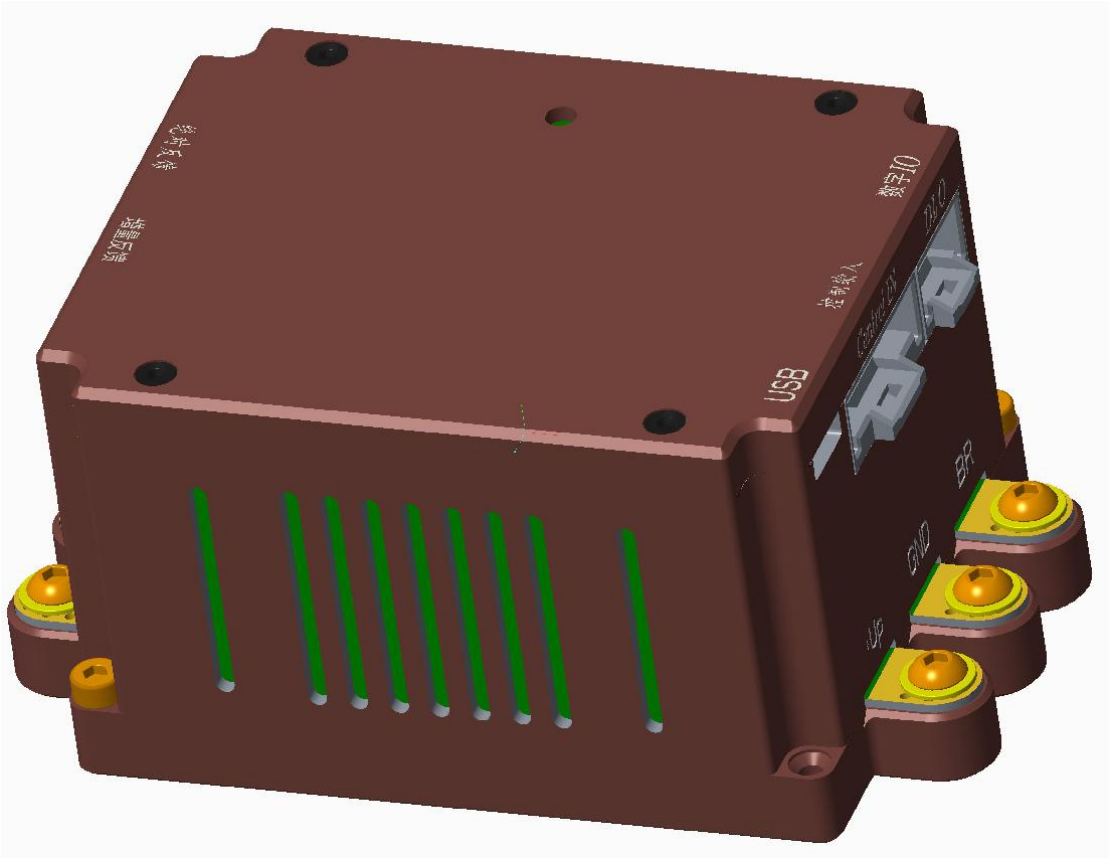
Catalogue of Servo Controller

(CAN Bus Control)



Assun Motor Pte Ltd

2020

1. Specification

Model			Servo Controller (CAN Bus Control)				
			AM-SOD-01-03-MAAS	AM-SOD-02-06-MAAS	AM-SOD-05-10-MAAS	AM-SOD-10-20-MAAS	AM-SOD-15-30-MAAS
Dimension (mm)			93.9*57*43.5				
Weight (g)			225				
Fundamental Specs	Output Rated Current (Continuous, RMS)		1 A	2 A	5 A	10 A	15 A
	Output Max. Current (Intermittent, RMS)		3 A	6 A	10 A	20 A	30 A
	Input Power Supply Voltage Range		12 VDC~48 VDC (Usually according to Motor Rated Voltage)				
	Overload Recognition Time		3 s				
	Overload Trip Reset Delay		30 s				
	Working Frequency		8khz ~ 34khz				
Rated Electric Insulation			Under DC voltage 1000V from input/output to housing, current leakage smaller than 3mA				
Total Electric Resistance			≥1MΩ（Temp. 40℃, RH 95%, no condensing water）				
Mean Time Before Failure （MTBF）			≥8000 Hrs				
Power Control			For BLDC & Servo Motor: SVPWM, Square Wave For Brushed Motor: Bipolar PWM				
IP Level			IP20				
Cooling Type			Requires auxiliary cooling				
Connection Portal Info	Analogue Voltage Input Portal		N/A				
	Digital IO Input Portal		4 Channel (5VDC~24VDC), hardware default in high voltage level when not connected. Detail control functions can be set and adjusted by changing parameters.				
	Digital IO Output Portal		4 Channel (All four channels are open collector output, highest voltage at 30V; First three channels have max. continuous current of 0.25A, and last channel has max. continuous current of 2A)				
	Direction + Pulse		N/A				
	Feedback Type		Electromagnetic/Optical Incremental Encoder; SSI Absolute Encoder; RS 485 Absolute Encoder				
Basic Function	Application Mode		Position Closed-loop Control / Speed Closed-loop Control / Torque Closed-loop Control				
	Preparation Time		Power on and no malfunction, controller ready in 3 seconds				
	Hardware Protection Threshold	Under Voltage	9v				
		Over Voltage	80v				
		Over Current	Over Current Protection				
		Overheat	85℃ Automate Alarm and Shut Down				
		Power Switch	Equipped power switch to turn on or off the motor.				

Model			Servo Controller (CAN Bus Control)
Basic Function	Software Protection	Malfunction Lock	Automate slow down and stop when detect malfunction, and lock the malfunction for inspection.
		Over Load	When current is continuously over Max. continuous current for 10 seconds, default to alarm for malfunction.
		Over Current	Monitor real time current value, immediate cut off motor output when current over the pre-set value.
		Differential Protection	Current or speed setting and feedback differential protection
	Digital IO	Input	Multiplex the following functions by adjusting parameters: Servo start, zero-speed position clamp, emergency shut down, origin point signal, positive position limit, negative position limit.
		Output	Multiplex the following functions by adjusting parameters: Power supply under voltage, position abnormal, hall feedback abnormal, over current, over load, driver overheat, current differentiate, speed differentiate, power supply over voltage, servo ready, servo operation, zero speed arrival, targeted speed arrival, targeted position arrival, brake output, origin point recover finish, error alarm, negative stall, positive stall, negative indicate.
	Communication Portal	USB	Usually for Commissioning (also support host computer control)
		CAN	CANOPEN 301 + DS402(Default node id: 0x08,500kbps)
		RS422/485	MODBUS RS422/485(ASCII/RTU) (Default node id: 0x08,57600bps,8,1,N,N,)
		Transmission Distance	≥100 Meters
Torque Control	Step Response		Rise time≤1.5ms；Over tune≤5%；Shock ≤2 times
	Current Closed Loop Control		≥1KHz
	Speed Limitation		Parameter Limits
Speed Control	Speed Feedback		Based on Encoder
	Encoder Power Supply		+5V±2%/500mA
	Speed Ratio		≥3000 : 1
	Step Response		Rise time≤40ms；Overtune≤15%；Shock≤2.5 times
	Sinusoidal Band Response		≥500Hz
	Static Error Rate		≤0.4%（In speed 1000RPM, rated torque load）
	Speed Fluctuation Rate		≤0.6%
	Linearity		≤0.45%
Position Close-Loop Control	Highest input pulse frequency		N/A
	Pulse command mode		N/A
	Command control mode		RS422/485 Modbus Communication; CAN Bus Control
	Electronic gear ratio		Electronic Gear N/M, N: 1 ~ 65535, M: 1 ~ 65535 (parameter setting)
	Torque Limit		(Parameter Setting)
Environment Requirements	Operation Temp.		-30℃ ~ +60℃
	Storage Temp.		-30℃ ~ +65℃
	Relative Humidity		0% ~ 90%RH （No condensing）
	Vibration Requirements		Frequency 5Hz to 25Hz, amplitude with 1.6mm; Frequency 25Hz to 200Hz, Acceleration within 1.2g, time within 30min

2. Connection Portal Definition

2.1 Communication Portal—Control IN

(1) USB Communication

Comply USD 2.0 Standard (Full Speed)

Micro USD connection adopted as the common configuration tool for servo controller.

Note: Use standard communication interface, cable length is recommended not to exceed 3m.

(2)

CAN Communication：CIA301 + DS402 protocol control, default node at 0x08,500kbps.

RS422/485 Communication: MODBUS protocol, default node at 0x08, RTU mode, 57600 baud rate, 8 data digit, 1 stop digit, no check digit, no flow control.

Pin	Name	Remark
1	Preserved	Preserved
2	Preserved	Preserved
3	Preserved	Preserved
4	Preserved	Preserved
5	Preserved	Preserved
6	Preserved	Preserved
7	Preserved	Preserved
8	Preserved	Preserved
9	CANH	CAN Communication
10	CANL	CAN Communication
11	GND	Communication Ground
12	GND-	Communication Ground
13	RS422 TX+	RS 422
14	RS422 TX--	RS 422
15	RS422 RX+	RS 422
16	RS422 RX-	RS 422

17	RS 485A	RS 485
18	RS 485B	RS 485

Note: RS 422 communication TX and RX is based on the controller itself for reference; For CAN and RS422/485 communication, there is no 120Ω resistor installed, need to be added if required.

Note: It is recommended to use a wire harness with tinned copper braid (twisted pair) for the communication cable, and the cross-sectional area of the copper core wire is not less than 0.5mm²

2.2 Digital I/O Pin---I/O

Pin	Name	Remark
1	DI 0	Digital input 0
2	DO 0	Digital output 0
3	DI 1	Digital input 1
4	DO 1	Digital output 1
5	DI 2	Digital input 2
6	DO 2	Digital output 2
7	DI 3	Digital input 3
8	DO 3	Digital output 3
9	DI_COM+	Common reference positive for digital IO input (input loop positive)
10	DO_COM-	Common reference negative for digital IO output (input loop negative)

Note: It is recommended to use a wire harness with tinned copper braid (twisted pair) for the communication cable, and the cross-sectional area of the copper core wire is not less than 0.5mm²

（1）Digital input pin DI0-DI3

Digital input pin DI0-DI3 (optocoupler isolation), please supply signal via relay or collector open circuit transistor;

When use connection point input, please use minor current, in case the relay has intermittent connections.

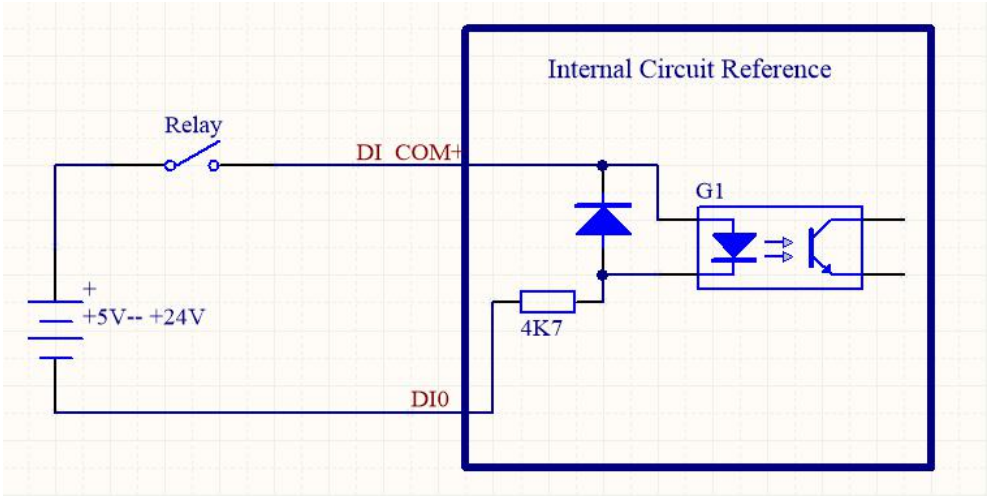
Digital input connection voltage range: 5V~24V, when lower than 3.3V, will recognize as low voltage level.

Inside the digital input connection there are 10KΩ resistance in series, please don't use the big current power supply to connect directly.

Circuit reference 1.

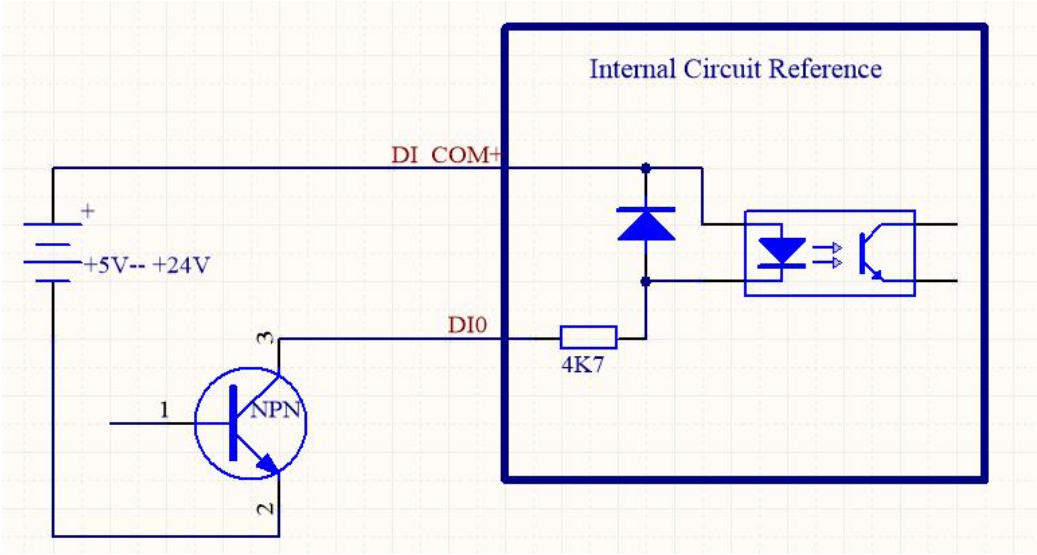
When switch open, controller detect high voltage level;

When switch close, controller detect low voltage level;



Circuit reference 2.

When outer control triode open, controller detect high voltage level; When triode close, controller detect low voltage level.



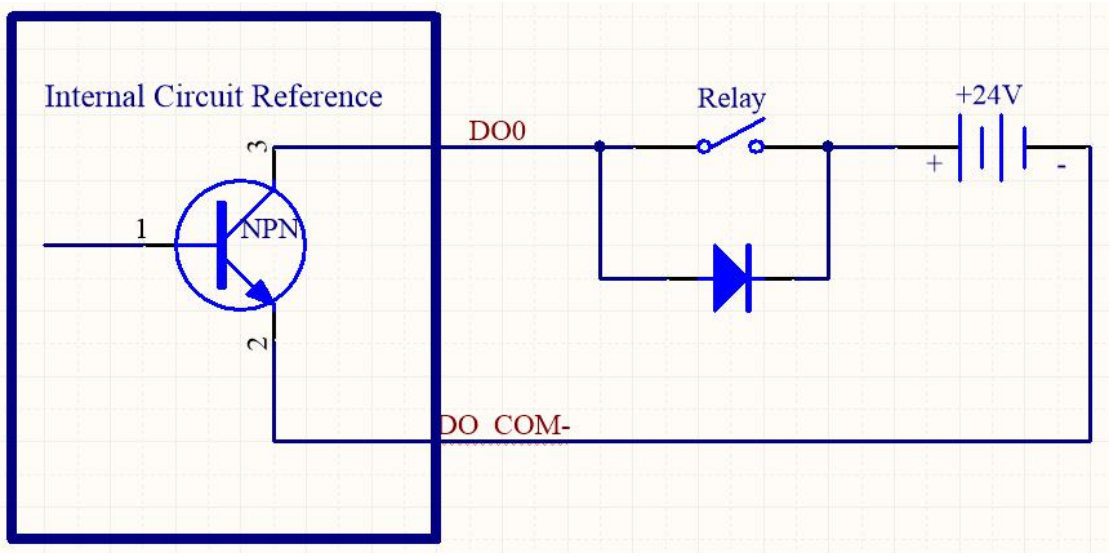
(1) Digital output pin DO0-DO3
Output circuit is open circuit collector output. Connected to relay or optocoupler. When receiving output signal via logic circuits like gates, please pay attention to avoid the noise impact.

The first circuit of optocoupler current recommended to be 10 mA.

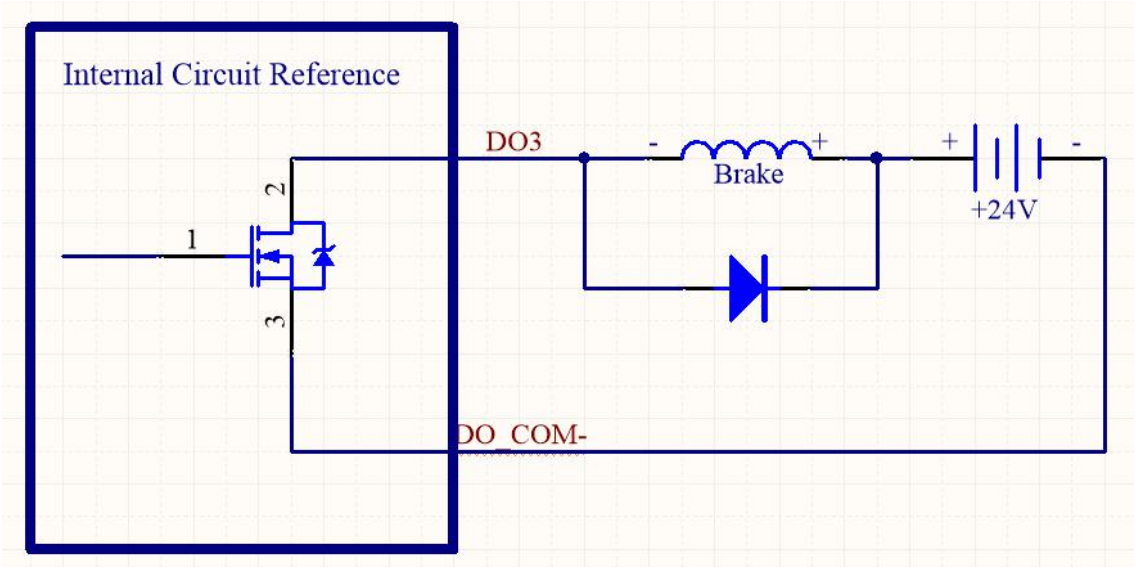
DO0-DO2: output collector open circuit triode voltage highest 30V, continuous current 250mA. Please pay attention to the current when using a relay control.

DO3: Output drain open circuit moss tube voltage highest 40V, continuous current 1A. This output pin is suitable for configuring outside brake. No need to connect relay.

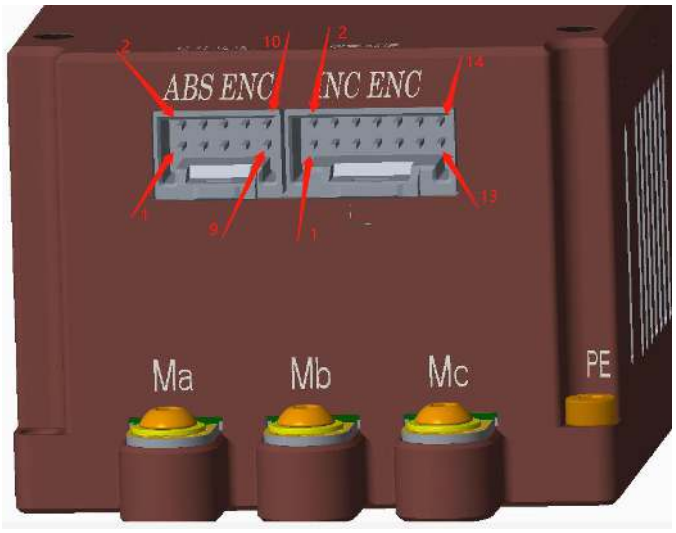
Circuit reference 1.



Circuit reference 2.



2.3 Encoder Connection



(1) Incremental encoder—INC ENC

Pin	Name	Remark
1	HALL B	Motor Hall Signal B
2	HALL A	Motor Hall Signal A
3	HALL C	Motor Hall Signal C
4	GND	+5V Power Supply Negative
5	+5V	+5V Power Supply Positive
6	+5V	+5V Power Supply Positive
7	GND	+5V Power Supply Negative
8	Not in Use	Preserved
9	A-	Incremental encoder A channel pulse input opposite direction end
10	A+	Incremental encoder A channel pulse input same direction end
11	B-	Incremental encoder B channel pulse input opposite direction end
12	B+	Incremental encoder B channel pulse input same direction end
13	Z-	Incremental encoder Z channel pulse input opposite direction end
14	Z+	Incremental encoder Z channel pulse input same direction end

Note: Support encoders with differential or without differential. For encoder without differential, connect to A+, B+ and Z+.

Note: It is recommended to use a wire harness with tinned copper braid (twisted pair) for the communication cable, and the cross-sectional area of the copper core wire is not less than 0.15mm^2

(2) Absolute encoder (SSI) portal, RS 485 absolute series data portal—ABS ENC

Pin	Name	Remark
1	SDATA+	RS 485 absolute data signal+
2	+5V	Encoder power supply positive
3	GND	Encoder power supply negative

4	SDATA-	RS 485 absolute data signal-
5	CLK+	SSI absolute clock signal+
6	CLK-	SSI absolute clock signal-
7	NSL+	SSI absolute chip select signal+
8	NSL-	SSI absolute chip select signal-
9	DATA+	SSI absolute data signal+
10	DATA-	SSI absolute data signal-

Note: It is recommended to use a wire harness with tinned copper braid (twisted pair) for the communication cable, and the cross-sectional area of the copper core wire is not less than 0.15mm²

2.4 Power Supply Portal

Note: It is recommended to use high-temperature wear-resistant multi-strand copper core for power cables, and a tinned copper braided wire harness, the cross-sectional area of the copper core wire is not less than 2~3mm²

Power supply positive to +Up

Power supply negative to GND

2.5 Regenerative parts

Note: It is recommended to use high-temperature wear-resistant multi-strand copper core for power cables, and a tinned copper braided wire harness, the cross-sectional area of the copper core wire is not less than 0.6~2mm²

Power supply positive to +Up

Regenerative parts to BR

When motor change from high speed to low speed, it will be in regenerative state (power supply voltage rise up high), thus a regenerative resistance will be proposed to balance the extra voltage.

When use regenerative resistor, connect it between +UP and BR. Before using this function, must use commissioning software to configurate and activate the function.

2.6 Motor Phase Connection Portal

Note: It is recommended to use high-temperature wear-resistant multi-strand copper core for power cables, and a tinned copper braided wire harness, the cross-sectional area of the copper core wire is not less than 2~3mm²

Motor phase and controller phase connection table

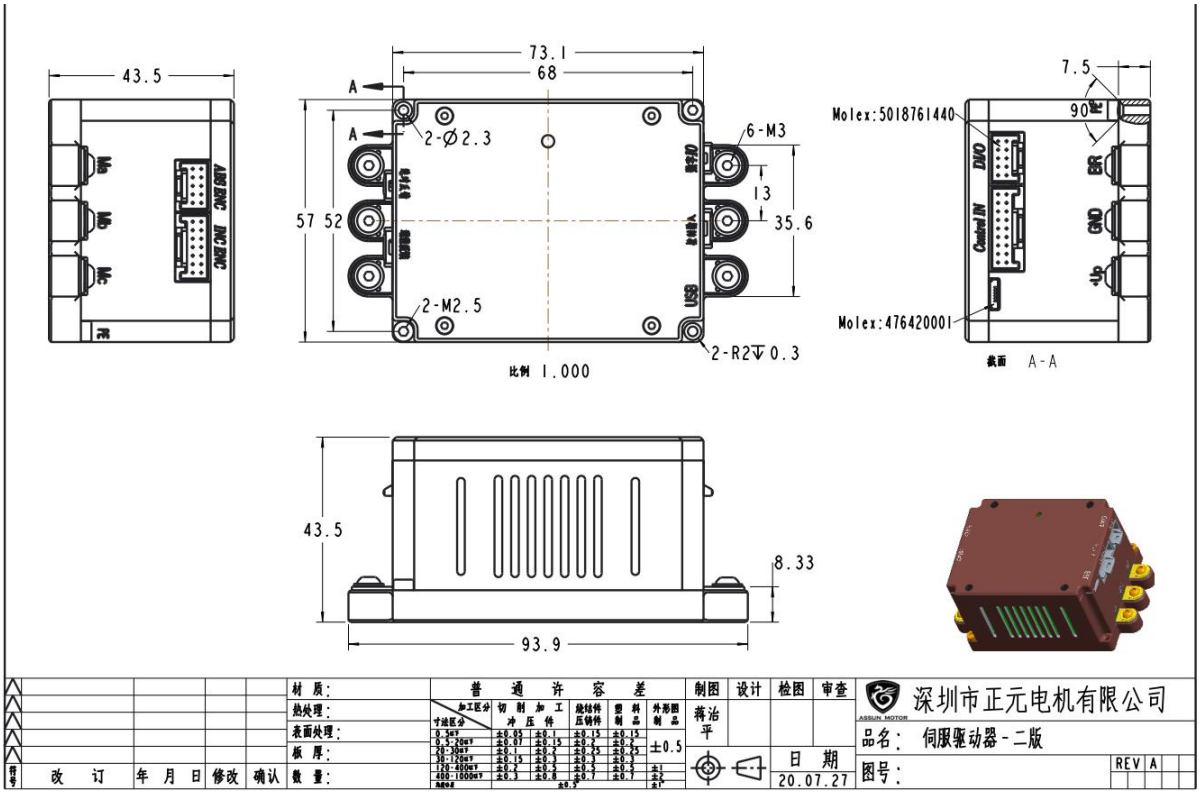
Motor Phase	Controller Phase Connection
U	Ma
V	Mb
W	Mc

Above are the phase connection of servo controller.

Note: For DC brushed motor, only connect Ma and Mc.

3. Product outlook

4. Product Dimension



5、★★Attention★★

5.1、Connection

(1) The positive and negative (+, -) polarity of servo driver must be correct, otherwise it may lead to rupture or damage, causing irreversible damage

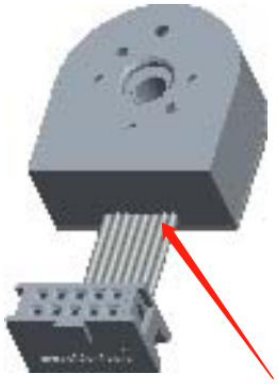
(2) The terminal should not be connected wrongly, otherwise it may be broken or damaged

(3) The user must make correct wiring (can communication, RS422 / 485, direction + pulse, analog input and other external communication interfaces) according to the hardware manual of the selected model

5.2、Use

(1) The power phase line of the motor cannot be installed in the same cable as the feedback line (Hall line and encoder line), otherwise, abnormal signal feedback may occur during the control process

(2) , as shown in the following figure: when installing the motor on the equipment, a certain length of cable (more than 20 mm recommended) outside the encoder outlet end must be fixed on the motor to prevent frequent pulling of the cable at the encoder outlet end during the motor movement, which will cause irreversible damage to the encoder line in serious cases



(3) Servo driver, hollow cup motor and encoder are precision instruments and equipment. Do not let them fall or suffer strong impact

5.3. About wiring and terminal model

(1) For the matching servo driver + motor: the wiring between the driver and the motor is all connected by default (the length is more than 200 mm), and all the parameters are matched. After the user gets it, he only needs to do application development

(2) For the communication cables between servo driver and external equipment, a certain number of cables will be provided by default

(3) Terminal model involved:

5016461000 (Brand: MOLEX, 10PIN)

5016461400 (Brand: MOLEX, 14pin)

5016461800 (Brand: MOLEX, 18pin)

5016471000 (Brand: MOLEX, metal contact)

Up、GND、BR、Ma、Mb、Mc : Inner diameter: 3mm, outer diameter: 6mm, with red insulating plastic sleeve