KEB Ebike BLDC Motor Speed Controller

Kelly KEB programmable **ebike brushless DC motor controller** provides efficient, smooth and quite controls for electric bicycle, electric motorcycle, scooter, etc. Ebike brushless motor controller outputs high taking off current, and strictly limit battery current. Motor speed controller can work with relative small battery, but provide good acceleration and hill climbing. BLDC motor speed controller uses high power MOSFET, PWM to achieve efficiency 99%. In most cases, Powerful microprocessor brings in comprehensive and precise control to BLDC motor controllers. This programmable brushless motor controller also allows users to set parameters, conduct tests, and obtain diagnostic information quickly and easily.

Features:

- Specially designed for electric bicycle and scooter.
- Intelligence with powerful microprocessor.
- Synchronous rectification, ultra low drop, fast PWM to achieve very high efficiency.
- Electronic reversing.
- Voltage monitoring on 3 motor phases, bus, and power supply.
- Voltage monitoring on voltage source 12V and 5V.
- Current sense on all 3 motor phases.
- Current control loop.
- Hardware over current protection.
- Hardware over voltage protection.
- Support torque mode, speed mode, and balanced mode operation. x
- Configurable limit for motor current and battery current. x
- Battery current limiting available, doesn't affect taking off performance.
- More startup current ,can get more startup speed. x
- Low EMC.
- LED fault code.
- Battery protection: current cutback, warning and shutdown at configurable high and low battery voltage. x
- Rugged aluminum housing for maximum heat dissipation and harsh environment.
- Rugged high current terminals, and rugged aviation connectors for small signal.
- Thermal protection: current cut back, warning and shutdown on high temperature. x

• Configurable 60 degree or 120 degree hall position sensors.
• Support motors with any number of poles.
• Up to 40,000 electric RPM standard. Optional high speed 70,000 ERPM, and ultra high speed 100,000 ERPM. (Electric RPM = mechanical RPM * motor pole pairs).
• Brake switch is used to start regen. x
• 0-5V brake signal is used to command regen current. x
• Support three modes of regenerative braking: brake switch regen, release throttle regen,0-5V analog signal variable regen.
• Configurable high pedal protection: Disable operation if power up with high throttle. x
• Current multiplication: Take less current from battery, output more current to motor.
• Easy installation: 3-wire potentiometer will work.
• Current meter output.
• Standard PC/Laptop computer to do programming. No special tools needed. x
• User program provided. Easy to use. No cost to customers. x

General Specifications:
•Frequency of Operation: 16.6kHz.
•Standby Battery Current: < 0.5mA.
•5V Sensor Supply Current: 40mA.
•Controller supply voltage range, PWR, 18V to 90V. x
•Supply Current, PWR, 150mA.
•Configurable battery voltage range, B+. Max operating range: 18V to 90V.
•Analog Brake and Throttle Input: 0-5 Volts. Producing 0-5V signal with 3-wire pot.
•Full Power Operating Temperature Range: 0℃ to 50℃ (controller case temperature).
•Operating Temperature Range: -30℃ to 90℃, 100℃ shutdown (controller case temperature).
•Peak Phase Current, 10 seconds: 350A. x
•Continuous Phase Current Limit: 140A. x
•Maximum Battery Current: Configurable x

Optional Features:
Optional Waterproof:

Step 1 - Kelly KBL/KEB Series Controllers Configuration Program V3.3

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Configuration Wizard

Controller Information

Model: KEB72801 Serial Number: 10010001 SoftWare Version: 0402

General Setting

Forward Switch [1]		○ Enable ◉ Disable
Foot Switch [2]		○ Enable ◉ Disable
Throttle Sensor Type [3]		3-wire Pot
Throttle effective starting	20%	
Throttle effective ending	80%	
Max Motor Current [4]	100%	
Max Battery Current [5]	70%	

Description

1. If enabled, Throttle Switch will be considered as Forward Switch. The motor will be run CW if turn on Throttle Switch and turn off Reversing Switch; Conversely, it will run CCW; If both switches are on or off, it will be in neutral and Throttle Safety Switch invalid.
2. Only if Forward Switch is off, Foot Switch can be used. If enabled, please turn on foot switch to activate throttle.
2. Usually Hall Throttle valid signal range is about 1V-4V. The controller will report fault for <0.5V or
4. The max output current as percentage of controller current rating. i.e. A 400A rated controller will limit the max output to 200A if you choose 50% here.
5. Controller will cut back motor current at high speed to limit battery current. Controller can output Max Motor Current at low speed. Note motor current can be much higher than battery current at low speed.

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Step 2 - Kelly KBL/KEB Series Controllers Configuration Program V3.3
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General Setting
Start-up Delay [1]
0.5 sec.
Hall Sensor Type [2]
120 degree
Control Mode
Torque
Under Voltage [3]
18V
Over Voltage [4]
90V
Throttle Up/Down Rate
3
Fast
Slow
Power On High Pedal Disable
Enable
Disable
Releasing Brake High Pedal Disable[6]
Enable
Disable
Configuration Wizard
Description
1. Set delay time to wait for stabilization of B+, mostly for main contactor debouncing.
2. Select 60 degree or 120 degree according to your motor hall sensor type.
3. Controller will cut back current at battery voltage lower than 1.1x the value, cut out at the value, and resume operation at 1.05x the value.
4. Controller will cut back regen current at 0.95x the value, cut out regen if voltage reached the setting, and resume regen at 0.95x the value.
5. If enabled, the controller will report fault and not operate if throttle got effective output at power up.
6. If enabled, the controller will report fault and not operate if throttle got effective output when releasing the brake.
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Step 3 - Kelly KBL/KEB Series Controllers Configuration Program V3.3

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Configuration Wizard

General Setting

Motor Top Speed [1]	100%		
Motor Poles[2]	8		
Half Speed In Reverse[3]	○ Enable	◉ Disable	
Boost Function[4]	○ Enable	◉ Disable	
Economy Function[5]	○ Enable	◉ Disable	
Half Current in Reverse[6]	○ Enable	◉ Disable	
Noise Reduction [7]	○ Enable	◉ Disable	

Description

1. Slide the silder to change allowed top speed of your motor. Actually it's done by limiting motor voltage to the percentage of battery voltage.
2. Motor poles configuration. When using CAN to get controller's parameter, please configure this parameter accurately.
3. If enabled,the max reverse speed will be limited to half of the max forward speed if reverse switch closed.
4. If enabled, the controller will output max power right after Brake signal > 4.2V. Or say you can wire a boost switch between Brake Input and 5V to activate it.
5. If enabled, the max output current will be limited to half of normal condition if Brake signal > 4.2V. Or say you may wire a economy switch between Brake Input and 5V to activate it.
6. If enabled, the max output current will be limited to half at reversing. Activated by reverse switch.
7. If the motor starts with noises enable this funtion to reduce it,otherwise don't use.

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Step 3

Step 4 - Kelly KBL/KEB Series Controllers Configuration Program V3.3

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Configuration Wizard

Regeneration Setting

Regeneration [1]		◉ Enable ○ Disable
Brake Switch [2]		◉ Enable ○ Disable
Releasing Throttle Starts Regen [3]	Disable	
Regen Current by Brake Switch On	20%	
Max Regen Current [4]	100%	
Brake Sensor Type [5]		No Used
Brake Sensor Starting Point	20%	
Brake Sensor Ending Point	80%	

Description

1. Regen is to recover mechanical energy, and charge back to battery. It has braking effect. Battery and secure current path are required during regen. Braker/Contactor on battery line has to be closed.
2. If enable, turn off throttle and turn on brake switch will start regen.
3. If enable, regen starts just after throttle released. You may disable it by dragging the slider to the leftmost position. Brake switch or brake sensor isn't required for the mode. The mode is only available for firmware version 0209 or later.
4. Max regen current with max signal from brake sensor.
5. It's to vary regen on time. Please choose "Not Used" if analog brake sensor isn't used. You have to turn on brake switch to start the regen, then vary the regen with the signal.

Brake Sensor Type is the same as Throttle Sensor Type.

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Step 4


Step 5 - Kelly KBL/KEB Series Controllers Configuration Program V3.3
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Sensor Setting
Motor Temperature Sensor [1]
Enable
Disable
Controller Stop Output Temperature
125C
Controller Resume Output Temperature
110C
CAN Setting
Configuration Wizard
Description
1. Thermistor is optional. Default to KTY83-122.
Alternative to a thermistor, voltage signal 4.5V to 30V on the motor temperature input pin (J2 Pin 4) will disable the controller.
caculating the max regen current in each mode:
actual regen current=max driving current*0.5*max allowed regen current of self-regen mode*tps mode and max allowed regen current or max allowed regen current of braking switch mode
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Step 5


Step 6 - Kelly KBL/KEB Series Controllers Configuration Program V3.3
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Finish Setting
Please click finish button to write configuration into the controller.
Configuration Wizard
kelly KEB controllers' configuration program
Help
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