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ZLAC8030D

Servo Driver Manual (Special forHub Servo Motor)

【 Please read the manual carefully before using, to avoid to damage the driver 】



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RELEASE NOTES

Version	Update time	Update content	Update person
V1.00		First edition	DHR, LHY

PREFACE

Thanks for choosing ZLAC8030D, the servo driver for hub servo motor.

This manual describes the installation, debugging, maintenance, operation and other aspects of the servo driver ZLAC8030D. 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.

1. Product Introduction

1.1 Outline

ZLAC8030D 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.

2. Electrical, Environmental Index

2.1 Electrical Index

Driver Parameter	Min value	Typical value	Max value	Unit
Input voltage	20 VDC	36VDC	48VDC	V
Output current(peak)	0	30	60	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	18	20		MΩ

2.2 Environmental Index

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

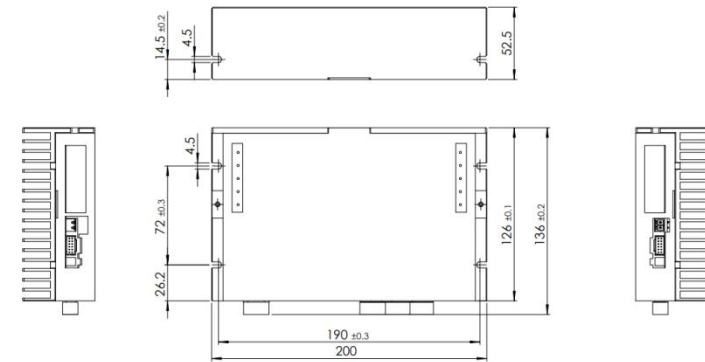


Fig.1 Installation dimension diagram (unit: mm)

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.

3. Driver Interface And Wiring

3.1 Interface Definition

3.1.1 Power supply wire and power cable of left motor

Port	Pin	Mark	Name	Function
	1	W	Motor power cable	Connect Motor power cable
	2	V		
	3	U		
	4	GND	Power supply port	Power supply 24-48V
	5	DC		

3.1.2 Power supply wire and power cable of right motor

Port	Pin	Mark	Name	Function
	1	DC	Power supply port	Power supply 24-48V
	2	GND		
	3	U	Motor power cable	Connect Motor power cable
	4	V		
	5	W		

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

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 port J3

Port	Pin	Mark	Name	Function
	1	BDC	Power supply +	Left brake control
	2	BDC-L	Left brake +	
	3	-BR-L	Left brake -	
	4	BDC-R	Right brake +	Right brake control
	5	-BR-R	Right brake +	
	6	BGND	Power supply -	

3.1.5 Motor control signal port J4

Port	Pin	Mark	Name	Function
	1	OUT+	Internal pull-up 5V output	Output function can be configured via CAN/RS485
	2	OUT-		
	3	IN+	Input signal, internal limit 5V input	Output function can be configured via CAN/RS485
	4	PWM_IN	PWM input(Only	

			emergency stop function is valid. If PWM function is requested, please contact technical team.)	PWM: 10-10KHz Voltage: 0-5V (reserved)
	5	IN-COM	Input common ground	Input common ground
	6	ADC_IN	ADC input	0-5V (reserved)
	7	+5V	Internal+5V power supply +, <100mA	External power output
	8	GND	Internal power supply -	

3.1.6 Communication port J5

Port	Pin	Mark	Name	Function
	1	CANL	CAN	
	2	CANH		
	3	SGND	Communication GND	
	4	A	RS485	
	5	B		

3.1.7 Regen resistor input port (BRK-RES)

Port	Pin	Mark	Name	Function
	1	R+	Regen resistor	Suggested 5-10 Ω, power 100-200W
	2	R-		

3.1.8 Auxiliary power input port(AUX-POWER)

Port	Pin	Mark	Name	Function
	1	GND	Auxiliary power	24V-48V
	2	AUX+		

3.1.9 Left/right motor absolute value encoder port (eRS-L/eRS-R)

Port	Pin	Mark	Name	Function
	1	A	Encoder RS485-A	
	2	VCC	Encoder power +	
	3	B	Encoder RS485-B	
	4	GND	Encoder power ground	

3.1.10 DIP switch (SW)

Port	Pin	Mark	Name	Function
	1	SW1	Dial switch	CAN terminal resistor selection
	2	SW2		RS485 terminal resistor selection

3.2 Control Signal Wiring

3.2.1 Input Signal

The ZLAC8030D series driver provides 2 photoelectric isolation programmable input interfaces and common cathode wiring. 2 (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.

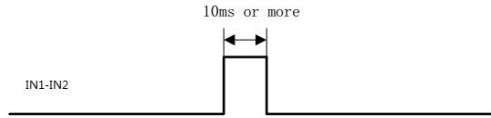


Fig.2 Input interface circuit

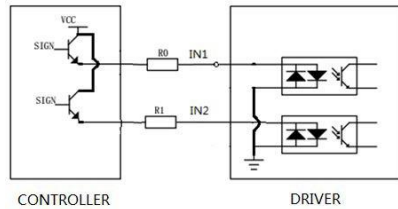
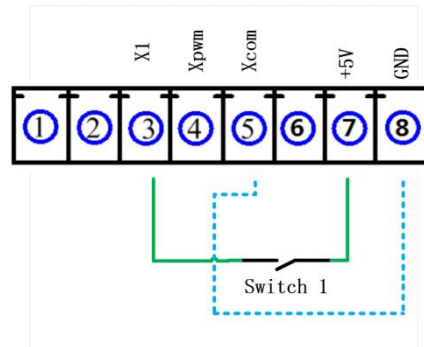


Fig.3 Control signal interface wiring diagram

External emergency stop wiring diagram:



I/O emergency stop processing method (detailed method please refer to CAN or RS 485 protocols.)

0: Lock shaft (Motor stops with holding force)

1: Release shaft (Turning off PWM output signal, motor is under free running status)

3.2.2 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.

3.2.3 Output signal

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

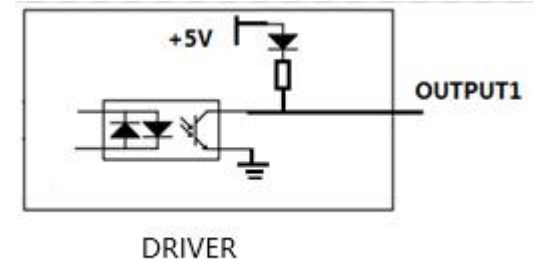


Fig.4 Output port circuit

2 circuit brake circuit's schematic diagram is as shown in Figure 5.

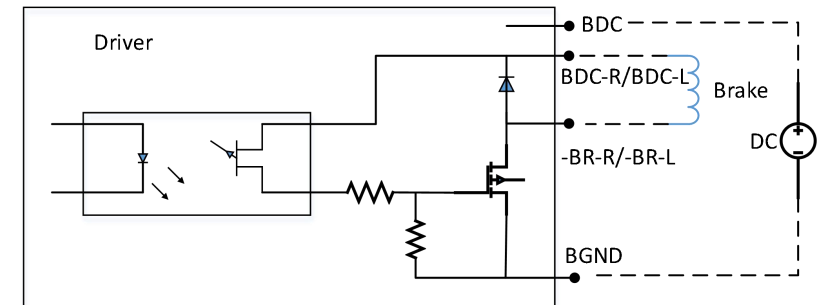


Fig.5 Brake circuit

3.3 CANopen Communication Port Description

ZLAC8030D series driver provides 5PIN communication port. For pin definition, please refer to 3.1.6 Communication Port, which includes CANH, CANL, and SGND. Note: Please use shielded twisted-pair cables for communication cable

and make ground connection to ensure stable communication.

3.4 RS485 Communication Port Description

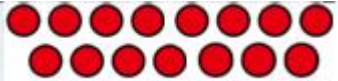
ZLAC8030D series driver provides 5PIN communication port. For pin definition, please refer to 3.1.6 Communication Port, which includes A, B, and SGND.

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

3.5 Status Indicator LED

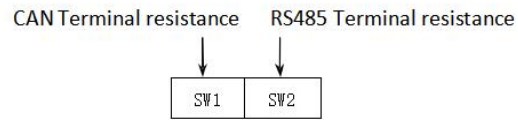
The green LED is the power indicator light. When the driver is powered on, the LED is always on; when the driver is powered off, the LED is off. The red LED is an error indicator light. When the driver fails, driver will stop and prompt the corresponding fault code. (For example: For overvoltage error, the red light flashes once, pauses, flashes again, pauses again continuously. It indicate that the driver is in overvoltage error state). In this case the user needs to use software or command to clear the error.

Status	Situation	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	
High driver temperature	Driver temperature is too high	13 Red	
Speed setting error	The given speed exceeds the set rated speed	14 Red	
Mixed error	There are at least 2 errors	15 Red	

4. DIP Switch Setting

ZLAC8030D driver uses a 2-digit DIP switch to set RES-SW. The details are as follows:



4.1 Terminal Resistance Setting

User can select whether to incorporate a 120 Ω -terminal resistor through this bit. According to the application, it is generally determined that only the master terminal and the last slave need to connect a 120 Ω terminal resistor.

CAN:

SW1 = OFF, invalid;

SW1 = ON, effective.

RS485:

SW2 = OFF, invalid;

SW2 = ON, effective.

4.2 Regen Resistor

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 regen resistors. If you have any questions, please consult our company)