

BLDL200 Universal Low Voltage Brushless DC Motor Driver Operating Instructions Manual

Main Features

- ◆ Can be connected to an external display operation panel to display the speed; can also be connected to a computer to set the drive parameters;
- ◆ Current-speed dual closed-loop design, large low-speed torque and stable operation;
- ◆ High torque and high speed output, the maximum speed is 8000 rpm/min; (depending on the user's motor)
- ◆ Speed regulation mode: external PWM speed regulation or external potentiometer speed regulation;
- ◆ With EN (enable), DIR (direction), X1 (brake) signal control terminals;
- ◆ Can output alarm signal ALM for user detection (gate output);
- ◆ It has protection functions such as overcurrent, overvoltage, undervoltage, Hall sensor phase error, and motor stall.



Product Overview

This brushless DC motor driver is our company's latest high-tech product for the field of low-voltage brushless motor transmission. This product uses large-scale integrated circuits to replace the original hardware design, and has higher anti-interference and fast response performance. This product is suitable for driving any low-voltage three-phase brushless DC motor with or without Hall with a peak current below 10A and a power supply voltage within DC 18V ~ 50V (the panel is nominally DC24V~48V) , and has the characteristics of low temperature when working with high current. The product is used in a series of electrical automation control fields such as knitting equipment, medical equipment, food packaging machinery, and power tools.

Functional Overview

This product can achieve the following functions: **(The standard factory default setting is square wave with Hall closed loop mode)**

1. Square wave with Hall speed open loop operation
2. Square wave with Hall speed closed loop operation
3. Square wave speed open loop operation without Hall
4. Square wave speed closed loop operation without Hall
5. Constant torque open loop mode operation **(long-term overload operation is strictly prohibited)**
6. Constant torque closed loop mode operation **(long-term overload operation is strictly prohibited)**

Users can set the above functions by themselves according to the host computer software or handheld debugger provided by our company.

Electrical performance indicators

Electrical performance (ambient temperature $T_j = 25^\circ\text{C}$)

Power supply	DC 18 V ~ 50 V DC power supply (capacity is selected according to motor power)
Maximum output current	No more than 10 A (depending on the motor and rated load)
Adaptive motor	motors with output power $\leq 200W$
Insulation resistance	At room temperature $> 500M\Omega$
Dielectric strength	0.5KV , 1 minute at normal temperature and pressure


Use environment parameters:

Cooling method	Natural air cooling & forced air cooling	
Usage Environment	occasion	Try to avoid dust, oil mist and corrosive gas
	temperature	0 °C ~ +50 °C
	humidity	< 80%RH , no condensation, no frost
	shock	< 0.5G (4.9m/s ²) 10Hz-60Hz (non-continuous operation)
Storage temperature	-20 °C ~ +65 °C	
Dimensions	1 18 mm X 75.5 mm X 35 mm	
Weight	About 0.27 Kg	

[Note] Due to the drastic changes in storage and transportation ambient temperature, condensation or frost is likely to occur. At this time, the driver should be left for more than 12 hours and powered on only after the driver temperature is consistent with the ambient temperature.

Port Description

Function	Logo	illustrate
Indicator Lights	POWER	Green power indicator light, when powered on, it means the power is normal
	ALARM	Red status indicator (1) The red light is off under normal circumstances; (2) When EN is not connected to GND1, the red light is always on; (3) In case of parameter storage failure , the red light flashes once and stops for 1 s; (4) In case of undervoltage fault , the red light flashes twice and then stops for 1 s; (5) In case of overvoltage fault , the red light flashes 3 times and stops for 1 s; (6) When the Hall signal fails, the red light flashes 4 times and stops for 1 s; (7) When the motor is short-circuited , the red light flashes 5 times and then stops for 1 s; (8) When the motor is stalled, the red light flashes 6 times and stops for 1 s; (9) When the motor is overloaded, the red light flashes 7 times and stops for 1 s; (10) When the motor speed is abnormal , the red light flashes 9 times and then stops for 1 s.
485 communication	RS485	It can be connected to an external handheld intelligent debugger to display the rotation speed and can also be used to set the drive parameters.

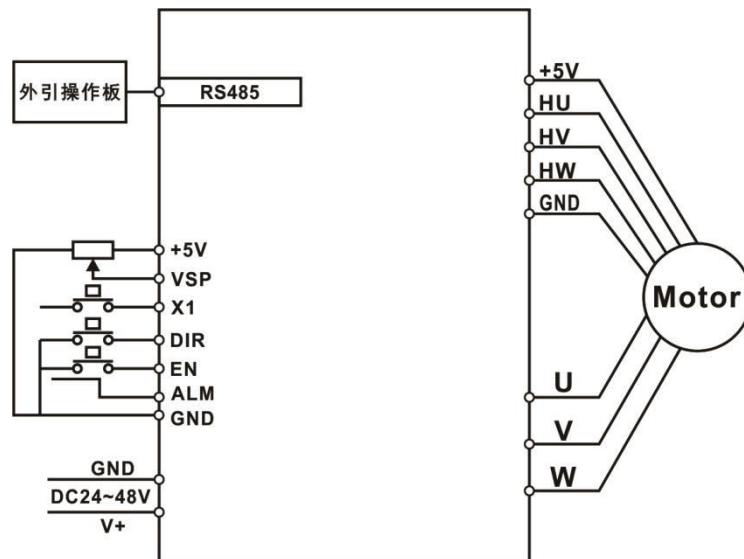
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Functional Description

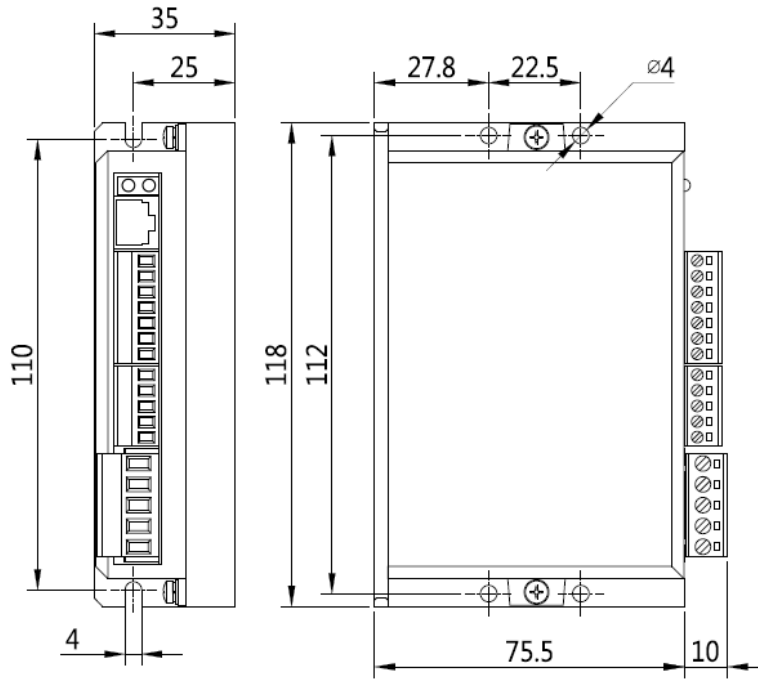
Speed regulation mode selection (VSP/PWM)	<p>1. External input speed regulation : Connect the two fixed ends of the external potentiometer to the GND and +5V1 ends of the driver respectively, and connect the adjustment end to the VSP end. You can use the external potentiometer (5K ~ 10K) to adjust the speed, or you can input analog voltage to the VSP end through other control units (such as PLC , single-chip microcomputer, etc.) to achieve speed regulation (relative to GND) . The acceptance range of the VSP port is DC 0V ~+5V , corresponding to the motor speed of 0~ rated speed;</p> <p>2. PWM speed regulation: Connect the positive terminal of PWM to VSP and the negative terminal</p>
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	to GND. The input frequency should be greater than 50Hz (100Hz is recommended). Change the duty cycle to adjust the speed.
Braking (X1)	by switching between high and low levels of the control terminal X1 . When X1 is at a low level, the motor stops running and the red light goes out when the brake is applied. When X1 is disconnected, the motor is allowed to run. (The braking force can be adjusted according to user requirements)
Motor forward/reverse signal (DIR)	By switching the high and low levels of the control terminal DIR, the forward and reverse rotation of the motor can be controlled. Note : To avoid sudden reversal when the motor is running at high speed, which may cause huge impact on the motor and mechanical equipment, when the DIR terminal receives the reversal signal, the driver first decelerates the motor until it stops. After stopping for about 1 second, the motor changes direction and speeds up to the set speed.
Motor start/stop signal (EN)	By switching between high and low levels of the control terminal EN . When EN is at a low level, the motor runs normally; when EN is not connected, the motor stops working and is in a free state, and the fault light is always on. When the motor is stopped by the run/stop terminal, the motor stops naturally, and its movement law is related to the load inertia.
Alarm indication (ALM)	The output voltage is 5V high level (relative to GND) during normal operation. When there is overvoltage, overcurrent, Hall signal error, or motor stall, the signal is 0V (relative to GND), and the red indicator light is on.

Wiring Diagram



Dimensions (unit: mm)







Safety Matters


- ★ The wiring of the motor and driver must be carried out when the power is off. Do not wire with power on.
- ★ According to the diagram, correctly connect the power line, motor winding line and Hall signal line. Note that the order of the three phases U, V, W must be consistent with the Hall signals HU, HV, HW.
- ★ Please do not disassemble the driver at will to avoid damage to the device.
- ★ It is strictly forbidden to touch all wiring terminals during power-on operation
- ★ It is forbidden to operate the drive without a casing
- ★ Impacting the drive may cause damage





Attachment: External lead box operation instructions

1. Instructions for operating the external lead box buttons


If the handshake is successful after power-on, the monitoring parameters of the P0 area will be displayed. If the handshake is unsuccessful, -Econ- will be displayed.  The parameters to be monitored can be adjusted by adjusting

 and pressing  the key. Press the key to enter the specific parameter monitoring interface. Long press  to

switch to the parameter setting interface to display Px — xx.  Select the bit to be set, set the parameter by adjusting

 and  pressing  the key, and press the key to enter the parameter value setting interface.  Select the bit

to be set,  set the parameter by adjusting  and pressing the key. After setting the parameter value, press 

to save the setting parameter. If press , exit the parameter value setting and return to the parameter selection interface. The parameter is not saved.

2. Parameter table

Function code	Name	Parameter range	Default Parameters	Parameter Description
P0-00	System version			
P0-01	Restore factory settings	0~1	0	
P0-02	Operation panel setting speed	50~10000	50	
P0-03	Acceleration time	1~2000	30	Unit: 0.1S
P0-04	Deceleration time	1~2000	30	Unit: 0.1S
P0-05	Motor rated speed	100~10000	3000	
P0-06	Motor pole pairs	1~32	2	
P0-07	Braking ratio	10~100	30	
P0-08	Speed command setting source	0~2	0	0: External potentiometer input 1: Operation panel setting 2:485 communication settings
P0-09	Potentiometer filter coefficient 1	0~1000	5	
P0-10	Potentiometer filter factor 2	0~100	5	
P0-11	External terminal filter coefficient 1	0~1000	10	
P0-12	External terminal filter coefficient 2	0~1000	2	
P0-13	Machine station number	1~250	1	
P0-14	Communication Format	0~1	0	0: 8,N,1 1: 8,N, 2
P0-15	Communication baud rate	0~4	2	0: 2400 1: 4800 2: 9600 3: 19200 4: 38400
P0-16	Bus current setting	1~100	24	Unit 0.1A
P0-17	Open loop closed loop selection	0~3	0	0: Inductive closed loop 1: Inductive open loop 2: Inductive closed loop 3: Inductive open loop
P0-18	Open loop duty cycle	5~96	5	
P0-20	Forward and reverse dead time	0~1000	10	Unit: 0.1S
P0-21	Open loop stall protection disabled	0~1	0	0: Stall protection is valid in open loop mode 1: Stall protection is invalid in open loop mode
P0-22	Motor control cycle T	1~1000	20	Unit: ms
P0-24	Motor control ratio P	0~1000	11	
P0-25	Motor Control Integral I	1~10000	3	
P0-28	Motor Control Integral I (Speed Prediction)	1~10000	10	Speed prediction integral coefficient

P0-29	Motor control proportional limiting	0~1500	180	
P0-30	Sensorless starting torque	0~1000	70	
P0-31	No-sense start speed	1~500	4	

3. Monitoring display interface

dP-00	Bus voltage
dP-01	Bus current
dP-02	Potentiometer voltage
dP-03	Running speed
dP-04	Error Code
dP-05	Drive operating status
dP-06	Bus current AD sampling value

BLDL200 low voltage DC brushless driver communication protocol

The communication mode uses the standard Modbus RTU protocol. The communication format can be changed through parameter P0-14, and the communication baud rate can be changed through parameter P0-15. If 485 communication is required to control the drive, parameter P0-08 needs to be changed to 2.

The communication parameter addresses are as follows (all in decimal):

Function code	Correspondence address	Name	Parameter range	Default Parameters	Unit
P0-00	0	System version			
P0-01	1	Restore factory settings	0~1	0	
P0-02	2	Operation panel setting speed	50~10000	50	RPM
P0-03	3	Acceleration time	1~2000	30	0.1S
P0-04	4	Deceleration time	1~2000	30	0.1S
P0-05	5	Motor rated speed	100~10000	3000	RPM
P0-06	6	Motor pole pairs	1~32	2	
P0-07	7	Braking ratio	10~100	30	
P0-08	8	Speed command setting source	0~2	0	
P0-09	9	Potentiometer filter coefficient 1	0~1000	5	
P0-10	10	Potentiometer filter factor 2	0~100	5	
P0-11	11	External terminal filter coefficient 1	0~1000	10	
P0-12	12	External terminal filter coefficient 2	0~1000	2	
P0-13	13	Machine station number	1~250	1	
P0-14	14	Communication Format	0~1	0	
P0-15	15	Communication baud rate	0~4	2	
P0-16	16	Bus current setting	1~100	24	0.1A

Brushless DC Motor Driver

P0-17	17	Open loop closed loop selection	0~1	0	
P0-18	18	Open loop duty cycle	5~96	5	
P0-19	19	Fan operation mode	0~1	0	0: The system temperature exceeds 40 degrees and the fan is running 1: When the enable pin is short-circuited, the fan runs
P0-20	20	Forward and reverse dead time	0~1000	10	Unit: 0.1S
P0-21	21	Open loop stall protection disabled	0~1	0	0: Stall protection is valid in open loop mode 1: Stall protection is invalid in open loop mode
P0-22	22	Motor control cycle T	1~1000	20	Unit: ms
P0-24	24	Motor control ratio P (low speed)	0~1000	11	
P0-25	25	Motor control integral I (low speed 1)	1~10000	3	
P0-28	28	Motor Control Integral I (Low Speed 2)	1~10000	10	
P0-29	29	Motor control proportional limiting	0~1500	180	
P0-30	30	Sensorless starting torque	0~1000	70	
P0-31	31	No-sense start speed	1~500	4	

The operation status addresses are as follows (all in decimal):

Correspondence address	Name	Unit
200	Bus voltage	V
201	Bus current	0.1A
203	Running speed	RPM
204	Fault number	

The running command addresses are as follows (all in decimal):

Correspondence address	Name	Scope
1000	Motor start and stop control	0: Motor stopped 1: Motor running
1001	Motor running direction	0: Forward 1: Reverse

Address 0 is read-only, 1~31 are readable and writable, 200~203 are read-only, and 1000~1001 are write-only.

Example

Motor start running: 01 06 03 E8 00 01 C8 7A

Motor stops running: 01 06 03 E8 00 00 09 BA

Set the motor speed to 1000RPM: 01 06 00 02 03 E8 28 B4

Actual motor speed: 01 03 00 CB 00 01 F5 F4