



## BLDC DRIVER

# 1200W High Voltage Brushless Driver

Manual 1.6-0214

## GlockCNC 1200WBD



[http://: www.glockCNC.com](http://www.glockCNC.com)

E-mail: [sales@glockcnc.com](mailto:sales@glockcnc.com)

# Read the operating instructions carefully before putting the driver into operation with power

## Preface

WBD series brushless motor drive is a new type of Brushless DC motor speed control has been custom manufactured for GlockCNC. We designed it with several advantages in mind; such as CNC integration, small size, various protections, high reliability.

## Product Characteristic

### 1. System Characteristic:

Input Voltage: AC110/220VAC, 50/60Hz,

Continuous Output current: 8A, suit for less than 1500W brushless motors

Max. Output current: 15A,

Working temp.: 0~+45°C

Storage temp.: -20~+85°C

Working & storage humidity: <85% no frosting

Structure: wall-mountable box type

### 2. Basic Characteristic

Cooling: Radiator

Control terminals : Isolation

Protection : Over load, over heat, over speed, lost voltage will cause power abnormality.

Panel : 6 digit LED display, 4 digit keypad operation



## Installation attention

\* During operation, it is strictly prohibited to open the shell or touch on the bottom of any measuring device and or connector.

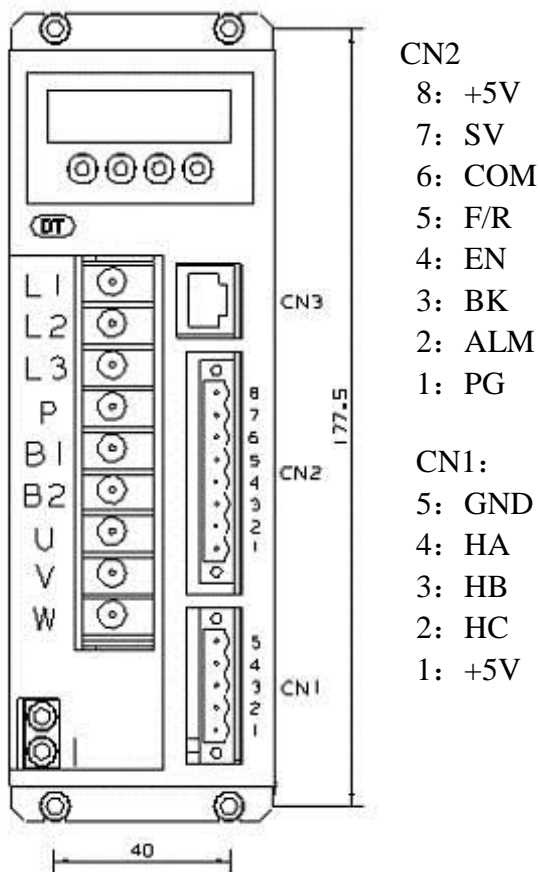
\* Wait a minimum of 1 minute after power failure to replace any fuses. Always disconnect the power source first. Do not replace fuse while in operation.

\* Brushless motor drive and brushless motor requires good and reliable grounding, otherwise the motor may not run smoothly.



## Power Terminal and Motor Terminal

No.	Terminal Name	Signal	Function
1	L1(L)(R)	Power input of main circuit	Main circuit power input terminal AC110/220V 50Hz, Connect L1 and L2 while using single phase voltage 110/220V
2	L2(N)(S)		
3	L3(T)		
4	P	High voltage DC bus line terminal	DC bus line terminal in driver, rated power 315V
5	B1	internal brake resistance	When using internal brake resistance, short circuit B1 and B2, when the power is not enough, need to use external brake resistance, break B1 and B2, connect external brake resistance with P and B2
6	B2	external brake resistance	
7	U(MA)	Output	The motor terminals must be connected with U,V,W one-to- one. Attention: do not reverse the motor by exchange 3 phase terminals, it is completely different with asynchronous motor
8	V(MB)		
9	W(MC)		
	PE	Protection	The release way is supplied for protection motor and drive when current leakage



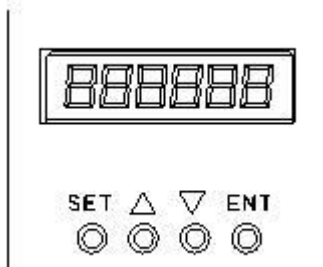
## Parameters setup

### 3.1 Parameters P1

Function Name	No.	Value Range	Default Value	Function Specification
Display optional	P1. 0	0~9	0	0. display real speed 1. display DC voltage of main circuit 2. display external analog input 3. display motor current 4. display internal program speed 5. U phase current 6. V phase current 7. W phase current 8. duty ratio 9. preserve
Internal running speed	P1. 1	0~9999	2000	When choose internal speed, the data will decide motor's speed(view P1. 2)
Choose signal sourcing of speed	P1. 2	0~2	1	0:internal instruct speed(tP1[0] is internal speed, when motor running, MUP to up speed ,MDOWN to reduce speed) 1: external terminal analog input, using SV signal of 7 pin of CN2 as motor's speed. 2:communication order control
Direction setting	P1. 3	0~1	0	0: CW 1: CCW
Choose signal sourcing of start-stop	P1. 4	0~2	1	0: button by hand control (ENT is start-stop, SET is reverse motor, +/- is for up and reduce speed) 1: external terminal control: using 4pin signal of CN2 to start and stop motor 2: communication order control
pole pairs of motor	P1. 5	0~99	2	attention: pole pairs=pole/2
Driver location	P1. 6	0~255	0	The driver location when Using communication to control motor
Speed scale factor	P1. 7	0~99999	1520	Scale factor using for PID speed control (KP)
Speed integrating factor	P1. 8	0~99999	320	Integrating factor using for PID speed control(KI)
Accelerated speed	P1. 9	1~60000	6000	The parameters is directly proportional to accelerated speed, the real accelerated speed is based on loading of motor
Decelerated speed	P1. 10	1~60000	6000	
Rated speed setting	P1. 11	0~99999	3000	Speed corresponding maximum analog input (unit: RPM)
Analog input dead band	P1. 12	0~3300	100	The function is used to set input voltage when motor speed is 0 (unit: mV)
Manual operation to adjust speed equivalent	P1. 13	1~999	1	Use bottom to change the speed equivalent under internal speed type ( speed changed per press)
Recover default parameters	P1. 14	0~1	0	Set up 1 then quit setting, connecting the power again, all parameters will recover to default value.

This series characteristics are used to set up some functions by clients self, they can be self-adjust according to clients' different demand. They are operation functions, have no relation with fundamental characteristics of driver

### 3.2 Control panel operation



As picture on left, there are 4 keys on the panel,

“SET”: press this key can enter or quite P1 setup menu

“▲”and “▼”: “+”and “-”,to choose the function and adjust the parameters.

Otherwise, “+”is the hotkey to enter trial operation function.

“ENT”: “confirmation” and “operation”, when setting parameters, press this

button to enter adjustment interface and jump. Under trial operation type, press ENT to start or stop motor.

Display instruction: total 6 digital tube shows “888888”, the light most is first and the lowest

Attention: The adjustment is forbidden if the adjusted value is larger than the maximum allowed, the bottom will be no response.

### 3.3 How to set parameters

#### Example

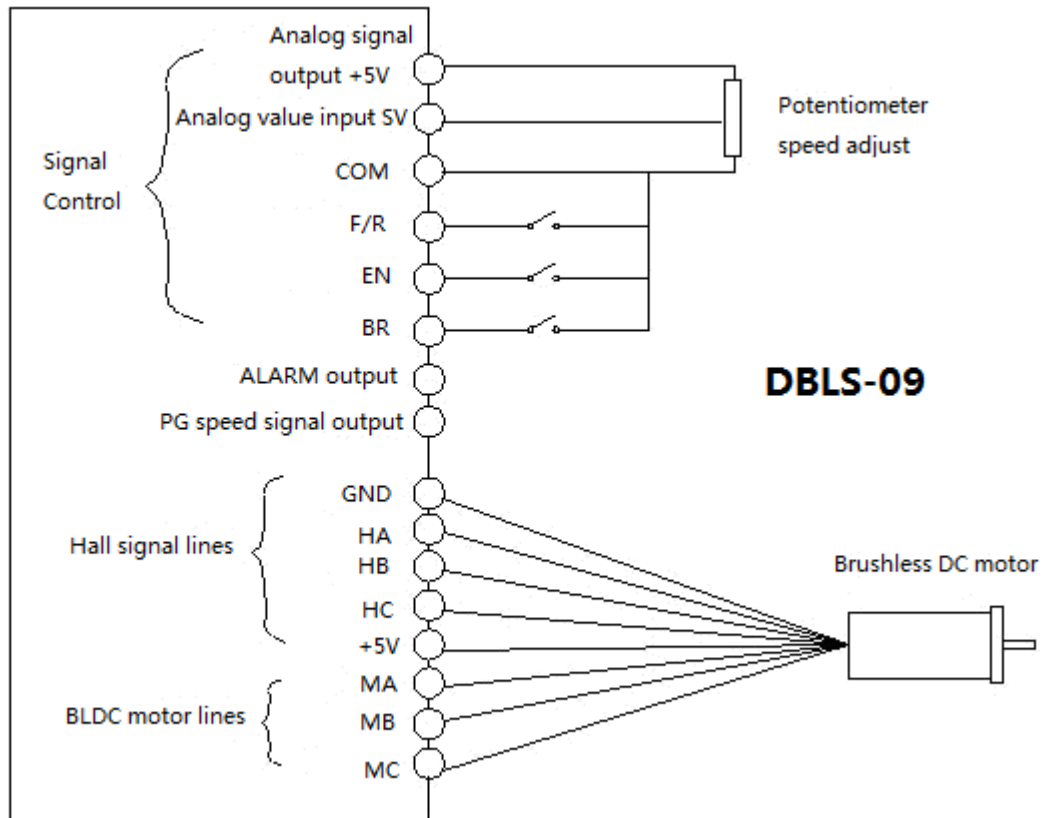
Demand: set internal speed (P1.1) to 1000rpm/min

Operation step as below:

1. After connecting with power, display “H 0”, the driver is standby, press “SET”, will display“P0. 0”, press “▲”until displayed “P0. 6”, press “ENT”, display “00000”, and the first light on right is flashing, press “▲”, change into “1”,press “SET”, display “P0. 6” . This step is to unlock the P1 parameter set
2. Press “SET”, display “P1 0”, the driver is entering P1 setting state
- 3.Press “▲”, until display “P1. 11”
4. Press “ENT”, display “2000”, and the first light on right is flashing
5. Press “ENT”, until the flashing is moving forward to the fourth position
6. Press “▼”, change into “1000”
7. Press “SET”, display “P1.11”, the parameters had been set up and save automatic
8. Press “SET” again, back to standby state, display “H 0”. Now, the new parameters adjustment had finished and take effect

- Attention:** 1. after adjustment, the driver need to connect with power again, then the new parameters will take effect
2. The parameters with “★” in the list can not been adjust when motor working
  3. The adjustment is forbidden if the adjusted value is larger than the maximum allowed, the bottom be will no response

## Wiring Diagram



## Functions

### 1. Speed adjustment method

This driver provide below three adjust methods for the user to choose:

Analog voltage adjustment speed: the terminals of external potentiometer connect to the +5v terminal in signal control and COM, connect the regulator terminal to SV, not only make it possible to adjust speed by external potentiometer (10K~100K), but also can achieve speed adjust through other control unit (Such as PLC, Microcontroller, etc) input analog voltage to SV. The acceptance of SV is DC 0V~+10V, and the corresponding motor rotate speed is 0 to rated speed.

You also can use external digital signal to adjust speed: apply PWM with 5V amplitude and 1KHz~2KHz Frequency between SV and GND to adjust the speed. The motor rotate speed will adjust by the duty radio liner adjustment.

The third method to adjust speed is using communication order controlling

## 2. Motor operate/stop control (EN)

You can control the brushless motor to run or stop by controlling the terminal “EN” and “COM” connecting. The motor will run when we connect the terminal “EN” to “COM”; when shut down, the motor will stop naturally. And the starting time will be decided by the initial setup in panel, the motor running will be affected by load added

## 3. Motor rotation direction control ( F/R )

You can control the motor rotation direction by controlling the terminal “F/R” and “COM” connecting. When connect terminal “F/R” to terminal “COM”, the motor will run at CCW (view from motor output side), and when shut down, the motor will run at another direction.

Attention: If you need to change the motor rotation direction, please stop the motor at first, otherwise the controller shall be caused to damage.

## 4. Break the motor to stop ( BK )

You can break the motor to stop if need. Motor can be running when the terminal “BK” not connect to “COM”, but if you connect these two terminal together, motor will stop quickly. If the overload alarm frequently, you need to add brake resistance for driver, the resistance value is not less than  $100\ \Omega$ , and power is not less than 100W. Attention: when install the brake resistance, the driver must be under without power and indicating light state. The brake resistance accessories is for charge

## 5. Speed signal output (PG)

The speed pulse output is 0C, output 30V/10mA max. You can connect with a resistance (3K ohm ~10K ohm) between “PG” and the input power to get the speed pulse signal. The relationship of output frequency  $F(\text{Hz})$  and speed  $N(\text{rpm})$  is:  $F=N * P / 60$ ,  $P$  is the pole pairs of motor, Output Pulse per revolution.

## 6. Alarm output (ALM)

The alarm output port is 0C, output 30V/10mA max. You can connect with a resistance (3K ohm ~10K ohm) between ALARM output and the input power to get the alarm signal. When alarm, this port and the GND connecting (Low voltage), and the controller will stop working and keep in alarm status.

## Working methods

The driver has three working methods by setting panel. The first is panel manual operation, press R/S to

start or stop the motor, press + - to up or reduce the speed, press “ ← | ” ENTER to confirm the speed. The second is by external terminals, the motor is working with settle, digital tube display running speed. The third method is communication type.

## Protection type

When the motor is running abnormally, the digital tube will display:

- (1) OL motor locked。
- (2) OC over current。
- (3) HE hall signal failure。
- (4) LV under voltage input 。
- (5) HU over voltage input。
- (6) EE IPM failure protection。
- (7) OT motor too hot

## System using

Firstly, connect motor and driver lines (winding lines, hall signal lines and power line) in strictly observe related norms and specification. It can't to reverse the motor by change lines connection, it is completely different with asynchronous motor. The motor and driver can not work normally even damaged if lines connected wrong

You can start the trial operation after connecting motor power line, hall line and driver power lines. At first, set the control panel or terminal control, secondly set the pole pairs of brushless DC motor (wrong pole pairs will display inaccurate speed and offer wrong inner parameter ), then press the start button, enlarge the potentiometer slightly , the motor will run, if the motor do not work, or shake, or alarm, maybe the lines connection is not correct, or load is too large, please check again, until the motor running normally.



When the motor is running in the process of the abnormal, the panel on the digital tube will show AL XX.

Alarm Display	Alarm code definition	Possible causes and treatments
AL oc	Driver current	<p>1, Check UVW lines connection is correct or not, we must pay special attention to whether the phase sequence connection error or short circuit. Note! Brushless motor absolutely CAN NOT change the direction of rotation by changing the motor's phase!! This is quite different from the AC induction motor.</p> <p>2, Whether the motor line is too long? Motor line and Hall line is usually not more than 10 meters, it needs to take appropriate measures if &gt;10 meters, otherwise it may cause OC alarm or other issues.</p> <p>3, Check the hall sensor line is correctly connected.</p> <p>4, check the start acceleration of motor is set too large? Try to reduce the value of P1.9.</p> <p>5, Motor or drive may occur fault, please contact the supplier.</p>
AL hE	Motor hall sensor fault alarm	<p>1, the Hall line is not connected properly or the sensor plug is not plugged in.</p> <p>2, the motor line and hall line length are too long cause interference will trigger the alarm, when the length of more than 3 meters, should use the shielded wire, the shielded layer should be connected the fifth terminal (GND) of driver CN1, the shielding layer should have been connected to the Hall line in the side of the motor, As a Single ended shielding method, The shielding layer on the motor side should be left floating, DO NOT connect with motor's shell.</p> <p>3, The hall sensor has failure, try to replace the motor.</p>
AL hU	Drive bus voltage too high alarm	<p>1, the input voltage is too high.</p> <p>2, the internal parameter of the drive is not appropriate. You will see the real bus voltage back to the main interface after setting P1.0 to 1. When in the 220V AC input, it should be displayed as about 310V + 20V (220V x 1.4) or so, the same way, about 530V while 380V. If there is a large error will lead to alarm to stop. If it is found that the value and the actual value (use multimeter of the voltage on the 1000V pin to measure the voltage on the P-B1 terminal) is larger, please contact the supplier to adjust the internal parameters.</p> <p>3, if it is occurred in the deceleration, it is in the process of braking feedback electric power over the limit and the occurrence of the bus voltage rise over the limit and alarm (this situation occurs only when the driver is set into a brake mode, the default setting is no brake mode, it should not happen this alarm). Firstly, in accordance with article second above to check the bus voltage display is normal or not, then check the brake resistance installation is normal or not, the resistance is normal or not (typically 30 ohms to</p>

		<p>200 ohms). If it is normal, the value of P1.10 (reduced speed) should be reduced, then the voltage rise rate decreases when the regenerative braking.</p> <p>4, if it is still in trouble, it may detection circuit failure of drive voltage, or other problems, please contact the supplier.</p>
aAL LU	Bus voltage too low alarm	<p>1, the input voltage is too low.</p> <p>2, the internal parameter of the drive is not appropriate. You will see the real bus voltage back to the main interface after setting P1.0 to 1. When in the 220V AC input, it should be displayed as about 310V + 20V (220V x 1.4) or so, the same way, about 530V while 380V. If there is a large error will lead to alarm to stop. If it is found that the value and the actual value (use multimeter of the voltage on the 1000V pin to measure the voltage on the P-B1 terminal) is larger, please contact the supplier to adjust the internal parameters.</p> <p>3, if it is occurred in the acceleration of the motor, it may be due to the acceleration of the load is too large, resulting in excessive load, may be appropriate to reduce the acceleration of the acceleration of the P1.9 value.</p> <p>4, if it is still in trouble, it may detection circuit failure of drive voltage, or other problems, please contact the supplier.</p>
AL Er	Motor blockage alarm	<p>1, the motor can't work normally cause the wrong connection of motor's lines</p> <p>2, the potentiometer is adjusted to a position close to 0 rpm, or the internal speed is set to 0, Or the speed command voltage is set close to 0</p> <p>3, the motor is blocked, please check the load.</p>
AL oL	Motor overload alarm	Usually caused by overload of the motor, please check the load.
AL ot	Driver overheat alarm	The drive alarm to stop cause the temperature is too hot. it may be due to the heat dissipation or overload. Please check the driver's heat dissipation.

### Causes and Solutions:

Failure	Possible causes and treatments
Motor out of running	<p>1. First, check whether there is alarm information on the panel of driver, if there is, check the alarm message.</p> <p>2. Check whether the emergency stop signal is released or not, if not, the motor could not start, at the same time, the panel shows: "br".</p> <p>3. The potentiometer is adjusted to a position close to 0 rpm, or the internal speed is set to 0, Or the speed command voltage is set</p>

	<p>close to 0. This will cause the motor to have been started, but there is no speed, this situation will usually trigger "Er" alarm.</p> <p>4, the motor wire connection is not connected or phase error, the motor can't operate normally. If the motor speed is still 0rpm in 3 seconds after starting, the "Er" alarm will be triggered.</p> <p>5, the load locked dead will cause the motor stop, at this time will trigger the "Er" alarm.</p> <p>6, The motor can't run cause the abnormal Hall signal. It is usually leads to "HE" alarm signal if hall signal unplug or lines failure, but it won't trigger the alarm if hall ABC sequence disorder. in order to confirm that hall is normal, set P1.0 to 10, the hall status will displayed in the panel. Then rotate motor clockwise slowly by hand, if the first 3 digits showed regular changes of 1-5-4-6-2-3, the hall signal is no problem. If not, the hall signal is abnormal</p>
Motor overheating	<p>Usually it is due to the overload and heat dissipation is not good, In particular, the motor or the drive itself will cause the motor overheating. Please set P1.0 to 4, it showing the driver's real-time power, check the power is too large or not. It is better if replace another drive to compare. If there is no difference after replace driver, and the load is normal, it may be a problem for the motor. However, because of the replacement of the motor is usually more troublesome, so the first test load, and then the driver, and finally the motor.</p>
Motor speed failed to meet the requirements	<p>1, the load resistance is too heavy, the maximum current of the motor is still unable to overcome the load resistance.</p> <p>2, the input of speed signal is abnormal, check the potentiometer and input speed signal voltage is normal or not.</p>
Abnormal noise when the motor is running	<p>1, Remove the load and then start the motor, if the noise still exists, and the noise related with speed, the problem is about motor's bearings or fan, try to another motor to check the noise if possible.</p> <p>2, if the noise is high frequency noise, has nothing to do with the speed, it may be the noise of current chopper, chopper frequency of drive is 16KHz by default, usually the current noise couldn't be heard, if reduced to 12K or even 8K, because the frequency is reduced to the human ear sensitive range, then the noise will gradually become obviously. In order to reduce the power loss, the high power drives will reduce the chopping frequency set, that it is a normal phenomenon.</p>
Motor running time and high speed	<p>1, Firstly check the speed signal is normal or not. It could change into internal speed mode to compare the speed is stable or not..</p> <p>2, if the internal speed is also the same phenomenon, usually it is the situation that load inertia is relatively large, such as the large turntable or roller type load, the response delay of over speed lead to speed closed loop vibrated. The solution is to reduce the speed of the PID gain, reduce the P1.7 and P1.8 multiplied to see the effect.</p>

	Or increase the reduction ratio mechanical is the most effective and beneficial to the motor operating conditions.
Alarm signal or speed signal without output	<ol style="list-style-type: none"><li>1. Check the external pull-up resistors are connected or not, the resistance is appropriate or not, the voltage is normal or not.</li><li>2. If there is no alarm signal, in order to find the problem easily, need to make a man-made alarm signal, at this point you can disconnect the motor line, only retain the hall signal lines, and then start the motor, artificially created "Er" alarm. If there is no speed signal, without starting the motor, rotate the motor slowly by hand, check if there is a change in the output signal.</li></ol>