BLDC DRIVERS

1500W High Voltage Brushless Driver

Manual 1.6-0213

DBLS-07-H

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

Summary

DBLS-07-H BLDC motor driver is designed by Dingtuo Technology independence which is assorted with the advanced motion control industrial. It is suitable for BLDC motor with the power under 400W. The driver adopts the latest high performance digital logic chips specialized for brushless motors. It uses a new type of PWM technology that enable the motor running high speed, small vibration, low noise, good stability and high reliability.

1. Product Characteristic

System Characteristic:

Input Voltage: AC85~265VAC, 50/60Hz,

Continuous Output current: 12A, suitable for ≤1500W motor

Working temp.: 0~+45°C   Storage temp.: -20~+85°C

Working & storage humidity: <85% (no frosting)

Structure: wall-mountable type

Basic Characteristic

Cooling: Radiator

Control terminals: Isolation

Work mode: speed open loop, speed closed loop, external interface control, panel manual control, sense mode, no sense mode, external analog voltage speed regulation, external PWM signal speed regulation, speed display, current effective value display, maintenance mode.

Protection: Over load, over heat, over speed, over voltage, under voltage will cause the power abnormal.

★★

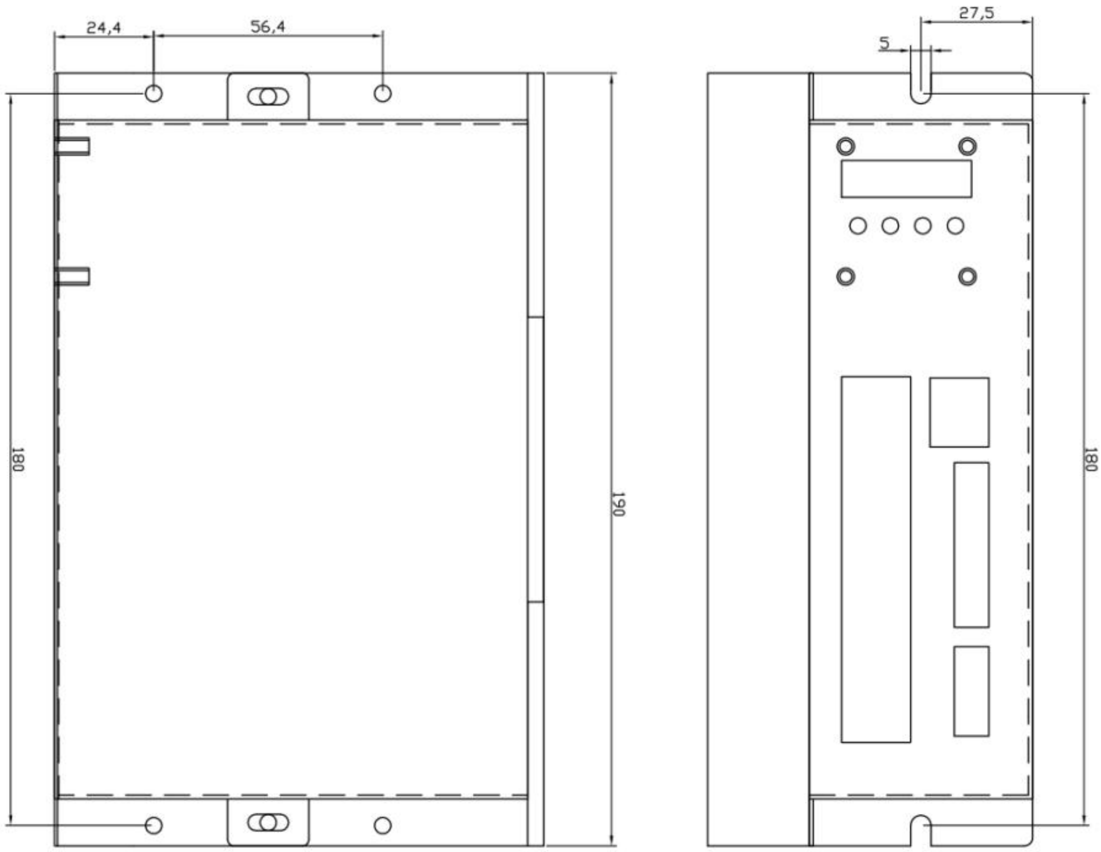
*** Do not measuring or touch any components without housing while operating.**

*** Should check soleplate or change fuse 1minter later after power off.**

*** Operating without housing is forbidden.**

*** Make sure to connect the ground terminal, otherwise the brushless motor will working unsteadily**

*** Sudden damage while drives working, our company only affords the service and replace in the guarantee. Personal injury and motor damage caused by the accident will invalidate the guarantee.**



Mounting Dimension: 190x80x130mm

4. Terminal and Signal

Power connection

No.	Terminal Name	Description
1	L1	110VAC
2	L2	110VAC
3	FG	Ground line
4	B1	External release resistor(reserve)
5	B2	External release resistor(reserve)
6	MA	Brushless motor winding U phase(A)
7	MB	Brushless motor winding V phase(B)
8	MC	Brushless motor winding W phase(C)
9	FG	For the ground

Hall Signal Terminal

No.	Name	Description
1	GND	Hall sensor Negative

2	HA	Hall sensor A phase
3	HB	Hall sensor B phase
4	HC	Hall sensor C phase
5	+5V	Hall sensor Positive

Motor Connection Terminal

No.	Name	Description
1	U	BLDC winding U phase (A)
2	V	BLDC winding V phase (B)
3	W	BLDC winding W phase (C)
4	FG	GND

Control Terminal

No.	Terminal Name	Description
1	Reserve	
2	Reserve	
3	+5V	**+5V** power output terminal
4	ALARM	Alarm output terminal
5	PG	Speed output terminall
6	SV	Analogy signal input terminal
7	BK	Brake terminal
8	EN	Run/Stop terminal
9	F/R	CW/CCW terminal
10	COM	COM terminal

Attention: If the external potentiometer is not used for speed regulation, the SV and +5V can be short-circuited to the rated speed, and then the COM and EN short-circuit control can be used to start and stop.

5. Function and Usage

Speed adjust method

This driver provides the user below three-speed control method:

Inner potentiometer speed adjustment: Rotate the potentiometer on the driver panel counterclockwise, the rotate speed decrease, rotate the potentiometer on the driver panel clockwise, the rotate speed becomes higher. Please make sure the potentiometer is set in the minimum state when you use external input mode to adjust the speed.

External input adjustment: Connect the terminals of the external potentiometer to the GND and +6.25v terminal, connect the regulator terminal to SV, then you can adjust the speed by using an external potentiometer. It also can achieve speed adjust through other control units (Such as PLC, SCM, etc) input analog voltage to SV. The acceptance of SV is DC 0V~+5V, and the

corresponding motor rotate speed is 0 to rated speed.

You also can use the 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 is adjusted by the duty radio liner adjustment. At this time, by adjusting the R-SV potentiometer, SV digital signal amplitude can be 0~1.0 ratio attenuation processing. Generally, adjust R-SV to 1.0, SV input digital signal without attenuation processing.

Motor operate/stop control (EN)

You can control the brushless motor to run or stop by controlling the terminal "EN" and "GND" connecting. The motor will be running when we connect the terminal "EN" to "GND"; when shut down, the motor will stop naturally, and the stopping time will be decided by the inertia and load adding on the motor.

Motor rotation direction control (F/R)

You can control the motor rotation direction by controlling the terminal "F/R" and "GND" connecting. When connecting terminal "F/R" to terminal "GND", 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 driver shall be caused to damage.

Brake the motor to stop (BK)

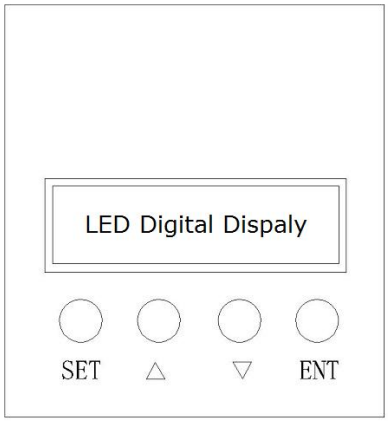
You can break the motor to stop if need. The motor will run when the terminal "BK" not connects to "GND", but if you connect these two terminals, the motor will stop quickly. And the motor stopping time will be decided by inertia and load adding on the motor.

Attention: If you are not necessary to stop the motor quickly, please DO NOT use this function, cause it has some electrical and mechanical impact on the motor and driver.

Speed signal output(PG)

The speed pulse output port is 0C, output 30V/10mA max. You can connect with a resistance (3K ohm ~10K ohm) between signal and input power to get the pulse signal, this port will output serial pulses which has fixed extent (it is 50uS). This output pulse from every rotation of the motor is 3 x N, "N" means the total pole number of the magnet. For example, 2 pair of poles, means 4 poles motor, 12 pulses per turn, when the motor speed is 500rpm, the pulses out from the PG is 6000.

Alarm output (ALM)



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

Drive failure

Over-voltage or over-current will lead the driver to a protection status, the driver will automatically stop working, the motor stop and blue light are flashing. As long as you enable terminals to reset (EN and GND disconnected) or power Off, the driver will disarm the alarm. Please check the motor wiring once this failure occurred.

6. Display and keyboard

Display and Keyboard Operation

Remark:"R/S": ON/OFF (backspace)

"+": Plus 1

"-" : Minus 1

"←｜: ENTER": Confirm key (call out setting parameter)

6.1 Parameter Setting Sequence

Please insure that the motor is under the stop situation when set the parameter. That is, in panel mode, the motor is in the stop state or, the motor is enabled to disconnect in external port mode,

1. In standby condition, press "ENTER" to call out the system parameters, press "ENTER" again, it will call out the parameter value.
2. Press "+"or "-"to the parameter number you want. Press "SET" to return to standby mode if there is no need to change value.
3. Press "ENTER" to show the parameter setting value. Press "SET" to return to standby mode if

there is no need to change value.

4. Press“+”or “-” to the value demanded.

5. Press “ENTER” to save the changes and press “SET” to return to standby mode.

Note: At setting mode, it will return to speed display interface if there is no press within one minute.

6.2 Working mode

Motor works at two modes. One is the panel mode, another is terminal control. The motor runs as the setting, display shows the speed of motor. Under the panel mode, Press “SET” to start/stop the motor, long press “+”or “−” to acceleration or deceleration speed, press “← | : ENTER” to insure and know the running speed.

6.3 Protect mode

While Motor operates abnormality, display shows ERR×

(1) Err-01: stall

(2) Err-02: over current

(3) Err-04: hall fault

(4) Err-08: input lost- voltage

(5) Err-10: input over-voltage

(6) Err-20: temperature alarm

(7) Err-40: peak current

(8) Err-80: Power module temperature alarm

6.4 Drives parameter setting:

P00X：Operating Parameter					
Function Code	**Function Name**	**Setting Range**	**Unit**	**Default value**	**Change**
P000	Control mode	00 External port mode 01 Panel mode 02 External port PWM speed ajustment 03 RS485		External port control mode	
P001	Pole	1~99	Pairs	2	○
P002	Rated Speed	100~9999 Valid for external port mode	RPM	3000	○
P003	Max. current setting	0~255	A	25	○

P004	Panel running speed	0~rated speed (only valid for panel mode)	RPM	2000	○
P005	Start time	0~255	0.1s	0	○
P006	Brake force setting	0~950	Decimal	900	○
P007	Open /closed loop control	00 Open loop 01 Closed loop		01 closed-loop	○
P008	Sense/no sense control	00 no sense 01 with sense		01 with sense	○
P009	Display mode	00 display real-time speed 01 display real-time current		00	
P010	Initial speed w/o sensor start	0-FFH	Hexadecimal	04	Immutable
P011	Starting torque	0-FFH	Hexadecimal	10	Immutable
P012	Current adjustment	0-FFH	Hexadecimal	255	Immutable
P013	Control mode	0-FH	Hexadecimal	10	
P014	Site address	1-250H	Decimal	1	
P015	Temperature alarm point	0-FFH	Hexadecimal	6C	Immutable

Mark 1:

P013

00: External control port effective EN: low level active FR: low level active BK: low level active

08: Internal control port effective EN: ineffective FR: low level BK: ineffective

0A: Internal control port effective EN: ineffective FR: high level BK: ineffective

AC current=display real-time DC current/power factor Q

Mark 2: The system working mode is divided into "speed mode" and "control mode".

The speed mode is defined in P000, and the control mode is defined in P013.

Note: After the P007 and P008 parameters are modified and saved, the drive must be powered off and restarted to enter the set control mode state.

7. System usage

Connect on the wires of the motor and driver (motor winding wires, Hall sensor, and power supply) strictly as request. It can not achieve the CW and CCW through changing the wires connection like the asynchronous motor. The motor will run abnormality with the wrong wires connection, like brushless motor will shake much or heat quickly (the temperature will up to 80 degrees in seconds to 2 min.), and will damage the motor and driver.

Please run the motor while connecting the power supply, Hall wires and drive power supply. Firstly set the potentiometer to the minimum, press the start switch, increase the motor potentiometer a little, the motor should run. If the motor does not run or shaking, maybe did the wrong wires connection, please recheck the brushless motor wires till the motor running normally.

8. Communication Mode

This communication model is used standard Mod bus protocol, implement national standards GB/T 19582.1 - 2008. It is using RS485 two-wire serial link communication, Physical interface uses two 3.81mm spacing 3 core Phoenix terminals, the serial connection is very convenient. The transmission mode is RTU, the testing mode is CRC, CRC start word is FFFFH. Data mode is 8-bit asynchronous serial, 2 stops bit, without an invalid bit, Supports multiple communication rates (see the table of parameters)

Parameters function supporting: 03H is for multi-register read, 06H is for single register write

Site address:

00: broadcast address

1-250: user address

251-255: special address, users can not use

No.	address	name	Setting range	Default	Unit	
00	$8000	First byte: control bit state Second byte: Hall angle and motor pole	First byte: Bit0: EN Bit1: FR Bit2: BK Bit3: NW Bit4: null Bit5: SENS Bit6: HR60 Bit7: KH	00H 02H		

			Second byte: Bit0-7: poles 1-255			
01	$8001	Maximum speed in analog adjustment	0-65535	3000	RPM	
02	$8002	First byte: start torque second byte: start speed without sense	1-255 1-255	10H 04H		
03	$8003	First byte: accelerate time second byte: decelerate time	1-255	0 0	0.1s	
04	$8004	First byte: max. current second byte: temperature alarm point		38H 30H		
05	$8005	External speed setting	0-65535	2000	RPM	
06	$8006	Brake force	0-1023	1023		
07	$8007	First byte: site address second byte: reserve	1-250	1 0		
08-0F		$8008-$800F	Segmental speed value(invalid)			
10-17		$8010-$8017	Reserve			
18	$8018	Real speed				
19	$8019	First byte: bus voltage second byte: bus current				
1A	$801A	first byte: control port state Second: empty	Bit4: SW1 Bit5:: SW2 Bit6:: SW3			
1B	$801B	First byte: fault state Second byte: motor running state	Bit0: stall Bit1: over current Bit2:: hall abnormality Bit3: low bus voltage Bit4: over bus voltage Bit5: peak current alarm Bit6: temperature alarm Bit7: reserve			
1C		$801C above illegal				

8000: first byte:

EN: when NW=0, 0: external EN low level effective 1: external EN high level effective

when NW=1, 0: EN ineffective 1: EN effective

FR: when NW=0, 0: FR low level effective 1: external FR high level effective

when NW=1, 0: FR ineffective 1: FR effective

BK: when NW=0, 0: external BK low level effective 1: external BK high level effective

when NW=1, 0: BK ineffective 1: BK effective

NW: 0: external control effective （EN,FR,BK） 1: internal effective

SENS: when SENS=0, the drive is no hall mode, SENS=1, the drive is hall mode

HR60: 0: 120° hall control 1: 60° hall control temporarily not supported

KH: 0: open loop control 1: closed loop control

9. Communication wires connection

RS-485 communication can be carried out by using the RJ45 cable connector

The RJ45 connector pins are defined as follows:

Pin	Function
8	GND
6	A
3	B