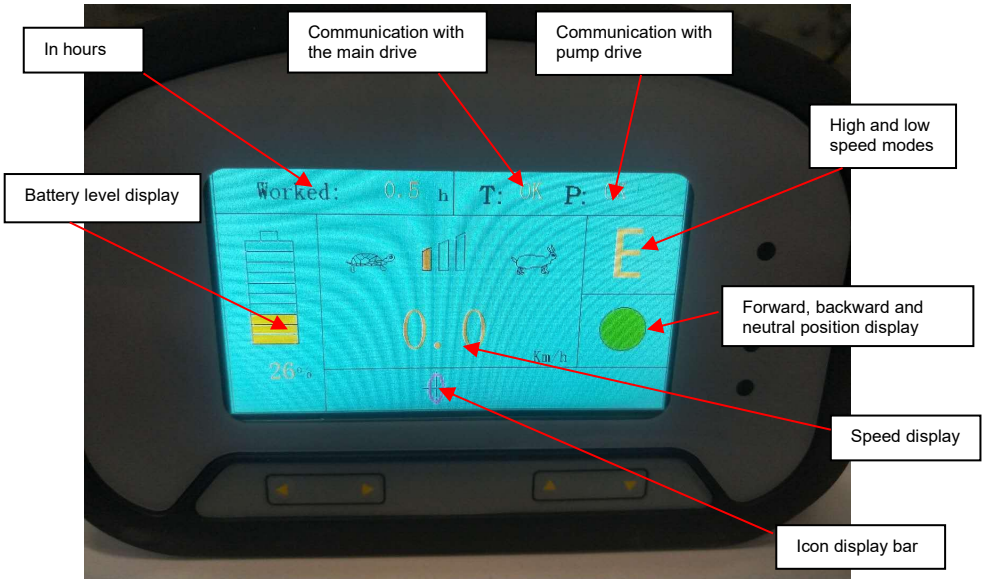
1.7.3 Features



Description of fault light flashing

No.	Fault light	Fault description	Troubleshooting
1	Communication fault light flashing	The communication between the instrumentation and the electric drive product is abnormal.	Check whether the communication cable is connected correctly
2	Handbrake light stays on	The handbrake switch is pulled up	Release the handbrake switch
3	Seat fault light flashing	Driver leaves the seat	The driver needs to be seated correctly in the driver's seat
4	Battery fault light flashing	Battery level is below 15%	Need to charge the battery

1.7.4 Main interface



1. Battery level display, display value is 0% ~ 100%;
2. WORKED: The instrumentation 's working time is counted, and it starts to count after power on;
3. T: The communication status with the main drive is displayed, OK is displayed when the communication is normal, and a corresponding fault function code appears when the communication is abnormal;
4. P: The communication status with the pump drive is displayed, OK is displayed when the communication is normal, and a corresponding fault function code appears when the communication is abnormal;
5. ●: Gear status display. When the lever is turned, three states ⇧ (forward), ● (neutral) and ⇩ (backward) are displayed.
6. 0.0Km / h: Vehicle running speed display.

1.7.5 Menu interface

1.First-level menu bar

Entry method: In the case of the main interface, press ▶ key once to enter the first-level menu. The first-level menu includes the “TESTER” and “SETTING” second-level menus.

Exit method: Press ◀ once to exit the menu and return to the main interface.

2. TESTER second-level menu bar

Entry method: With the cursor in "TESTER", press the ◀ key once to enter the second-level menu; the "TESTER" submenu includes "CURRENT (output current)", "MOTOR SPEED (motor speed)", "MOTOR TEMP (Motor temperature), CNTRL TEMP (drive temperature).

Exit method: press ◀ key once to return to the first-level menu, press ◀ again to exit the menu and return to the main interface.

3. SETTING second-level menu bar

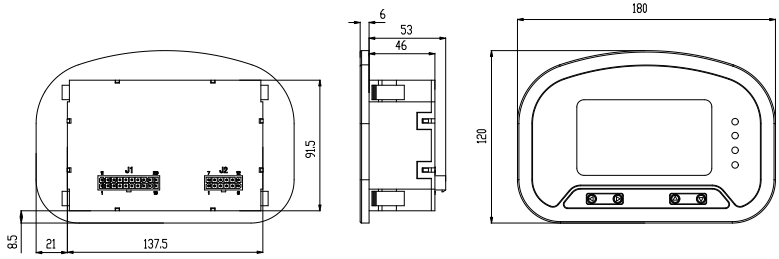
The second-level menu bar is mainly used to modify the parameters. You need to enter the password before changing the parameters.

Entry method: In the case of the main interface, press ▶ once, then press ▼ again, move the cursor to SETTING, and then press ▶ to enter the hour meter clear input password interface, press ▲ key, enter the first password, and then press ▼ to enter into the second password change, input the four digit password in sequence, and press the ▶ confirm button to clear the hour meter.

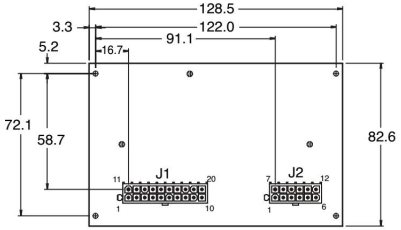
Exit method: press ◀ key once to return to the first-level menu, press ◀ again to exit the menu and return to the main interface.

1.7.6 Dimensions

Length * width * height = 180mm * 120mm * 58.5mm



1.7.7 Terminal definition



Pin	Definition	Description
J1-PIN1	BATTERY+	Connect to battery positive, 18-90V DC input
J1-PIN2	BATTERY-	Connect to battery negative, 0V
J1-PIN3	SENDER1	0-3.3V analog input
J1-PIN4	SENDER2	0-3.3V analog input
J1-PIN5	SENDER3	0-5V analog input
J1-PIN6	SENDER4	0-5V analog input
J1-PIN7	Switched-input1	Digital input 1, active high
J1-PIN8	Switched-input2	Digital input 2, active high
J1-PIN9	Switched-input3	Digital input 3, active high
J1-PIN10	Switched-input4	Digital input 4, active high
J1-PIN11	Switched-input5	Digital input 5, active high
J1-PIN12	Switched-input6	Digital input 6, active high
J1-PIN13	KEY-Switched-input	Key switch input, active high
J1-PIN14	Mosfet-out1	Drive output 1, open collector
J1-PIN15	Mosfet-out2	Drive output 2, open collector
J1-PIN16	Mosfet-out3	Drive output 3, open collector

J1-PIN17	NC	
J1-PIN18	SENDER	0-5V analog input
J1-PIN19	NC	
J1-PIN20	NC	

Pin	Definition	Description
J2-PIN1	CAN-H	Communication with the electric drive product CAN-H
J2-PIN2	CAN-L	Communication with the electric drive product CAN-L
J2-PIN3	GND	Connect to battery negative
J2-PIN4		
J2-PIN5	CAN-H	CAN communication terminal resistance strobe, short with J2-PIN6 when needed
J2-PIN6	CAN-TERM	CAN communication terminal resistance strobe, short with J2-PIN5 when needed
J2-PIN7	RS485-	Reserved for 485- communication, for external card charging terminal
J2-PIN8	RS485+	Reserved for 485+ communication, for external card charging terminal
J2-PIN9		
J2-PIN10	GND	Grounding
J2-PIN11		
J2-PIN12	+7Vout	7V power output, output current 0.1A

1.8 Product use environment and installation requirements

When selecting the installation environment, the following issues should be taken into account:

• The electric drive product should be fixed on a clean and flat metal plate, and evenly apply a proper amount of thermal silica between the bottom of the electric drive product and the metal plate. The metal plate is generally selected from an aluminum plate.

• The installation position of the electric drive product should be selected where the ventilation and heat dissipation are good.

• Keep the electric drive product and its vicinity clean.

• The ambient temperature should be within -20℃~50℃. If the temperature exceeds 50℃, external forced cooling or derating is required.

• The humidity should be less than 95%RH, non-condensing.

• The vibration at the installation place should be less than 5.9m/s^2(0.6g).

• The device should be protected from the direct sunlight.

• Do not install the device in the place with corrosive gas and explosive gas.

Electrical connection requirements:

• The main fuse and control loop fuse must be installed, and the specifications should match the maximum current value of the electric drive product;

• The wiring between the motor, battery and electric drive product is as short as possible, and the connection should be parallel;

• Small current cables should be kept away from large current cables and must be crossed in orthogonal directions;

• The CAN communication bus must be twisted pair. We recommend twisted pair with shield.

 **DANGER** All switches must be in the disconnection position. Live operation is strictly prohibited!

If there is any special installation requirement, please consult our company.

Chapter 2 Wiring of Electric Drive Product

This chapter introduces the wiring and cable connection of the electric drive product, as well as the issues needing attention.

DANGER
• Do not open the cover until the power supply of the electric drive product is completely disconnected for at least 10 minutes. • Make sure that the internal wiring be conducted only when the voltage between the main circuit terminals +DC and -DC is below 36V. • Only the well-trained and authorized personals are allowed to perform the internal wiring of the electric drive product. • Check the wiring carefully when connecting the emergency stop or safety circuit. • Check the voltage level of the electric drive product before power-on, otherwise, human injury and death or equipment damage may be caused.

WARNING
• Check carefully whether the rated input voltage of the electric drive product is consistent with the AC power voltage before power-on. • The electric drive product has passed the dielectric strength test before delivery. Do not conduct this test again. • Do not connect the AC supply cables to the output terminals U, V and W.

2.1 Wiring and configuration of main circuit terminals

2.1.1 Types of main circuit input/output terminals

L630-2424-Z model

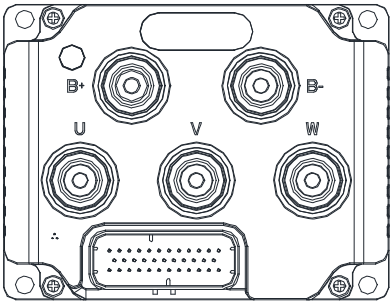


Fig. 2-1 L630-2424-Z model appearance

Table 2-1 L630-2424-Z model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L630-2428 model

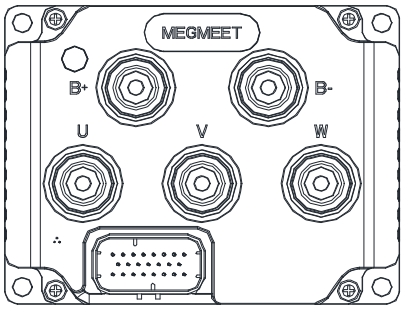


Fig. 2-2 L630-2428 model appearance

Table 2-2 L630-2428 model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L630-2428-Z model

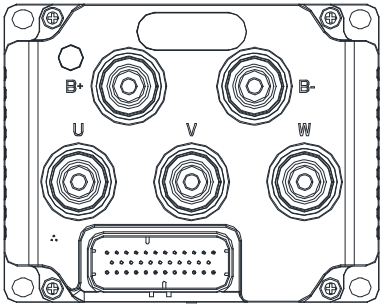


Fig. 2-3 L630-2428-Z model appearance

Table 2-3 L630-2428-Z model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L632E model

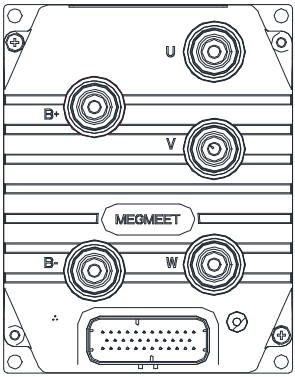


Fig. 2-4 L632E model appearance

Table 2-4 L632E model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L636E model

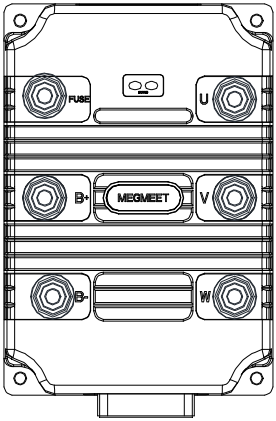


Fig. 2-5 L636E model appearance

Table 2-5 L636E model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L638E model

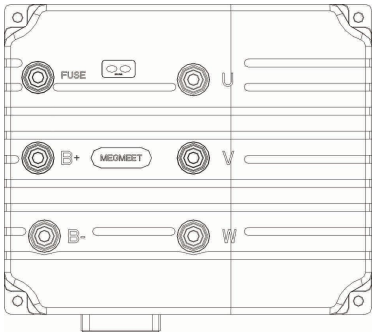


Fig. 2-6 L638E model appearance

Table 2-6 L638E model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L640 model (natural cooling)

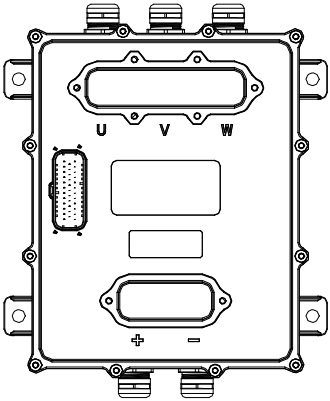


Fig. 2-7 L640 model appearance (natural cooling)

Table 2-7 L640 model main circuit interface definition (natural cooling)

Terminal	Function
+	Electric drive product positive bus input, connect the positive terminal of the battery
-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L640 model (air cooling)

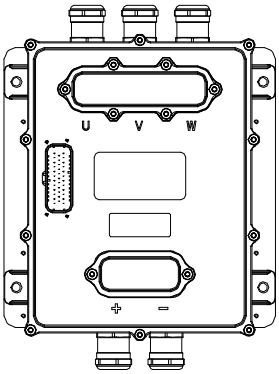


Fig. 2-8 L640 model appearance (air cooling)

Table 2-8 L640 model main circuit interface definition (air cooling)

Terminal	Function
+	Electric drive product positive bus input, connect the positive terminal of the battery
-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L640 model (water cooling)

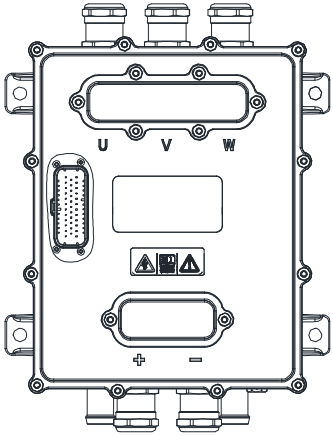


Fig. 2-9 L640 model appearance (water cooling)

Table 2-9 L640 model main circuit interface definition (water cooling)

Terminal	Function
+	Electric drive product positive bus input, connect the positive terminal of the battery
-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L650 model

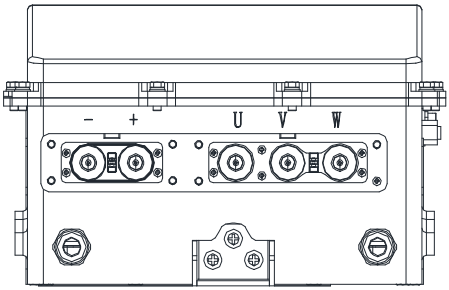


Fig. 2-10　L650 model appearance

Table 2-10　L650 model main circuit interface definition

Terminal	Function
+	Electric drive product positive bus input, connect the positive terminal of the battery
-	Electric drive product negative bus input, connect the negative terminal of the battery
U	Motor U phase output
V	Motor V phase output
W	Motor W phase output

L660D/T model

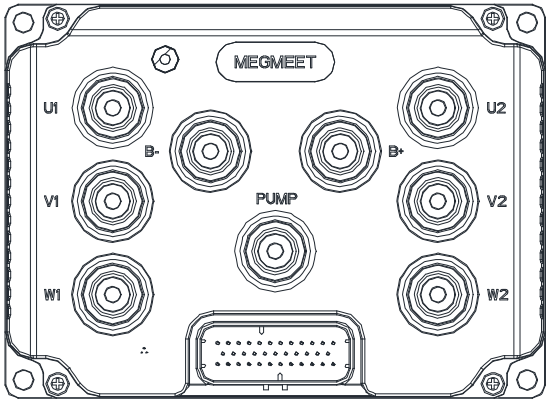


Fig. 2-11　L660D/T model appearance

Table 2-11 L660D/T model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U1	Motor 1 U phase output
V1	Motor 1 V phase output
W1	Motor 1 W phase output
U2	Motor 2 U phase output
V2	Motor 2 V phase output
W2	Motor 2 W phase output
PUMP	DC pump

L662D model

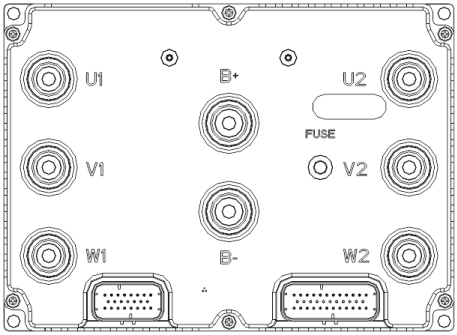


Fig. 2-12 L662D model appearance

Table 2-12 L662D model main circuit interface definition

Terminal	Function
B+	Electric drive product positive bus input, connect the positive terminal of the battery
B-	Electric drive product negative bus input, connect the negative terminal of the battery
U1	Motor 1 U phase output
V1	Motor 1 V phase output
W1	Motor 1 W phase output
U2	Motor 2 U phase output
V2	Motor 2 V phase output
W2	Motor 2 W phase output

2.1.2 Wiring for basic operation

L630-2424-Z and L630-2428-Z models

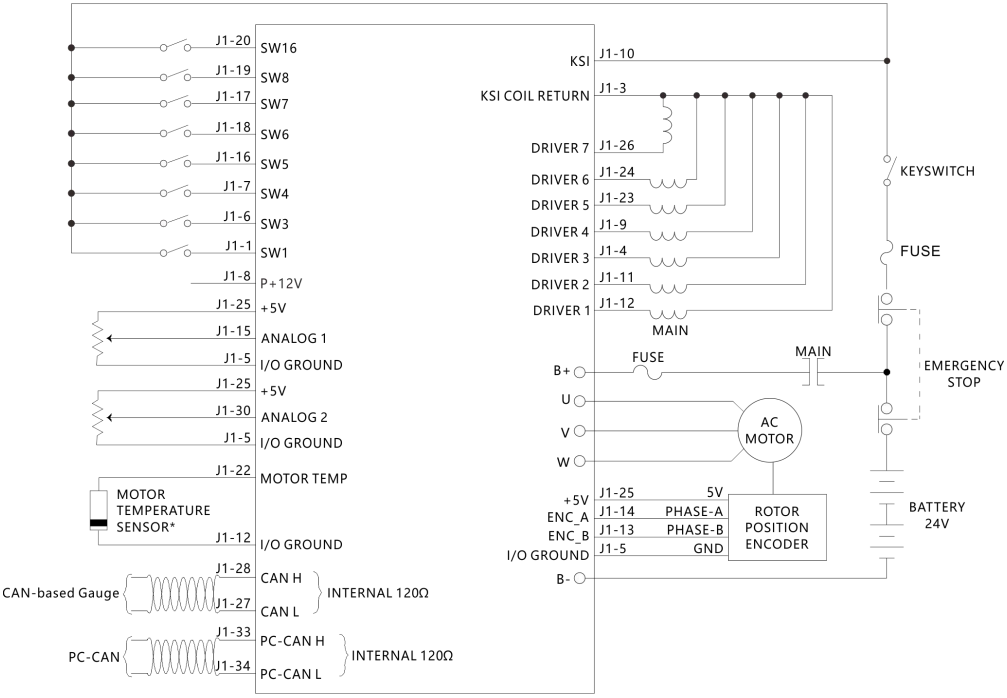


Fig. 2-13 Wiring diagram for main circuit and control circuit terminals (L630-2424-Z and L630-2428-Z models)

L630-2428 model

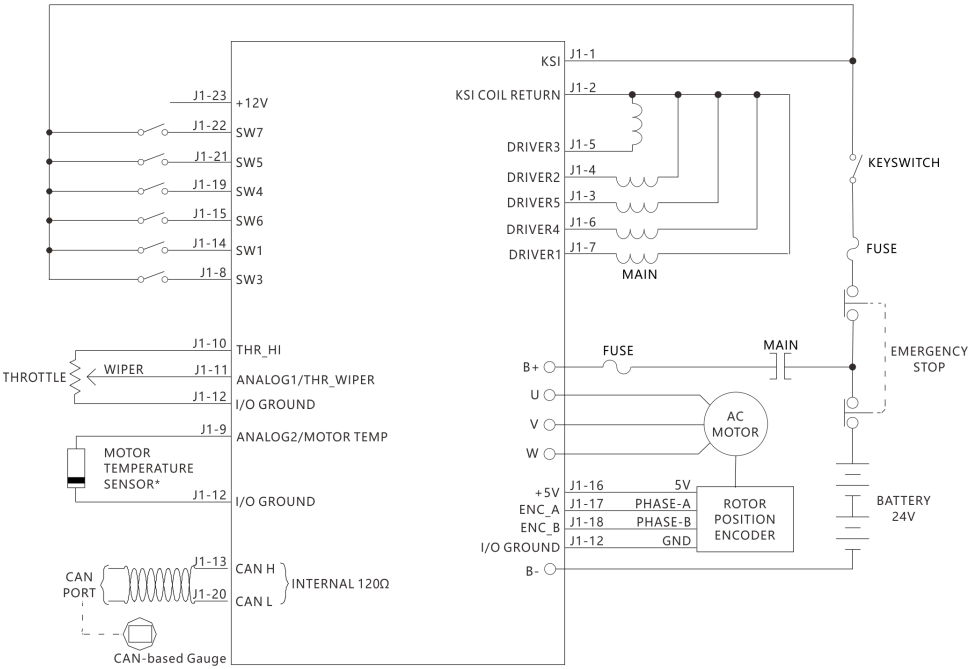
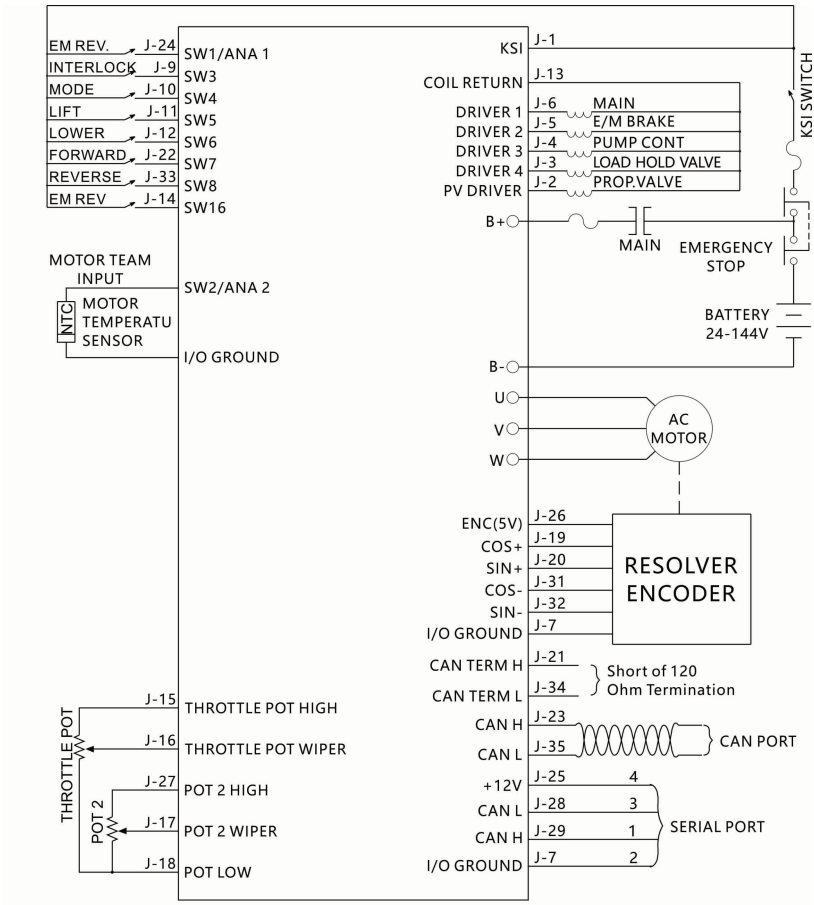


Fig. 2-14 Wiring diagram for main circuit and control circuit terminals (L630-2428 model)

L632E, L636E, L638E models



Note: The encoder used with synchronous motor and asynchronous motor is different, and the hardware interface is different. If an asynchronous motor is used, the encoder interface refers to the figure above.

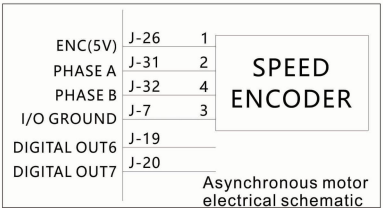


Fig. 2-15 Wiring diagram for main circuit and control circuit terminals (L632E, L636E, L638E models)

L640 model

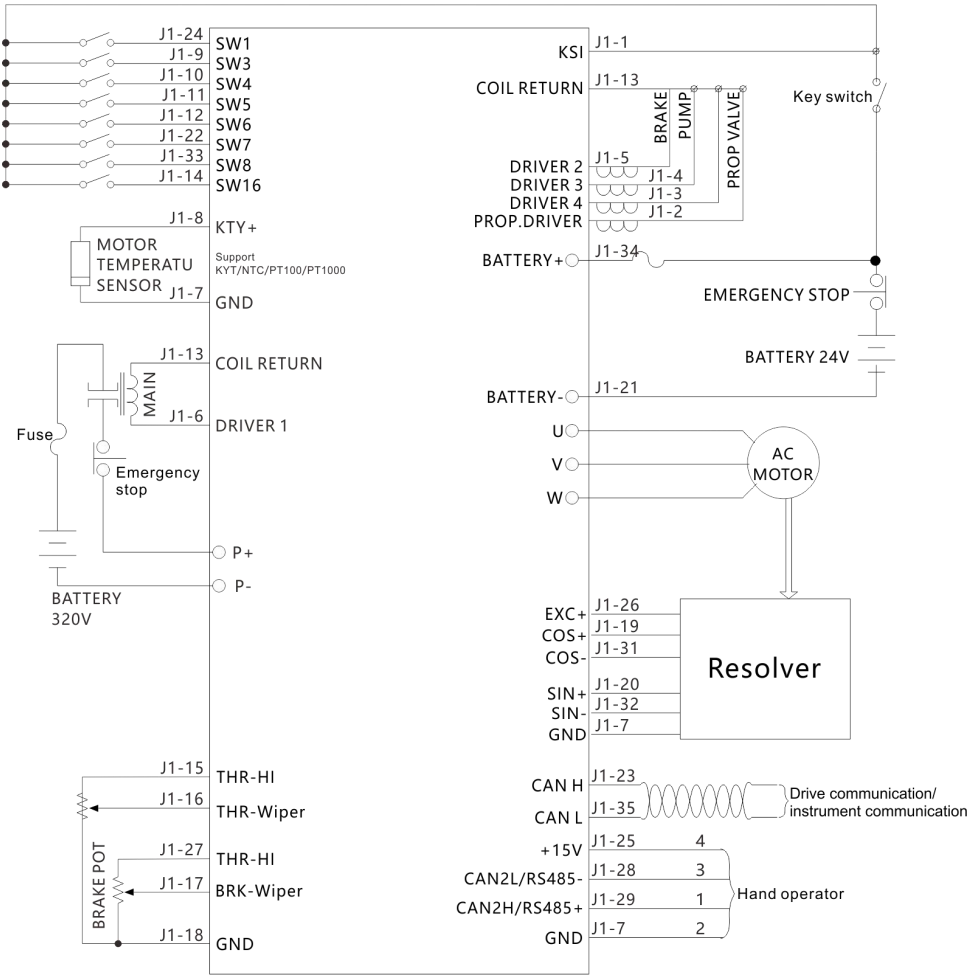


Fig. 2-16 Wiring diagram for main circuit and control circuit terminals (L640 model)

L650 model

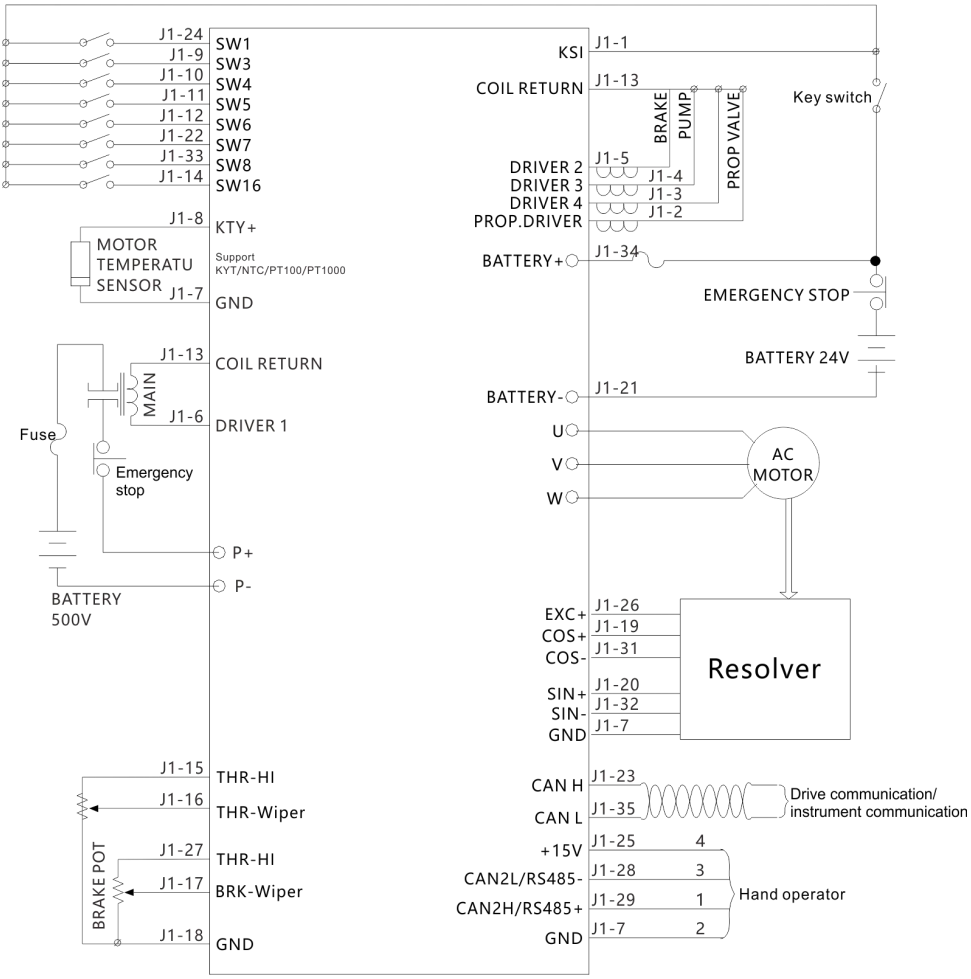


Fig. 2-17 Wiring diagram for main circuit and control circuit terminals (L650 model)

L660T model

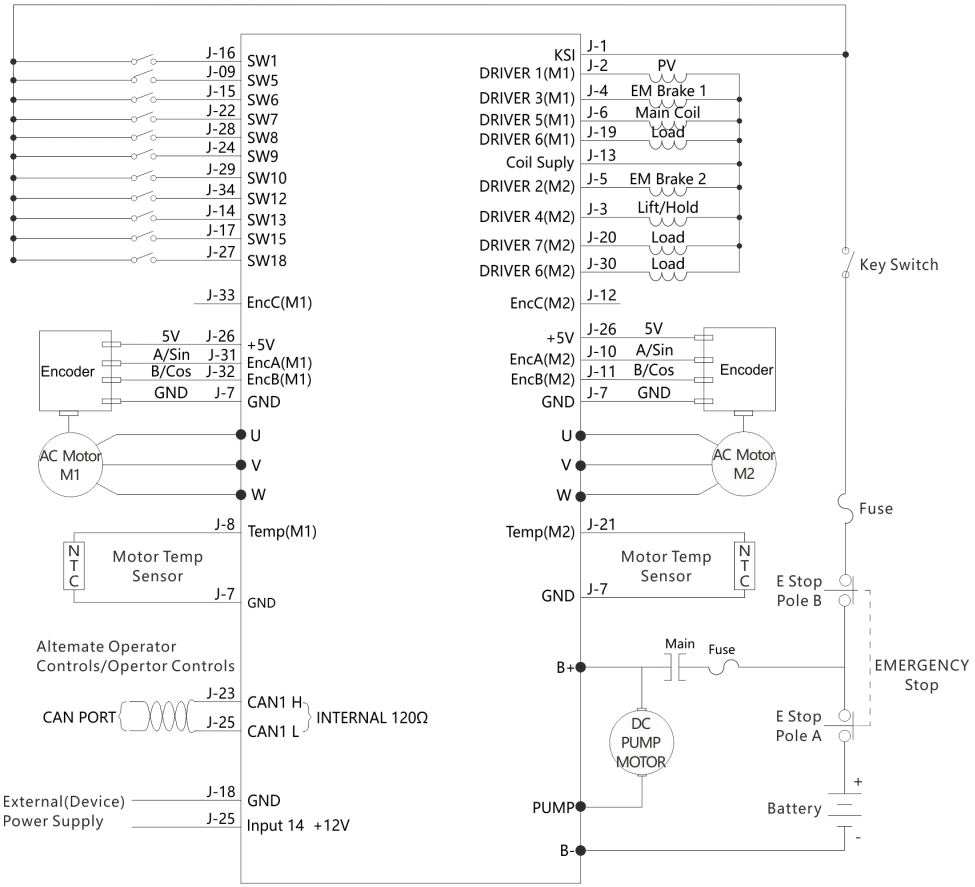
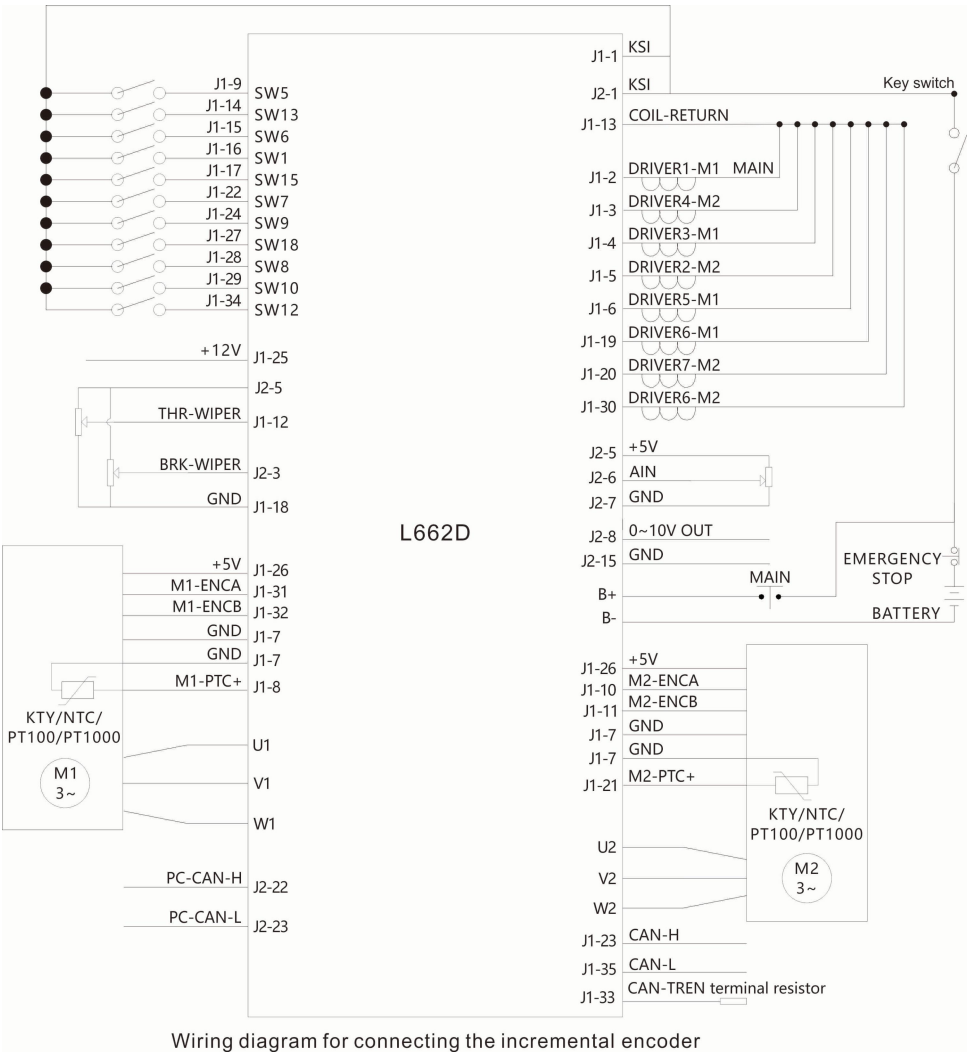


Fig. 2-18 Wiring diagram for main circuit and control circuit terminals (L660T model)

L662D model

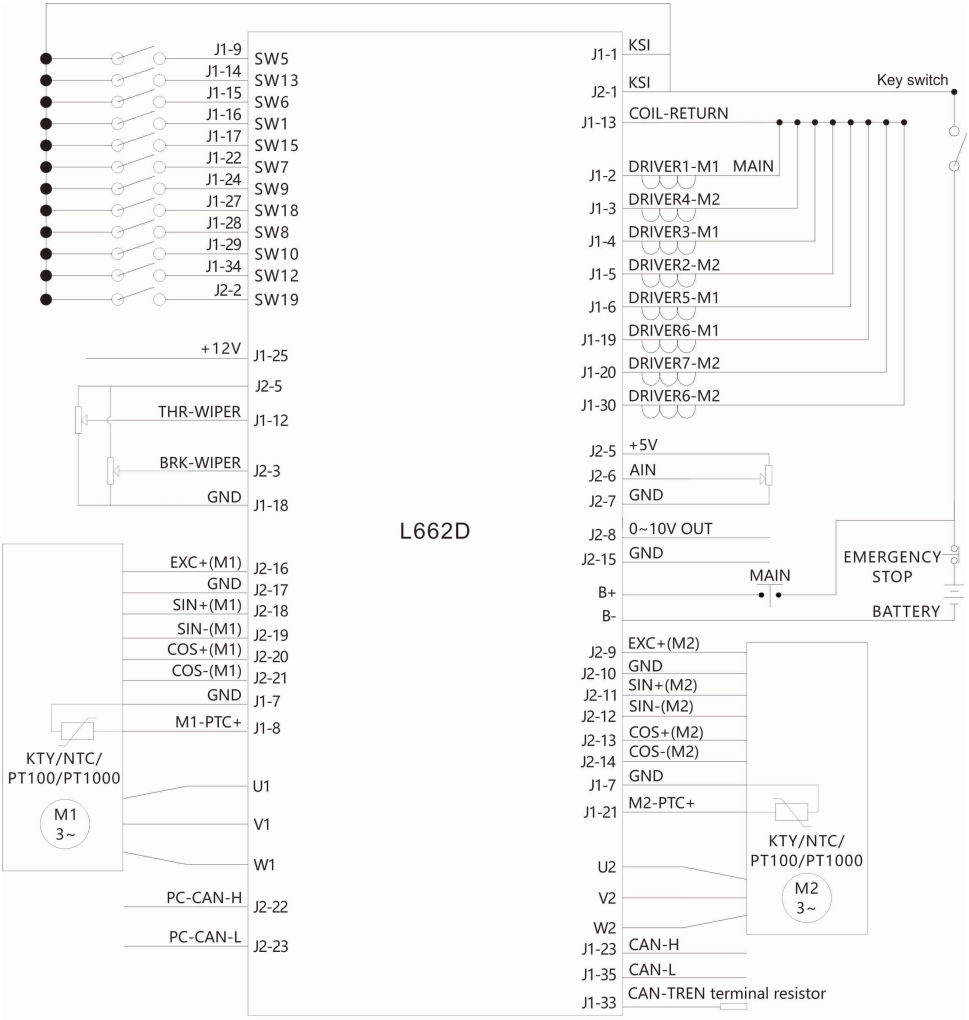
Connecting the incremental encoder



Wiring diagram for connecting the incremental encoder

Fig. 2-19 Wiring diagram for main circuit and control circuit terminals (L662D model connecting the incremental encoder)

Connecting the resolver



Wiring diagram for connecting the resolver

Fig. 2-20 Wiring diagram for main circuit and control circuit terminals (L662D model connecting the resolver)

2.2 Wiring and configuration of control circuit

L630-2424-Z and L630-2428-Z models

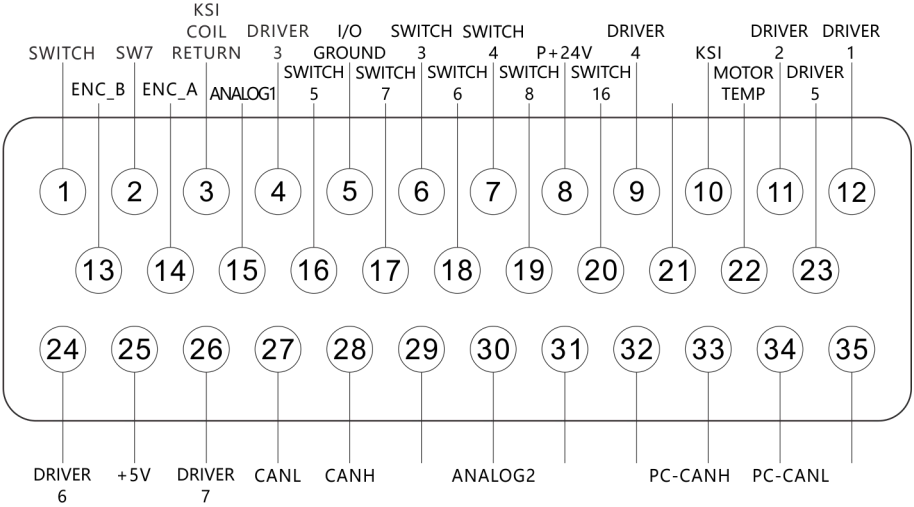


Fig. 2-21 Terminal interface definition diagram (L630-2424-Z and L630-2428-Z models)

For the terminal function description, please refer to Table 2-13.

Table 2-13 35PIN control interface definition (L630-2424-Z and L630-2428-Z models)

No.	Terminal	Name	Specification
1	SWITCH1	Digital input	Digital input, 0/24V, active high
2	Reserved		
3	KSI COIL RETURN	Main contactor output +	0/24V, active high, maximum current 12A
4	DRIVER3	Multi-way valve drive output	High power output, 200Hz, 2A
5	I/O GND	GND	
6	SWITCH3	Digital input	Digital input, 0/24V, active high
7	SWITCH4/ENC1_C	Digital input/incremental encoder phase C	
8	+12V	+12V power supply	+12V power supply
9	DRIVER4	Multi-way valve drive output	High power output, 200Hz, 2A
10	KSI	Key start input signal	0/24V, active high, maximum current 1A
11	DRIVER2	Multi-way valve drive output	High power output, 200Hz, 2A
12	DRIVER1	Main contactor output -	High power output, 200Hz, 2A
13	ENC B	Incremental encoder	Asynchronous motor: Sensor B signal

14	ENC A	Incremental encoder	Asynchronous motor: Sensor A signal
15	WIPER/AI1	Throttle signal/analog input	Input voltage range 0-5V (input impedance 4.9kΩ); analog input
16	SWITCH5	Digital input	Digital input, 0/24V, active high
17	SWITCH7	Digital input	Digital input, 0/24V, active high
18	SWITCH6	Digital input	Digital input, 0/24V, active high
19	SWITCH8	Digital input	Digital input, 0/24V, active high
20	SWITCH16	Digital input	Digital input, 0/24V, active high
21	Reserved		
22	MOTOR TEMP	Motor temperature input	Analog input
23	DRIVER5	Multi-way valve drive output	High power output, 200Hz, 2A
24	DRIVER6	Multi-way valve drive output	High power output, 200Hz, 2A
25	+5V	Encoder +5V power supply	
26	DRIVER7	Multi-way valve drive output	High power output, 200Hz, 2A
27	CAN-L	CAN L	Isolated CAN, 125k
28	CAN-H	CAN H（125k）	Isolated CAN, 125k
29	Reserved		
30	AI2	Analog input	Input voltage range 0-5V (input impedance 4.9kΩ); analog input
31	Reserved		
32	Reserved		
33	PC-CAN-L	Host device debugging CAN	Non-isolated CAN, 1000k
34	PC-CAN-L	Host device debugging CAN	Non-isolated CAN, 1000k
35	Reserved		

L630-2428 model

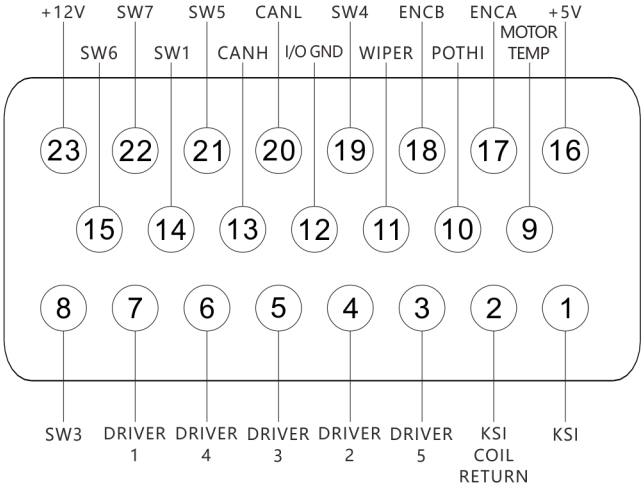


Fig. 2-22 Terminal interface definition diagram (L630-2428 model)

For the terminal function description, please refer to Table 2-14.

Table 2-14 23PIN control interface definition (L630-2428 model)

No.	Terminal	Name	Specification
1	KSI	Key start input signal	0/24V, active high, maximum current 1A
2	KSI COIL RETURN	Contactor drive +	0/24V, active high, maximum current 12A
3	DRIVER5	Multi-way valve drive output	High power output, 200Hz, 2A
4	DRIVER2	Multi-way valve drive output	High power output, 200Hz, 2A
5	DRIVER3	Multi-way valve drive output	High power output, 200Hz, 2A
6	DRIVER4	Multi-way valve drive output	High power output, 200Hz, 2A
7	DRIVER1	Main contactor output	High power output, 200Hz, 2A
8	SWITCH3	Digital input	Digital input, 0/24V, active high
9	MOTOR TEMP	Motor temperature input	Analog input
10	POTHI	Throttle power +	Allowable maximum current: 100mA
11	WIPER/AI1	Throttle signal/analog input/digital input signal	Input voltage range 0-5V (input impedance 4.9kΩ); analog input
12	I/O GND	GND	
13	CAN-H	CAN H (125k)	

14	SWITCH1	Digital input	Digital input, 0/24V, active high
15	SWITCH6	Digital input	Digital input, 0/24V, active high
16	+5V	Encoder +5V power supply	
17	ENC A	Incremental encoder/resolver	Asynchronous motor: sensor A signal; Synchronous motor: resolver feedback cos-
18	ENC B	Incremental encoder/resolver	Asynchronous motor: sensor B signal; Synchronous motor: resolver feedback sin-
19	SWITCH4/ENC1_C	Digital input/incremental encoder phase C	
20	CAN-L	CAN L (125k)	
21	SWITCH5	Digital input	Digital input, 0/24V, active high
22	SWITCH7	Digital input	Digital input, 0/24V, active high
23	+12V	+12V power supply	+12V power supply

L632E, L636E, L638E models

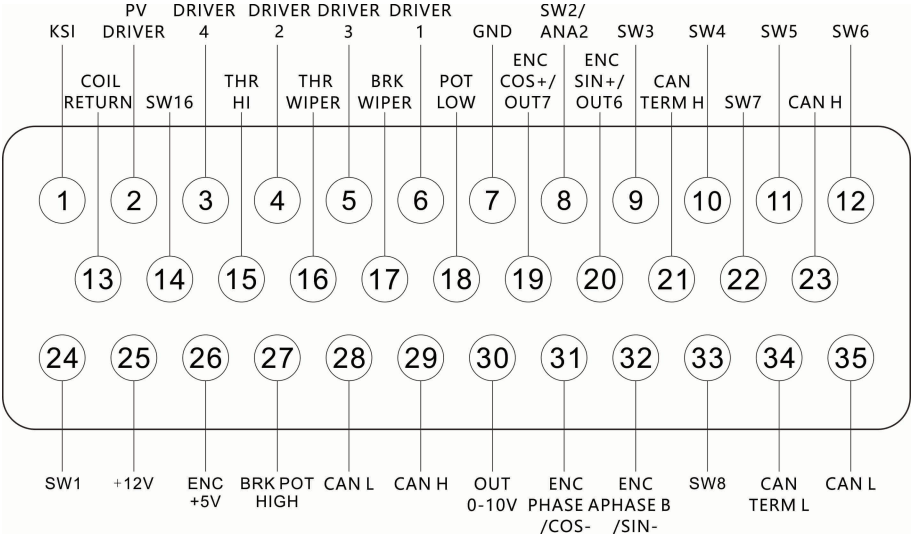


Fig. 2-23 Terminal interface definition diagram (L632E, L636E, L638E models)

For the terminal function description, please refer to Table 2-15.

Table 2-15 35PIN control interface definition (L632E, L636E, L638E models)

No.	Terminal	Name	Specification
1	KSI	Key switch input	0/48V or 80V, active high, maximum current 1A
2	PROP DRIVER	Proportional valve drive +	High power output, 18kHz, 2A
3	DRIVER4	Multi-way valve drive 4+	High power output, 200Hz, 2A
4	DRIVER2	Multi-way valve drive 2+	High power output, 200Hz, 3A
5	DRIVER3	Multi-way valve drive 3+	High power output, 200Hz, 2A
6	DRIVER1	Main contactor	High power output, 200Hz, 2A
7	GND	Grounding	Grounding
8	SW2/ANA2	Motor temperature input	Digital input: 0/48V or 80V, active high; analog input: provide 3.6mA constant current output
9	SW3	Brake switch	Digital input, 0/48V or 80V, active high
10	SW4	Hand brake switch	Digital input, 0/48V or 80V, active high
11	SW5	Seat A switch	Digital input, 0/48V or 80V, active high
12	SW6	Seat B switch	Digital input, 0/48V or 80V, active high
13	COIL RETURN	Contactor drive-	0/48V or 80V, active high, maximum current 12A
14	SW16	Speed cutting switch	Digital input, 0/48V or 80V, active high
15	THR _HI	Throttle power +	Allowable maximum current: 100mA
16	THR WIPER	Throttle signal	Input voltage range:0~5V (input impedance: 4.9kΩ)

17	BRK WIPER	Brake signal	Input voltage range:0~5V (input impedance: 4.9kΩ)
18	POT-LOW	Throttle GND	
19	Asynchronous motor: out7 Synchronous motor: COS+	Asynchronous motor: digital output Synchronous motor: resolver feedback cos+	
20	Asynchronous motor: out6 Synchronous motor: SIN+	Asynchronous motor: digital output Synchronous motor: resolver feedback sin+	
21	CAN_H	Communication CAN H	
22	SW7	Forward switch	Digital input, 0/48V or 80V, active high
23	CAN_H	CAN H (125k)	Communication CAN
24	SW1	Accelerator switch signal	Digital input, 0/48V or 80V, active high
25	+12V	12V keyboard power supply	Allowable maximum current: 100mA
26	ENC+5V	Encoder 5V power supply	Allowable maximum current: 100mA
27	BRK-high	Brake power supply	Allowable maximum current: 100mA
28	CAN L	CAN L	
29	CAN H	CAN H	
30	0-10V-out	0-10V out	
31	Asynchronous motor: A Synchronous motor: COS-	Asynchronous motor: sensor A signal; Synchronous motor: resolver feedback cos-	
32	Asynchronous motor: VA Synchronous motor: SIN-	Asynchronous motor: sensor B signal; Synchronous motor: resolver feedback sin-	
33	SW8	Reverse switch	Digital input, 0/48V or 80V, active high
34	CAN_T_L	CAN L matching resistor	
35	CAN L	CAN L(1M)	

L640 and L650 models

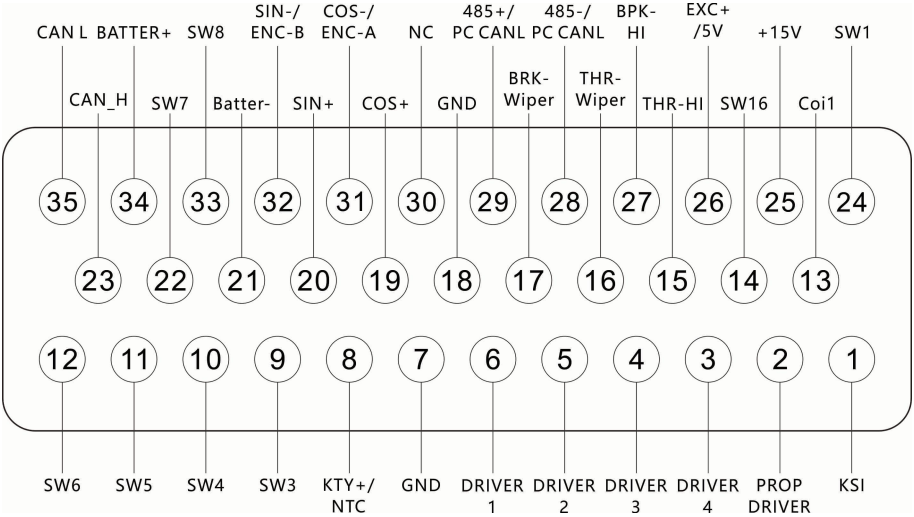


Fig. 2-24 Terminal interface definition diagram (L640 and L650 models)

For the terminal function description, please refer to Table 2-16.

Table 2-16 35PIN control interface definition (L640 and L650 models)

No.	Terminal	Name	Specification
1	KSI	Key start switch	0/+12V signal input, active high
2	PROP DRIVER	Proportional valve	0/+12V signal output, active low
3	DRIVER4	Multi-way valve 4	0/+12V signal output, active low
4	DRIVER3	Multi-way valve 3	0/+12V signal output, active low
5	DRIVER2	Multi-way valve 2	0/+12V signal output, active low
6	DRIVER1	Main contactor	0/+12V signal output, active low
7	GND	Grounding	
8	KTY+/NTC	Motor temperature sensor analog input	Support KTY/NTC/PT100/PT1000 sensors
9	SW3	Digital input 3	0/12V input, generally used for brake switch
10	SW4	Digital input 4	0/12V input, generally used for hand brake switch
11	SW5	Digital input 5	0/12V input, generally used for seat switch A
12	SW6	Digital input 6	0/12V input, generally used for seat switch B
13	Coil	Coil common +	12V output
14	SW16	Digital input 16	0/12V input, generally used for speed cutting switch
15	THR-HI	Throttle power supply	+5V output
16	THR-Wiper	Throttle signal input	0~5V analog input

17	BRK-Wiper	Brake signal input	0~5V analog input
18	GND	Throttle grounding	Throttle grounding
19	COS+	Resolver feedback cos+	10k rotary wave feedback signal input
20	SIN+	Resolver feedback sin+	10k rotary wave feedback signal input
21	Batter-	Control power negative	Negative terminal of external low voltage 12V control power supply
22	SW7	Digital input 7	0/12V input, generally used for forward switch
23	CAN_H	Communication CAN	Drive CAN network communication, instrument network communication interface
24	SW1	Digital input 1	0/12V input, generally used for accelerator enable switch
25	+15V	Handheld operator power supply	+15V output
26	EXC +/5V	Resolver excitation output+	10k excitation signal output, peak-to-peak value 8V
27	BRK-HI	Brake power supply	+5V output
28	485-	Handheld communication RS485-	
29	485+	Handheld communication RS485+	
30	NC	NC	
31	COS-/ENC-A	Resolver feedback cos-	10k rotary wave feedback signal input
32	SIN-/ENC-B	Resolver feedback sin-	10k rotary wave feedback signal input
33	SW8	Digital input 8	0/12V input, generally used for reverse switch
34	Batter+	Control power positive	Positive terminal of external low voltage 12V control power supply
35	CAN L	Communication CAN	Drive CAN network communication, instrument network communication interface

L660T model

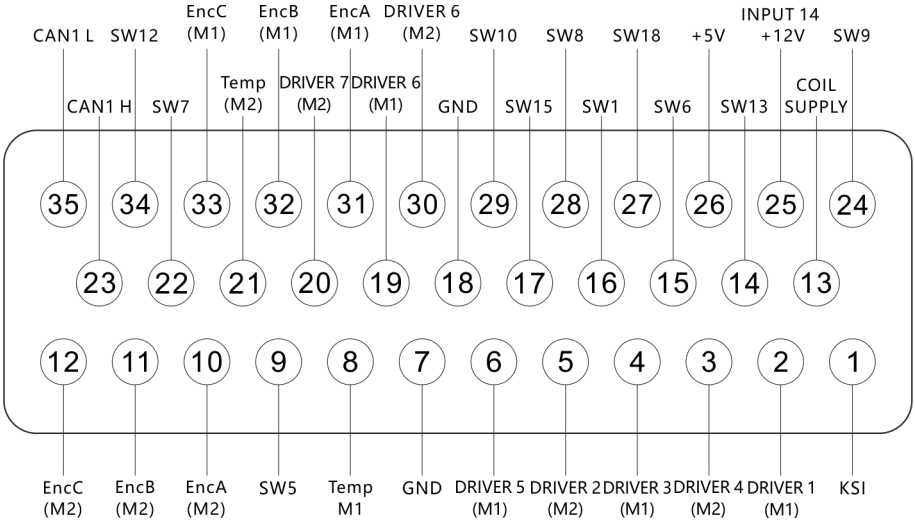


Fig. 2-25 Terminal interface definition diagram (L660T model)

For the terminal function description, please refer to Table 2-17.

Table 2-17 35PIN control interface definition (L660T model)

No.	Terminal	Name	Specification
1	KSI	Key switch input	0/24V, active high, maximum current 1A
2	DRIVER1(M1)	Proportional valve drive (-)	Low level output, 18kHz, 2A
3	DRIVER4(M2)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
4	DRIVER3(M1)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
5	DRIVER2(M2)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
6	DRIVER5(M1)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
7	GND	Grounding	Grounding
8	TEMP(M1)	Motor temperature input	Digital input: 0/24V, active high; Analog input: Provide 0.3mA constant current output
9	INPUT5	Digital input 5	Digital input, 0/24V, active high
10	EncA(M2)	Encoder SIN+ signal	1.5V~3.1V pulse signal Digital input: used as three Hall input
11	EncB(M2)	Encoder COS+ signal	1.5V~3.1V pulse signal Digital input: used as three Hall input
12	EncC(M2)	Encoder input signal	Digital input: used as three Hall input
13	COIL SUPPLY	Drive power port	Output voltage 24V, output current 10A

14	SW13	Digital input 13	Digital input, 0/24V, active high
15	SW6	Digital input 6	Digital input, 0/24V, active high
16	SW1	Digital input 1	Digital input, 0/24V, active high
17	SW15	Digital input 15	Digital input, 0/24V, active high
18	GND	External power port ground	Current 200mA
19	DRIVER6(M1)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
20	DRIVER7(M2)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
21	TEMP(M2)	Motor temperature input	Digital input: 0/24V, active high; Analog input: Provide 0.3mA constant current output
22	SW7	Digital input 7	Digital input, 0/24V, active high
23	CAN H	Electronic control vehicle CAN H	CAN H signal
24	SW9	Digital input 9	Digital input, 0/24V, active high
25	INPUT14 +12V	External power supply	Output voltage 12V, maximum output current 200mA
26	+5V	Encoder power supply+	Voltage: +5V, current: 200mA
27	SW18	Digital input 18	Digital input, 0/24V, active high
28	SW8	Digital input 8	Digital input, 0/24V, active high
29	SW10	Digital input 10	Digital input, 0/24V, active high
30	DRIVER6(M2)	Multi-way valve drive (-)	Low level output, 200Hz, 2A
31	EncA(M1)	Encoder SIN+ signal	1.5V~3.1V pulse signal Digital input: used as three Hall input
32	EncB(M1)	Encoder COS+ signal	1.5V~3.1V pulse signal Digital input: used as three Hall input
33	EncC(M1)	Encoder input signal	Digital input: used as three Hall input
34	SW12	Digital input 12	Digital input, 0/24V, active high
35	CAN L	Electronic control vehicle CAN L	CAN L signal

L662D model

Terminal 1

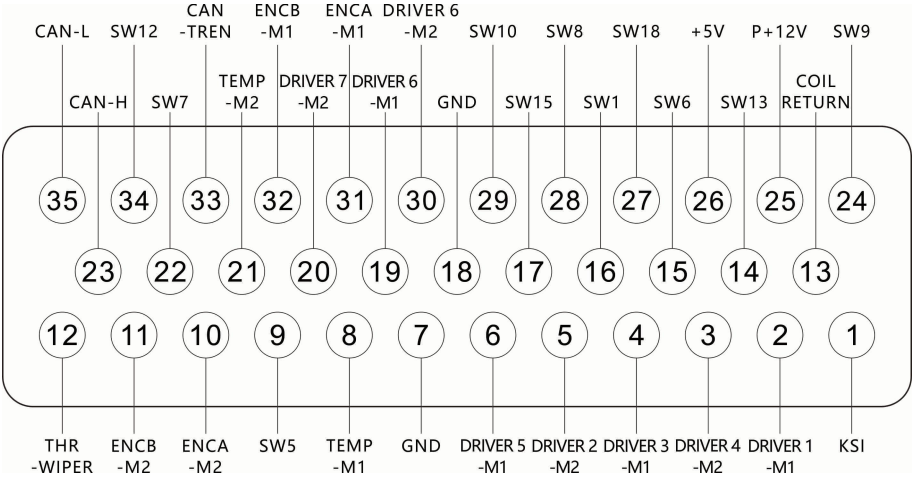


Fig. 2-26 35PIN terminal interface definition diagram (L662D model)

For the terminal function description, please refer to Table 2-18.

Table 2-18 35PIN control interface definition (L662D model)

No.	Terminal	Name	Specification
1	KSI	Key switch	0/48V or 0/80V, active high, maximum current 8A
2	DRIVER1-M1	Driver output, with current detection	High power output, 200Hz, 3A
3	DRIVER4-M2	Driver output, with current detection	High power output, 200Hz, 3A
4	DRIVER3-M1	Driver output, with current detection	High power output, 200Hz, 3A
5	DRIVER2-M2	Driver output, with current detection	High power output, 200Hz, 3A
6	DRIVER5-M1	Driver output	High power output, 200Hz, 3A
7	GND	Grounding	Grounding , battery B-
8	TEMP-M1	Motor 1 temperature sensor feedback input	Analog input
9	SW5	Digital input 5	Digital input, 0/48V or 0/80V, active high
10	ENCA-M2	Motor 2 encoder A signal input	Square wave signal input, open collector
11	ENCB-M2	Motor 2 encoder B signal input	Square wave signal input, open collector
12	THR-WIPER	Throttle signal input	Analog input, 0-12V
13	COIL-RETURN	Coil return common positive	Driver port common positive terminal 48V or 80V
14	SW13	Digital input 13	Digital input, 0/48V or 0/80V, active high

15	SW6	Digital input 6	Digital input, 0/48V or 0/80V, active high
16	SW1	Digital input 1	Digital input, 0/48V or 0/80V, active high
17	SW15	Digital input 15	Digital input, 0/48V or 0/80V, active high
18	GND	Grounding	Grounding , battery B-
19	DRIVER6-M1	Driver output	High power output, 200Hz, 3A
20	DRIVER7-M2	Driver output	High power output, 200Hz, 3A
21	TEMP-M2	Motor 2 temperature sensor feedback input	Analog input
22	SW7	Digital input 7	Digital input, 0/48V or 0/80V, active high
23	CAN-H	Vehicle CAN H	CAN 2.0
24	SW9	Digital input 9	Digital input, 0/48V or 0/80V, active high
25	P+12V	12V output power supply	
26	+5V	5V output power supply	
27	SW18	Digital input 18	Digital input, 0/48V or 0/80V, active high
28	SW8	Digital input 8	Digital input, 0/48V or 0/80V, active high
29	SW10	Digital input 10	Digital input, 0/48V or 0/80V, active high
30	DRIVER6-M2	Driver output	High power output, 200Hz, 3A
31	ENCA-M1	Motor 1 encoder A signal input	Square wave signal input, open collector
32	ENCB-M1	Motor 1 encoder B signal input	Square wave signal input, open collector
33	CAN-TREN	Car CAN terminal resistor strobe	120 Ω
34	SW12	Digital input 12	Digital input, 0/48V or 0/80V, active high
35	CAN-L	Vehicle CAN L	CAN 2.0

Terminal 2

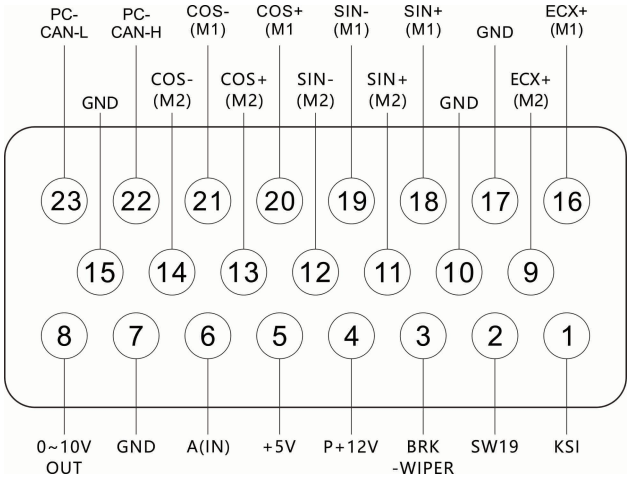


Fig. 2-27 23PIN terminal interface definition diagram (L662D model)

For the terminal function description, please refer to Table 2-19.

Table 2-19 23PIN control interface definition (L662D model)

No.	Terminal	Name	Specification
1	KSI	Key start signal	0/48V or 0/80V, active high, maximum current 8A
2	SW19	Digital input 19	Digital input, 0/48V or 0/80V, active high; positive pole usually connected to the output terminal of keyswitch, and in parallel connection with J1-01
3	BRK-WIPER	Angle sensor analog input	Input voltage range 0 to 5 V (input impedance 4.9 kΩ) Receives the analog voltage single-ended input
4	P+12V	12V output power supply	12V/0.2A
5	+5V	5V output power supply	5V/0.2A
6	A(IN)	Lift potentiometer input	Analog input, 0-12V
7	GND	Grounding	Grounding
8	0-10VOUT	Analog output	0-10V analog output
9	ECX+(M2)	Motor 2 resolver excitation signal	Rotating wave signal Vpp=7V
10	GND	Grounding	Grounding
11	SIN+(M2)	Motor 2 resolver feedback signal	Rotating wave signal
12	SIN-(M2)	Motor 2 resolver feedback signal	Rotating wave signal
13	COS+(M2)	Motor 2 resolver feedback signal	Rotating wave signal
14	COS-(M2)	Motor 2 resolver feedback signal	Rotating wave signal
15	GND	Grounding	Grounding
16	ECX+(M1)	Motor 1 resolver excitation signal	Rotating wave signal Vpp=7V
17	GND	Grounding	Grounding
18	SIN+(M1)	Motor 1 resolver feedback signal	Rotating wave signal
19	SIN-(M1)	Motor 1 resolver feedback signal	Rotating wave signal
20	COS+(M1)	Motor 1 resolver feedback signal	Rotating wave signal
21	COS-(M1)	Motor 1 resolver feedback signal	Rotating wave signal
22	PC-CAN-H	Host device debugging CAN	CAN 2.0
23	PC-CAN-L	Host device debugging CAN	CAN 2.0

Note

For all models, it is suggested to use the wire with cross section area over 1mm^2 as the connecting wire of the control circuit terminals. Use shielded wires for motor encoder signal wires.

Chapter 3 Quick Operation Guide for Electric Drive Product

3.1 Electric drive product operation panel

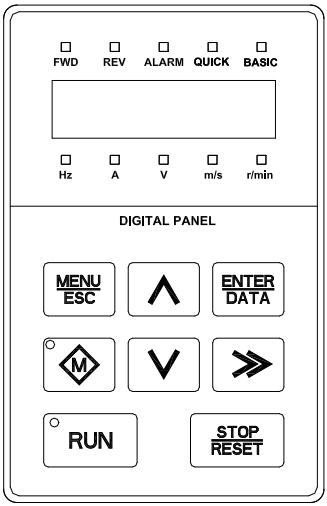


Fig.3-1 Schematic diagram of operation panel

3.2 LED description

Table 3-1 LED description

LED symbol		Name	Meaning	Color
Unit LED	Hz	Frequency LED	On: Current parameter displayed represents the running frequency Flash: Current parameter displayed represents the frequency set	Green
	A	Current LED	On: Current parameter displayed represents the current	Green
	V	Voltage LED	On: Current parameter displayed represents the voltage	Green
	m/s	Line speed LED	On: Current parameter displayed represents the line speed	Green
	r/min	Rotating speed LED	On: Current parameter displayed represents	Green

			the rotating speed	
Status LED	FWD	Forward running LED	On: In the stop status, it means the electric drive product has forward running command In the running status, it means the electric drive product is running forward Flash: The electric drive product is switching from FWD to REV	Green
	REV	Reverse running LED	On: In the stop status, it means the electric drive product has reverse running command In the running status, it means the electric drive product is running reversely Flash: The electric drive product is switching from REV to FWD	Green
	ALARM	Alarm LED	On: The electric drive product enters the alarm status	Red
	QUICK	Menu mode LED	QUCIK LED BASIC LED Menu mode On Off Quick menu Off On Basic menu	Green
	BASIC		Off Off Verification menu	Green

The running status LED is above the RUN key and the running command channel LED is above the Multi-functional key (M key). Their indication meanings are as shown in Table 3-2.

Table 3-2 Status LED description

LED	Display status	The indicated status of the electric drive product
Running status LED	Off	Stop status
	On	Running status
Running command channel LED	On	Operation panel control status
	Off	Terminal control status
	Flash	Serial port control status

3.3 Introduction to operation panel keys

Table 3-3 Operation panel function table

Key	Name	Function
MENU/ESC	Program/exit key	To enter or exit the programming state
ENTER/DATA	Function/data key	To enter the lower level menu or confirm data
∧	Increase key	To increase the data or function code
∨	Decrease key	To decrease the data or function code
≫	Shift key	To select the bit for change in the data in editing state, or switch the display of status parameters in other state
M	Multi-functional key	No
RUN	Run key	When pressing this key in the operation panel mode, the electric drive product will start to run
STOP/RESET	Stop/reset key	Stop or fault reset

3.4 Identification of LED display symbols

The correspondence relation between the LED display symbols and the character/figure is as shown below:

LED Display	Meaning	LED Display	Meaning	LED Display	Meaning	LED Display	Meaning
	0		A		I		S
	1		b		J		T
	2		C		L		t
	3		c		N		U
	4		d		n		V
	5		E		O		y
	6		F		o		-
	7		G		P		.
	8		H		q		
	9		h		r		

3.5 LED interface definition

The keyboard is connected through the network cable. If it is not convenient to make the 35PIN terminal wire into crystal connector, you can make the adapter.

Handheld box keyboard	Electric drive product 35PIN waterproof connector	
Crystal connector definition	Corresponding port number	Function description
1	CON1-29	Signal cable/RX
2	CON1-28	Signal cable/TX
3,4,5,6	CON1-7	Signal ground
7,8	CON1-25	Power supply (+12VDC)

Chapter 4 Parameter List

Explanation to the terms in the function code parameter table

Table field	Explanation
Function code number	Representing the number of the function code, e.g. P00.00
Function code name	Name of the function code, explaining it
Leave-factory value	The value of the function code after restoring the leave-factory settings
Set range	The minimum and maximum values of the function code allowed to set
Unit	V: Voltage; A: Current; ℃: temperature; Ω: resistance; mH: inductance; rpm: rotate speed; %: percentage; bps: baud rate; Hz, kHz: frequency; ms. s, min, h, kh: time; kW: power;/: No unit
Property	○: Means the function code can be changed during running; ×: Means the function code can be changed in the stop state; *: Means the function code can be read only, can not be changed
Function code option	List of function code parameter settings
User setting	Used to set parameters by users

4.1 Basic menu function code parameter table

Function code	Name	Setting range	Unit	Default value	Change
Group P00: System parameters					
P00.00	Menu mode selection	0: Quick mode 1: Basic mode			*
P00.02	Upper 16 bits of software version No.	0~65535			*
P00.03	Lower 16 bits of software version No.	0~65535			*
P00.04	Parameter protection	0~ 2		0: All parameters are allowed to be	*

Function code	Name	Setting range	Unit	Default value	Change
				modified 1: All parameters are not allowed to be modified	
P00.07	Electric drive product type	0: Left drive 1: Right drive 2: Pump drive		1	×
P00.08	Model setting	2420: 24V 200A 2437: 24V 375A 4827: 48V 270A 4835: 48V 350A 4845: 48V 450A 4860: 48V 600A 8035: 80V 350A 1420: 144V 200A		4845	×
Group P01: Display parameters					
P01.02	Output frequency	0	Hz		*
P01.03	Output voltage	0.--1000.	V		*
P01.04	Output current	0.0--6000.0	A		*
P01.12	Bus voltage	0.--1000.	V		*
P01.22	Radiator temperature	0	℃		*
P01.23	Motor temperature	0	℃		*
P01.24	Motor speed	0	rpm		*
Group P02: Basic control parameters					
P02.00	Mode selection	Unit place: 1: Closed loop vector 2: IF mode 3: VF mode		1	×
		Tens place:			

Function code	Name	Setting range	Unit	Default value	Change
		0: Asynchronous motor 1: Synchronous motor			
P02.01	Reference frequency source selection	0: Keyboard reference 1: Analog reference 2: Communication reference		0	○
P02.02	Running command channel selection	0: Keyboard control 1: Terminal control 2: Communication control		1	○
P02.03	Running direction setting	0: Forward corresponds to clockwise operation of the motor 1: Forward corresponds to counterclockwise operation of the motor		0	○
P02.04	Stop detection frequency	0.--150.00	Hz	1	×
P02.05	Frequency keyboard reference	0.--3000.00	Hz	10	○
P02.06	Downtime confirmation time	0.--65535	Ms	50	○
P02.09	Maximum output frequency	0.--1000.00	Hz	300	×
Group P03: Motor parameters					
P03.00	Rated power of motor	1.--400.00			○
P03.01	Rated voltage of motor	1.--999.9			○
P03.02	Rated current of motor	0.1--999.9			○
P03.03	Rated frequency of motor	1.00--3000.00			○
P03.04	Rated rotating	1.--60000.			○

Function code	Name	Setting range	Unit	Default value	Change
	speed of motor				
P03.11	Motor pole pairs number	0.--60.			○
P03.13	Synchronous motor direct axis inductance	0.--655.35	mH	0	○
P03.14	Synchronous motor q-axis inductance	0.--655.35	mH	0	○
P03.15	Synchronous motor back-EMF constant	0.--6553.5	V	0	○
P03.19	Motor temperature sensor type	0: No sensor 1: PT1000 2: NTC 3: KTY122 4: KTY130 5: KTY150 6: NTC_HT_OLD		2	×
P03.24	Motor parameter auto-tuning	1: Static identification 2: Dynamic identification			○
P03.25	Synchronous machine tuning current coefficient	0.00 --3.00		1.6	×
P03.26	Synchronous motor initial angle	0.--0xFFFF			○
P03.27	Slip gain	0.001~100		1	○
P03.28	Phase sequence of motor power line after	0: Power line phase sequence OK 1: Restart the machine after replacing any two-phase power line phase sequence		0	×

Function code	Name	Setting range	Unit	Default value	Change
	synchronous motor identification				
P03.29	IPM motor MTPA control enable switch	0~1		0	×
P03.30	Encoder type	0: Resolver 1: Current type incremental encoder 2: Voltage type incremental encoder		2	×
P03.31	Encoder line number	0~65535		80	×
P03.32	Encoder rotation direction	0: Positive 1: Reverse		0	×
P03.33	Incremental encoder phase number	0: Orthogonal type 1: Single phase type		0	×
P03.34	Resolver pole pair	1~60		1	×
Group P04: Acceleration and deceleration time parameters					
P04.00	Forward acceleration time	0.0~3000.0	S	2.5	○
P04.01	Deceleration time when the accelerator pedal is fully released when moving forward (two-wheel drive model)	0.0~3000.0	S	5.5	○
P04.02	Deceleration time when the accelerator pedal is not released when moving forward	0.0~3000.0	S	5.5	○

Function code	Name	Setting range	Unit	Default value	Change
P04.03	Backward acceleration time	0.0~3000.0	S	3.5	○
P04.04	Deceleration time when the accelerator pedal is fully released when reversing	0.0~3000.0	S	2.5	○
P04.05	Deceleration time when the accelerator pedal is not released when reversing	0.0~3000.0	S	5.5	○
P04.06	Forward and backward switch to neutral braking time	0.0~3000.0	S	2	○
P04.07	Forward and backward switching time	0.0~3000.0	S	0.8	○
P04.08	Pump drive acceleration time	0.0~3000.0	S	0.5	○
P04.09	Pump drive deceleration time	0.0~3000.0	S	0.3	○
P04.10	Speed cutting gain	0~100		50	○
Group P05: Speed control parameters					
P05.00	Speed loop gain 1	0.1--6553.5		5	○
P05.01	Speed loop gain switching frequency 1	0.0 -- 500.0	Hz	0	○

Function code	Name	Setting range	Unit	Default value	Change
P05.02	Speed loop gain 2	0.1-- 6553.5		15	○
P05.03	Gain switching time 1	0 -- 65535	ms	60000	○
P05.04	Speed loop integration time 1	0 -- 65535	0.1ms	1	○
P05.05	Mechanical braking speed loop gain	0 -- 65535		5	○
P05.06	Integral time of electromagnetic brake speed loop	0 -- 65535	0.1ms	1	○
P05.07	Climbing speed limit	50 -- 100	%	50	○
P05.08	Climbing speed stable Kp gain	0 -- 65535		1000	○
P05.09	Climbing speed stable Ki gain	0 -- 65535		1000	○
P05.14	Motor speed limit	0.-- P02.09	Hz	150	×
P05.15	Turning acceleration/ deceleration time adjustment coefficient	0 -- 200	%	50	○
P05.16	Electromagnetic brake torque maintenance time	0 -- 65535	ms	500	○
P05.17	Mechanical braking time (foot brake switch is enabled)	0.1--100		0	○

Function code	Name	Setting range	Unit	Default value	Change
P05.18	Reverse deceleration gain	0.1 -- 1.0		0.7	○
P05.19	High speed interval	0.0 -- 100.0	%	70	○
P05.20	Low speed interval	0.0 -- 100.0	%	30	○
P05.21	Electromagnetic braking electric torque limit value	0 -- 100	%	20	○
P05.22	Electromagnetic braking electric torque drop time	0 -- 65535	ms	50	○
P05.23	Accelerator release filter time	0 -- 65535	ms	50	○
P05.24	High speed electromagnetic braking deceleration time when moving forward	0 -- 65535	ms	1500	○
P05.25	Low speed electromagnetic braking deceleration time when moving forward	0 -- 65535	ms	2500	○
P05.26	Accelerator enable switch filter time	0 -- 65535	ms	200	○
P05.27	Low frequency regenerative braking torque limit	0 -- 100	%	80	○

Function code	Name	Setting range	Unit	Default value	Change
P05.28	Medium speed electromagnetic braking deceleration time when moving forward	0 -- 65535	ms	2000	○
P05.29	High frequency regenerative braking torque limit	0 -- 100	%	80	○
Group P06: Torque control parameters					
P06.07	Electric drive product forward torque limit value	0.-- 500.0			○
P06.08	Electric drive product negative torque limit value	0.-- 500.0			○
Group P07: Switch enable parameter					
P07.00	Encoder disconnection detection enable switch	0: Disable 1: Enable		1	×
P07.01	Motor power line disconnection detection enable switch	0: Disable 1: Enable		1	×
P07.02	Accelerator pedal/tire angle abnormality detection enable switch	0: Disable 1: Enable		1	×
P07.03	HPD fault enable switch	0: Disable 1: Enable		1	×
P07.04	Hour meter	0: Disable		1	×

Function code	Name	Setting range	Unit	Default value	Change
	clear switch	1: Enable			
P07.05	Flux-weakening control enable switch	0: Disable 1: Enable		1	×
P07.06	High speed saturation suppression switch	0: Disable 1: Enable		1	×
P07.07	Steering wheel angle sensor enable switch	0: Disable 1: Enable		1	×
P07.08	Harvey valve enable switch	0: Disable 1: Enable		1	×
P07.09	Accelerator pedal enable steering wheel operation switch	0: Disable 1: Enable		1	×
P07.10	Steep slope descent enable switch	0: Disable 1: Enable		1	×
P07.11	Synchronous motor DC protection enable switch	0: Disable 1: Enable		1	×
P07.12	Speed tracking enable switch after the accelerator pedal is released	0: Disable 1: Enable		1	×
P07.13	Overvoltage suppression switch	0: Disable 1: Enable		1	×
P07.14	Motor speed protection switch	0: Disable 1: Enable		1	×

Function code	Name	Setting range	Unit	Default value	Change
P07.15	Pump drive proportional valve input enable switch	0: Disable 1: Enable		1	×
P07.16	Mechanical brake control mode	0: Automatic 1: Manual		1	×
P07.17	Tire angle sensor enable switch	0: Disable 1: Enable		1	×
P07.18	Fast current limit enable switch	0: Disable 1: Enable		1	×
P07.19	DRV fault shield switch	0: Disable 1: Enable		1	×
P07.20	Foot brake booster enable switch	0: Disable 1: Enable		1	×
Group P08: Vehicle control parameters					
P08.00	Vehicle type	1: Double drive 2: Single drive 3: Single-travel drive without pump drive		2	×
P08.01	Battery type	1: Lead acid battery 2: Lithium battery		2	×
P08.02	Open circuit voltage when lead acid battery is full	0.0V -- 200.0V		51.5	×
P08.03	Open circuit voltage when lead acid battery is exhausted	0.0V -- 200.0V		47.5	×
P08.04	Rotation delay time when the steering wheel	0.--60000.ms			×

Function code	Name	Setting range	Unit	Default value	Change
	is not in neutral				
P08.05	Tire angle sensor value when the left side of the steering wheel is limited	0.-- 3300.mv			×
P08.06	Tire angle sensor value in the middle of the steering wheel	0.-- 3300.mv			×
P08.07	Tire angle sensor value when the right side of the steering wheel is limited	0.-- 3300.mv			×
P08.08	Accelerator pedal corresponds to the minimum analog value	0.-- 3300mv			×
P08.09	Corresponding analog value when the accelerator pedal is enabled	0.-- 3300mv			×
P08.10	Accelerator pedal corresponds to the maximum analog value	1.-- 3300mv			×
P08.11	Motor derating factor	0.60 -- 1.00			×
P08.12	Turning limit adjustment	0.0 -- 1.0			×

Function code	Name	Setting range	Unit	Default value	Change
	angle 1				
P08.13	Turning limit adjustment factor 1	0.0 -- 1.0			×
P08.14	Cooling fan starting temperature	10 -- 200	℃	90	×
P08.15	Motor over temperature pre-alarm temperature	60 -- 200	℃	125	×
P08.16	Speed limit factor when the steering wheel is killed	1.0 -- 100.0			○
P08.17	Battery voltage level	0 -- 1000	V	80	×
P08.18	BMS type 0: Ht 1: Dsl	0 -- 10		0	×
P08.19	Vehicle tire diameter	0.0 -- 6000.0	mm	680	○
P08.20	Vehicle gearbox ratio	0.0 -- 6000.0		22.6	○
P08.21	Dial type	0 -- 5 0: No instrumentation 1: Old instrumentation 2: New instrumentation			×
P08.22	Pump drive motor assist speed when the steering wheel rotates	200 -- 2000	rpm	600	○
P08.23	Pump drive assist speed when the gear switch and	0 -- 2000	rpm	200	○

Function code	Name	Setting range	Unit	Default value	Change
	steering wheel sensor are both enabled (when the steering wheel is at rest)				
P08.24	Rotation delay time when the steering wheel is in neutral	0 -- 65535	ms	3000	○
P08.25	Speed tracking period after the accelerator pedal is released	0 -- 65535	ms	300	○
P08.26	Speed tracking speed deviation threshold after the accelerator pedal is released	0.0 -- 100.0	Hz	12	○
Group P09: Terminal input parameters					
P09.00	SW1 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.01	SW1 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.02	SW3 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.03	SW3 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high.			×

Function code	Name	Setting range	Unit	Default value	Change
		Effective after restart			
P09.04	SW4 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.05	SW4 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.06	SW5 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.07	SW5 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.08	SW6 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.09	SW6 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.10	SW7 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.11	SW7 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.12	SW8 terminal function	Input function code: 1-32 0: No definition			×

Function code	Name	Setting range	Unit	Default value	Change
	selection	1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			
P09.13	SW8 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
P09.14	SW16 terminal function selection	Input function code: 1-32 0: No definition 1-32: FunIN.1-32, refer to DIDO function code definition, effective after restart			×
P09.15	SW16 terminal logic selection	Input polarity setting: 0-1 0: Indicates that the input is valid when it is low. 1: Indicates that the input is valid when it is high. Effective after restart			×
Group P10: Terminal output parameters					
P10.00	DR2 terminal function selection	Output function code: 1-32 0: No definition 1-32: FunOUT.1-32, refer to DIDO function code definition		0	×
P10.01	DR2 terminal logic selection	Output polarity setting: 0-1 0: Indicates that the output is low when it is valid. 1: Indicates that the output is high when it is valid.		1	×
P10.02	DR3 terminal function selection	Output function code: 1-32 0: No definition 1-32: FunOUT.1-32, refer to DIDO function code definition		0	×
P10.03	DR3 terminal logic selection	Output polarity setting: 0-1 0: Indicates that the output is low when it is valid. 1: Indicates that the output is high when it is valid.		1	×
P10.04	DR4 terminal function	Output function code: 1-32 0: No definition		0	×

Function code	Name	Setting range	Unit	Default value	Change
	selection	1-32: FunOUT.1-32, refer to DIDO function code definition			
P10.05	DR4 terminal logic selection	Output polarity setting: 0-1 0: Indicates that the output is low when it is valid. 1: Indicates that the output is high when it is valid.		1	×
P10.06	DR5 terminal function selection	Output function code: 1-32 0: No definition 1-32: FunOUT.1-32, refer to DIDO function code definition		0	×
P10.07	DR5 terminal logic selection	Output polarity setting: 0-1 0: Indicates that the output is low when it is valid. 1: Indicates that the output is high when it is valid.		1	×
P10.08	DR2 terminal properties	1.--2 1: Switch valve 2: Proportional valve		1	×
P10.09	Output frequency when DR2 is used as a proportional valve	1.--50000	HZ	500	×
P10.10	Output duty cycle when DR2 is used as a proportional valve	0.0--100.0	%	50	×
P10.11	DR3 terminal properties	1.--2 1: Switch valve 2: Proportional valve		1	×
P10.12	Output frequency when DR3 is used as a proportional	1.--50000	HZ	500	×

Function code	Name	Setting range	Unit	Default value	Change
	valve				
P10.13	Output duty cycle when DR3 is used as a proportional valve	0.0--100.0	%	50	×
P10.14	DR4 terminal properties	1.--2 1: Switch valve 2: Proportional valve		1	×
P10.15	Output frequency when DR4 is used as a proportional valve	1.--50000	HZ	500	×
P10.16	Output duty cycle when DR4 is used as a proportional valve	0.0--100.0	%	50	×
P10.17	DR5 terminal properties	1.--2 1: Switch valve 2: Proportional valve		1	×
P10.18	Output frequency when DR5 is used as a proportional valve	1.--50000	HZ	500	×
P10.19	Output duty cycle when DR5 is used as a proportional valve	0.0--100.0	%	50	×
Group P12: Advanced function parameters					
P12.00	Current loop proportional gain	0.000 -- 65.535		3	○

Function code	Name	Setting range	Unit	Default value	Change
P12.01	Current loop integral time	0.000 -- 65.535		0.015	○
P12.02	Speed reference filter time	0 -- 65535	0.01 ms	100	○
P12.03	Torque reference filter time	0 – 65535	0.01 ms	10	○
P12.04	Speed feedback filter time	0 -- 65535	0.01 ms	1000	○
P12.05	Torque feedforward filter time	0 -- 65535	0.01 ms	20	○
P12.06	Flux reference value	0.5--6500.0			○
P12.07	Medium and low frequency electric minimum flux reference value	0.0 -- 300.0	%		×
P12.08	Q axis output voltage limiting	0.56 -- 1.00		0.95	×
P12.09	D axis output voltage limiting	0.56 -- 1.00		0.95	×
P12.10	Overcurrent suppression Kp gain	0 -- 65535		1000	○
P12.11	Overcurrent suppression Ki gain	0 -- 65535		1000	○
P12.12	High frequency braking overcurrent suppression point	0 -- 1000	A	300	×

Function code	Name	Setting range	Unit	Default value	Change
P12.13	Medium and low frequency braking overcurrent suppression point	0 -- 1000	A	330	×
P12.14	Low frequency torque reference filtering time	0 -- 65535	0.01 ms	500	○
P12.15	Torque limiting curve frequency point 1	0.0 -- 300.0	Hz		○
P12.16	Torque limiting curve percentage 1	0.0 -- 100.0	%		○
P12.17	Torque limiting curve frequency point 2	0.0 -- 300.0	Hz		○
P12.18	Torque limiting curve percentage 2	0.0 -- 100.0	%		○
P12.19	Torque limiting curve frequency point 3	0.0 -- 300.0	Hz		○
P12.20	Torque limiting curve percentage 3	0.0 -- 100.0	%		○
P12.21	Pre-excitation current	0.0 -- 1		0.026	○
P12.22	Pre-excitation time	0.-- 65536	ms	100	○
P12.23	Stop	0.--65535.	ms	5000	○

Function code	Name	Setting range	Unit	Default value	Change
	pre-excitation hold time				
P12.24	Electric overcurrent suppression point	0.--1000	A	370	○
P12.25	Actual operating time of the system		0.1s		*
P12.26	Overmodulation depth	0.567 -- 1.600		1	×
P12.27	Output voltage mode	0 -- 1		1	×
P12.28	Synchronous motor weak magnetic mode	0. -- 2		2	×
P12.29	Synchronous motor model calculates field weakening current adjustment coefficient	0.0 -- 5.0		1	○
P12.30	Asynchronous motor field weakening adjustment gain	50 -- 200		100	○
P12.31	Synchronous motor weak magnetic mode 2 coefficient	0--65535	1000	0	○
P12.32	Slip compensation coefficient in asynchronous motor power generation	50 -- 200		100	×

Function code	Name	Setting range	Unit	Default value	Change
	mode				
P12.33	Output voltage adjustment factor in power generation mode	10 -- 100		100	×
Group P13: Steep slope slowly descending parameter					
P13.00	System running time		0.1s		*
P13.01	Enter the steep slope slowly descending speed threshold	0.0 -- 20.0		Hz	○
P13.04	Slope Ki gain	0.001 -- 65.535		0.01	○
P13.05	Slope time	0 -- 6553.5		5	○
P13.09	The cumulative current value of entering the slope	0.--65535		5000	×
P13.10	Steep slope slowly descending Kp gain	0.1 -- 6553.5		20	○
P13.11	Slope speed	1 -- 3000	rpm	200	○
P13.12	Slope Kp gain	0.1 -- 6553.5		5	○
P13.13	Steep slope slowly descending Ki gain	0.001 -- 65.535	0.01		○
Group P14: Manufacturer parameters					
P14.02	Weak magnetic starting point	56.7 -- 100.0	%	86.6	×
P14.03	Zero speed enable current suppression	0 -- 1000	A	300	○

Function code	Name	Setting range	Unit	Default value	Change
	point				
P14.04	Overvoltage suppression Kp gain	0 -- 65535		1000	○
P14.05	Overvoltage suppression Ki gain	0 -- 65535		1000	○
P14.06	Excessive speed deviation detection value	0.0 -- 50.0	%	20	×
P14.07	Excessive speed deviation detection time	0.0 -- 60.0	s	2	×
P14.08	Ksi filter time	0 -- 65535	ms	500	×
P14.09	Drive output current limit point	0 -- 1000	A	350	×
P14.10	Fast current limit time limit	0 -- 65535	ms	500	×
P14.11	Throttle release steering wheel delay time	0 -- 65535	ms	5000	×
P14.12	Foot brake release steering wheel delay time	0 -- 65535	ms	5000	×
P14.13	P1413RSVD	0 -- 65535			×
P14.14	Fault output lamp flashing frequency	0 -- 65535	4ms	10	○
P14.15	Cutting speed switch switching smoothing factor	0 -- 65535		10	○
P14.16	Fault output	0 -- 65535		5	○

Function code	Name	Setting range	Unit	Default value	Change
	long signal length				
Group P16: Analog configuration					
P16.00	Throttle depth 1/ pump drive up and down analog 1	0.0 -- 100.0	%		○
P16.01	Frequency corresponding to throttle depth 1 / frequency corresponding to pump drive up and down analog 1	0.0 -- 100.0	%		○
P16.02	Throttle depth 2/ pump drive up and down analog 2	0.0 -- 100.0	%		○
P16.03	Frequency corresponding to throttle depth 2 / frequency corresponding to pump drive up and down analog 2	0.0 -- 100.0	%		○
P16.04	Throttle depth 3/ pump drive up and down analog 3	0.0 -- 100.0	%		○
P16.05	Frequency corresponding to throttle depth 3 / frequency corresponding to pump drive up and down	0.0 -- 100.0	%		○

Function code	Name	Setting range	Unit	Default value	Change
	analog 3				
P16.06	Throttle depth 4/ pump drive up and down analog 4	0.0 -- 100.0	%		○
P16.07	Frequency corresponding to throttle depth 4/ frequency corresponding to pump drive up and down analog 4	0.0 -- 100.0	%		○
P16.08	Throttle depth 5 / pump drive tilt analog 1	0.0 -- 100.0	%		○
P16.09	Frequency corresponding to throttle depth 5/ frequency corresponding to pump drive tilt analog 1	0.0 -- 100.0	%		○
P16.10	Pump drive tilt analog 2	0.0 -- 100.0	%		○
P16.11	Frequency corresponding to pump drive tilt analog 2	0.0 -- 100.0	%		○
P16.12	Pump drive tilt analog 3	0.0 -- 100.0	%		○
P16.13	Frequency corresponding to pump drive tilt analog 3	0.0 -- 100.0	%		○
P16.14	Pump drive tilt analog 4	0.0 -- 100.0	%		○

Function code	Name	Setting range	Unit	Default value	Change
P16.15	Frequency corresponding to pump drive tilt analog 4	0.0 -- 100.0	%		○
P16.16	Pump drive side shift analog 1	0.0 -- 100.0	%		○
P16.17	Frequency corresponding to pump drive side shift analog 1	0.0 -- 100.0	%		○
P16.18	Pump drive side shift analog 2	0.0 -- 100.0	%		○
P16.19	Frequency corresponding to pump drive side shift analog 2	0.0 -- 100.0	%		○
P16.20	Pump drive side shift analog 3	0.0 -- 100.0	%		○
P16.21	Frequency corresponding to pump drive side shift analog 3	0.0 -- 100.0	%		○
P16.22	Pump drive side shift analog 4	0.0 -- 100.0	%		○
P16.23	Frequency corresponding to pump drive side shift analog 4	0.0 -- 100.0	%		○
P16.24	Switch valve	0.0 -- 100.0	%	15	○

Function code	Name	Setting range	Unit	Default value	Change
	pump drive up 1 frequency				
P16.25	Switch valve pump drive up 2 frequency	0.0 -- 100.0	%	66.7	○
P16.26	Switch valve pump drive tilt frequency	0.0 -- 100.0	%	33.3	○
P16.27	Switch valve pump drive side shift frequency	0.0 -- 100.0	%	17.7	○
P16.28	Switch valve pump drive accessory 1 frequency	0.0 -- 100.0	%	10	○
P16.29	Switch valve pump drive accessory 2 frequency	0.0 -- 100.0	%	10	○
P16.30	Proportional valve analog input enable threshold	0 -- 4096		400	○
Group P17: Reserved function					
P17.05	Excitation adjustment proportional gain (reserved)	0 -- 60000		2000	○
P17.06	Excitation adjustment integral gain (reserved)	0 -- 60000		1500	○
P17.07	Torque adjustment proportional gain (reserved)	0 -- 60000		2000	○
P17.08	Torque	0 -- 60000		1500	○

Function code	Name	Setting range	Unit	Default value	Change
	adjustment integral gain (reserved)				
Group P18: Customized function					
P18.19	Turning output torque adjustment coefficient	0.0 -- 200.0	%	100	○
P18.26	Power level high grade coefficient	0.0 -- 1.0			○
P18.27	Power level medium grade coefficient	0.0 -- 1.0			○
P18.28	Power level low grade coefficient	0.0 -- 1.0			○
P18.29	Throttle depth / acceleration / deceleration time curve & throttle depth 1	0.0 -- 100.0			○
P18.30	Throttle depth/ acceleration /deceleration time curve & acceleration/ deceleration time percentage 1	0.0 -- 1.0			○
P18.31	Throttle depth / acceleration / deceleration time curve & throttle depth 2	0.0 -- 100.0			○
P18.32	Throttle depth/ acceleration/	0.0 -- 1.0			○

Function code	Name	Setting range	Unit	Default value	Change
	deceleration time curve & acceleration/ deceleration time percentage 2				
P18.33	Throttle depth / acceleration / deceleration time curve & throttle depth 3	0.0 -- 100.0			○
P18.34	Throttle depth/ acceleration/ deceleration time curve & acceleration/ deceleration time percentage 3	0.0 -- 1.0			○
P18.39	Parameter upload and download	1: Parameter upload to handheld 2: Parameter download to electric drive product			×
P18.43	Torque feedforward gain	0.0 -- 100.0	%	0	○
P18.44	Power line disconnection detection coefficient	0.0 -- 2.0			○
P18.46	Analog value when the throttle is enabled	0 -- 4095		0	*
P18.48	Accelerator pedal stepping threshold	0 -- 100		10	○
P18.49	Accelerator	0 -- 100		10	○

Function code	Name	Setting range	Unit	Default value	Change
	pedal stop threshold				
P18.50	Accelerator pedal stepping detection refresh time	0 -- 65535		50	○
P18.51	Steering wheel rotation threshold	0 -- 100		4	○
P18.52	Steering wheel stop threshold	0 -- 100		2	○
P18.53	Steering wheel angle sensor detection refresh time	0 -- 65535	1ms	50	○
Group P20: Fault parameters					
P20.00	Parameter version number high 16-bit data	0 -- 65535			○
P20.01	Parameter version number low 16-bit data	0 -- 65535			○
P20.02	First fault type	0 -- 65535			
P20.03	Second fault type	0 -- 65535			
P20.04	Third (last) fault type	0 -- 65535			
P20.05	Frequency at the third (last) fault				
P20.06	Current at the third (last) fault				
P20.07	Bus current at the third (latest) fault				
P20.08	Input terminal				

Function code	Name	Setting range	Unit	Default value	Change
	status at the third (last) fault				
P20.09	Output terminal status at the third (last) fault				
P20.10	Drive status at the third (last) fault				
P20.11	Power-on time at the third (last) fault (min)				
P20.12	Running time at the third (last) fault (min)				
P20.13	Frequency at the second fault				
P20.14	Current at the second fault				
P20.15	Bus current at the second fault				
P20.16	Input terminal status at the second fault				
P20.17	Output terminal status at the second fault				
P20.18	Drive status at the second fault				
P20.19	Power-on time at the second fault (min)				
P20.20	Running time at the second fault (min)				
P20.21	Frequency at the first fault				

Function code	Name	Setting range	Unit	Default value	Change
P20.22	Current at the first fault				
P20.23	Bus current at the first fault				
P20.24	Input terminal status at the first fault				
P20.25	Output terminal status at the first fault				
P20.26	Drive status at the first fault				
P20.27	Power-on time at the first fault (min)				
P20.28	Running time at the first fault (min)				
Group P98: Parameter sampling					
P98.06	Current sampling coefficient	0.0--2000.0			×

Chapter 5 L6 Series Electric Drive Products Debugging Steps

5.1 L6 series electric drive products installation preparation

1. Handheld controller: This is an optional device, mainly used for initial debugging of machine parameters, which can provide demand to the manufacturer.

2. Accelerator:

Type	Description
1	Single-ended 0~5V voltage source throttle, current source throttle, 3-port potentiometer throttle
2	Swing 3-port 0~5V throttle
3	2-wire 5 kΩ-0 potentiometer throttle

3. Motor:

The motor should be kept clean and dry around, and other objects should not be placed inside or outside;

It is strictly forbidden to put together with strong magnetic objects;

The input voltage level needs to be correct;

If the motor is found to have an abnormal smell during use, it should be stopped immediately for inspection;

The wiring between the motor and the electric drive product should be as short as possible;

Overload is strictly prohibited;

If the motor is running, there is leakage, the speed drops suddenly, severe vibration occurs, there is abnormally loud noise, overheating and smoke, or the electrical contact is ignited and smoke, it should be powered off immediately and shut down for inspection;

Frequently check whether the motor is overheated ;

Always check the motor connection screw, whether there is loose, fire smoke, insulation aging phenomenon;

4. Battery:

Try not to use it under overload, high humidity or steep slope;

Keep the battery good heat dissipation and not exposed to sunlight;

Do not mix old and new batteries;

If the battery has been used for more than 4 years, it needs to be replaced;

When externally charging, do not reverse the polarity of the battery, otherwise the battery may be scrapped.

5.2 L6 series electric drive products detection

The detection parameters can be monitored by the PC host computer. The host computer interface is as follows:

5.2.1 Detect with a multimeter

Detect according to the following table, each test item needs to be tested more than 3 times.

No.	Multimeter terminal		Normal value range	
	Red probe	Black probe	Polarity value measurement	Resistance measurement
1	B+	U/V/W/B-		Above 1MΩ
2	B-	U/V/W		Above 1MΩ
3	U/V/W	B+	About 0.4V	
4	B-	U/V/W	About 0.4V	

DANGER All external wiring of the electric drive product must be removed before testing, and the B+ and B- terminals should be discharged with a resistor of not less than 20Ω/30W!

5.2.2 Vehicle parameter detection

L6 series electric drive products provide a powerful PC inspection system that monitors the vehicle's various conditions in real time:

No.	Specifications	Unit
1	U phase current sampling value	A
2	V phase current sampling value	A
3	W phase current sampling value	A
4	Encoder A phase sampling value	V
5	Encoder B phase sampling value	V

6	Tire angle sampling value	V
7	Throttle pedal sampling value	V
8	Output current	A
9	Output frequency	Hz
10	Motor temperature	℃
11	Radiator 1 temperature	℃
12	Bus voltage	V
13	Encoder angle original value	V
14	Throttle enable AD value	V
15	Reserved	/
16	Forward switch	ON/OFF
17	Back switch	ON/OFF
18	Acceleration enable switch	ON/OFF
19	Brake enable switch	ON/OFF
20	Hand brake switch	ON/OFF
21	Seat A switch	ON/OFF
22	Seat B switch	ON/OFF
23	Pump drive up and down switch	ON/OFF
24	Pump drive tilt enable switch	ON/OFF
25	Pump drive side shift enable switch	ON/OFF
26	Cutting speed switch	ON/OFF
27	Fault status	/

After the vehicle is installed, you can check whether the vehicle and the electric drive product are working properly by detecting the various switch states on the right side of the host computer interface. If there is an abnormality, it can be checked in a targeted manner to facilitate on-site debugging.

 **DANGER** The drive wheel of the vehicle must be suspended before the test to prevent accidental movement of the vehicle from causing human injury!

5.3 L6 series electric drive products debugging

5.3.1 Voltage level setting

1) Use the electric drive product operation panel to enter the P00.08 parameter group;

2) Set the corresponding voltage level according to the battery parameters.

5.3.2 Motor parameter setting

1) Use the electric drive product operation panel to enter the P03 parameter group;

2) Set the corresponding parameters according to the motor parameters.

5.3.3 Electromagnetic brake parameter setting

1) Use the electric drive product operation panel to enter the P05.17 parameter group;

2) Set the corresponding parameters according to the electric brake specifications.

5.3.4 Accelerator parameter setting

1) Suspended vehicle drive wheel;

2) Use the electric drive product operation panel to enter the P08.08~P08.10 parameter group;

3) Set the corresponding parameters according to the accelerator parameters.

 DANGER The drive wheel of the vehicle must be suspended before the test to prevent accidental movement of the vehicle from causing human injury!

5.3.5 Steering wheel parameter setting

1) Suspended vehicle steering wheel;

2) Use the electric drive product operation panel to enter the P08.04~P08.07 parameter group;

3) Set the corresponding parameters according to the steering wheel parameters.

 DANGER The steering wheel of the vehicle must be suspended before the test to prevent accidental movement of the vehicle from causing human injury!

5.3.6 Control mode parameter setting

1) Suspended vehicle steering wheel;

2) Use the electric drive product operation panel to enter the P02.00 parameter group;

3) Enter the parameters in the selected mode and set them;

Unit place	Tens place
1: Closed loop vector 2: IF mode 3: VF mode	0: Asynchronous motor 1: Synchronous motor

5.3.7 Motor speed control parameter setting

1) Suspended vehicle steering wheel;

2) Use the electric drive product operation panel to enter the P05 parameter group;

3) Enter the parameters in the selected mode to adjust the speed and switching of the walking motor and pump motor to achieve the best effect.

5.3.8 Motor torque control parameter setting

1) Suspended vehicle steering wheel;

2) Use the electric drive product operation panel to enter the P06 parameter group;

3) Enter the parameters in the selected mode, and adjust the torque of the walking motor and pump motor according to the load condition to achieve the best effect.

5.4 Electric drive product and motor matching

5.4.1 Motor matching

If you are debugging a traction motor

 DANGER Then please first suspend the drive wheel and fix the vehicle to prevent accidental movement of the vehicle from causing human injury!

The drive wheel of the vehicle should be free to rotate, unfully released brakes, handbrakes or other severe friction can cause the test to be invalid or fail.

If you are debugging a hydraulic pump system, the motor should be disconnected from the hydraulic pump, allowing the motor to rotate freely. If the motor is not disconnected from the pump, the test will not be completed accurately.

Note: If the electric drive product's maximum current is increased by 20% or when the wiring configuration changes (for example, the delta connection becomes a Y-type connection, and vice versa) the following test needs to be repeated.

1) Set the voltage level, P00.08;

2) Set the electromagnetic brake parameters, P05.17;

3) Set the motor temperature sensor type, P03.19;

Parameter No.	Parameter description
0	Sensorless
1	PT100
2	NTC
3	KTY122
4	KTY130
5	KTY150
6	NTC_HT_OLD

4) Enter motor rated power, P03.00;

5) Enter motor rated voltage, P03.01;

6) Enter motor rated current, P03.02;

7) Enter motor rated speed, P03.04;

8) Enter motor pole pairs, P03.11;

9) Enter positive and negative torque limits, P06.07, P06.08. Note that this speed must be achieved by system performance. 50% is a typical setting;

10) Enter the forward and negative speed limits, P06.05, P06.06. Set to low torque to reduce the heat of the motor and the resonance of large current;

11) Check whether there is a fault alarm;

 DANGER Do not approach the wheel, the motor will start to rotate next!

12) Set the electric drive product to the forward state;

13) Step on the accelerator pedal to check whether the rotation direction of the wheel is forward. If not, release the accelerator pedal, disconnect the power supply, and check whether the power line and signal line are connected incorrectly;

14) During the motor rotation, check whether the fault is reported. If there is no fault, the motor can run normally;

15) On-off KSI once again.

5.4.2 Speed setting

1) Take a straight line distance of 20 meters in a flat section;

2) Set the throttle initial value P16.00~P16.09;

3) Select a reference point, the vehicle slowly starts from the starting point of 20 meters to the end point, and can't stop in the middle;

4) Observe the speed value of the whole vehicle panel, and change the P16.00~P16.09 parameter group according to the field application requirements, and then change the vehicle speed.

5.5 Measurement

Measuring vehicle full load or no load climbing current

5.5.1 Torque parameter setting

1) Use the electric drive product operation panel to enter the P06.07, P06.08 parameter group;

2) Set the corresponding parameters according to the load and slope requirements;

5.5.2 Preparation before measurement

1) Clamp the clamp meter to the positive or negative pole of the battery;

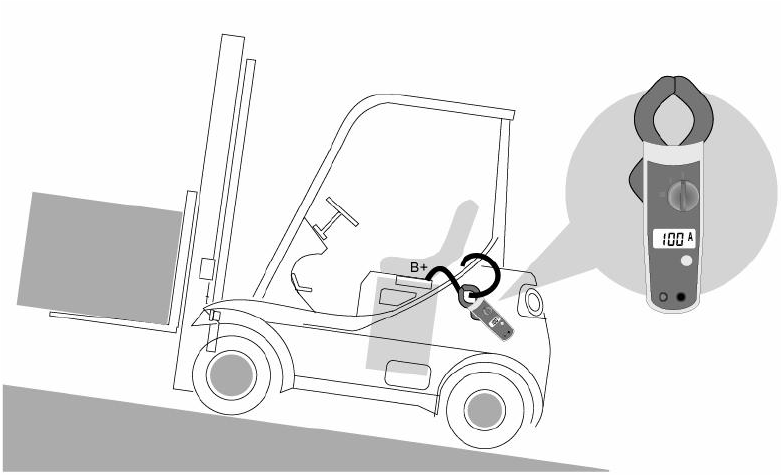
2) Counterweight the vehicle according to customer requirements;

3) Adjust the throttle setting to the optimal value;

5.5.3 Measurement and recording

The vehicle starts to climb and observes the current value of the clamp meter. At the end of the climb, record the maximum value of the clamp meter throughout the process.

The project needs to be tested more than 3 times and the recorded data is averaged.



Chapter 6 Troubleshooting

6.1 LED indicator display mode

This product is equipped with LED indicator, which display different information through a combination of different lights. See the table below:

Table 6-1 Fault record table

LED display Information description	
Display	Information
Indicator flashes	The machine is malfunctioning
The indicator light is always on	The machine is running normally

6.2 Alarm code table

All the possible alarm types for L6 series electric drive products are summarized as shown in table 6-2.

Table 6-2 Alarm code table

Alarm code	Alarm type	Possible alarm causes	Solutions
AL.026	Electric drive product temperature pre-alarm	Electric drive product over temperature alarm point 75 ° C	Derating operation
AL.027	Motor temperature pre-alarm	Motor over temperature alarm point 115 ° C	Derating operation
AL.028	HPD- gear fault	When the system is powered on, it is detected that the gear is not neutral.	Suspend operation, automatic recovery
AL.029	HPD-throttle fault	When the system is powered on, it is detected that the accelerator pedal is enabled.	Suspend operation, automatic recovery
AL.030	HPD-seat fault	When the seat is empty, the gear is not in neutral.	Suspend operation, automatic recovery

6.3 Fault code table

This fault code table provides the following information.

- Fault code
- The name of the fault displayed on the programmer
- Performance caused by fault
- Possible fault cause
- Deep cause of fault
- State resolution

When a fault occurs, if it is confirmed that it is not a wiring error or a mechanical fault of the vehicle, try restarting with the vehicle key switch. If the fault persists, turn off the key switch and check whether the 35-pin connector is properly connected or dirty. After repairing and cleaning, reconnect and try again.

Table 6-3 Fault code table

Fault code	Fault code displayed on the instrumentation	Fault type	Possible fault cause	Solutions
Er.003	0x81	DO terminal assignment exception	Incorrect terminal connection	Check terminal wire sequence
Er.004	0x82	DI terminal assignment exception	Incorrect terminal connection	Check terminal wire sequence
Er.005	0x70	Electric drive product over-voltage protection	The battery input is abnormal or the model is incorrectly configured.	Check whether the input power or the machine model is configured correctly
Er.006	0x54	Abnormal tyre angle sensor input	Tire angle sensor damage or control board fault	Seek for service support
Er.007	0x53	Abnormal accelerator pedal sensor input	Accelerator pedal damage or control board damage	Replace the accelerator pedal or seek for service support
Er.008	0x13	Motor U phase open circuit	Main transistor (U phase) has open circuit fault, or motor side (U phase) wiring is open	Check U phase wiring

Fault code	Fault code displayed on the instrumentation	Fault type	Possible fault cause	Solutions
Er.009	0x14	Motor V phase open circuit	Main transistor (V phase) has open circuit fault, or motor side (V phase) wiring is open	Check V phase wiring
Er.010	0X10	Hardware overcurrent	Torque setting is too large	Reduce torque value
			External wiring short circuit	Check whether the wiring is correct
Er.011	0x21	Electric drive product over temperature protection fault	Exceeding the electric drive product over temperature protection point	Run after cooling down
Er.012	0x15	Motor W phase open circuit	Main transistor (W phase) has open circuit fault, or motor side (W phase) wiring is open	Check W phase wiring
Er.013	0x71	Electric drive product overload	The motor parameters are incorrect.	Reconfirm the motor parameters
			The load is too large.	Check whether the load is normal
			Battery voltage is too low	Check battery voltage
Er.014	0X16	Charging failure	Abnormal power supply wiring and terminal wiring	Check whether the power supply wiring and terminal wiring are correct
Er.015	0X01	Main contactor pull-in failed	Contactor short circuit fault	Check whether the contactor is good
Er.016	0X02	Main contactor open abnormal	Main contactor or fuse open circuit	Check whether the contactor and fuse are good
Er.017		Motor overspeed	Parameter setting error	Reset motor parameters, if no effect, seek for service support

Fault code	Fault code displayed on the instrumentation	Fault type	Possible fault cause	Solutions
Er.018	0X16	Buffer resistor charging time is too long	Bus short circuit or abnormal parameter setting	Check whether the wiring is normal, check the machine parameter setting.
Er.019	0X52	Current sensor abnormality	Circuit board fault	Restart KSI, if no effect, seek for service support
Er.020	0x72	Buffer resistor discharge time is too long	Circuit board fault or bus short circuit	Restart KSI, if no effect, seek for service support
Er.021	0x73	Memory chip read and write exception	Circuit board fault	Restart KSI, if no effect, seek for service support
Er.022	0x74	No valid KSI signal was read	Circuit board fault	Restart KSI, if no effect, seek for service support
Er.025	0X56	Encoder failure	Wiring error	Check whether the encoder wiring is good
Er.026	0x75	Electric drive product over temperature pre-alarm	Electric drive product temperature is greater than 75 ° C	Check the heat dissipation device or derating operation
Er.027	0x76	Motor over temperature pre-alarm	Motor temperature is greater than 115 ° C	Check whether the motor is abnormal or derating operation
Er.028	0x77	HPD- gear fault	When the system is powered on, it detects that the gear is not neutral.	Move the gear to neutral
Er.029	0x78	HPD throttle detection exception	When the system is powered up, it is detected that the accelerator pedal is enabled.	Detecting the accelerator pedal

Fault code	Fault code displayed on the instrumentation	Fault type	Possible fault cause	Solutions
Er.030	0x79	HPD-seat logic fault	When the seat is empty, the gear is not in neutral.	The seat cannot be empty, shift the gear to neutral
Er.031	/	Sync machine tuning failed	Motor parameters and encoder settings are abnormal	Check motor parameters and encoder settings
Er.032	/	Model setting fault	Model setting error	Set P00.08 to the correct model
Er.035	0x62	Seat switch fault	Seat switch fault or circuit board fault	Check seat switch, restart KSI, if no effect, seek for service support
Er.036	0X81	Car CANOPEN bus disconnection	Cannot communicate with the right motor electric drive product	Check whether the CAN communication wiring is good
	0X82		Cannot communicate with the left motor electric drive product	
	0X84		Cannot communicate with the loading and unloading electric drive product	
Er.037		Excessive speed deviation	1. Encoder parameters are set incorrectly. 2. No parameter identification was conducted	1. Set the encoder parameters correctly 2. Identify motor parameters
Er.038		Fast current limit fault	Acceleration / deceleration time is too short	Increase acceleration / deceleration time
Er.039	0x51	Motor temperature protection	Motor temperature is too high	Stop running for a period of time, and start again after cooling down

Fault code	Fault code displayed on the instrumentation	Fault type	Possible fault cause	Solutions
Er.040	0x63	The right drive did not receive lithium battery PDO data	Abnormal detection signal	Check related signal lines
Er.041		Lithium battery status abnormal	The lithium battery is faulty	Replace the battery
Er.046	0x03	Electric drive product undervoltage protection	Low battery voltage	Replace the battery
Er.049	0x61	Forward/reverse direction switch failure	Direction switch is abnormal.	Check whether the direction switch is working properly.
Er.050	0x80	Electric drive product software overcurrent protection	The motor parameters are incorrect.	Reconfirm the motor parameters
			The load is too large.	Check whether the load is normal
			Battery voltage is too low	Check battery voltage

Note:

Other ErrorCodes are displayed directly on the instrumentation.

Left fault code: 0x3200|EmcyError

Right fault code: 0x3000|EmcyError

Pump fault code: 0x5000|EmcyError

If 0x5081 is displayed on the instrumentation, it means that the pump drive can not communicate with the right drive, and displays right drive communication fault.

If 0x3056 is displayed on the instrumentation, it means that the right drive reports the walking sensor fault.

6.4 DIDO function definition

This table provides the following information.

- SW input signal function description
- DRIVER output signal function description

Table 6-4 DIDO function definition

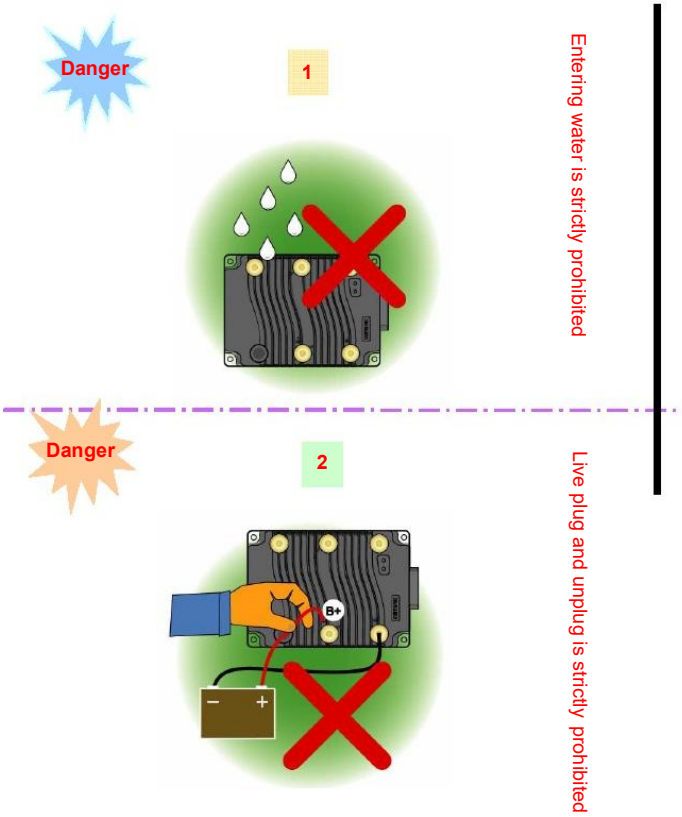
DIDO description	Coding	Name	Function name	Status
SW input signal function description	FunIN.1	ForwardSW	Forward switch	Distribution
	FunIN.2	BackwardSW	Back switch	Distribution
	FunIN.3	SeatSW	Seat switch	Distribution
	FunIN.4	HandBrakeSW	Hand brake switch	Distribution
	FunIN.5	BrakeSW	Foot brake switch	Distribution
	FunIN.6	AccSW	Throttle enable switch	Distribution
	FunIN.7	PumpRiseDownSW	Pump drive up/down enable switch	Distribution
	FunIN.8	PumpLeanSW	Pump drive tilt enable switch	Distribution
	FunIN.9	PumpSideSW	Pump drive side shift enable switch	Distribution
	FunIN.10	PumpRiseDownSW2	Pump drive up/down enable switch 2	Distribution
	FunIN.11	ValveCtrlRaiseUpDisableInput	Valve-controlled lifting disable input switch	Distribution
	FunIN.12	SwValveTest1Sw	Switch valve accessory 1 input switch	Distribution
	FunIN.13	SwValveTest2Sw	Switch valve accessory 2 input switch	Distribution
	FunIN.14	MechBrakeHandEnableSw	Mechanical brake manual enable switch	Distribution
	FunIN.15	SpeedCultingSw	Speed cutting enable switch	Distribution
DRIVER	FunOUT.1	BackUpLightCtrl	Reverse lamp relay control switch	Distribution

DIDO description	Coding	Name	Function name	Status
output signal function description	FunOUT.2	HarveyValveSW	Harvey valve control switch	Distribution
	FunOUT.3	RadiatorFanStrl	Motor cooling fan relay control switch	Distribution
	FunOUT.4	MotorMechBrake	Motor mechanical brake control switch	Distribution
	FunOUT.5	ValveCtrlRaiseUp	Valve-controlled lifting enable switch	Distribution
	FunOUT.6	ValveCtrlFallDown	Valve-controlled drop enable switch	Distribution
	FunOUT.7	ErrInfoOutput	Fault information display output	Distribution

Appendix 1　Precautions

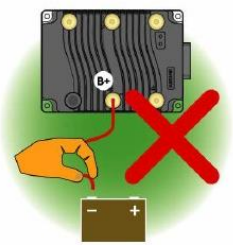
Please read the following carefully before using the product (if you have any questions, please contact MEGMEET engineers):

If the following conditions occur, the electric drive product may be seriously damaged!



Danger

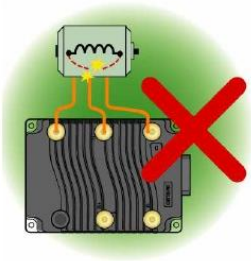
3



Reverse polarity is strictly prohibited

Danger

4



Motor short circuit is strictly prohibited

Appendix 2 Warranty and Service

Shenzhen Megmeet Electrical Co., Ltd. manufactures motor electric drive products strictly according to the ISO9001:2015 standard. In case of any product abnormalities, please contact the distributor or the headquarters. Our company will provide full technical support for you.

1. Warranty period

The product is warranted for 12 months from the purchase date, however, the warranty date shall not exceed 18 months after the manufacturing date on the nameplate.

2. Warranty scope

During the warranty period, any product abnormalities incurred due to our company can be freely repaired or replaced by our company. In case of the following situations, maintenance fees will also be charged even if the product is still in the warranty period.

(1) The damages are caused by fire, flood, strong lightning strike, etc.

(2) The damages are caused by users' unauthorized modifications.

(3) The product is damaged due to drop or in transmission after the purchase.

(4) The product is damaged because the standard requirements are not obeyed in actual use.

(5) The product is damaged because the user does not follow the instructions of the user manual.

3. After-sales service

(1) If there are specific requirements for electric drive installation and trial operation, or the working status of the drive is not satisfactory (such as unsatisfactory performance and function), please contact the distributor or Shenzhen Megmeet Electrical Co., Ltd.

(2) In case of any abnormality, contact the distributor or Shenzhen Megmeet Electrical Co., Ltd. immediately for help.

(3) During the warranty period, our company will repair any drive abnormality incurred due to the product manufacturing and design free of charge.

(4) If the product is out of the warranty period, our company can provide paid repairing service according to the customers' needs.

(5) The service charge is calculated by actual costs. If there is an agreement, the agreement shall prevail.

Shenzhen Megmeet Electrical Co., Ltd.

Address: 5th Floor, Block B, Unisplendor Information Harbor, Langshan Road, Nanshan District, Shenzhen, 518057, China

Tel: +86-755-86600500

Fax: +86-755-86600562

Zip code: 518057

Website: https://www.megmeet.com

Shenzhen Megmeet Electrical Co., Ltd.

Electric Drive Warranty Bill

Customer company:	
Detailed address:	
Zip code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact:	Tel:
Maintenance person:	Tel:
Maintenance date:	
Comment on service: □**Good** □**Fair** □ **So so** □ **Poor** Other comment: User's signature: Date:	
Return visit record in Customer Service Center: □**Telephone return visit** □**Letter return visit** Other: Signature of the technical support engineer: Date:	

Note: This bill becomes invalid if the user can not be visited.

Shenzhen Megmeet Electrical Co., Ltd.

Electric Drive Warranty Bill

Customer company:	
Detailed address:	
Zip code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact:	Tel:
Maintenance person:	Tel:
Maintenance date:	
Comment on service: □**Good** □**Fair** □ **So so** □ **Poor** Other comment: User's signature: Date:	
Return visit record in Customer Service Center: □**Telephone return visit** □**Letter return visit** Other: Signature of the technical support engineer: Date:	

Note: This bill becomes invalid if the user can not be visited.