ZLAC8015D

Servo Driver Manual (Special for Hub Servo Motor)

【Pleasereadthemanualindetailbeforeuse,toavoiddamagetothedriver】

Shenzhen ZhongLing Technology Co.,Ltd.

Add: 8t h Floor, Building 3, Qiyu Indus trial Cit y, Gongle Tiezai Rd., Xixiang St., Bao' an Dist, Shenz hen, China

Pos tcode: 518000

Tel : +86- 0755-2979 9302

Fax: +86- 0755-2912 4283

Email: sales@z lingkj.com

Web: www.zlingkj.com

深圳中菱科技有限公司
Shen Zhen Zhong Lin Technology Co.,ltd

CATALOG

RELEASE NOTES

Version	Update time	Update content	Update person
V1.00		First edition	DHR, LHY
V1.01	2022-08-20	Schematic diagram for adding brake wiring	LHY、CX
V1.02	2023-06-27	3.5 Modifying Fault Warnings 3.6 Adding Relief Circuits	LHY、CX

PREFACE

Thanks for choosing ZLAC8015D, the servo driver for hub servo motor.

This manual describes the installation, debugging, maintenance, operation and other aspects of the servo driver ZLAC8015D. Please read this manual in detail before use, and be familiar with the safety precautions.

This manual may be revised timely when product is improved, specification and version are changed or for some other reasons, which will not be notified particularly.

Any questions when using our products, please read the relevant manual or call our technical service department, we will meet your requirements in the shortest possible time.

Marks and warning signal:

Danger: Indicates that this operation error may endanger personal safety!

Attention: Indicates that this operation error may result in equipment damage!

SAFETY PRECAUTIONS

Open Box and Check

Do not install integrated step-servo motor which is damaged or with missing parts.

Installation

Installed on a non-flammable metal frame, prevent the intrusion of dust, corrosive gases, conductive objects, liquids and flammable materials, and maintain good heat dissipation conditions.

During installation, be sure to tighten the mounting screws of the integrated step-servo motor. It should be protected from vibration and shock.

Wiring

Please perform the wiring work by professional electrical engineer;

Before wiring, please confirm that the input power is off. Wiring and inspection must be performed after the power is turned off and the integrated step-servo motor indicator is off to prevent electric shock;

When plugging and unplugging the integrated step-servo motor terminals, make sure that its indicator is off before proceeding;

Please set the emergent stop circuit outside the controller;

Please tighten the output terminal with a suitable torque.

Electrify

Please confirm whether the main circuit input power is consistent with the rated working voltage of the integrated step-servo motor;

Do not test the integrated step-servo motor for high voltage and insulation resistance at will;

Do not connect the electromagnetic contactor or electromagnetic switch to the output circuit.

Operation

Do not directly touch the output terminals after the integrated step-servo motor is powered on;

When the system is running, the integrated step-servo motor may

have a high temperature rise, do not touch it;

Please confirm the input and output signals to ensure safe operation;

The alarm can be reset only after the operation signal is cut off. Alarm resetting in the running signal state will cause the integrated step-servo motor to restart suddenly;

Do not change the parameter settings of the integrated step-servo motor at will. The parameter modification needs to be performed under standby condition.

Maintenance and Inspection

Do not touch the integrated step-servo motor terminals directly, and some have high voltage, very dangerous;

Before powering up, be sure to install the cover; when removing the cover, be sure to cut off the power supply first;

Before wiring, please confirm whether the input power is off;

After cutting off the main circuit input power and confirming the integrated step-servo motor indicator light has completely extinguished, it can be inspected and maintained;

Do the inspection and maintenance by professional electrical engineer;

Do not do wiring, disassembling or other operation on the terminals during power on.

There is an integrated circuit on the main control board of the servo driver. Please pay full attention when checking to avoid damage caused by static induction.

一、PRODUCT INTRODUCTION

1.1、OUTLINE

ZLAC8015D is a high-performance digital servo driver for hub servo motor. It has a simple structure and high integration, and adds RS485 & CANOPEN bus communication and single-axis controller function.

1.2、FEATURES

■ Adopt CAN bus communication, support CiA301 and CiA402 sub-protocol of CANopen protocol, could mount up to 127 devices. CAN bus communication baud rate range 100-1000Kbps, default is 500Kbps.

■ Adopt RS485 bus communication, support modbus-RTU protocol, could mount up to 32 devices. RS485 bus communication baud rate range 9600-128000Bps, default is 115200bps. (The upper computer only supports 19200-128000bps)

■ Support operation modes such as position control, velocity control and torque control.

■ User can control the start and stop of the motor through bus communication and query the real-time status of the motor.

■ Input voltage: 24V-48VDC.

■ 2 isolated signal input ports, programmable, implement the driver's functions such as enable, start stop, emergency stop and limit.

■ With protect function such as over-voltage, over-current.

1.3、APPLICATION

Suitable for AGV, delivery robot, service robot, automated handling machine, etc.

二、ELECTRICAL, ENVIRONMENTAL INDEX

2.1、ELECTRICIAL INDEX

Driver Parameter	Min value	Typical value	Max value	Unit
Input voltage	20 VDC	36VDC	48VDC	V
Output current(peak)	0	15	30	A
Control signal input current	7	10	16	mA
Over-voltage protection	-	75	-	VDC
Under-voltage protection	-	16	-	VDC
Input signal voltage	-	5	-	VDC
Insulation resistance	20			MΩ

2.2、ENVIROMENTALINDEX

Cooling Type		Natural cooling or forced cooling
Working environment	Application occasion	Avoid dust, oil mist and corrosive gases
	Working temperature	0~50℃
	Max. ambient humidity	90% RH(no condensation)
	Storage temperature	-10~70℃
	Vibration	10~55Hz/0.15mm

2.3、INSTALLATION DIMENSION

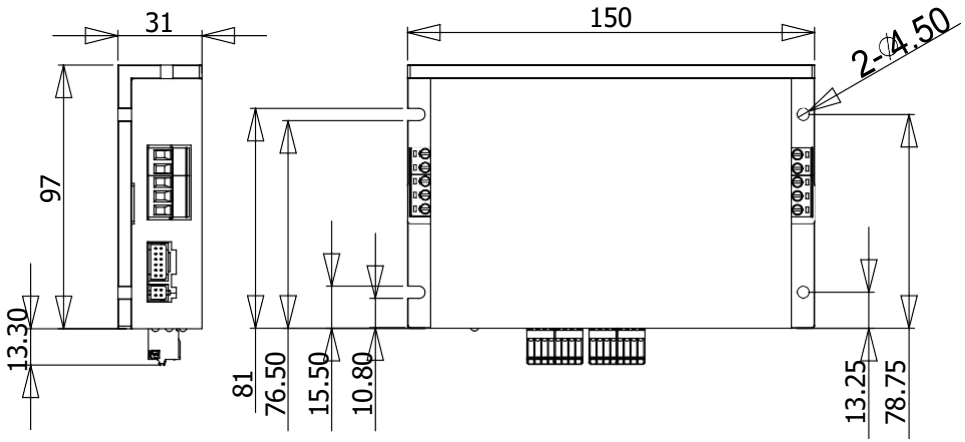


Fig.1 Installation dimension diagram (unit: mm)

2.4、INSTALLATION

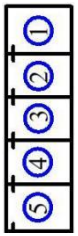
User can use the wide or narrow side of the driver cooled radiator for installation. If installing with wide side, use M3 screws to install through the holes on four corners. If installing with narrow side, use M3 screws to install through the holes on both sides. In order to achieve good heat dissipation, it is recommended to use narrow-side installation.

The power device of the driver will generate heat. If it works continuously under the condition of high input voltage and high power, the effective heat dissipation area should be enlarged or forced cooling. Do not use it in a place where there is no air circulation or where the ambient temperature exceeds 60 ° C. Do not install the driver in a humid or metal debris place.

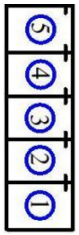
三、DRIVER INTERFACE AND WIRING

3.1、INTERFACE DEFINITION

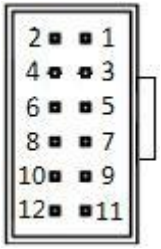
3.1.1、Power wire and power supply input port of left motor

Port	Pin	Mark	Name	Function
	1	DC	Power supply interface	Power supply 24V-48V
	2	GND		
	3	U	Motor power interface	Wire connected to motor
	4	V		
	5	W		

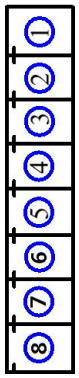
3.1.2、Power wire and power supply input port of right motor

Port	Pin	Mark	Name	Function
	5	GND	Power supply interface	Power supply 24V-48V
	4	DC		
	3	W	Motor power interface	Wire connected to motor
	2	V		
	1	U		

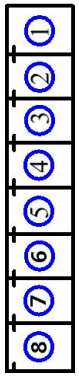
3.1.3、Left/Right motor's incremental encoder and hall port J2/J6

Port	Pin	Mark	Name	Function
	1	iA+	Encoder	
	2	iA-		
	3	iB+		
	4	iB-		
	5	RTC+	Temperature sensor	
	6	RTC-		
	7	V	Hall sensor	
	8	W		
	9	U		
	10	GND	Power ground	
	11	VCC	Power positive	Output to encoder and HALL
	12	GND	Power ground	

3.1.4、Motor control signal portJ3

Port	Pin	Mark	Name	Function
	1	BGND-L	Left brake power-	Left brake control
	2	-BR-L	Left brake-	
	3	BDC-L	Left brake power+/Left brake+	
	4	BGND-R	Right brake power-	Right brake control
	5	-BR-R	Right brake-	
	6	BDC-R	Right brake power+/Right brake+	
	7	OUTPUT1	Internal pull up 5V output	Could be configured via CAN or 485
	8	OUTPUT2		

3.1.5、Motor control signal portJ4

Port	Pin	Mark	Name	Function
	1	AOUT-L	Left motor encoder A	Left motor encoder output signal
	2	BOUT-L	Left motor encoder B	
	3	AOUT-R	Right motor encoder A	Right motor encoder output signal
	4	BOUT-R	Right motor encoder B	
	5	+5V	Encoder +5V power supply +, <100mA	External power output
	6	GND	Encoder +5V power supply -	
	7	INPUT1	Input signal, internally limited 5V input	Could be configured via CAN or 485
	8	INPUT2		

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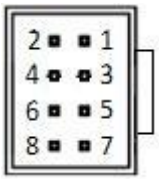
3.1.6、Communication port J5

Port	Pin	Mark	Name	Function
	1	CANH	CANOPEN	
	3	CANL		
	2	A	RS485	
	4	B		
	5	CANH	CANOPEN	
	7	CANL		
	6	A	RS485	
	8	B		

3.2、 CONTROL SIGNAL WIRING

The ZLAC8015D series driver provides two photoelectric isolation programmable input interfaces and common cathode wiring.

Two (J4) programmable input signals are isolated from the external control interface through optocouplers, as shown in the following figure. In order to ensure reliable conduction of the internal optocoupler of the driver, it is required that the driving current provided by the controller end be at least 10mA.

The level pulse width of IN1-IN2 input needs to be greater than 10ms, otherwise the driver may not respond properly. The IN1-IN2 timing chart is shown in Figure 2.

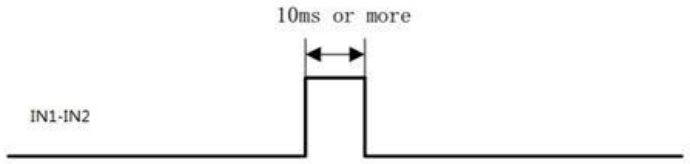


Fig.2 Input interface circuit

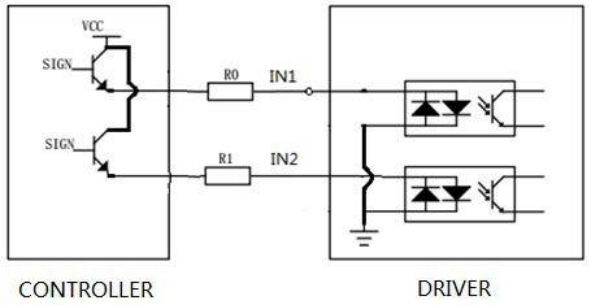


Fig.3 Control signal interface wiring diagram

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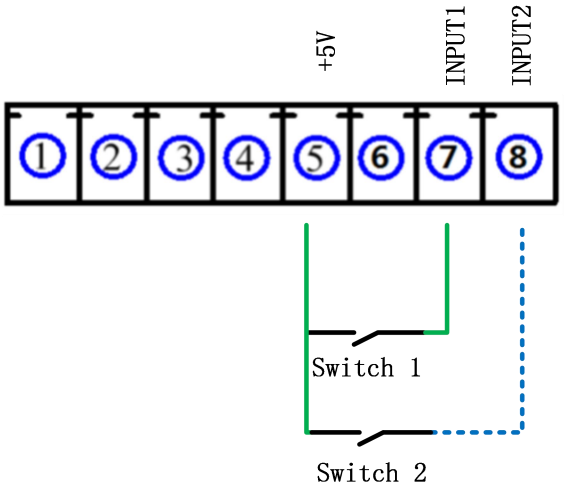

Note: The default input voltage for the control signal level is 5V. Other voltages require adding a current limiting resistor, such as 12V with an external 1K 1/2W resistor, 24V with an external 2K 1/2W resistor.

After each power on of the driver, the input port defaults to an unspecified state, and the input signal is invalid at this time. Users can configure input functions through the bus.

Signal output wiring, such as alarm, in place, etc., can be pulled up to 5V internally or 3.3-24V externally.

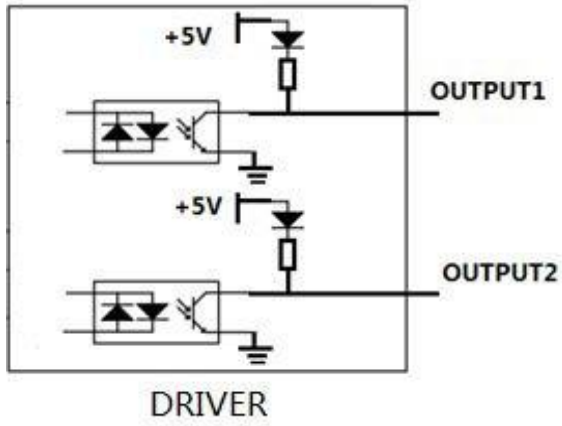

Fig.4 Output interface circuit

There are 2brake circuits, the schematic diagram is shown in Figure 5.

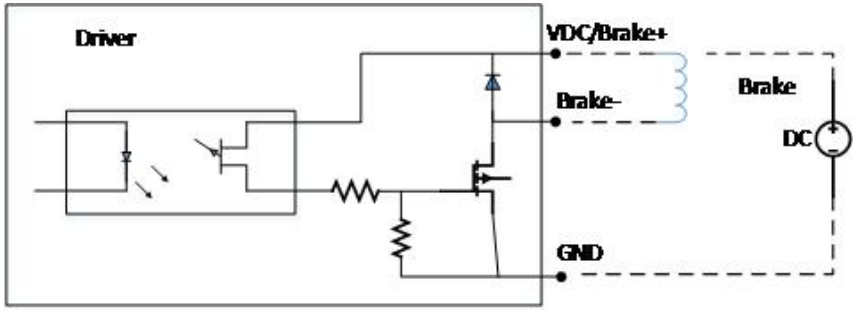

Fig.5 Output interface circuit

3.3、CANOPEN COMMUNICATION PORT DESCRIPTION

ZLAC8015D series driver provides 8PIN communication port. For pin definition, please refer to 3.1.6 Communication Port, which includes CANH, CANL, CANH and CANL. Note: Please use shielded twisted-pair cables for communication cable and make ground connection to ensure stable communication.

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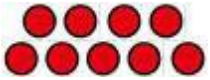
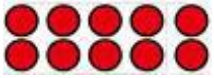
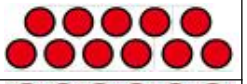
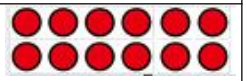
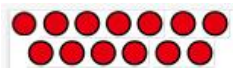
3.4、RS485 COMMUNICATION PORT DESCRIPTION

ZLAC8015D series driver provides 8PIN communication port. For pin definition, please refer to 3.1.6 Communication Port.

Note: Please use shielded twisted-pair cables for communication cable and make ground connection to ensure stable communication.

3.5、STATUS INDICATOR LED

The green LED is the power indicator light. When the driver is powered on, the LED is always on; when the driver is powered off, the LED is off. The red LED is a fault indicator light. When the drive fails, the drive will stop and prompt the corresponding fault code. (For example: Overvoltage, flash the red light once, pause, flash the red light again, and cycle continuously to indicate that the drive enters the overvoltage alarm) The user needs software to clear the alarm before the fault can be cleared.

Status	Situation	Status indicator LED description	
Over-Voltage	The power supply voltage exceeds the maximum rated voltage.	1 Red	
Under-Voltage	The power supply voltage is lower than the minimum working voltage.	2 Red	
Over-Current	Phase current through the motor exceeds short-circuit between phases	3 Red	
Over-Load	The phase current through the motor exceeds the set overload current	4 Red	
Current out-of-tolerance	Control current and output current are out of tolerance		Reserved
Position out-of-tolerance	The given position is out of tolerance with the output position	6 Red	
Speed out-of-tolerance	The given speed and output speed are out of tolerance		Reserved
Internal reference error	Internal fault of the driver	8 Red	
Parameter reading error	EEPROM parameters read error	9 Red	
HALL fault	The HALL cable is not plugged in or the signal is incorrect	10 Red	
High motor temperature	Motor temperature is too high	11 Red	
Encoder error	Check if the motor encoder cable is loose, or pin sequence is wrong	12 Red	
Mixed error	There are at least 2 errors	13 Red	

3.6、BLEEDER

If the user is using a speed exceeding 100 RPM or requires emergency stop, fast stop, and other functions, it is recommended to add a relief circuit in the circuit to prevent damage to the driver or other equipment caused by the back electromotive force generated by excessive speed or emergency stop. (Recommended resistance parameter: 5 Ω 100W, different matching motors, and different matching discharge resistors. If you have any questions, please consult our company) The connection method is shown in the following figure: