YUYANG KING YKZ Series

high-power brushless DC motor controller

Manual

TABLES

1. OVERVIEW

This manual is mainly introducing the features of YUYANG KING series high-power BLDC motor controller, as well as how to install, operate and maintain the controllers. Customers are requested to read this manual very carefully before using, for any problem , please find our contacting information in the last page and contact us by any time you are convenient.

YUYANG KING series high-power BLDC motor controller provides a efficient, stable and easy to mounting of motor control solution to various of big& medium size of electric vehicles, including hybrid vehicles, electric forklift, electric boat and industrial speed governing motors, etc. YUYANG KING controllers could makes a energy transfer rates of 99% by taking the high-power MOSFETS design, besides, the powerful intelligence MPU inside the controller offering a complete and accurate controlling to the applications. Users are easy to configure, test and diagnose their controllers by connecting to the computer via a data wire provided by our company.

2. Specifications and features

2.1 Specifications：

- Working frequency：15.6KHz

- STDBY energy consumption：＜ 3W

- 5V hall sensor current：≤ 30mA

- Working voltage rates：24V to 144V (DC)

- Input current of electric lock: ≤ 200mA

- Standard pedal input：0-5V（3 wire resistive），0.8-3.6V（hall sensing）

- Brake simulation signal & pedal signal input：0-5V

- Working temperature range in full power：0℃ to 80 ℃（shell temperature）

- Working temperature range：-30℃ to 120 ℃，halt at 120℃ (shell temperature)

- Constant motor running current：120A - 700A,subject to the models

- Max battery current limit：50A - 250A,subject to the models

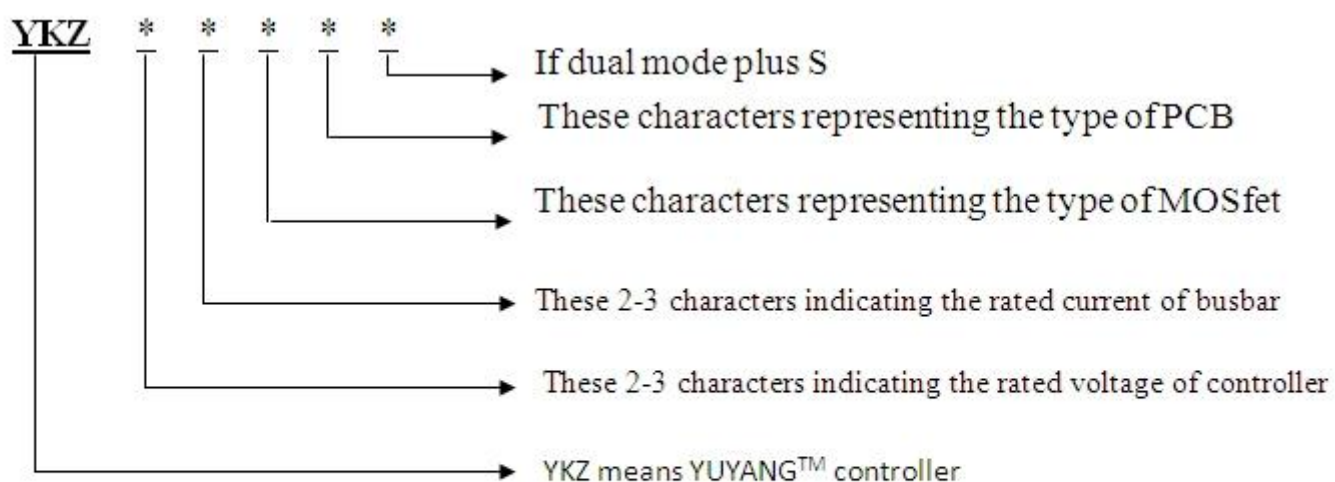- Max supported speed：≥50000 rpm（with hall sensor）

2.2 Features：

- Using the intelligent MPU

- Low energy consumption in High-speed, with synchronous rectification PWM circuit

- Battery current limit function can prolong the lifespan of battery sets

- Big starting current provide high starting speed

- Superior anti-interference and anti-shock performance

- Status LED indicates different fault information, it help the users to diagnostics & maintain the controller conveniently

- With battery protection function ,it protect against the low voltage &over voltage by reducing or cutting off the battery current output

- With thermal protection function, this thermal protection &compensation circuit provides constant current limit during under/over temperature condition ,so it can protect the controller and battery well

- Compatible with the 60°/120°hall sensor in both

- Throttle protection function disable the controller if throttle wires become open, also can prevent the controller operation if the electricity key is turned on while throttle is applied (For optional)

- Manual cruise/auto cruise function are available(For optional)

- Auto-matching with all kinds of motors

- Configurable soft/quick start mode

- Online/offline updating function available

2.3 Regular functions

● Configurable over/under voltage protection function offers real-time battery current monitoring (For optional)

● Single periodic current adjustment provide over voltage protecting in microsecond rates

● With thermal sensor to detecting any thermal information

● Configurable EABS brake system   effect by strong/weak braking signal (For optional)

● Safety reversing function, reversing speed can be set by 30% to 50% of the forwarding speed

● Providing +5V powering to hall sensor with over current protecting

● Configurable Forwarding, Neutral and Reversing operations(For optional)

● Configurable Energy saving mode, Acceleration mode and Climbing mode (For optional)

● 3 wires access of speed governing, additional supplying +5V power source

● 5 wires access of hall sensor connector, no hall sensor application is available for optional

● Real-time battery current monitoring system make sure the output current will not excess the maximum battery working current

2.4   Nomenclature：

YKZ ＊ ＊ ＊ ＊ ＊

→ If dual mode plus S

→ These characters representing the type of PCB

→ These characters representing the type of MOSfet

→ These 2-3 characters indicating the rated current of busbar

→ These 2-3 characters indicating the rated voltage of controller

→ YKZ means YUYANG™ controller

e.g. 1：YKZ6070AA：means 60V,70A,and use the STP75NF75 MOSfet, small 24pcs MOSfet PCB

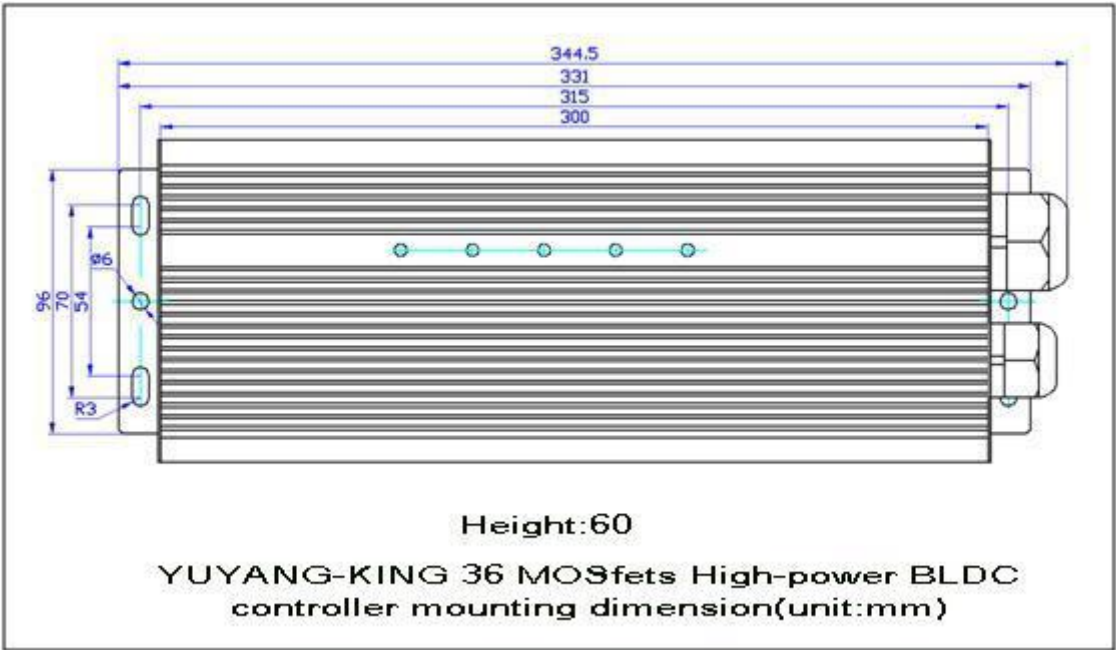e.g. 2：YKZ96100EC：means 96V,100A,and use IRFB4115GPbF MOSfet, small 36pcs MOSfet PCB

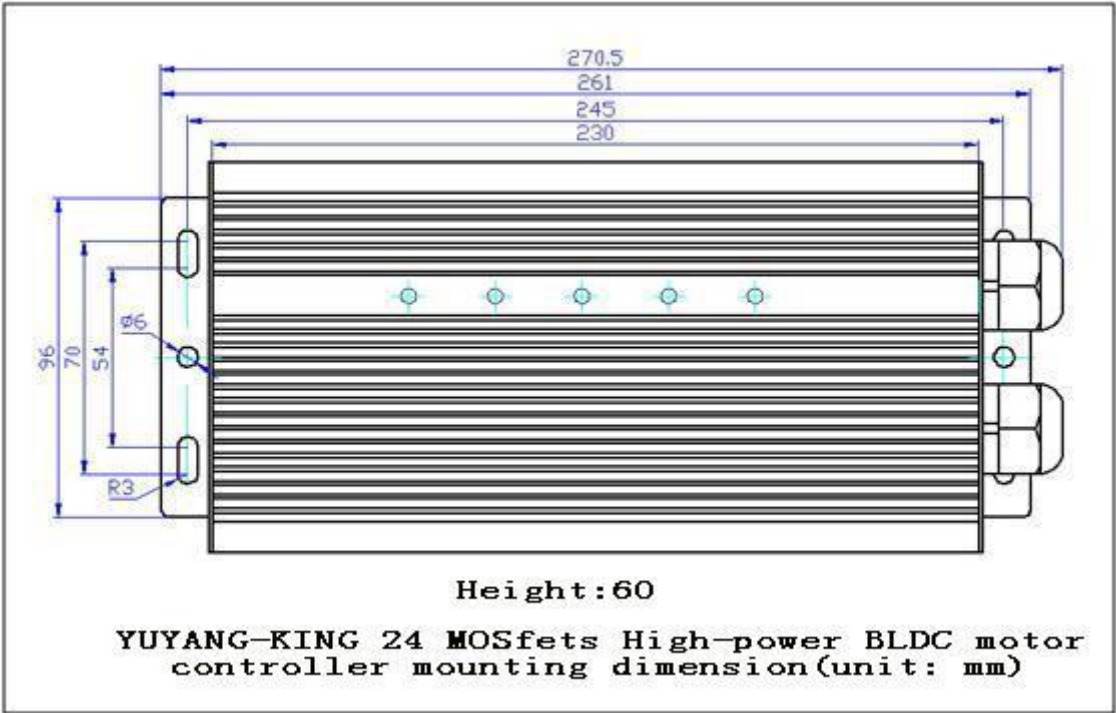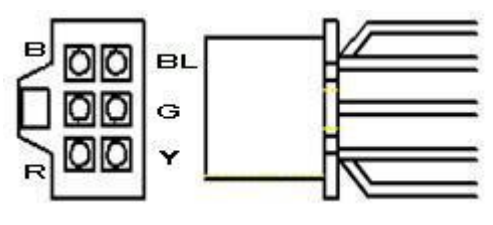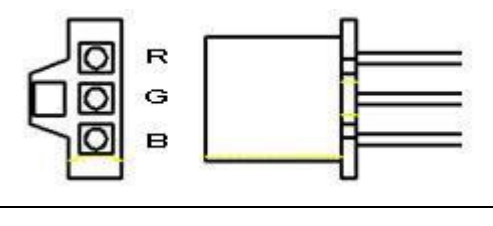# 3. Mounting instruction
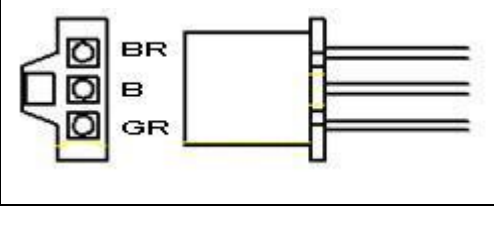
3.1 Mounting the controller：

Please cut off the main power source before mounting the controller, and recover the main powering again only in terms every connection is right. Some conditions could cause the motor to run out of control, operator should disconnect the motor or jack up the vehicle and get the drive wheels off the ground before working on the control circuit of vehicle.
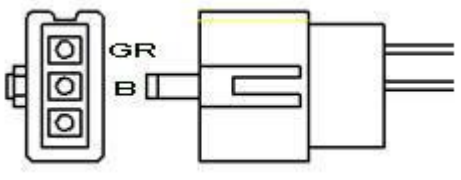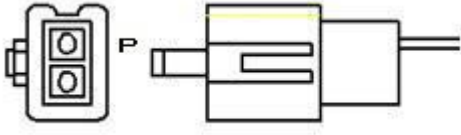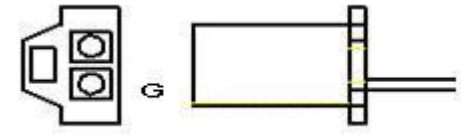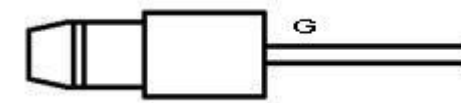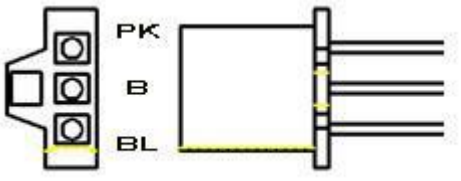
The mounting location should be chosen in a ventilate space in order to gains a full output of powering, mounting the controller in a airtight condition may decrease the working time of full power running ,or even cause a thermal protection abnormally. This controller totally including 5pcs of high-current busbars, they are 2pcs of main power cables (in red and black color), 3pcs of output cables (in blue, green and yellow color),all these cables should fastened by bolts and tightened with nuts. Since the temperature of these cables is very high, so the operator need pay attention to the cables if the insulation is broken.

3.2 Mounting dimension：
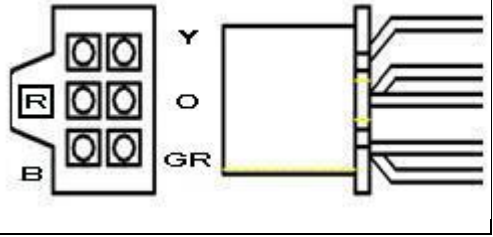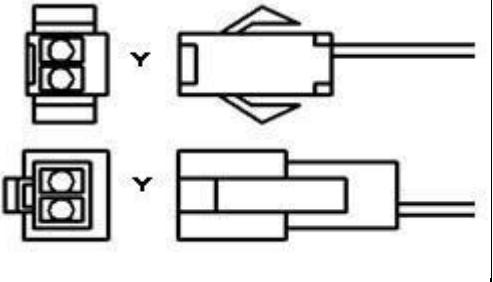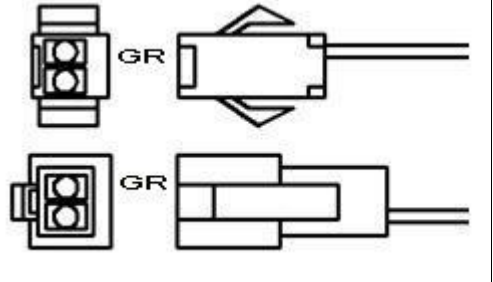

Height:60
YUYANG-KING 24 MOSfets High-power BLDC motor
controller mounting dimension(unit: mm)

Height:60
YUYANG-KING 36 MOSfets High-power BLDC
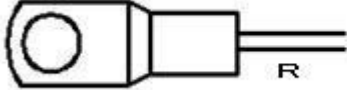controller mounting dimension(unit:mm)
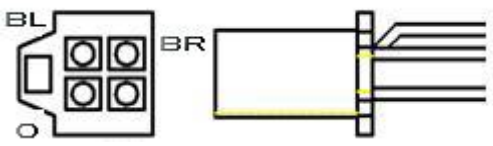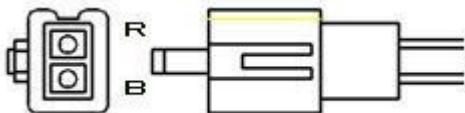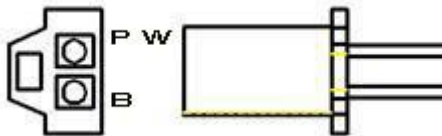
3.3 Controller wire ：

No	Name	Connector	Connector color	Connector define	Wire Spec	Connector description
1	Motor hall wire	6 cores socket (2.8-6Y)	white			
				hall signal /yellow	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Yellow	
				hall signal /green	Wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Green	
				hall signal /blue	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Blue	
				earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
				Power/red	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Red	
2	Throttle wire	3 cores socket (2.8-6Y)	white			
				Power/red	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
				throttle signal/green	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Yellow	
				earth wrie/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Red	
3	Neutral reversing wire	3 cores socket (2.8-6Y)	white	reversing/ bronze	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Bronze	
				earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	

No.	Name	Socket	Color	Wire	Wire spec	Image
				neutral/gray	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Gray	
4	Low voltage brake	3 cores socket (2.8-6A)	white	Low-V brake/gray	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Gray	
				earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
5	High voltage brake	2 cores socket (2.8-4A)	white	high-V brake/purple	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Purple	
6	Hall meter	2 cores socket (2.8-4Y)	white	speedometer wire/green	Wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Green	
7	Phase line meter	1 core socket(∅4 BulletHead shape terminal)	with green sleeve	speedometer wire/green	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Green	
8	3 speed	3 cores socket(2.8-6Y)	red	high speed/pink	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Purple	
				earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
				low speed/blue	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Blue	
9	Anti-thief	6 cores	red			

		socket(2.8-6Y)		sensor wire/gray	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Gray	
				anti-thief signal/yellow	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Yellow	
				main earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
				main power/red	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Red	
				electric switch lock/orange	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Orange	
10	Self learning	2 cores relaying socket SM-2Y	black	self-leaning/yellow	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Yellow	
		2 cores relaying socket SM-2A		earth wire/yellow	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Yellow	
11	Speed limit	2 cores relaying socket SM-2Y	black	speed limit/gray	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Gray	
		2 cores relaying socket SM-2A		earth wire/gray	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Gray	
12		1 core				

	Electric switch lock-1	plug(¢4 bullethead shape terminal)		electric switch lock/orange	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Orange	
13	Electric switch lock-2	1 core plug(circular ring)		electric switch lock/orange	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Orange	
14	Anti-thief 3+2	4 cores socket(2.8-4Y)	red	electric switch lock/orange	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Orange	
				sensor wire/bronze	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Bronze	
				anti-thief signal/blue	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Blue	
		2 cores plug(2.8-4A)		main earth wire/red	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Red	
				main power/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	
15	Cruise	2 cores socket(2.8-4Y)	white	cruise/purple white	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Purple/White	
				earth wire/black	wire (AVR-90) 0.3mm2 (16/0.15) 300/300V Black	

4. Maintenance

There are no user serviceable parts & components in YUYANG KING controllers, unauthorized opening, repairing activities may caused the controllers not working and will void the warranty. However, we recommend to clean the controller shell and connection cables periodically with proper operation. Please disconnect controller busbars from the battery for at least 1 minute, then start the maintenance processing.

1． Check every connection and if there are loose, corrosion and broken were found, then remove the corrosion with a abrasive paper ,covering the broken area with electrical tape and tight the bolt in the end.

2． Remove the water on the controller wires before reconnecting with the battery.

3． Wipe the dust&dirt on the controller shell with a clean rag.

Reconnect the controller with the battery after the maintenance was completed. Since arcing can occur in case the battery was full charged, so <u>please use the insulated tools and take care of personal safety when connecting the controllers again.</u>

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