



**Shihlin Electric**

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# AC Servo System

SDA Series 100W~3.5KW



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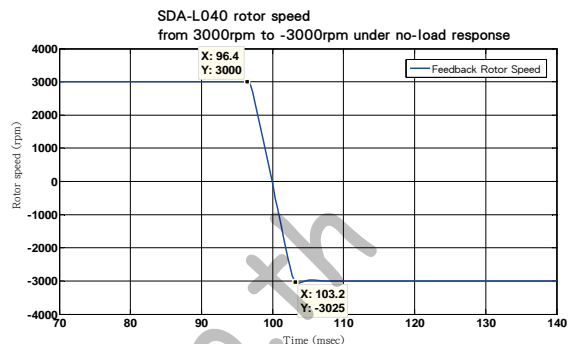
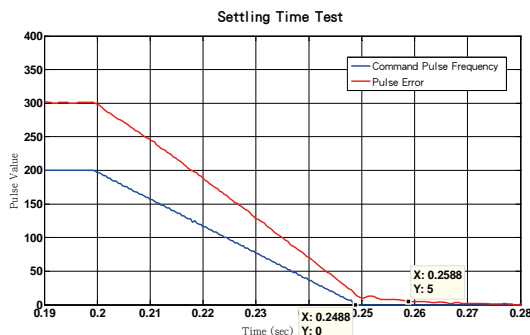
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## Features

### High speed and high-accuracy

- High speed frequency response amplifiers (490Hz) and high command settling time (less than 1.0ms).
- At no load situation, when the motor speed is between 3000rpm to -3000rpm, the accelerate time is 6.9ms.



Test example of 400W

### Multiple control modes for various applications

- Position control mode, speed control mode, torque control mode, and single-axis position control mode.
- Different control modes could be set as hybrid mode via switching I/O.

### Built-in single-axis control mode

- Build-in linear and S curve acceleration/deceleration parameters.
- Build-in linear and S curve acceleration/deceleration parameters.
- Various home position return modes.

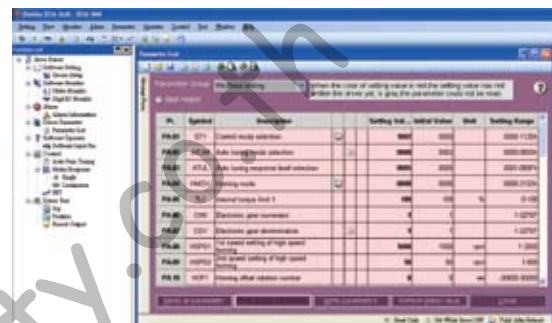
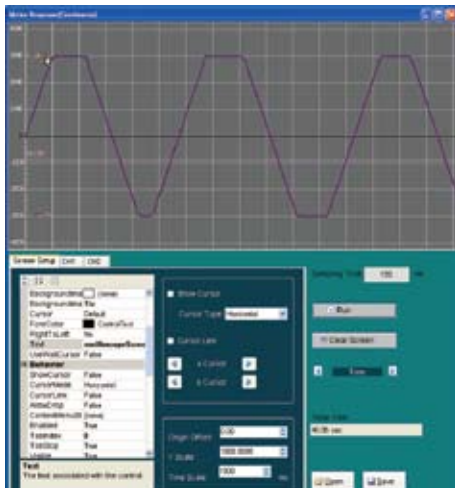
### Modbus communication and USB interface

- Support Modbus communication protocol.
- Support USB communication.
- RS232/RS485 interface.
- Support baud rate from 4800 to 115200 bps.



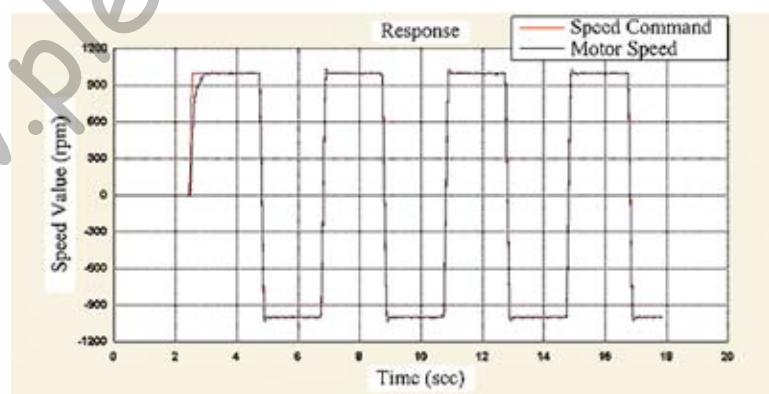
## Highly potent servo software

- A variety of functions are available for the customers.
- Status monitoring.
- Parameter data reading and writing; file reading and saving, output printing.
- Digital I/O monitoring and internal digital input controlling.
- Jog testing and position testing.
- Automatic inertia estimation and gain calculation.
- FFT resonance sweep function.
- Oscilloscope long-term status capturing function.



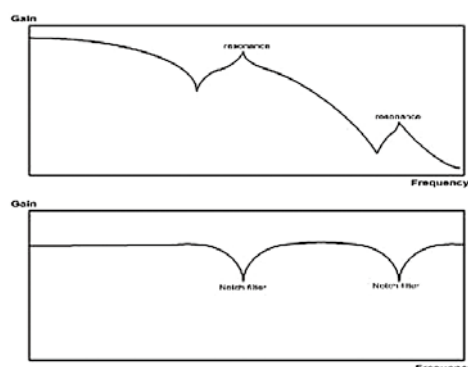
## Auto tuning function

- There is an automatic on-line control theory to achieve a stable control.



## Mechanical resonance filter setup

- The user can set up two mechanical resonance points to suppress mechanical vibration.



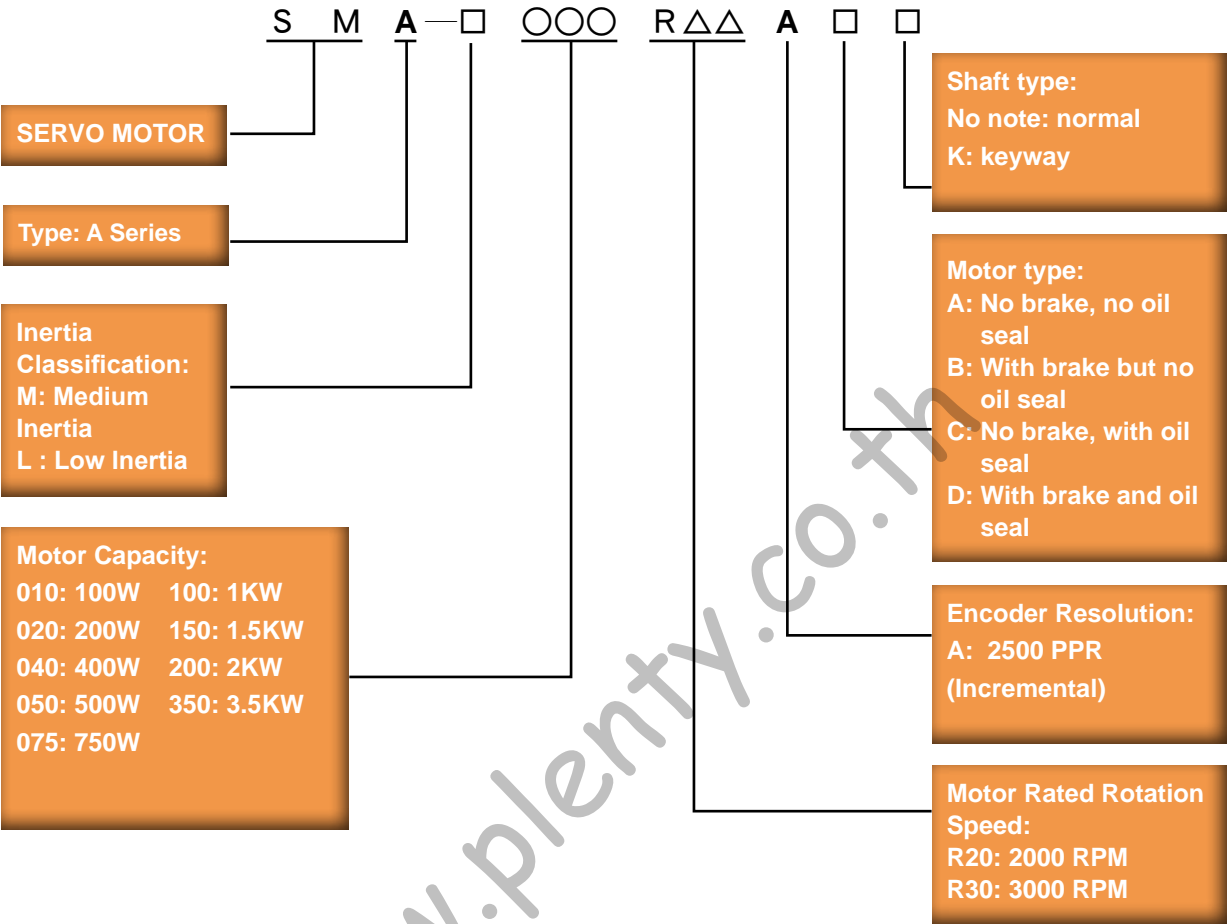
## CE certification

- EMC
  - IEC 61800-3
  - IEC 61800-4
- Safety
  - IEC 61800-5-1

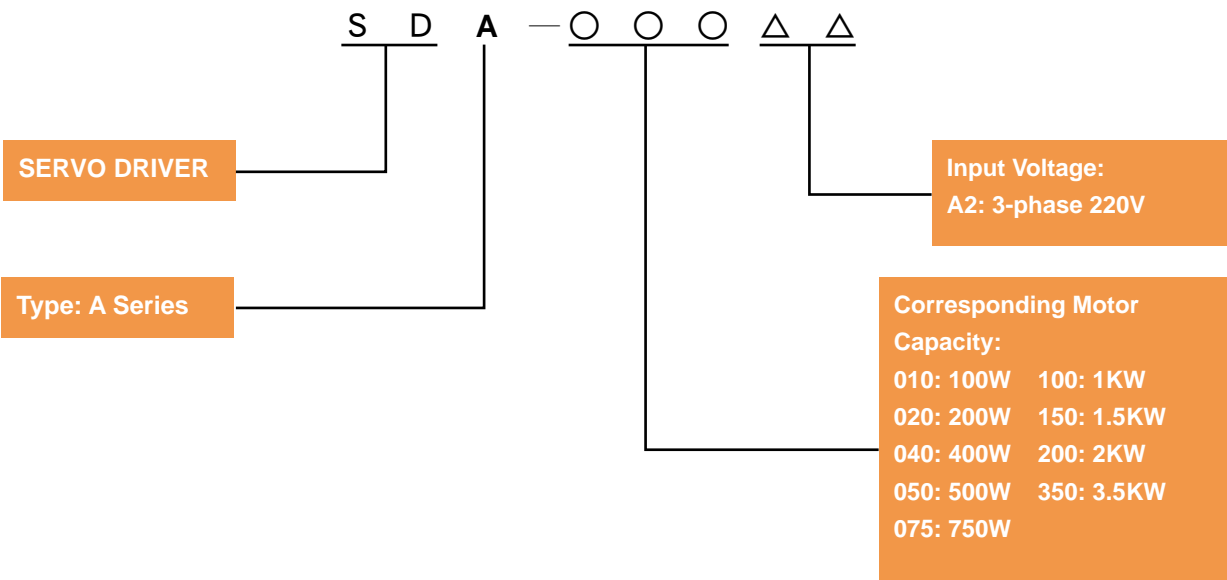


# Model Description




■ Servo Motor



■ Servo Amplifier



## Product Corresponding Table

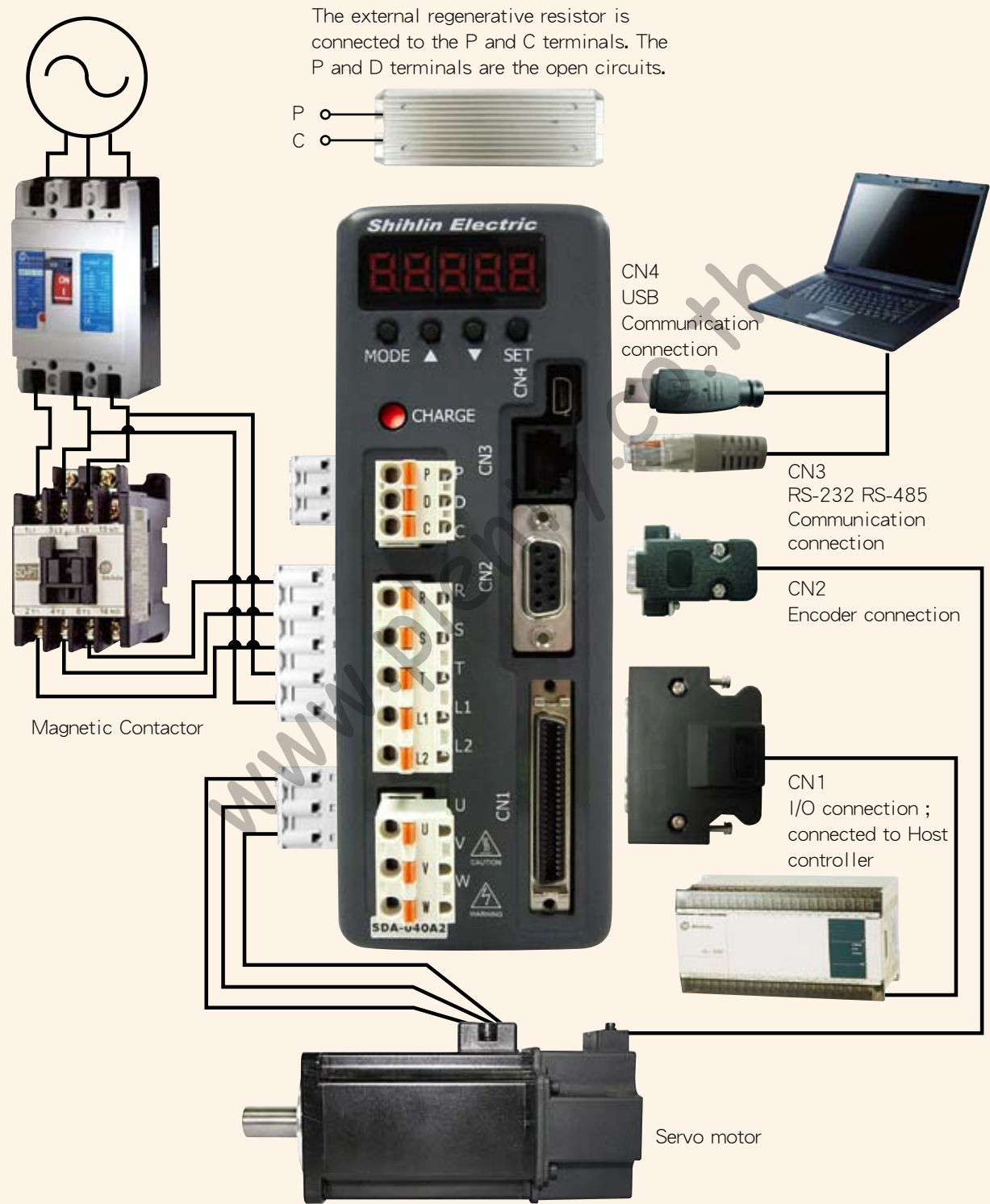
Servo Amplifier									
Capacit	100W	200W	400W	500W	750W	1KW	1.5KW	2KW	3.5KW
Model	SDA-010A2	SDA-020A2	SDA-040A2	SDA-050A2	SDA-075A2	SDA-100A2	SDA-150A2	SDA-200A2	SDA-350A2
Appearance									

Servo Motor						
Low Inertia	Capacit	100W	200W	400W	750W	
	Model	SMA-L010R30AA	SMA-L020R30AA	SMA-L040R30AA	SMA-L075R30AA	
	Appearance					
Medium Inertia	Capacit	500W	1KW	1.5KW	2KW	3.5KW
	Model	SMA-M050R20AC	SMA-M100R20AC	SMA-M150R20AC	SMA-M200R20AC	SMA-M350R20AC
	Appearance					

# Connections with Peripheral Equipment

Power Supply:

3 phase 200V to 230V



# Servo Amplifier Appearance and Panel Descriptions

## Power Indicator Light:

If the light is on, it indicates that the servo amplifier still has a high voltage.

## Internal/External Regenerative Resistor :

- When using the external regenerative resistor, connect P and C terminals to the resistor, and make P and D the open circuits.
- When using the internal regenerative resistor, make P and C terminals the open circuits, and make P and D terminals the short circuits.

## Main Circuit Power :

Connect R, S, and T to commercial electrical power of AC 200 – 230V and 50/60Hz.

## Control Circuit Power :

L 1 and L 2 for single -phase AC 200 – 230V , 50/60 Hz Power Supply

## Servo Motor Output :

Connect to U, V , and W ports of the motor power. C cannot be connected to the main circuit power. Wrong connection can cause servo amplifier damages.

## Heatsink :

Fix the servo amplifier and heatsink the temperature.

## LED Display :

The 5-digit, 7-segment LED displays the alarm code, servo status, parameters, etc

## Operation Panel :

Operation status includes setups for function, parameter, etc.  
 MODE : Mode options  
 ▲ : Increase value on the display panel  
 ▼ : Decrease value on the display panel  
 SET : Set: To set data

## USB Connection :

Connect to PC and servo amplifier.

## RS-232 / RS-485

Connection :  
 Connect to PC and servo amplifier

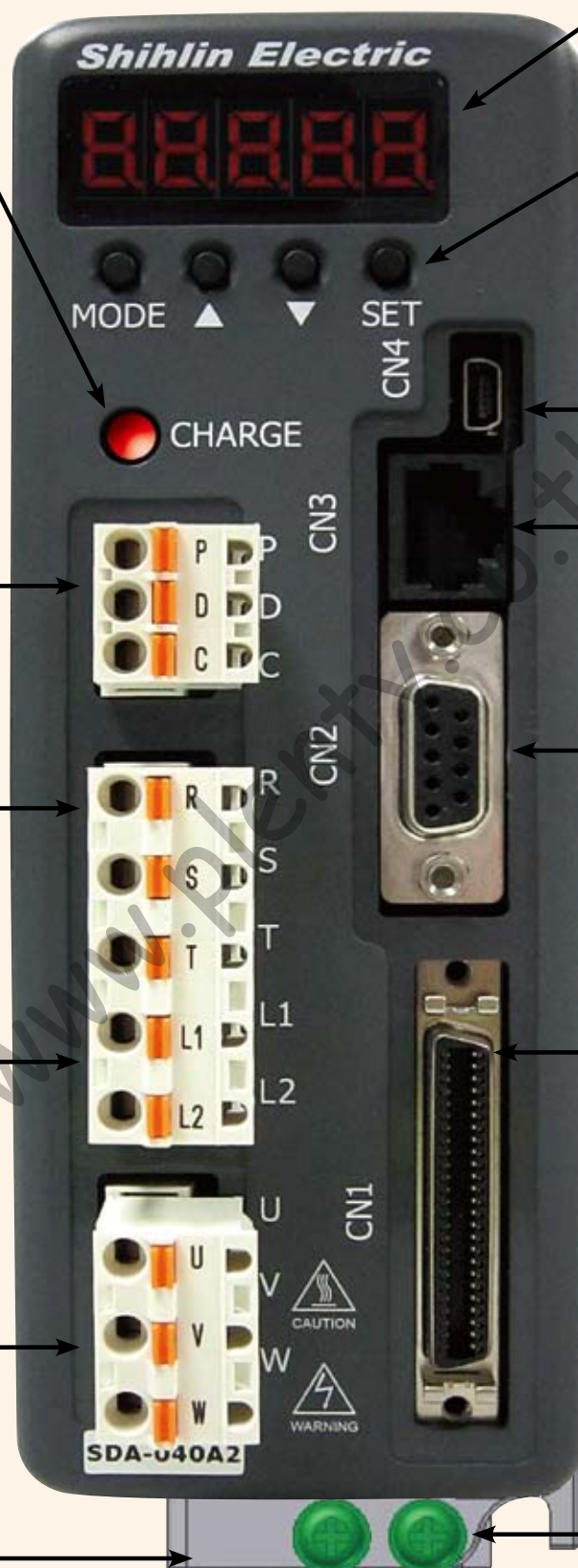
## Encoder Connector :

It is to connect to the encoder of servo motor.

## Control Connection :

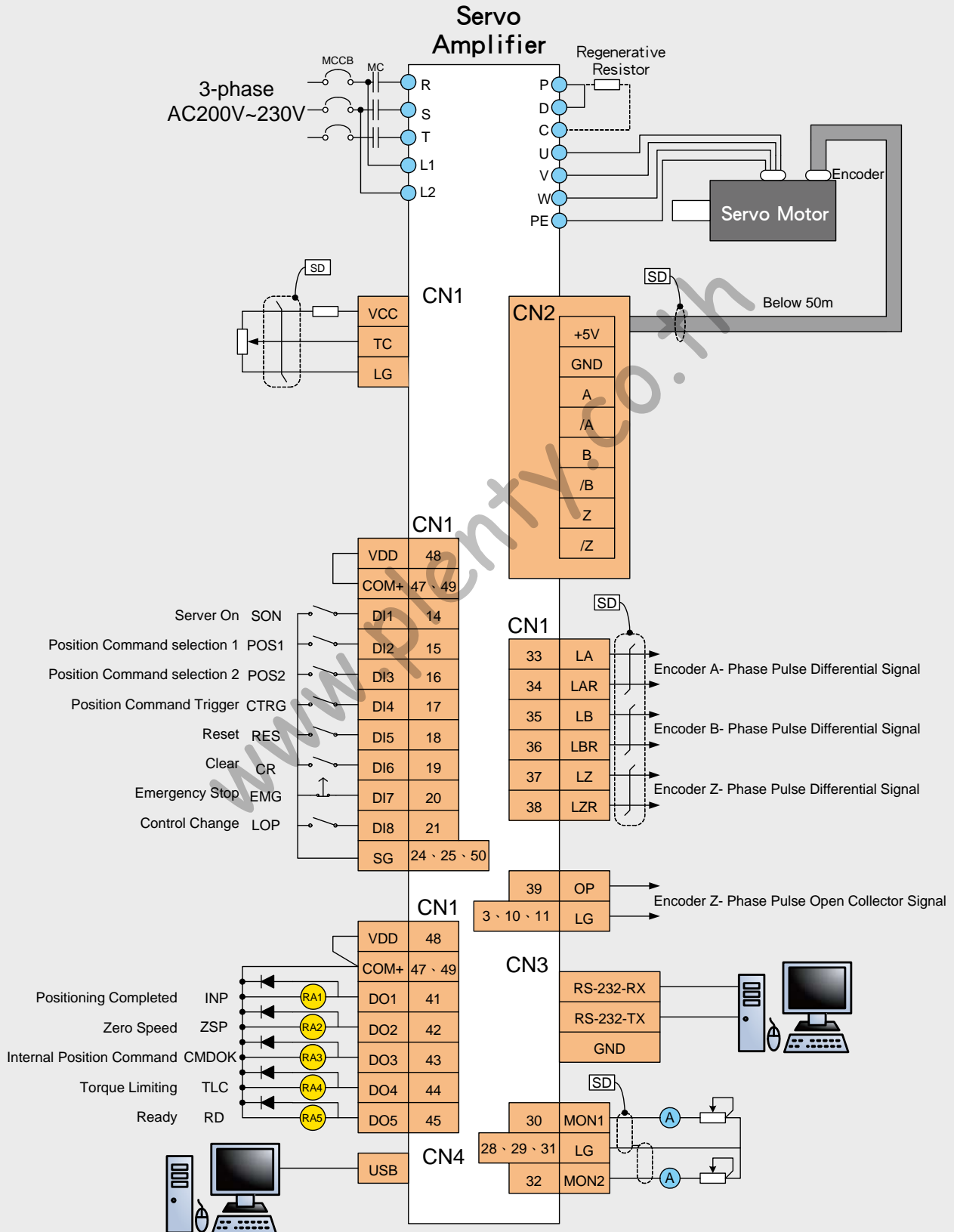
Can be connected to the external control I/O connector or to the PLC .

## Ground

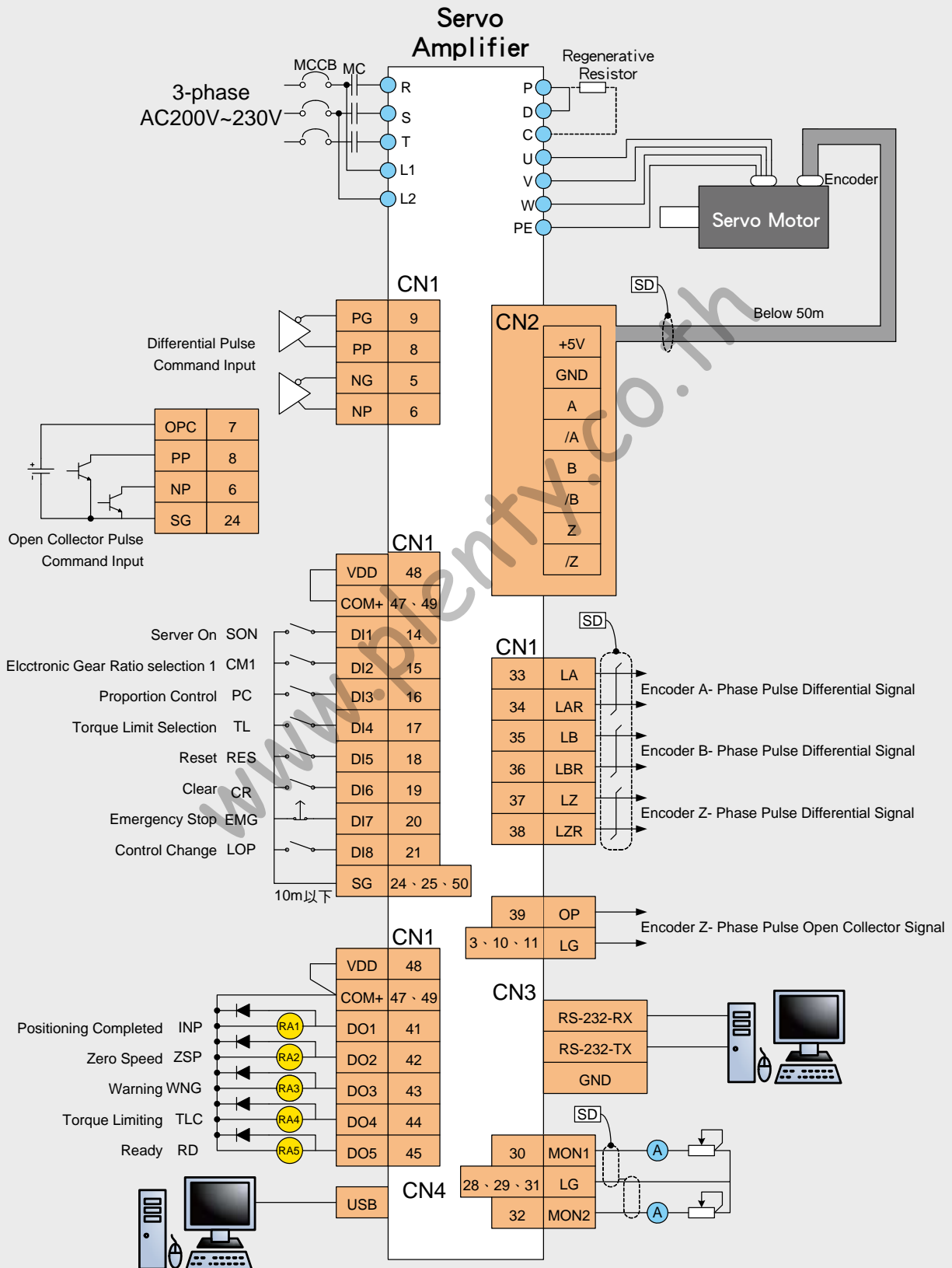


# Standard Wiring Diagram

## ■ Built-in single-axis position control (PR)

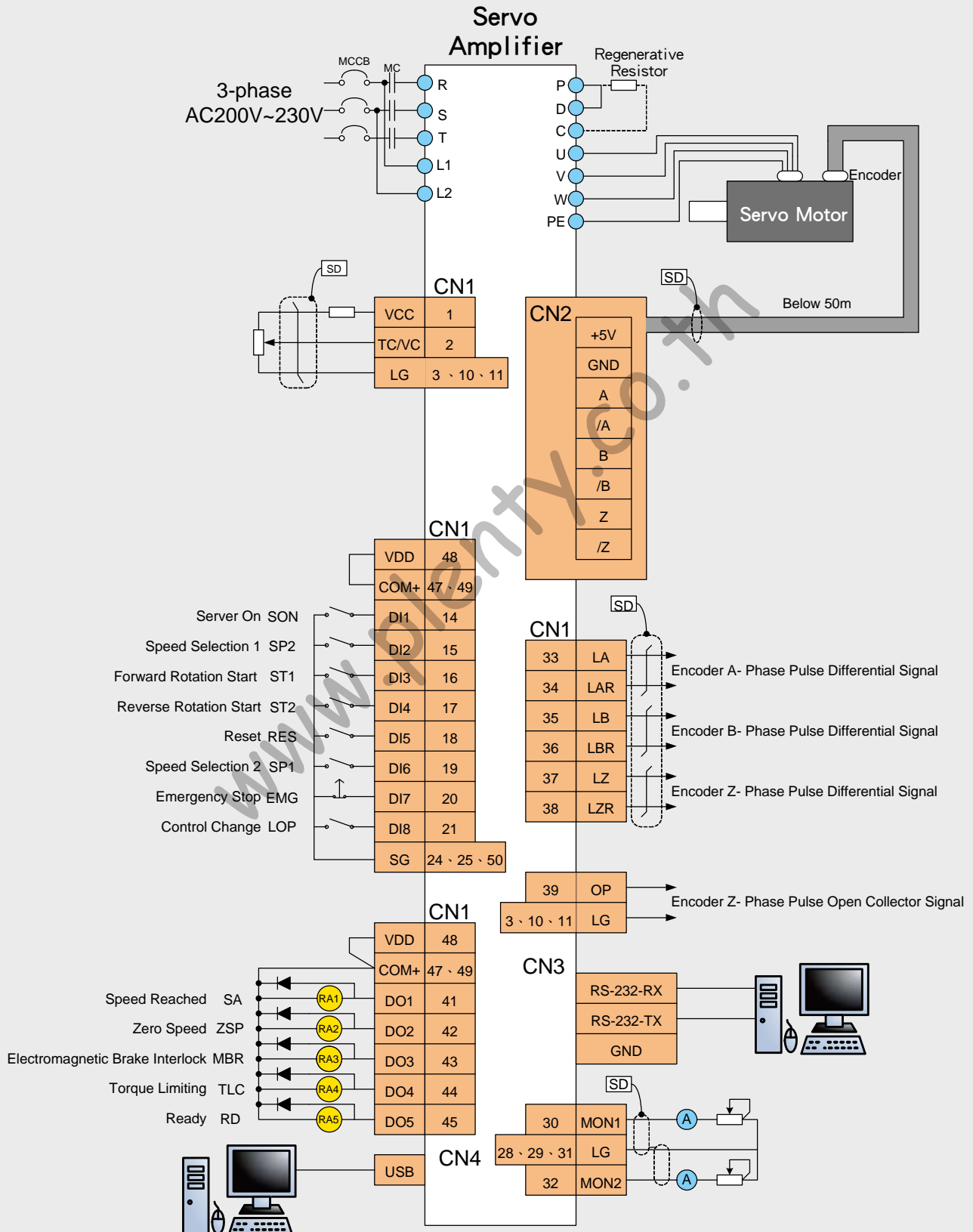


## Position control (PT)

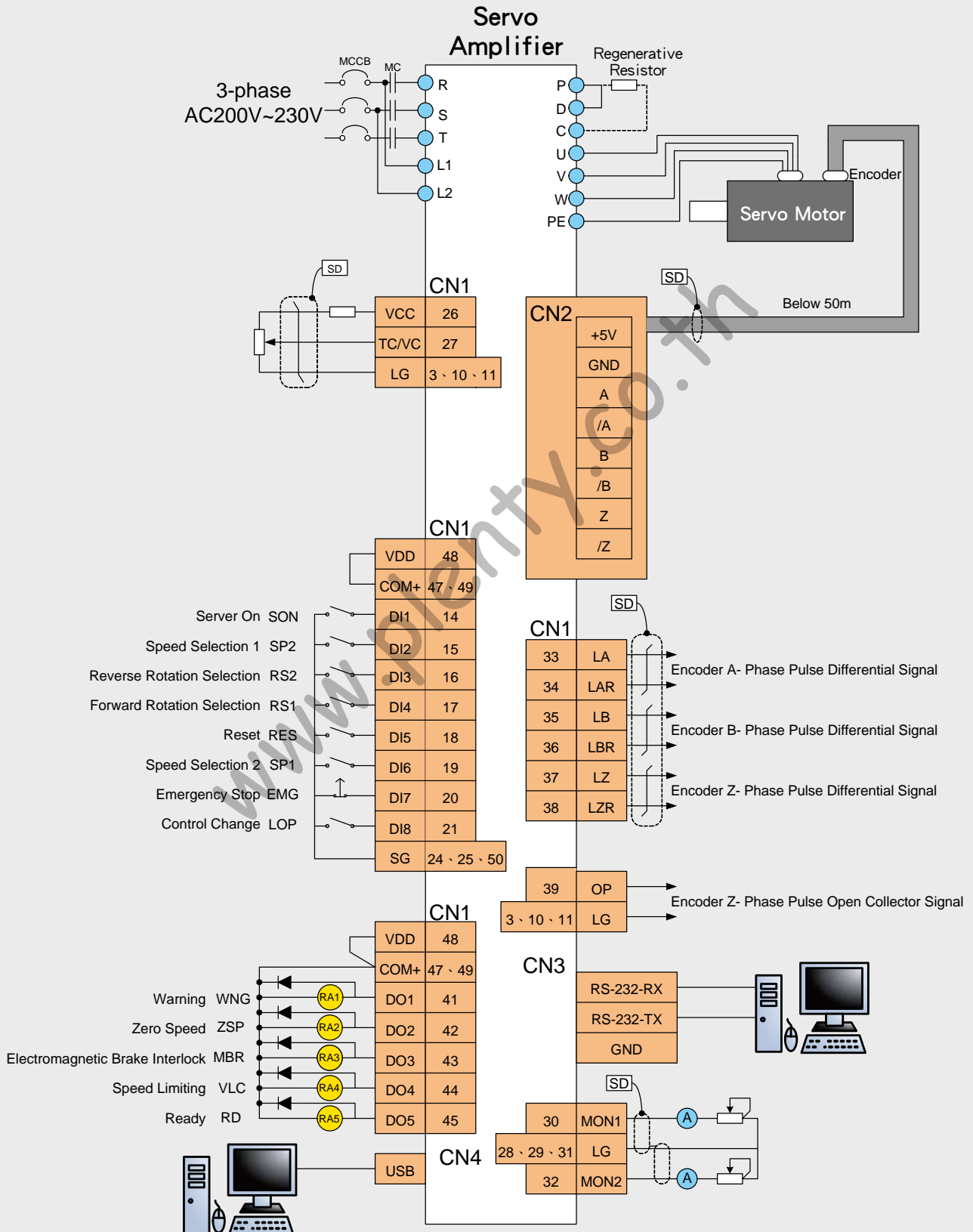


# Standard Wiring Diagram

## Speed control (S)



## Torque control (T)



# Servo Amplifier Specifications

Servo Amplifier Model SDA-□□□A2		010	020	040	050	075	100	150	200	350
Recommend Servo Motor Model SMA-□□□□		L010	L020	L040	M050	L075	M100	M150	M200	M350
Motor Power		100W	200W	400W	500W	750W	1KW	1.5KW	2KW	3.5KW
Main Circuit Power	Voltage / Frequency	3-phase 200~230VAC 50/60Hz or 1-phase 230VAC 50/60Hz					3-phase 200~230VAC 50/60Hz			
	Permissible Voltage Fluctuation	3-phase 170~230VAC 50/60Hz or 1-phase 207~253VAC 50/60Hz					3-phase 170~253VAC 50/60Hz			
	Permissible Frequency Fluctuation	Maximum + 5%								
Control Circuit Power	Voltage / Frequency	1-phase 200~230VAC 50/60Hz								
	Permissible Voltage Fluctuation	1-phase 170~253VAC 50/60Hz								
	Permissible Frequency Fluctuation	Maximum + 5%								
	Power Consumption (W)	30								
Control Method		3-phase full wave rectify, IGBT-PWM controlled (SVPWM drive)								
Dynamic Brake		Built-in								
Protective Functions		Overcurrent, regenerative overvoltage, overload protection, fan failure protection, output short circuit protection, encoder error protection, abnormal regeneration protection, low voltage / instantaneous power failure protection, overspeed protection, excessive error protection								
Encoder Feedback		2500ppr (10000 resolution) increment encoder								
Communication Interface		RS232/RS485(MODBUS), USB								
Position Control Mode	Maximum Output Pulse Frequency	500kpps (Line Driver), 200kpps (Open Collector)								
	Pulse Command	CCW Pulse train +CW Pulse train ; Pulse train + Symbols ; A-, B-phase pulse train								
	Command Type	External pulse control / Internal register setup								
	Commend Smoothing	Low-pass filter / Linear / S curve								
	Command Pulse Multiplying factor	Electronic gear A/B ratio A : 1~32767, B : 1~32767, 1/50 < A/B < 200								
	In-Position range setting	0~±10000pulses								
	Error Excessive	±3 rotations								
	Torque Limit	Internal parameter setup or external analog Input setup (0~+10VDC/Maximum torque)								
Speed Control Mode	Feedforward Compensation	Internal parameter setup 0~200%								
	Speed Control Range	Analogue speed command 1:2000; Internal speed command 1:5000								
	Command Type	External analog voltage input / Internal register setup								
	Commend Smoothing	Low-pass filter / Linear acceleration and deceleration curve / S curve								
	Analog Speed Command Input	0~±10VDC/Rated speed (input impedance: 10~12kΩ)								
	Speed Fluctuation Rate	Load fluctuation 0~100%: ± 10% (maximum); power fluctuation ±10%: ± 0.5% (maximum); Ambient temperature 0℃~55℃: ± 0.5% (maximum) ( Analog speed command )								
	Torque Limit	Internal parameter setup or external analog Input setup (0~+10VDC/Maximum torque)								
	Bandwidth	Maximum 490Hz								
Torque Limitation Mode	Command Type	External analog voltage input								
	Commend Smoothing	Low-pass filter								
	Analog Torque Command Input	0~±10VDC/Maximum torque (input impedance: 10~12kΩ)								
	Speed Limit	Internal parameter setup or external analog Input setup (0~+10VDC/Maximum speed)								
Input and Output Signals	Digital Input	Servo on, forward and backward inhibit limits, pulse error clear, torque direction selection, speed command selection, positioning command selection, forward and backward rotation direction selection, proportion control switching, torque limit switching, abnormal alarm reset, emergency stop, control mode switching, electric gear ratio selection, gain switching								
	Digital Output	Torque limit reached, speed limit reached, servo ready, zero speed reached, position reached, speed reached, alarm signal, Homing completed								
	Analog Input	Analog speed command / limit, analog torque command / limit								
	Analog Output	Command pulse frequency, pulse error, current command, DC bus voltage, serve motor speed, torque value								
Cooling Method		Natural cooling, open (IP20)					Fan cooling, open (IP20)			
Environment	Temperature	0℃ ~ 55℃ (Force air circulation in the surrounding area if the temperature goes beyond 45℃); Storage: -20~65℃ (non freezing)								
	Humidity	Maximum 90% RH (non condensing); Storage: Below 90% RH (non condensing)								
	Installation Location	Indoor (avoid direct sun light); no corrosive gas, no flammable gas, no oil mist or dust								
	Altitude	Between sea level and 1000 m								
	Vibration	Maximum 5.9 m/s2								
Weight (Kg)		1.3			1.6			2.4		

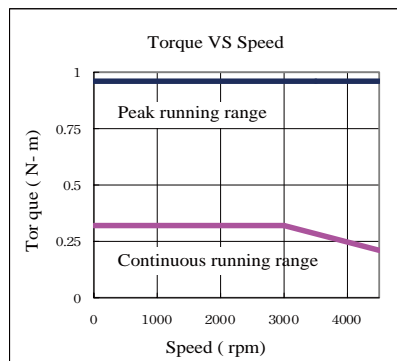
# Servo Motor Specifications

Servo Motor Series		Low Inertia				Medium Inertia				
SMA-□□□□		L010	L020	L040	L075	M050	M100	M150	M200	M350
Power facility capacity (kVA)		0.3	0.5	0.9	1.3	1.0	1.7	2.5	3.5	5.5
Rated output (W)		100	200	400	750	0.5K	1K	1.5K	2.0K	3.5K
Rated torque (N・m)		0.32	0.64	1.27	2.4	2.39	4.78	7.16	9.55	16.7
Maximum torque (N・m)		0.96	1.92	3.81	7.2	7.16	14.4	21.6	28.5	50.1
Rated speed (r/min)		3000				2000				
Maximum speed (r/min)		4500				3000			2500	
Permissible instantaneous Speed (r/min)		5175				3450			2850	
Rated power ratio (kW/s)		18.29	19.69	46.08	47.21	8.6	18.2	27.7	23.5	37.3
Rated current (A)		0.9	1.4	2.4	4.9	3.0	5.8	8.5	10	16
Maximum current (A)		2.7	4.2	7.2	14.7	9	17.4	25.5	30	48
Momnent of Inertia J (x10-4kg・m2) ( ) is with electromagnetic brake motor.		0.055 ( 0.058 )	0.204 ( 0.224 )	0.335 ( 0.355 )	1.203 ( 1.245 )	6.59 ( 8.55 )	12.56 ( 14.54 )	18.52 ( 20.61 )	38.8 ( 49.2 )	74.8 ( 85.2 )
Insulation class		F								
Speed and Position Detector		2500ppr								
Environment	Enclosure (IP)	65 (Note 1)								
	Working temperature	0~40℃								
	Storage humidity	Under 80%Rh (non freezing)								
	Storage temperature	-15~70℃								
	Storage humidity	Under 90%Rh (non freezing)								
	Vibration class	V-15								
	Vibration Resistance	x, y : 49 m/s2				x, y : 24.5 m/s2				
	Altitude	1,000 m								
Weight (Kg) ( ) is with electromagnetic braker.		0.55 (0.75)	1.01 (1.44)	1.46 (1.89)	2.89 (3.63)	4.8 (6.6)	6.9 (8.7)	9.0 (10.8)	11.6 (16.9)	17.7 (23.0)
Safety Certification		CE								

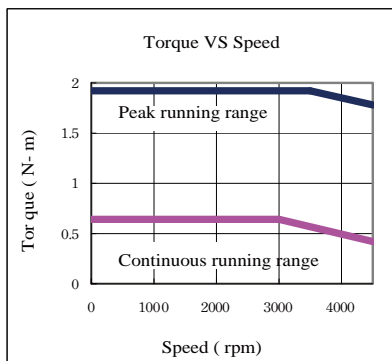
Note 1: The shaft-through portion is excluded

# Servo Motor Torque Characteristic

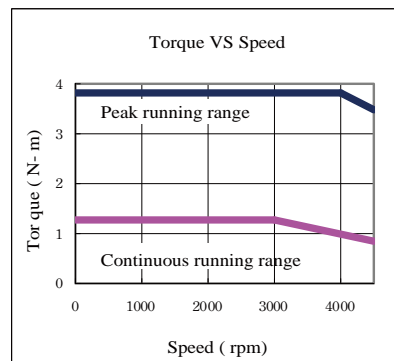
【 SMA-L010 】



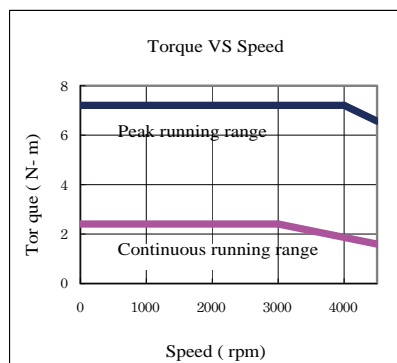
【 SMA-L020 】



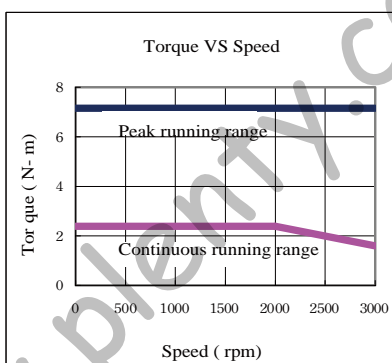
【 SMA-L040 】



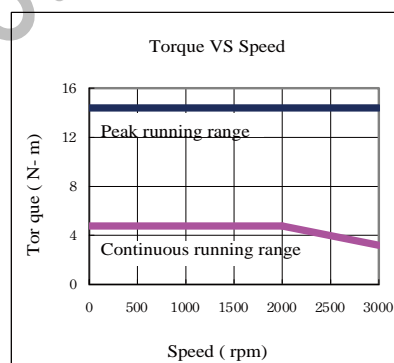
【 SMA-L075 】



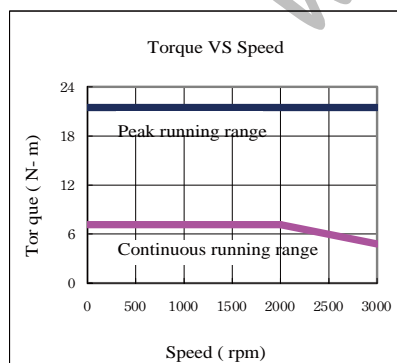
【 SMA-M050 】



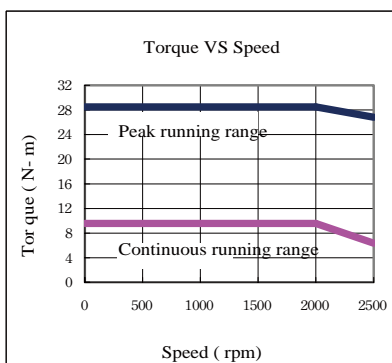
【 SMA-M100 】



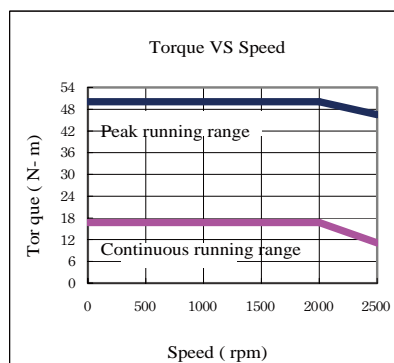
【 SMA-M150 】



【 SMA-M200 】



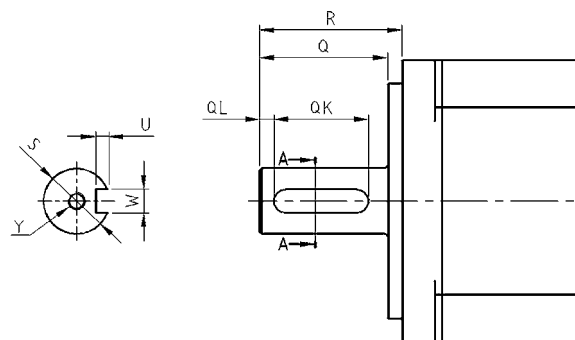
【 SMA-M350 】



※ : For 3-phase 220VAC.

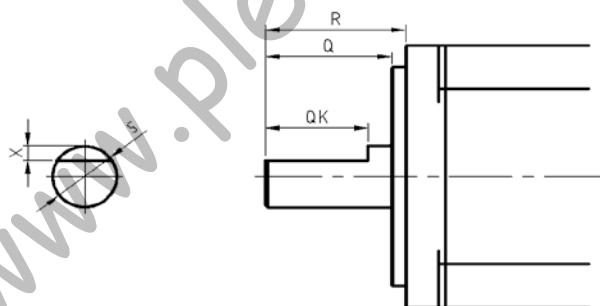
# Motor Shaft Dimensions

## Key way



Motor models	Dimensions							
	S	R	Q	QK	QL	W	U	Y
SMA-L020(B)\L040(B)	$\phi 14h6$	30	27	20	3	5 <sup>0</sup> <sub>-0.03</sub>	3	M4 Depth 15
SMA-L075(B)	$\phi 19h6$	40	37	25	5	6 <sup>0</sup> <sub>-0.03</sub>	3.5	M5 Depth 20
SMA-M050(B)\M100(B)\M150(B)	$\phi 24h6$	55	52	35	5	8 <sup>0</sup> <sub>-0.036</sub>	4	M8 Depth 20
SMA-M200(B)\M350(B)	$\phi 35h6$	78	75	55	5	10 <sup>0</sup> <sub>-0.036</sub>	5	M8 Depth 20

## D-cut



Motor models	Dimensions				
	S	X	R	Q	QK
SMA-L010(B)	$\phi 8h6$	1	25	22.5	20.5

# Electromagnetic Brake Specifications

Motor models	SMA系列				
	L010B	L020B/L040B	L075B	M050B/M100B/M150B	M200B/M350B
Electromagnetic brake types	Spring-action safety brake				
Rated voltage (V)	DC 24V 0-10 %				
Power consumption (W)	6.3	7.9	8.6	19.3	34
Static fraction torque (N · m)	0.3	1.3	2.4	8.5	45

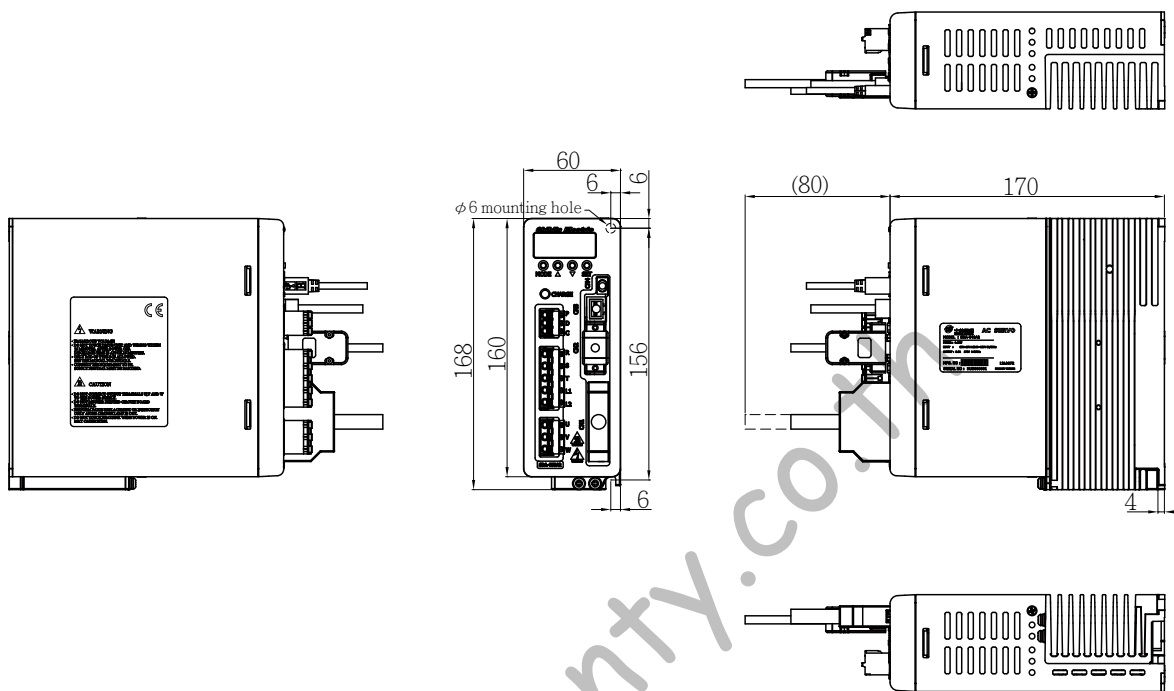


**Note :** The electromagnetic brake is used only for safety maintenance. Use it only when the motor is OFF. Do not use it as a motor deceleration brake.

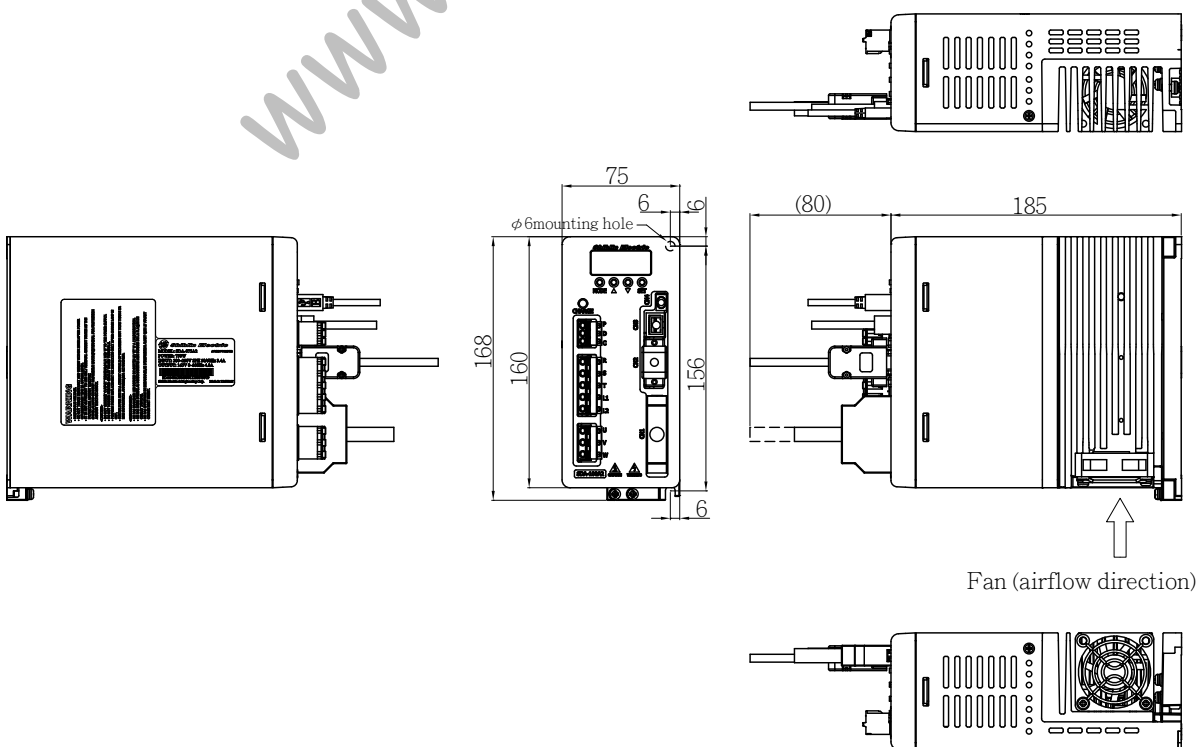
# Servo Amplifier Dimensions

SDA-010A2、SDA-020A2、SDA-040A2、SDA-050A2 (100W~500W)

Unit : [mm]

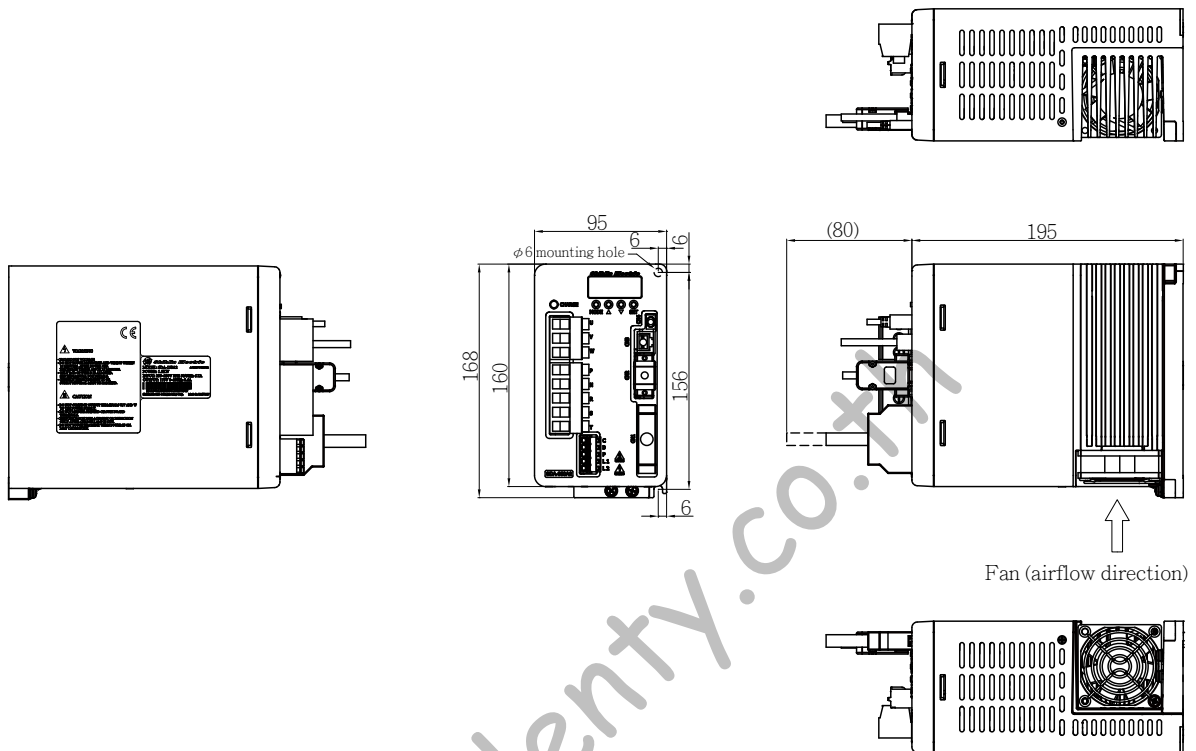


SDA-075A2、SDA-100A2 (750W、1KW)



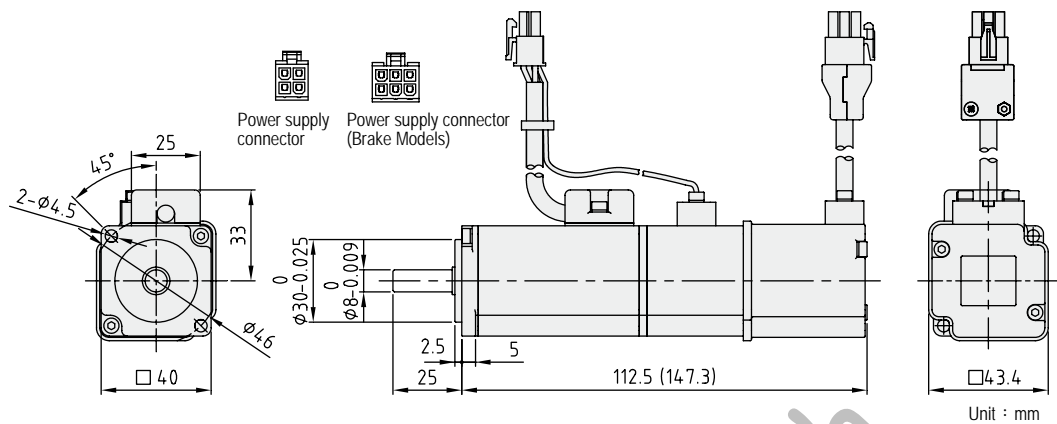
# SDA-150A2 、 SDA-200A2 、 SDA-350A2 (1.5KW~3.5KW)

Unit : [mm]



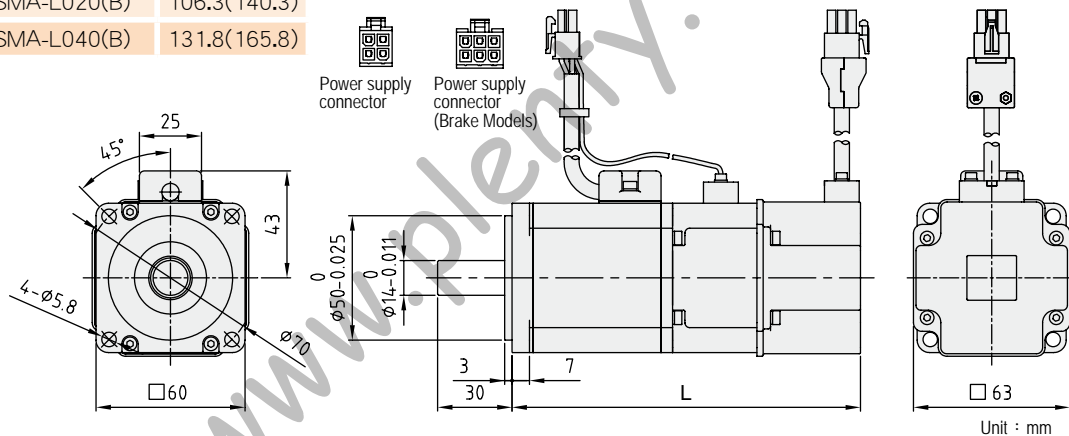
# Servo Motor Dimensions

## 【 SMA-L010(B) 】

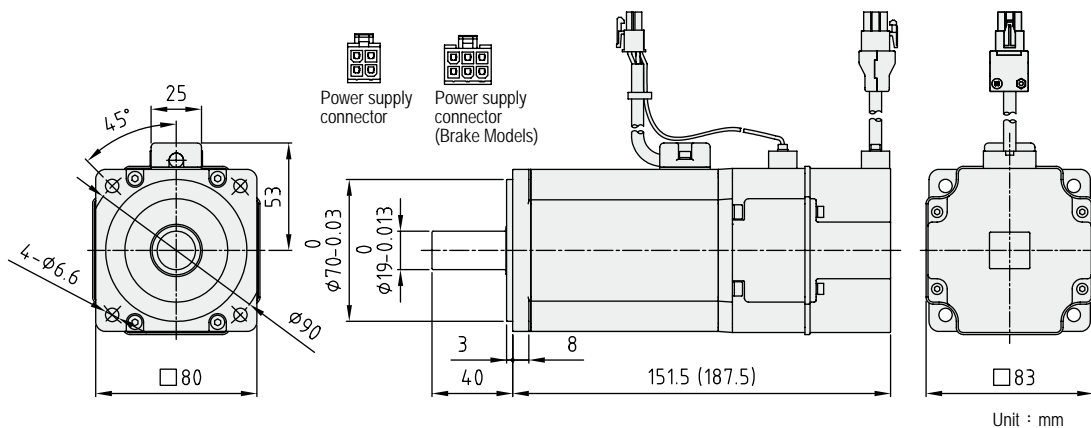


## 【 SMA-L020(B) 、 SMA-L040(B) 】

Model	L
SMA-L020(B)	106.3(140.3)
SMA-L040(B)	131.8(165.8)

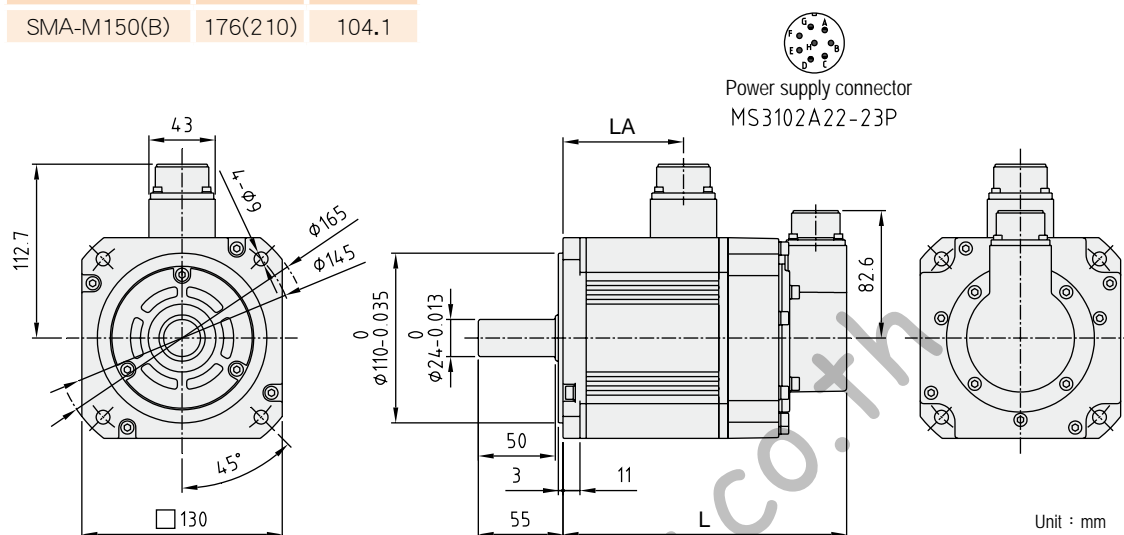


## 【 SMA-L075(B) 】



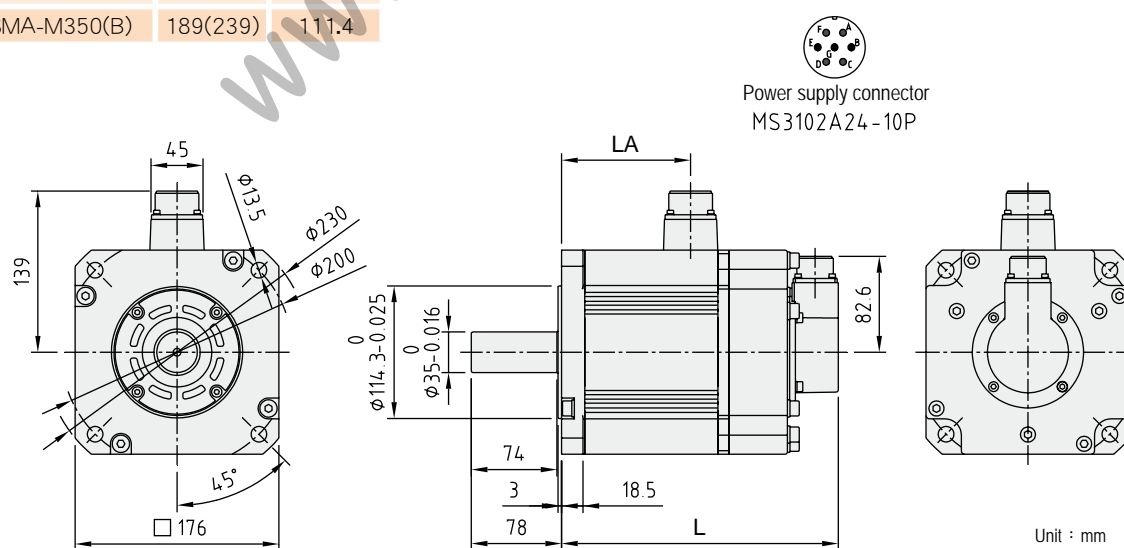
## 【 SMA-M050(B) 、 SMA-M100(B) 、 SMA-M150(B) 】

Model	L	LA
SMA-M050(B)	124(158)	52.1
SMA-M100(B)	150(184)	78.1
SMA-M150(B)	176(210)	104.1

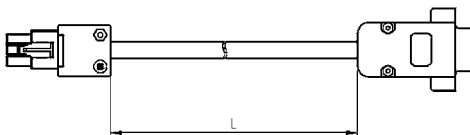
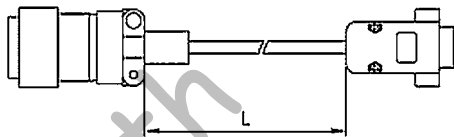
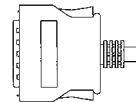
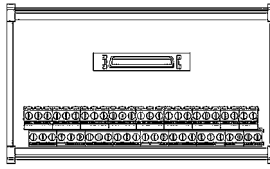
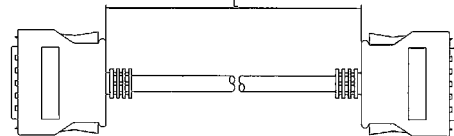
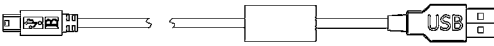
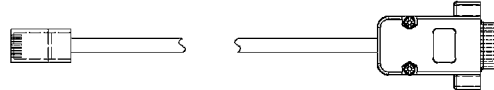
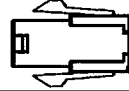
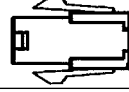

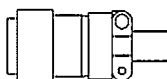


## 【 SMA-M200(B) 、 SMA-M350(B) 】

Model	L	LA
SMA-M200(B)	149(199)	71.4
SMA-M350(B)	189(239)	111.4



## Optional Cables and Connectors

Name		Serial	Content
<b>CN2: Select One only</b>	SMA-L Encoder for low inertia motors Cable / Connector Set	SDA-ENLCBL□M-L □ The length of the cable inside 2, 5, 10 ... m ( Note 1)	
		SDA-ENLCBL□M-H □ The length of the cable inside 2, 5, 10 ... m ( Note 1)	
		SDA-ENCNL Connector set	
	SMA-M Encoder for medium inertia motors Cable / Connector Set	SDA-ENLCBL□M-H □ The length of the cable inside 2, 5, 10 ... m ( Note 1)	
		SDA-ENLCBL□M-H □ The length of the cable inside 2, 5, 10 ... m ( Note 1)	
		SDA-ENCNM Connector set	
<b>CN1</b>	I/O Connector	SDA-CN1	
	Terminal blocks and a wire set	SDA-TB50	
		SDA-TBL□M	
<b>CN4</b>	USB communication line	SDA-USB3M	
<b>CN3</b>	RS232/RS485 Communication line	SDA-RJ45-3M	
<b>Power Connector</b>	SMA-L Low Inertia Motor	SDA-PWCNL1	
	SMA-L Low Inertia Motor (with an electromagnetic brake)	SDA-PWCNL2	
	SMA-M Medium Inertia Motor (500W 、 1KW 、 1.5KW)	SDA-PWCNM1	
	SMA-M Medium Inertia Motor (For 2KW 、 3.5KW)	SDA-PWCNM2	

Note 1: L and H indicate bending life. L: standard, H: long bending life

# Shihlin Electric Factory Automation Products



Human Machine Interface



Servo motor  
and drive



Temperature  
Controller



Inverter



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