



MACHINE INDUSTRIES

# **REPM Brushless DC Motor Driver for Milling Machine**

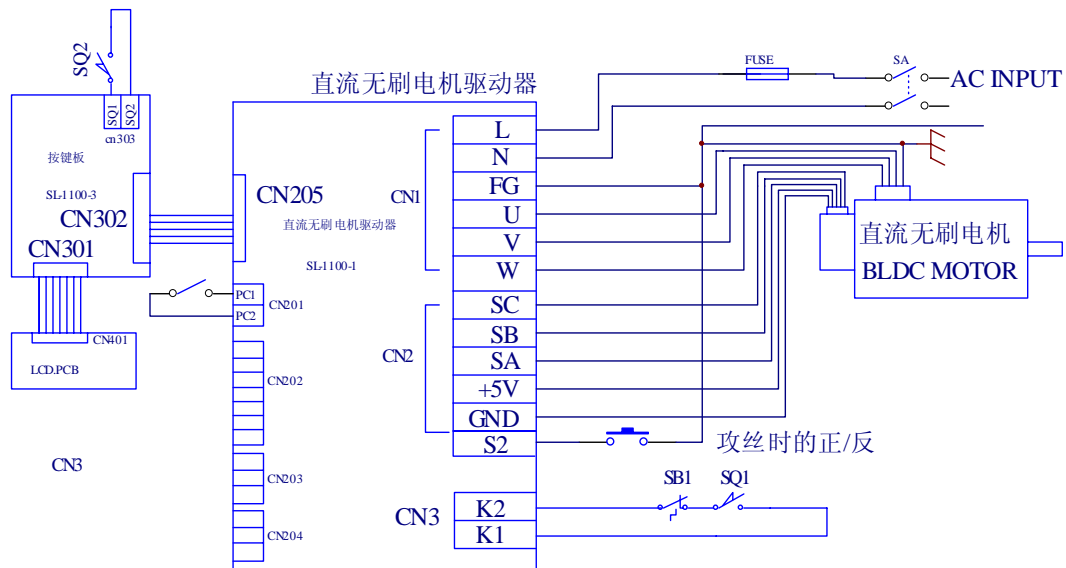
**MBLC-1100-150H-SL**

**Operating Instructions**

## Overview

This serial Brushless DC Motor driver unit is designed for small milling machine system application, the system has perfect control function ,simple operation ,easy maintenance , also with maximum torque and stability at low speed .

MBLC-1100-150H-SL Driver Unit,desighed for Mini CNC Milling Machine system, consists of following four parts connection : MBL-92GM-150Hhigh voltage brushless dc motor (short title as motor in following description ), MBLC-1100-150H-SL brushless dc motor driver (short title as driver in following driver ), SL-1100-3 brushless dc motor driver key-press (short title as key-press in following description) and SL-LCD display (short title as LCD in following driver) .



F1-1

CN1						CN2							
Power			Motor Input			Sensor Wire					Fuction Switch Wire		
L1	N2	FG	U	V	W	SC	SB	SA	GND	VCC	K4	K3	S1

CN3—CN3-1 driver and key-press connection

CON1—key-press and HSC-LCD connection

FUSE

SA—Power Switch

SB1E—Emergency Stop Switche

SQ1 electric control door limit switch

SQ2 protective mask limit switch

CN8 External user judgement portal (short-term external user effective)

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## 1. Brushless DC Motor Driver Feature

- ◆ Power Supply AC110V
- ◆ Power Rating:1100W, Rated Current:8A, Maximum Current:16A
- ◆ Rated Speed:6000RPM , Adjustable Range:400-6000RPM , Acceleration Time:5S。
- ◆ PID Speed closed –loop and current dual-loop regulator ,speed-loop control accuracy  $\pm 1\%$
- ◆ With current limit, starting failure, stall, the module protection function
- ◆ With machine emergency-stop switch ,protective mask ,electronic control door open limit protection
- ◆ With LCD display actual speed of machine spindle and driver work status ,speed display accuracy  $\pm 2\%$
- ◆ Using key-press adjust driver work status , operation is easy and convenient .
- ◆ It is easy to implement CNC control driver's work status by Using external user interface

## 2、 The Brief Description of BLDC Motor Driver Unit

### 2. 1 BLDC Motor Driver

Drive can control motor to start,stop,accelerate ,slowdown,forward,reverse,tapping, current limit protection ,emergency stop ,electric-control door open and protective mask open power-off protection ,or control through external user interface .

Overpower Protection: 30S Hard stop when the motor load is more than1.5 times, and shown protection codeE5。

### 2. 2 key-press board

Key-press board can control driver run status through each function-key . moving keys will be issued "trickle" Sound when press effective .the function are as follows

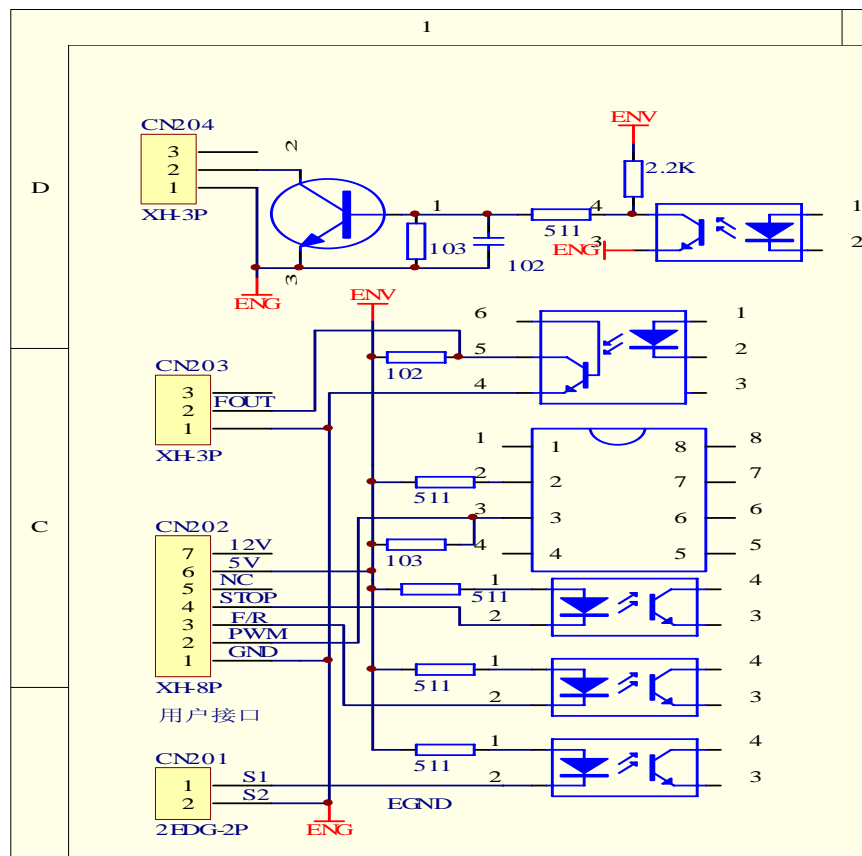
1. START Driver starting control button
2. STOP Driver stopping control button
3. FORWARD Drive forward operational control button
4. REVERSE Drive reverse operational control button
5. “+” Driver accelerate control button
6. “-” Driver slow-down control button

7. TAPPING Driver tapping function control
8. LED Tapping function display LED
9. CN303 Interface protection mask switch ,when short circuit ,enter stop status ,all button non-effective. After disconnecting ,press start button to recover the state before short circuit

## 2. 3 SL-LCD Screen

LCD screen display actual speed of motor using four digital (spindle speed with fixed speed ratio ) “FOR ” means forward ,”REV” means reverse ,”STOP ”means stop ,direction driver work status .

## 2. 4 External user interface connecting diagram



CN201 Judgment signal for external user interface。when short circuit, the external user interface is effective and all buttons are not available。

CN203 Impulse output port(4 pulses per revolution)

CN204 Error Output port, Output open

CN202:The function of every pins as follows:

- ①GND for external power supply

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②PWM signal portal,Users can select the suitable fixed frequency PWM signal when the received frequency between 500Hz-4KHz,duty ratio is 10%-90%, relative to the motor speed is 0-6000RPM.

③F/R External control switch for Forwarder/Reverse。 The speed will reduce to 500 before switchover and nd will autoacceleration to the original speed after finished。

④STOP:Spare on-off portal,no this function now。

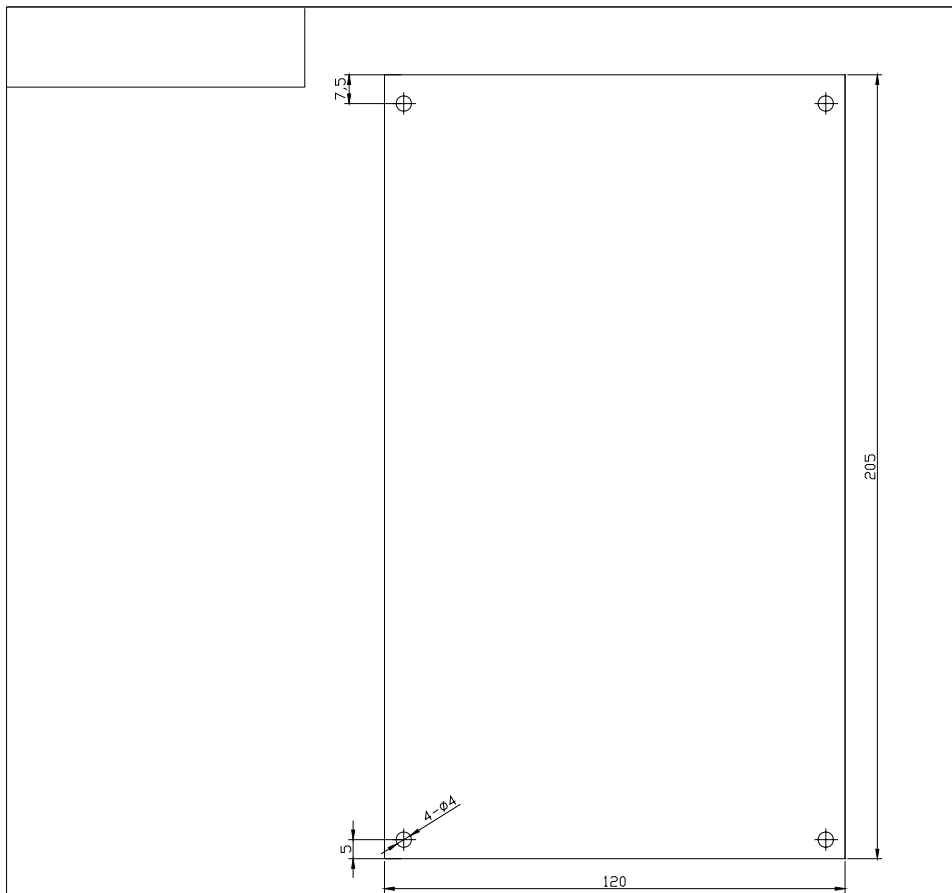
⑤FOUT The output impulse for actual speed of motor,two pulses per revolution

⑥user interface +5V power supply

⑦user interface +12V power supply



### 三、Outside measurement

#### 3. 1 Driver overall dimension

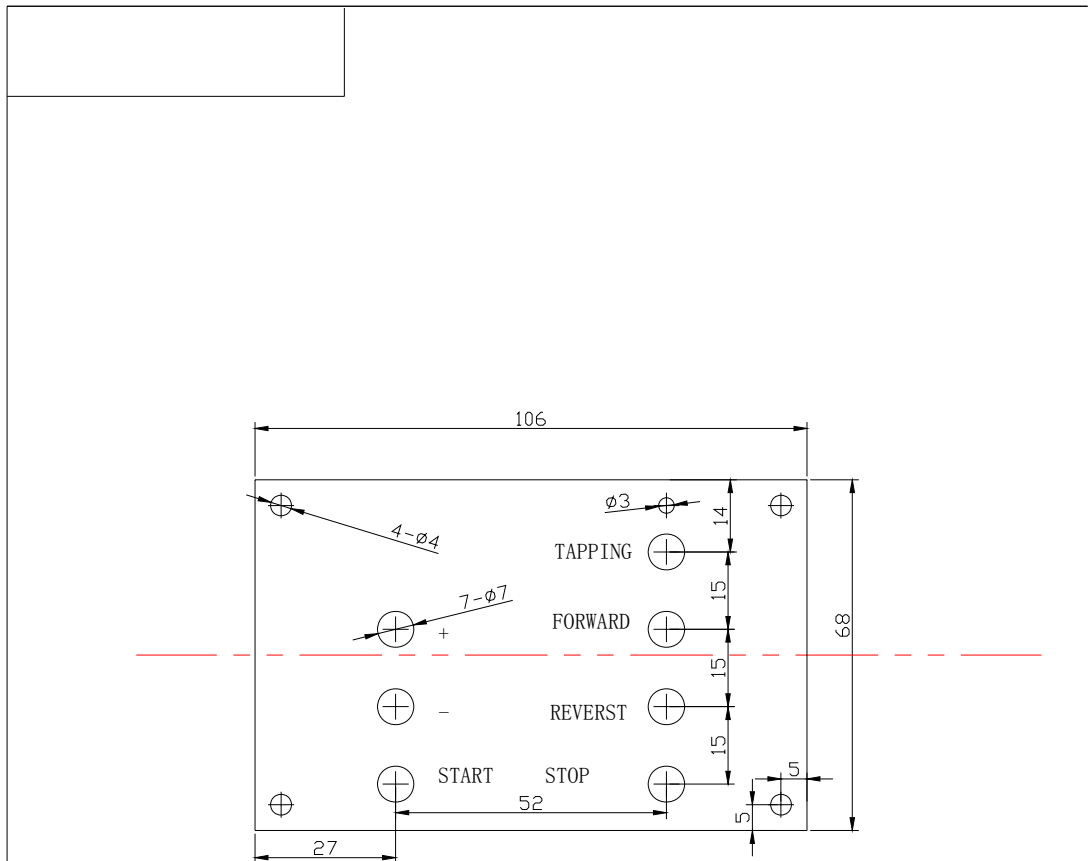


技术要求:

1. PCB板厚度T=1.5MM.
2. PCB板正面元件最高不超过28MM.
3. 反面元件连同散热器不超过58MM.

通用件登记												HSC-1100
描图												
描校												
底图总号												
标记		处数		更改单号		签字		设计		标准化		
签字		绘图		审定		图样标记		数量	重量	比例		
日期		审核		视图			版本号	A-1	共 18 张	第 13 张		
工艺		日期		06.12.28		弘佳机电设备有限公司						

### 3.2 Key-press board overall dimension



#### 技术要求:

1. PCB板厚度T=1.5MM.
2. 7按钮离印板正面高度为13MM, 3绿色发光管不低于按钮, 但不高于按钮2MM, 在两排按钮之间的印板正面上无其它元件。
3. 蜂鸣器和接线柱安放在PCB板背面, 高度不超过PCB板背面12MM。

通用件登记

描图

描校

底图总号

标记 处数 更改单号 签字

签字

设计 标准化

绘图

审定

图样标记

数量

重量

比例

日期

审核

视图



版本号

A-1

工艺

日期

06.12.28

共 18 张

第 13 张

按键板

弘佳机电设备有限公司

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#### 四、 Key-press board function description for Brushless DC Motor Driver of Milling Machine

1. System connect line well in accordance with the wiring diagram ,connect SA ,if SQ1 ,SQ2,SB are all close-up at this moment , Buzzer issued a "trickle" LCD display “0000、FOR、STOP”, “FORWARD、REVERST、TAPPING、START”all these button effective ,the speed ratio of milling machine and motor spindle is 1:1 ,display speed same as motor speed .
2. Press “START” driver display forward at the minimum speed is 400RPM±10% , when starting,the maximum speed is 6000RPM±1% 。
3. When press “+” one time ,driver let motor speed increase 20RPM, ,if press “+”for long-time driver let motor speed increased to 6000RPM rapidly。 press "-" key each time driver allows motor speed drop, declining rule is opposite to accelerating。
4. “FORWARD” means driver control motor forward operation , “REVERST”means driver control motor reverse operation ,motor slowdown to 500RPM firstly before switch the direction ,after switching ,speed restore automatically as before .
5. “TAPPING” is the switching button for tapping or un-tapping ,press one time ,switch to another status. when entering tapping state ,LED diode light on . when at 1000-3600RPM ,tapping state can switch to un-tapping directly .when un-tapping switch to tapping state ,speed decline to 1000RPM automatically ,and held at this speed when switch finished ,driver let speed accelerate to 1000-3600RPM when switching forward and reverse .driver let motor speed decline to 500RPM before starting switching ,after finished , accelerate to 1000RPM and then hold at this speed. “FORWARD、REVERST”on key-press board is non-effective at the state of tapping .using S2 which on terminal pillar of driver CN2 to connect external button for switching forward and reverse . Every pressing button action , switching to a forward / Reverse.。
6. Driver will enter stop status when press “stop” button at any time ,,and remember the current state , “FORWARD、REVERST、START”on the key-press board is effective at this moment , “+、 -、 TAPPING” is non-effective .it will restore as the



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speed before stop when press “START” next time .。

7. No matter the driver work at any status ,as long as one of “SQ1、SQ2、SA、SB” unlink ,driver is off immediately ,meanwhile ,losing driver work state.
8. When the locating hole of driver key-press board fasten with lathe ,it will need to embed insulation tablets for increasing insulation strength ,the parts that fasten the key-press and lathe is prior to choose plastic material .

## 五、 Motor and Driver connecting diagram

1. Connecting diagram (as following picture F1-1)
2. Use instruction:



- ①Pls make clear the input voltage before connecting ,be sure it is in the accordance with the voltage marked on driver nameplate .
- ②Assure motor and driver has well protective earthing。
- ③Pls check connecting of wiring end carefully to see if it is all right before use .
- ④If the wire provided by diagram is different from the color marked on matched motor ,pls follow the motor nameplate
- ⑤Pls use the motor and driver in the range of parameter marked by motor nameplate ,in order to achieve the best performance and stick up for safety .
- ⑥Driver need to have dustproof ,waterproof ,and prevent metal entering into rind body for not arising risk .
- ⑦Keep 20cm distance between Driver and Milling Machine。
- ⑧Radiator fan is necessary for electric cabinet.