KEYA ELECTRON

科亚电子

KYDBL2430-1E

Brushless Controller Operation Instruction

JiNan KeYa Electron Science and Technology Co., Ltd

Please read the operation instruction carefully prior to using this product.

Any fault and loss due to not complying with the cautions of operation and installation instructions is not within the scope of the warranty, and manufacturer will not undertake the related responsibility for that.

Please keep all documents handy, and for any enquiry, please contact the manufacturer.

Safe Cautions

- Please arrange professional technicians for installation, connection and debugging of the equipment.
- In the charged case, it is forbidden to install, remove or change the circuit of equipment.
- Please equip with necessary protector between the power input terminals and the power supply (storage battery) for this product to avoid dangerous accidents or critical damages; over current protector, fuse, emergency switch, etc. shall be installed.
- Please keep isolation and insulation protection for the product, earth, and all equipments.
- If should it be deemed necessary to debugging the equipment in a charged case, please select non-metal special screwdriver or special debugging tool.
- The produce shall be installed under a good ventilation circumstance.
- This product can not be used under abnormal circumstance full of high humid, dust, corrosion gas and strong vibration.

 This sign means an important prompt or warning

Overview:

MMT KYDBL2430-1E is a kind of intelligent brushless dc motor controller.The use of high-performance 32-bit MCU controller, adopts the advanced control algorithms, coordinate external quadrature encoder input to complete the open loop and closed loop speed, under the closed loop torque of motor sport.Controller with multiple analog input port, the pulse input port and digital I/O port, can through the special software to redefine its functions.Universal RS232 serial port communication, CAN Open, CAN be widely used in automation.

Specification and model:

Model	Maximum Output current DC : (A)	Maximum Output voltage DC: (V)	Direct voltage Working range DC: (V)
KYDBL4830-1E	30	48	10-50 (95%)

Product features:

1. Wide voltage input.

2. Intelligent PID control loop.

3.Four works type: open loop control, closed loop speed control, open loop and closed loop torque control.

4.External potentiometer, external 0 to 5 VDC analog, pulse command control mode, the RC control mode.

5.Safety of forward & reverse control, four quadrant operation, support regeneration.

6.Enable control function.

7.Maximum current limit.

8.4 input port, the function may be defined as analog input, pulse input or digital input function.

9.2 MOS open drain circuit output , generally as 24 v 1 a output (maximum load capacity of 40 v 1 a), can be used to control relay coil or other attachments.

10.Over-current, overheating, overvoltage, undervoltage, short circuit anomalies such as starting protection function.

11. LED status indicator, fault alarm output.

12.CAN bus communication, and customers to use you then details of the communication protocol.

13.RS232 communication, and customers to use you then a serial port protocol in deta.

performance indicators:

1.Supply voltage: 10 to 50 VDC.

2.Continuous working current 13 A, peak current 30 A.

3,.Out + 5 VDC power supply (power supply to encoder): 5VDC.20 Ma.

4.Analog input range: 0-5 VDC.

5.Pulse input range: 500 hz - 5000 hz (corresponding to maximum speed)

Note : The minimum pulse frequency with different maximum speed Settings will have corresponding change.

6.Duty cycle input range 20% -- 80% (input frequency range f≤1 KHZ , recommended to use 250 Hz frequency)

7. RC signal (a PWM signal: RC remote control receiver output signal)

8.Digital output interface: 2 road, open drain, maximum load capacity of 40 V 1 A.

9.Temperature protection status: 70 ℃ overheating protection to reduce the output, 85 ℃ stop output.

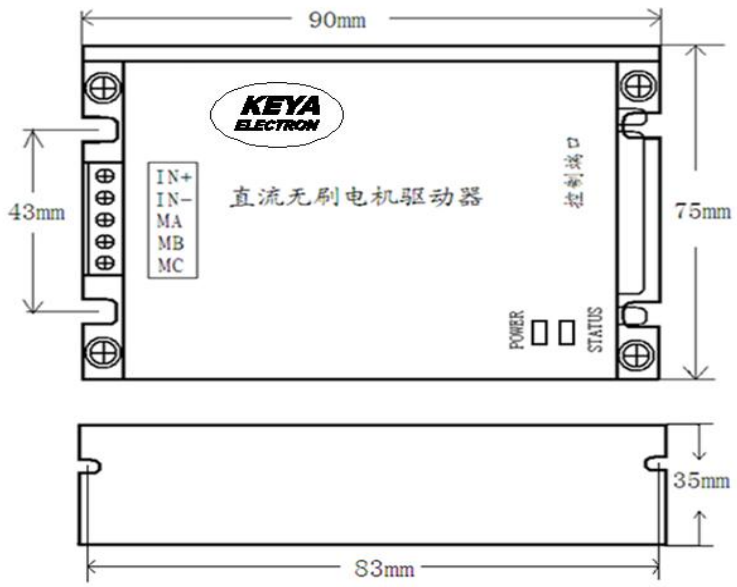
10.Working environment temperature 25 ℃ - + 60 ℃.

11.Environment humidity: relative humidity ≤ 80 .

12.Size: L * W * H = 90 mm * 75 mm * 35 mm

13.Weight: 185 g

Deminsion: 90 mm * 75 mm * 35 mm



Note: 4*Φ5mm mounting hole is equipped on the bottom of driver housing to facilitate horizontal installation.

This driver shall be kept away from dust, high-humidity environment and accidental contact shall also be avoided. Enough space shall be reserved around the driver for ventilation and regulation.

When fixed, this driver shall be kept away from other heat source. Guarantee that this drive works within the range of specified environment temperature. Installed on equipments with intense vibration is not recommended; if not, please take precautions against vibration.

I. Wiring requirements:

1. Do not connect wire under charged circumstances.

2. Insulated wire and shielded wire matching well with driver’ s voltage and current shall be selected for the device; Specifications of power input line and motor connecting line selected for the driver are shown in following table:

Table 1 Specification and length of wires

Current (A)	Wire specification (mm^2)	Max. length (m)

Power input line: 30 4 10

Motor output line: 30 4 10

WARNING

In any cases, signal line and logic control wire is not allowed to be bound, mixed or wired with power input wire, output wire (motor wire) and other power lines, induced voltage generated may cause interface, malfunction or direct damages upon the driver.

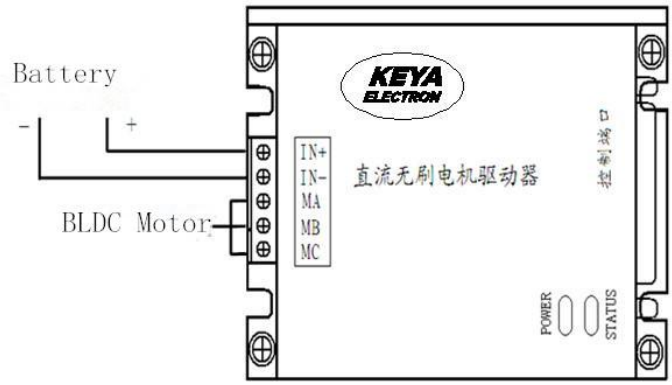
3. As driver does not have internal protection of opposite connection, please be sure to guarantee that positive and negative poles of power input are consistent with that of external power supply, otherwise, damages may be caused.

4. Please use proper tools for wiring and guarantee its correctness.

WARNING

All output connecting lines which control the terminal shall be kept away from wires at powersupply end and output end.

In order to reduce unnecessary electronic signal interference, length of connecting lines which control the terminal shall be shortened as much as possible, in case that length of connecting line exceeds 0.5m, shielded wire shall be adopted.

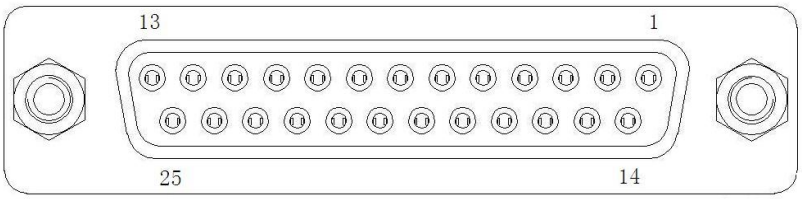


Terminal connection diagram:

1, IN + IN- dc battery input: input 10 --50 v.

2, MA MB MC: brushless dc motor: controller outputs, external brushless dc motor.

3, Control port: using standard DR25 .



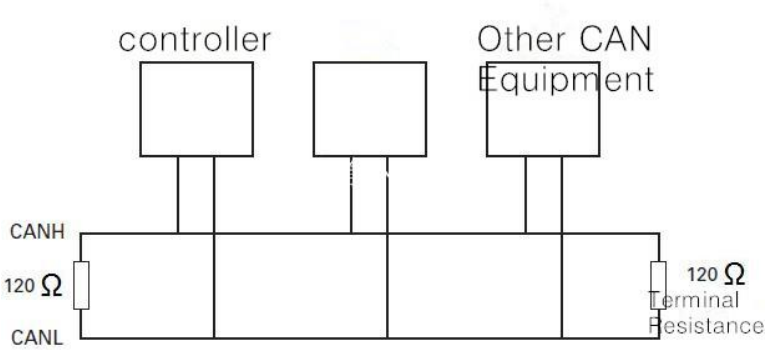
Interface Definition	Function	Remark	Software I/O
1	Fault alarm output	Can be set	DOUT2
2	Tx-out	RS232Tx	
3	Rx-in	RS232Rx	
4	Enable control EN	Effective for high level	DIN5
5	GND		
6	Reversing control DIR	Effective for high level	P/AIN4
7	Controller output DC 5V (20mA)		
8	Controller output DC 5V (20mA)		
9	CANH	CAN-high	
10	CANL	CAN-lower	
11	GND		
12	Input signal IN		DIN3
13	Controller output DC 5V (20mA)	As potentiometer supply	
14	Fault alarm output	Can be set	DOUT1
15	BLDC motor power +	Red	
16	BLDC Motor Hall---A	Brown	

17	BLDC Motor Hall---B	Blue	
18	BLDC Motor Hall---C	Blue	
19	BlDC Motor Power-	Orange	
20	Encoder feedback power +	Red	
21	Encoder feedback input---B+	Gray	
22	Encoder feedback input---A+	Green	
23	Encoder feedback power -	Black	
24	Brake STOP	Effective for high level	DIN6
25	Controller outputDC 5V (20mA)		

2 ①14Alarm output:It is MOS open drain circuit output , According to the preset status choose to on or off. Generally as 24V 1A output (maximum load capacity of 40V 1 A),When using need to connect 10 k Pull-up resistors .

2③5it is the eS232 serial connection between controller and PC computer.

9⑩CAN Open Connection,When use CAN,I/O-5,6 disabled on software)



4、Terminal④：Control End EN

The end with the + 5 VDC disconnected the motor stopped free, output end be cut off is the power level at this time.Get through connection of + 5 VDC, the motor will run. It is recommended to use the terminal to control start-stop of motor safely.

5、Terminal⑥：Control End of forward-reverse DIR

The motor will reverse when the terminals connect with + 5 VDC. Factory set the default is forwa rd-reverse control, 0-5v given signal and in the operation of single direction.If given signal is 0-2. 5v-5v two-way control, reversing can be done by external given signal, can also use DIR terminal digital signal to control the reversing.

6、Terminal⑫：Signal Input End IN

6.1⑫ As Analog Input：Definition for a given analog signal input end.When using external 0-5 v analog signals, please connect⑫and⑪ when using external potentiometer as a given signal, connect the⑪,⑫,⑬terminal. factory default: 0-5 v analog given signal or potentiometer given signal, a single direction control.It can be adjusted to two-way control 0-2.5 v-5v according to customer's need .The 0-2.5 v as the forward control, 2.5 v -5 v for the reversing control.

6.2、⑫ As Digital Signal Input：Defined as pulse input or PWM signals input end.In ac tual use, the end can be used as an external given signal input, can also be used as the signal in put feedback.It can be customized according to customer's need.Input range of pulse：500Hz—5000Hz,the max limit of the input pulse is corresponding to the maximum speed of motor.
It is recommended to use 250Hz, when PWM signal input, frequency not more than 1KHz, account for 20%-80% of input range.

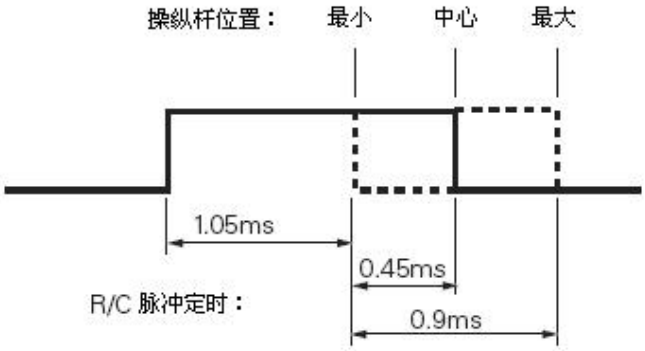
【Note】Minimum pulse frequency will change corresponding to different actual maximum speed. The end can be used as connection with RC RADIO, receiving effective R/C signal control. Detaile d instruction are as follows :

Operate controller under the mode of R/C

In this work mode, controller is used as radio receiver of R/C radio mode remote control and receive pulse signal from R/C radio, When minimum pulse width corresponding to the 1.0 millisecond width and corresponding to the minimum location of joystick, 2.0 millisecond pulse width corresponding to the

largest location of joysticks.when the Lever in the center position, pulse width should be 1.5 milliseconds

【Note】To achieve the best control precision, please make sure that the pulse width signal of R C radio signal is in the range of 1.0 ms - 2.0 ms.

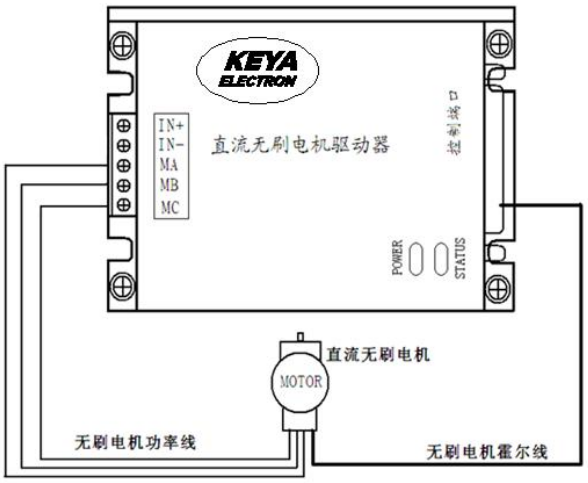


6、Terminal㉕：Brake STOP

When the end connected with + 5 VDC,the motor will brake, and the end cut off is the output o f power level.

Note : when restart;please cut off ㉕ and +5VDC at first, remove the brake command.And then reconnect ④ **EN** and +5VDC,means finish reset, controller is under ready state, if external control signal input is not zero, the controller has input, and the motor runs.

VIII、Connection and Instruction of direct current brushless motor



1、power line connection of brushless motor

Controller output end MA MB MC used to connect brushless motor, connecting according to the three power lines of brushless motor.

【Note】：It is noted that three power line A B C phase should matched with output connection phase of controller, when connecting brushless dc motor power line , if reverse connection, will lead to motor uncontrolled shaking back and forth.

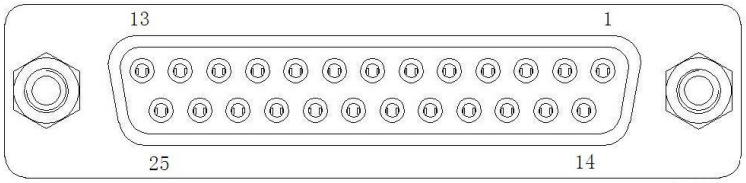
2、Hall connection of brushless motor

Terminal ⑮、⑲ provide work power for brushless motor hall, three-phase output signal A.B.C as input feedback signal connect to the end ⑯⑰⑱ of controller directly.【Note】:It is noted that three power line A B C phase of hall should matched with output connection phase of controller, when connecting brushless dc motor hall line , if reverse connection, will lead to motor uncontrolled shaking back and forth.

> ⚠ Warning
>
> All external connection line of control terminal should not close to the wires of power supply and output end, the output wire.
>
> In order to reduce unnecessary electronic interference, should try to shorten the connection wire length of control terminal, as the connection wire more than 0.5 m, please use the shielded wire.

IX.Connection and Instruction of encoder

Controller can work in open loop mode, the speed closed-loop model, closed loop position mode, the closed loop torque mode.When the controller works in closed-loop control, it need to accept the motor speed feedback signal.It is recommended to use incremental quadrature encoder as a feedback device.In most applications, 1000-2500 line encoder is a choice.The connection details of encoder :



Terminal ⑳、㉓ provide work power for encoder, two-phase output orthogonal signals A +, B + of

encoder as the feedback of input signal connected to the terminal ㉑,㉒of the controller directly.

【Note】：It is noted that three power line A B C phase of encoder should matched with output connection phase of controller to the motor, when connecting motor and encoder line , if reverse connection, will lead to motor uncontrolled shaking back and forth. At this time, Exchange the A,B phase signal of encoder.

X. Connection of insurance and power switch

1、Between the power input of controller and the power (battery), please must be equipped with a quick fuse and emergency main switch power supply in case of emergency power cutoff when necessary.

（Note: the choice of the rapid insurance and main switch of power: the rated current value of main switch of the power is greater than or equal to 150 ~ 200% of the rated current of the motor）

Note:Please make sure the rated motor voltage is matched with output voltage of controller.

2、Connection of power input:

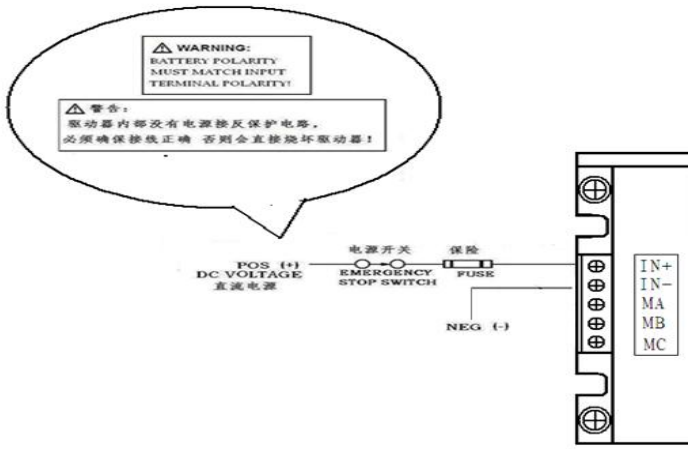
Warning

There is no power supply polarity reverse connect protection circuit in the power supply input of controller. It should be confirmed that POS (+) connect to the "+" end of the controller, NEG (-) connect to the "-" side of the controller.

2.1、Please confirm" positive" and" negative" polarity of the power (battery) before connect power supply(battery) to the controller, it must correspond to "IN+ " "IN -" polarity of dc power input of controller.

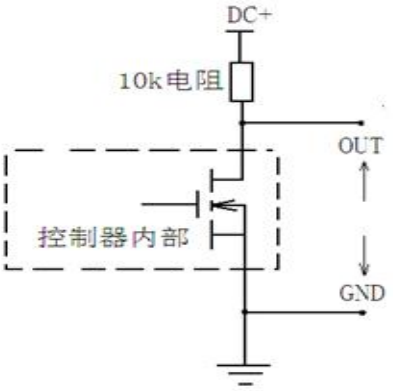
2.2、Choose suitable wire connection according to table1.

2.3、Check whether the power (battery) voltage can meet the requirements of the working voltage of the controller, and power (battery) capacity can carry load current of motor.



Connection drawing of insurance and power switch

XI. Digital output



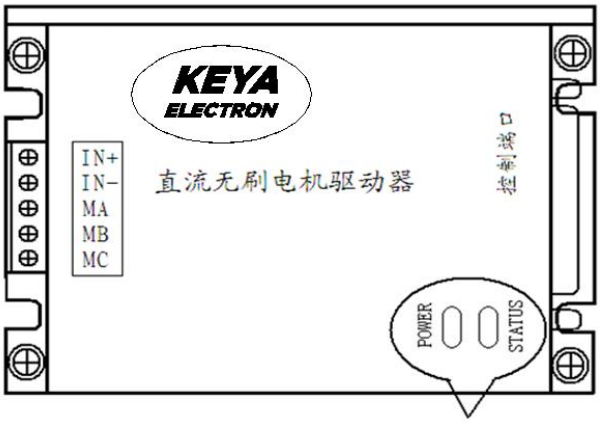
Controller provide line2 digital output①,②, this terminal is MOS tube drain open circuit, general output range is 24v 1A, max output is 40v 1A, it should connect 10k pull-up resistance when use. As shown. Every line digital output choose through or cutoff according to the preset state of a certain event.

Listed below is the events state which is allowed response by controller. It can only choose one of these events trigger digital output. Line 2 digital output can choose different events state.

	events state	action description of digital output
1	controller has output	motor get through, digital end has output
2	motor reverse	When the opposite direction of current through motor, digital end have output
3	over-voltage	When the supply voltage exceeds max limit, digital end

		has output
4	over heat	When exceed over heat limit, digital end has output.
5	LED state	The output of the digital port is synchronization with LED state

XII. Instruction of LED indicator light state



LED state indicator light

Normal state(POWER green light bright continuously, STATUS red light indicate signal given mode)	
State indicate	mode instruction
STATUS red light one bright,one extinguish	RS232 mode
STATUS red light blink twice	pulse input mode
STATUS red light blink three times	analog input mode

Fault state (POWER green light bright continuously, STATUS red light blink indicate fault)	
State indicate	fault instruction
STATUS red light blink very fast	short circuit

STATUS red light blink four times fast	Under-voltage or over voltage
STATUS red light blink twice fast	over heat
STATUS red light bright 1 interval, bright continuously	power level cutoff

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