

DC12/48RT100BL-XW

## Driver Operation Manual



Jinan Keya Electronic Technology Co., Ltd.

**Please read this operation manual thoroughly before using this device.**

Any failures and damages caused by non-compliance of precautions stipulated in this operation and installation manual are beyond the scope of warranty and the manufacturer disclaims any responsibility for them. This manual must be carefully kept. In case of any question, please contact us!

**Safety precautions**

- Installation, connection and commissioning of this device shall be carried out by professionals.
- Do not install, remove or replace device circuit under charged circumstances.
- Please make sure that necessary protectors are mounted between power input end of this device and power supply (storage battery) to avoid accidents or fatal damages; Devices need to be mounted: over-current protector, fuse, emergency switch.
- Isolation and insulation protection between device and ground as well as devices shall be well equipped.
- In case that charged commissioning of this device is really needed, well-insulated nonmetal special screwdriver or special commissioning tools shall be used.
- This device shall be installed in well-ventilated environment.
- This device shall not be directly exposed to abnormal environments with high humidity, dust, corrosive gas and intense vibration.



This picture identify an important notice or warning.

## Overview:

Keya - DC12/48RT100BL-XW is a kind of intelligent high-power DC motor driver. This driver uses high-performance MCU, adopts advanced motion control algorithm and is applicable to situations having special functional requirements and has external analog quantity, pulse-width control and potentiometer speed governing functions. It can sets soft start and stop as well as maximum current and motor torque, separately selects forward and backward rotations of motor and separately controls forward limit and backward limit. This driver is also equipped with fault alarm output end to effectively protect the reliability and safety of device package and can be widely used in automation control industry.

## II. Specifications and Model:

Model	Max. Output current AC: (A)	Max. Output voltage DC: (V)	DC voltage Input range DC: (V)
DC12/48RT100BL-XW	100	50	10- 50

## III. Characteristics:

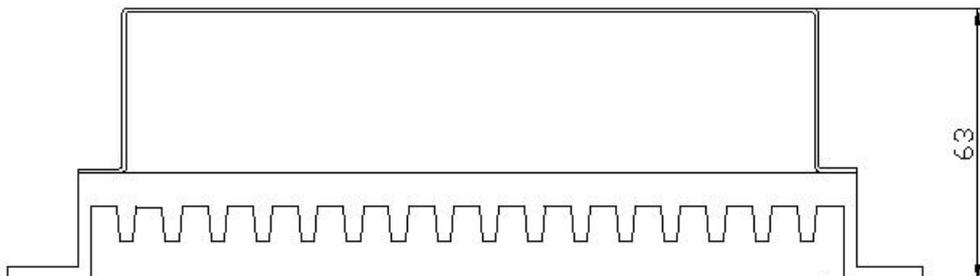
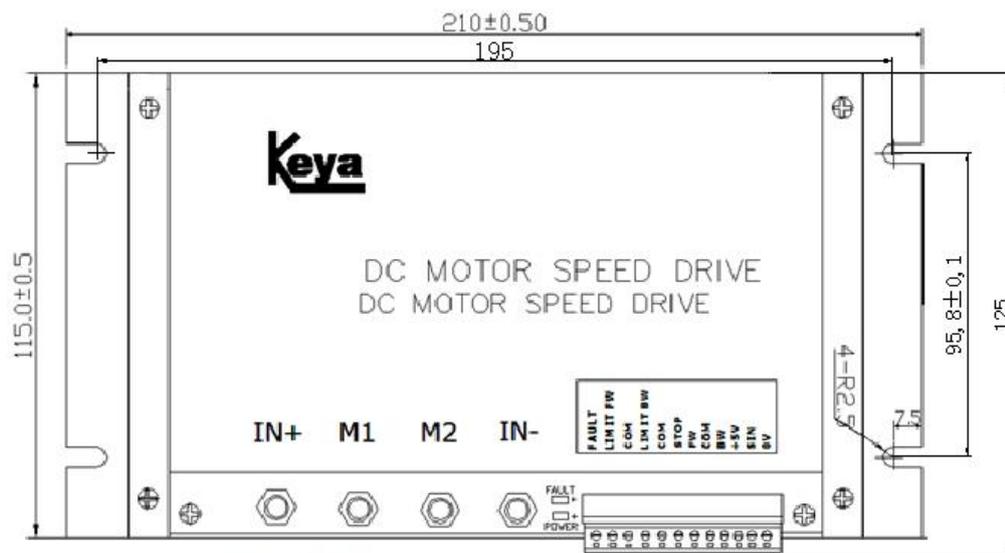
- ◆ Small size.
- ◆ Wide voltage input.
- ◆ Multiple control modes: Potentiometer, analog control, pulse-width control
- ◆ Independent forward & backward control.
- ◆ Independent forward & backward limit
- ◆ Brake control.
- ◆ Maximum current limit.
- ◆ Protections started under abnormal conditions: Over-current, over-heat, over-voltage, under-voltage, short circuit, etc.
- ◆ LED fault alarm status indicator, fault alarm output.

## IV. Performance index:

1. Supply voltage: 10—50VDC.
2. Standby current: 6mA.
3. Continue working current: 50A High instant current: 100A-60S.
4. Working frequency: 2KHZ.
5. Out+5VDC Power supply (can be supplied to potentiometer): 5V DC 20mA
6. Input range of analog quantity: 0-- 5VDC or 0-10VDC

7. Soft starting time: 0-5S
8. Soft stopping time: 0-5S
9. Pulse input frequency: 250Hz
10. Input range of duty ratio: 0-- 100%
11. Digital quantity output interface: Maximum load capacity is 50v 1A.
12. Temperature protection status: stops output at 80°C
13. Operating temperature:-30°C-- +60°C
14. Environment humidity: relative humidity≤80RH.
15. Boundary dimension: **L \* W \* H = 210mm \* 115mm \* 63mm**
16. Weight: 975g

**V. Boundary dimension:**



Boundary Dimensional Drawing

**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 <sup>2</sup> )	Max. length (m)
Power input line:	100	<b>10</b>	15
Motor output line:	100	10	15

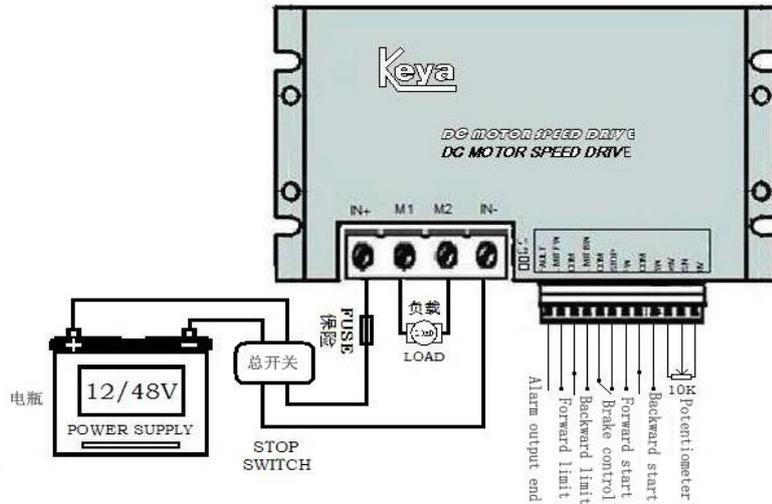


### **WARNING**

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.

### **VII. Terminal connection diagram:**



## WARNING

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

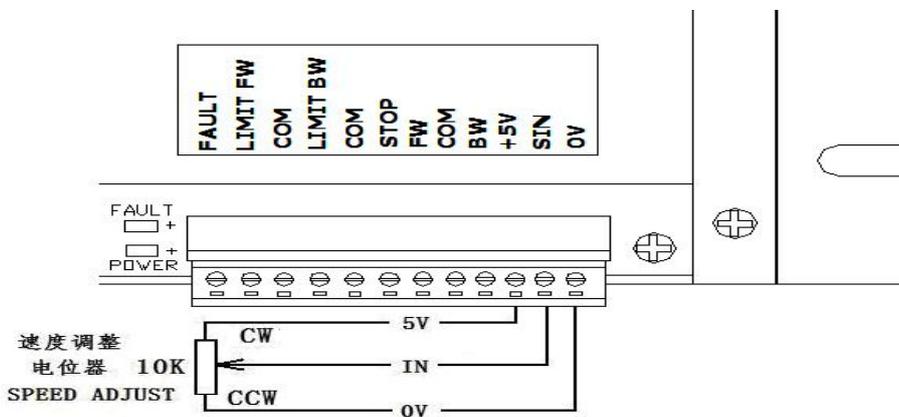
As output voltage supplied by the driver is 5V and current is 20 mA (small), other external loads (such as data display instrument, indicator light) shall not be connected, otherwise, damages may be caused.

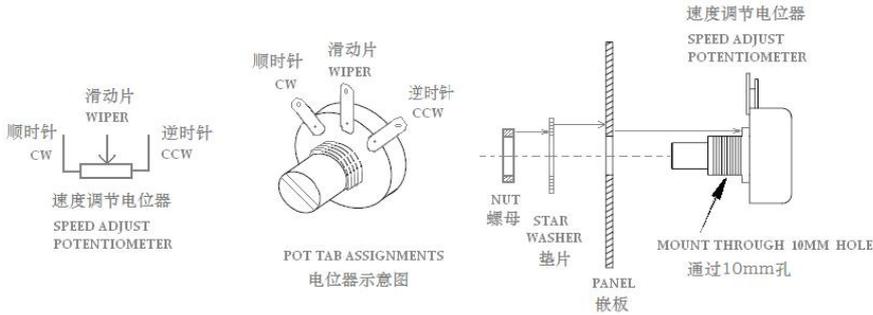
In order to reduce unnecessary electronic signal interference, length of connecting lines which control the terminal shall be shortened as much as possible, in case that length of connecting line exceeds 0.5m, shielded wire shall be adopted.

## VIII. Potentiometer control:

**Potentiometer control:** a 2W/10K potentiometer shall be used to control speed governing of the driver; wiring diagram is shown below.

Installation method:

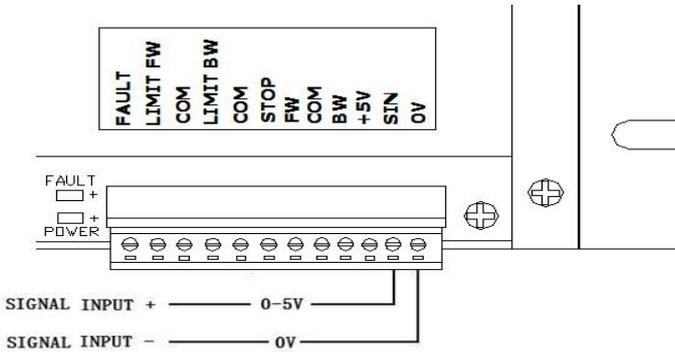




**⚠ WARNING**

Be sure to use shielded wire for signal input and shielding net shall be single-ended grounded.  
 Be sure to use shielded wire for all control signal connecting lines and shielding net shall be single-ended grounded.

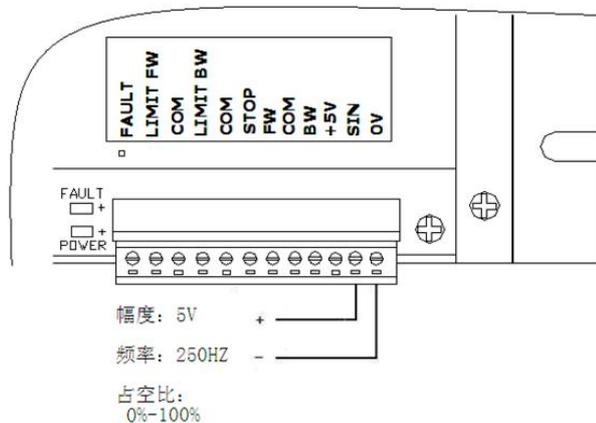
**IX. Analog quantity control: External 0-5V control**



**⚠ WARNING**

Be sure to use shielded wire for standard signal input and shielding net shall be single-ended grounded.  
 Be sure to use shielded wire for all control signal connecting lines and shielding net shall be single-ended grounded.

**X. Pulse control: duty ratio regulation, frequency is 250 HZ, amplitude is 5V**

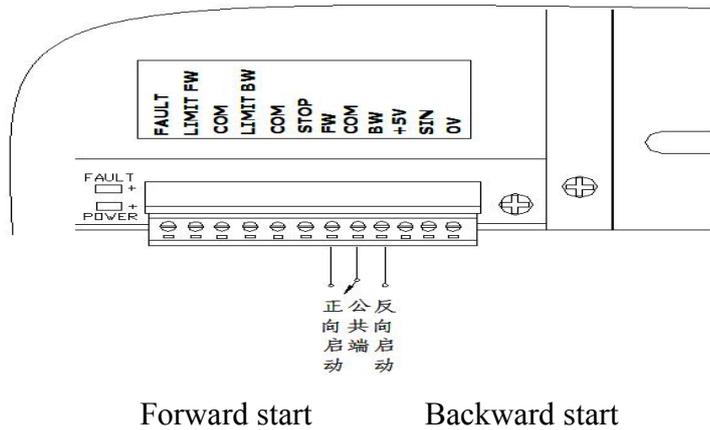




## WARNING

Be sure to use shielded wire for signal input and shielding net shall be single-ended grounded.  
Be sure to use shielded wire for all control signal connecting lines and shielding net shall be single-ended grounded.

### XI. Motor forward and backward control:



Forward start: FW and COM shall be shorted connected, i.e. forward run.

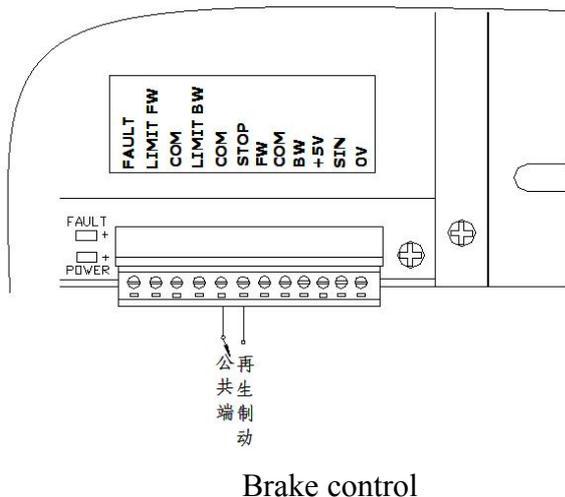
Backward start: BW and COM shall be shorted connected, i.e. backward run.

Note:

In case that COM terminal is not shorted connected with FW or BW terminal, driver is inoperative.

In case that COM terminal is shorted connected with FW and BW terminal at the same time, driver is inoperative.

### XII. Brake control:

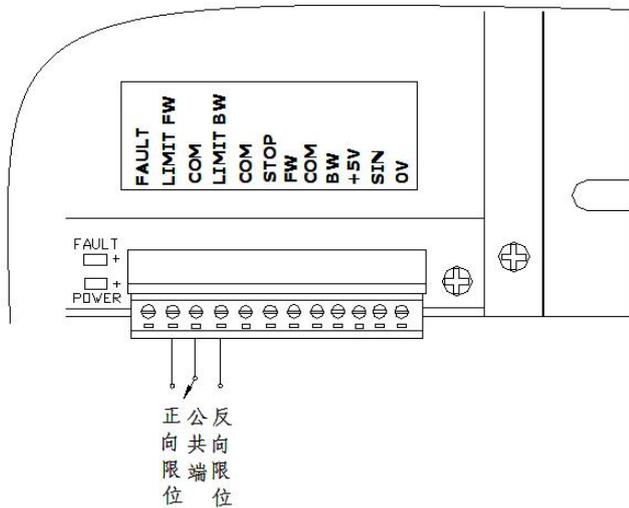


Brake control: STOP and COM terminal shall be shorted connected, i.e. motor will be immediately stopped.

Note: In case of forward brake, if link between STOP and COM is not disconnected, backward start

is allowed, in order to restore forward start, disconnect STOP and COM terminal, and then disconnect FW and COM terminal, reconnect them and forward start is restored. And so on for backward brake.

### XIII. Motor forward and backward limit:



Forward limit    Backward limit

Forward limit: LIMIT FW and COM shall be shorted connected, i.e. forward limit.

Backward limit: LIMIT BW and COM shall be shorted connected, i.e. backward limit.

Note: in case of using limit function, need to know the details of logical relationship between forward & backward start and forward& backward limit.

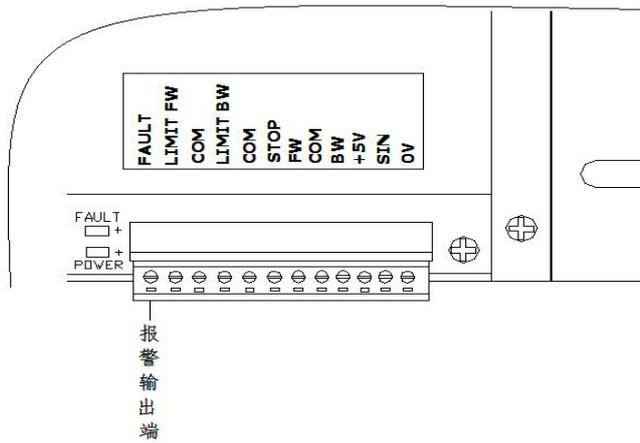
Control logic:

Firstly, confirm that COM terminal is not shorted connected with LIMIT FW or LIMIT BW, if required by switch functions, limit direction which is opposite to moving direction shall be selected for shorted connection.

Back and forth movement of motor:

Supposing that initial position will move forward, firstly, disconnect forward limit and connect backward limit, and then connect forward start, motor is in direct motion; when it move forward to certain position, disconnect backward limit, connect forward limit, motor will be immediately stopped; after this, disconnect forward start, connect backward start, motor is in opposite running, when it move backward to certain position, disconnect forward limit, connect backward limit, motor will be immediately stopped. After the completion of above-mentioned actions, a cycle of control logics has been finished, if repetition is required, above-mentioned control logic need to be circulated.

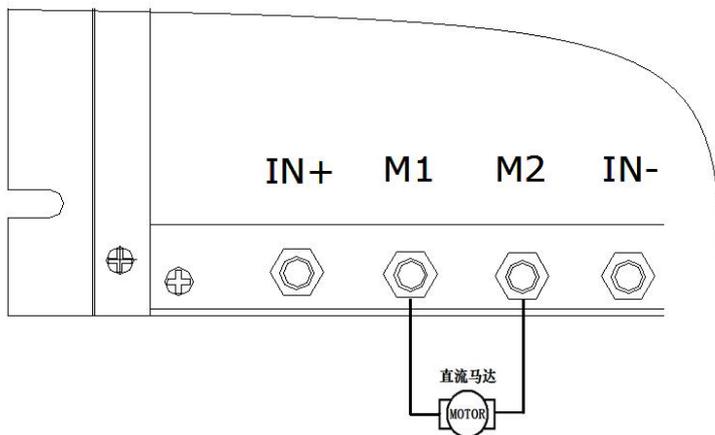
### XIV. Fault alarm:



Alarm output end

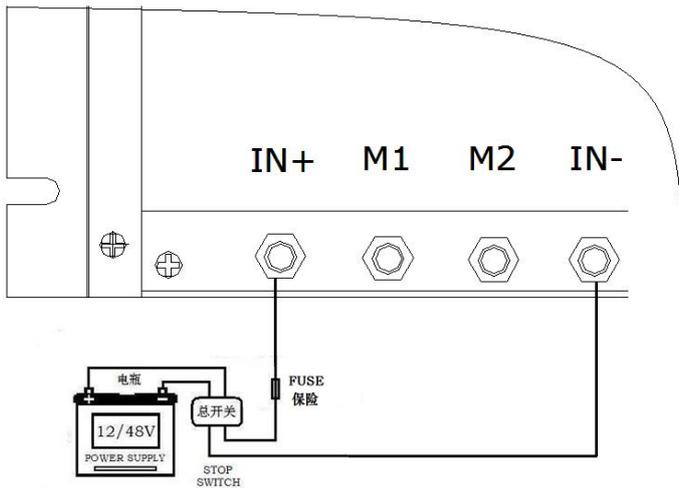
This port is fault alarm output end. It is in high level (DC5V) under working condition and in lower level (DC0V) under alarm condition.

#### XV. Connection and description of DC motor:



1. The driver provides motor with voltage by “M1”“M2”terminal blocks.  
Note: in case that forward start port is connected on control terminal, however, motor runs in opposite direction, so the driver shall be disconnected, and then interchange “M1” and “M2” wiring, motor will be in direct motion.
2. Please confirm that rated voltage of the motor matches well with output voltage of the driver.

#### XVI. Connection of main power:



### WARNING

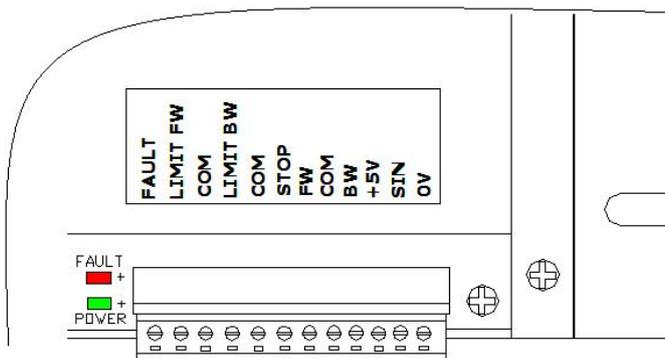
No reverse polarity protection is provided for power input end of this driver. Storage battery (+) shall be connected to “IN+” and storage battery (-) shall be connected to “IN-”.

1. As there is no internal fuse, a quick-fused fuse and battery main emergency switch shall be mounted between power input end and storage battery to protect the driver from emergency power off when necessary.

(Note: Selection of quick-fused fuse and battery main switch: ratio of rated current value of battery main switch to rated current value of motor is: 1:3)

Confirm whether the battery voltage can meet driver’s working voltage requirements and whether battery capacity can bear the load of motor

### XVII. Status description of LED indicator light:



#### Working condition (POWER Green light, STATUS Red light)

Status indicator	Mode description
L1 (POWER) Green Light-----Constant light	Electrical connection
L2 (STATUS) Red light-----A flicker after powered up	Power on self test
Fault state (POWER Green light, STATUS Red light)	
Status indicator	Fault description
L2 (STATUS) Red light-----Constant light	Over-current protection
L2 (STATUS) Red light-----Quick flashing	Instant over-current

L2 (STATUS) Red light-----Four flickers	Over-voltage protection
L2 (STATUS) Red light-----a flicker	Temperature protection

**XVIII. Description of driver's protection functions: controller provides overvoltage, under-voltage, overheat and over-current protection**

1. **Over voltage, under-voltage protection:** when external power supply is higher or lower than pre-set voltage value threshold, output of controller will be cut off. The range of normal working voltage is 10-50v. Meanwhile, under-voltage & over voltage value can be set according to customer's requirements.
2. **Overheat protection:** Controller contains an internal temperature detection circuit, when detected temperature exceeds 80°C, output stage of controller will be fully off.
3. **Over-current protection:** controller contains an internal current detection circuit, when detected output current of controller reaches to over-current protection threshold, controller will enter into over-current protection state.

Note: supposing that driver is under forward start status, when detected working current exceeds the current threshold, driver will immediately cut off the power stage and stop output. After troubleshooting, disconnect forward start, connect them again to remove protection.

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