

# Syntec F Series Axial Motor

## Basic Installation Instructions V1.1

Dear users, please go through the instructions in detail before the installation, operation, maintenance, and inspection of the motor. Please read the complete contents, including related knowledge, safety notifications, and precautions thoroughly before the operation.

The motors are precision electronic devices. For the safety of both operators and the machine, please ensure all the tests, installations, and adjustments are operated by professional electrical engineering personnel. For the description with “DANGER,” “WARNING,” and “CAUTION” in the manual, please read them in detail. If there are any concerns, please contact our branches in various regions. Our professionals are glad to be at your service.

Please comply with the guidelines below before finishing reading the complete manual:

- The installation environment should comply with the operating conditions of the motors.
- Implement the wirings according to the wiring diagram.
- Implement the grounding strictly and follow the current National Electrical Code. (References: NFPA 70: National Electrical Code, 2005 Ed.)
- Do not modify the wirings while the device is powered up.

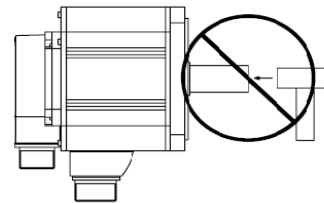
### 1. Safety Precautions

Please pay extra attention to the instructions below while operating the product.	
	<ul style="list-style-type: none"> <li>* Operate the motor according to the manual; otherwise, it may cause malfunction or casualties.</li> <li>* The installations, adjustments, and maintenance shall be performed by professional electrical engineering personnel.</li> <li>* Do not apply the product to machines that may cause casualties, device damage or system shut down.</li> </ul>
	<ul style="list-style-type: none"> <li>* Please select appropriate types of drivers and motors according to the loading of the machine tool.</li> <li>* Avoid corrosive or flammable conditions and objects.</li> <li>* Do not move the motor by holding motor shafts or lead wires.</li> <li>* To protect motors, please disconnect the load first and reconnect it after confirming whether the operation is correct.</li> <li>* Brake motors provide braking if power cut abruptly. To prevent the loud noise interferes with the operation of controllers, the wiring shall be as short as possible; separate the power cables and the signal cables as far as possible.</li> </ul>
	<ul style="list-style-type: none"> <li>* Operating temperature range: 0°C~40°C and without condensation</li> <li>Operating altitude (Max.): 1,000 meters</li> <li>Operating humidity: 20%~80% and without condensation</li> <li>The environment shall not generate a strong magnetic field, and there shall be a space for ventilation.</li> <li>* Storage temperature range: -20°C~60°C and without condensation</li> </ul>

<ul style="list-style-type: none"> <li>* Storage humidity: 20%~80% and without condensation</li> <li>* Check each instruction below before power on:               <ul style="list-style-type: none"> <li>◦ Ensure all groundings are reliable.</li> <li>◦ Ensure the wiring is reliable. (Phase loss is unacceptable.)</li> <li>◦ Ensure the encoder is correct and the connection is reliable.</li> <li>◦ Ensure the power cables and the control lines are connected firmly.</li> <li>◦ Remove all the tools to prevent accidents.</li> <li>◦ Cover every cover plate and prevent moving objects from touching the power.</li> <li>◦ Cut all the power before inputting power. That is, connect every control terminal but do not conduct. Doing so may ensure the motor will not start and cause irregular action when the power is on.</li> </ul> </li> <li>* Please turn off the power before plugging and unplugging cables or changing wires to prevent electric shock or driver damage.</li> </ul>
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### 2. Notifications

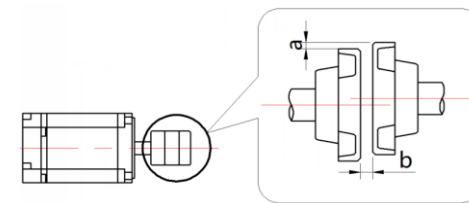
- \* Please note that the encoder in the motor is a precision device. Do not hit, knock, and modify the shaft extender!



- \* Ensure every joint is fixed firmly when installing motors.
- \* Please wipe the rust prevention applied to the shaft ends completely before the installation. After the assembly, move the rotating part by hand, and ensure the shafts can rotate properly; minimize the static load capacity as much as possible.
- \* Please pay attention to the notifications below when connecting motors to machines. Incorrect installation may reduce the service life of the motors, and even cause damage to them.

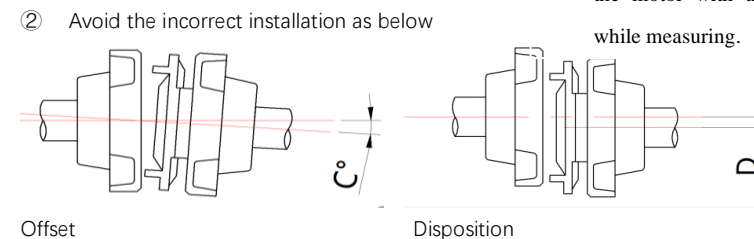
- Coupler installation:

- ① Motor shafts and bearing shafts shall remain concentric after passing through couplers. Non-concentricity shall be less than 0.05mm. Make charts before the installation and follow requirements below:



Descriptions:  
Adjustment accuracy: Obtain the difference between the maximum and the minimum values of the 4 points below 0.05mm.

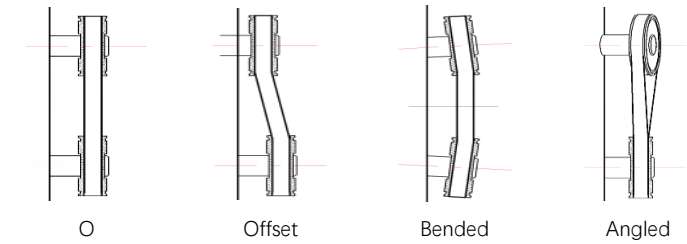
Note: Rotate the output shafts of the motor with the couplers while measuring.



Do not cause the motor to bend or torque due to installation misalignment; it may cause damage to the motor and equipment.

- Belt Installation

- ① Keep the motor shaft parallel to the belt shaft. Parallelism tolerance zone < 0.1mm.
- ② Select the belt types according to the motor types.
- ③ Define the belt tension according to the shaft diameter and force.
- ④ Install the belt correctly to prevent motor damage due to incorrect installation.



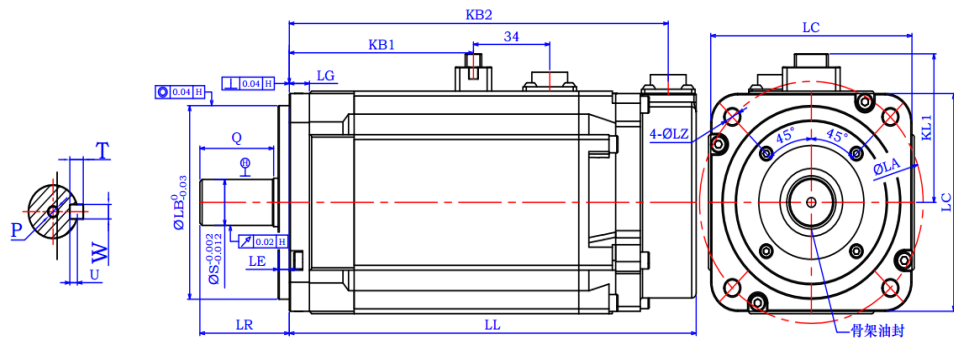
### 3. Specifications

Type	STA 09 (90*90)	STA13 (130*130)					STA18 (180*180)			
		AM3	AM5	AM8	AM11	AM15	AM8	AM18	AM28	AM35
Size	AM3	AM5	AM8	AM11	AM15	AM8	AM18	AM28	AM35	AM48
Rated power (KW)	1.0	1.1	1.7	2.4	3.1	2.5	2.9	4.46	5.5	7.5
Pole number	10	10	10	10	10	10	10	10	10	10
Rated rotational speed (rpm)	3000	2000	2000	2000	2000	3000	2000	2000	1500	1500
Maximum rotational speed (rpm)	6000	4000	4000	4000	4000	5000	4000	3000	2000	2000
Rated current (A)	2.05	4.17	6.44	8.27	9.2	4.9	9.9	13.9	11.9	16.5
Maximum current (A)	6.3	12	26	26	29.5	16	26.5	38.3	33.9	45.9
Rated Torque (Nm)	3.2	5.4	8.34	11.5	15	8	18.6	28.4	35	48
Max. Torque (Nm)	10	14.9	30.8	34	45	24	46	72	91.4	120.9

Type	STA09 (90*90)	STA13 (130*130)					STA18 (180*180)			
		AM3	AM5	AM8	AM11	AM15	AM8	AM18	AM28	AM35
Moment of inertia (kgm <sup>2</sup> ×10 <sup>-4</sup> )	3.57 (3.85)	13.3 (16)	20.6 (23.3)	26.3 (28.97)	32.8 (35.5)	20.6	46 (51.9)	69 (74.9)	90.5 (108)	125 (140)
Brake Torque (Nm)	4.5	19	19	19	19	\	40	40	72	72
DC injection power (V)	DC24	DC24	DC24	DC24	DC24	\	DC24	DC24	DC24	DC24
Brake power (W)	12	24	24	24	24	\	28	28	40	40
Encoder	Nikon 24bit Multi-turn Absolute encoder					Syntec Encoder	Nikon 24bit Multi-turn Absolute encoder			
IP Level	IP67									
Safety Certification	CE IEC60034-1 & FCC									

4. External Dimensions (Unit: mm)

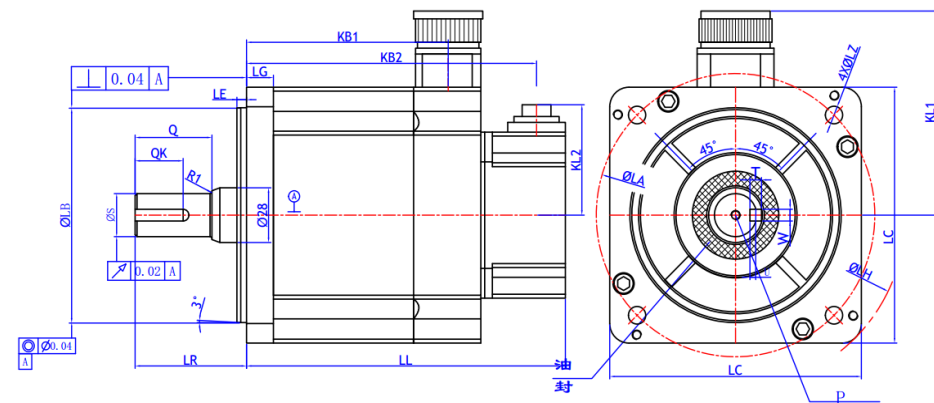
- S08-AM3-60-E12-□-F4



Note: “( )” refers to the specifications with brakes.

Type	LL	LR	KB1	KB2	Flange Size					
					LA	LB	LC	LE	LG	LZ
AM3-60-□-F4	147(182)	40	89.5 (82.5)	134.5 (169.5)	100	80 <sup>0</sup> <sub>-0.03</sub>	90	5	9	6.6
Type	Shaft Size		Keyway Size				Tapped Hole			
	S	QK	W	T	U	Q	P			
AM3-60-□-F4	19 <sup>-0.002</sup> <sub>-0.012</sub>	25	6	6	3.5	33	M6*15			

- S08-AM5-40-E12-□-F3
- S08-AM8-40-E12-□-F3
- S08-AM11-40-E12-□-F3
- S08-AM11-30-E12-□-F3
- S08-AM15-40-E12-□-F3

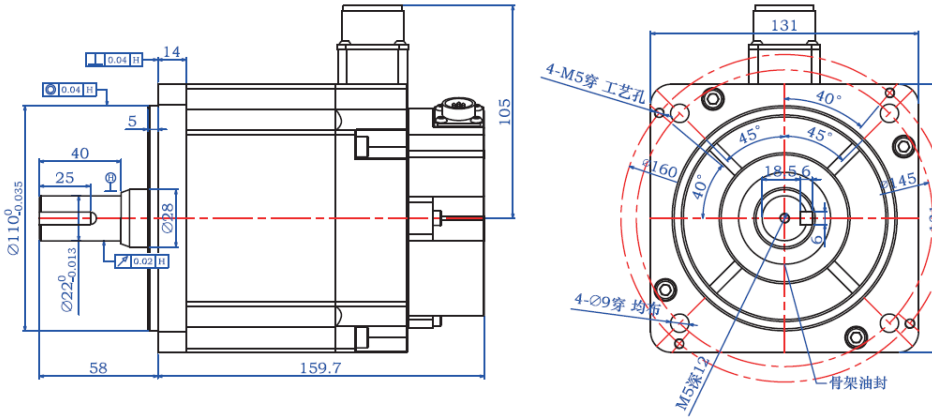


Note: “( )” refers to the specifications with brakes.

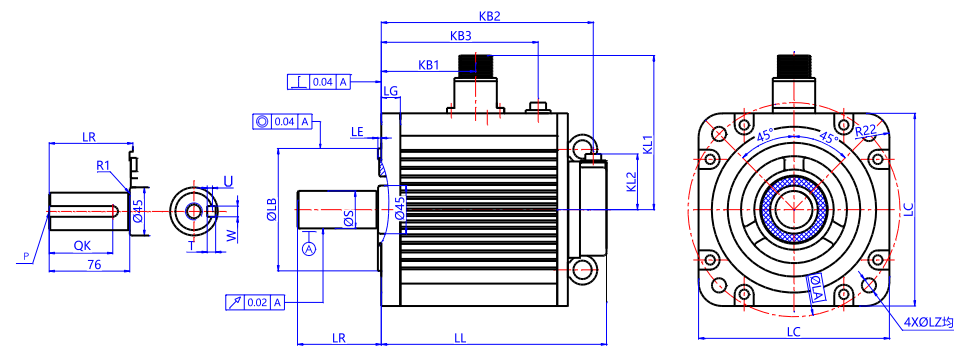
Type	KB2	Flange Size					
		LA	LB	LC	LE	LG	LZ
AM5-□-F3	128 (178)	145	110 <sup>0</sup> <sub>-0.035</sub>	130	5	14	9
AM8-□-F3	149 (199)	145	110 <sup>0</sup> <sub>-0.035</sub>	130	5	14	9
AM11-□-F3	170.5 (220.5)	145	110 <sup>0</sup> <sub>-0.035</sub>	130	5	14	9
AM15-□-F3	196.5(246.5)	145	110 <sup>0</sup> <sub>-0.035</sub>	130	5	14	9

Type	Shaft Size		Keyway Size				Tapped Hole
	S	QK	W	T	U	Q	P
AM5-□-F3	19 <sup>0</sup> <sub>-0.013</sub>	25	5	5	3	40	M5*12
AM8-□-F3	22 <sup>0</sup> <sub>-0.013</sub>	25	6	6	3.5	40	M5*12
AM11-□-F3	24 <sup>0</sup> <sub>-0.013</sub>	25	8	8	4	40	M5*12
AM15-□-F3	24 <sup>0</sup> <sub>-0.013</sub>	25	8	8	4	40	M5*12

- S08-AM8-50-E13-□-F1



- S08-AM18-40-E12-□-F4
- S08-AM28-30-E12-□-F4

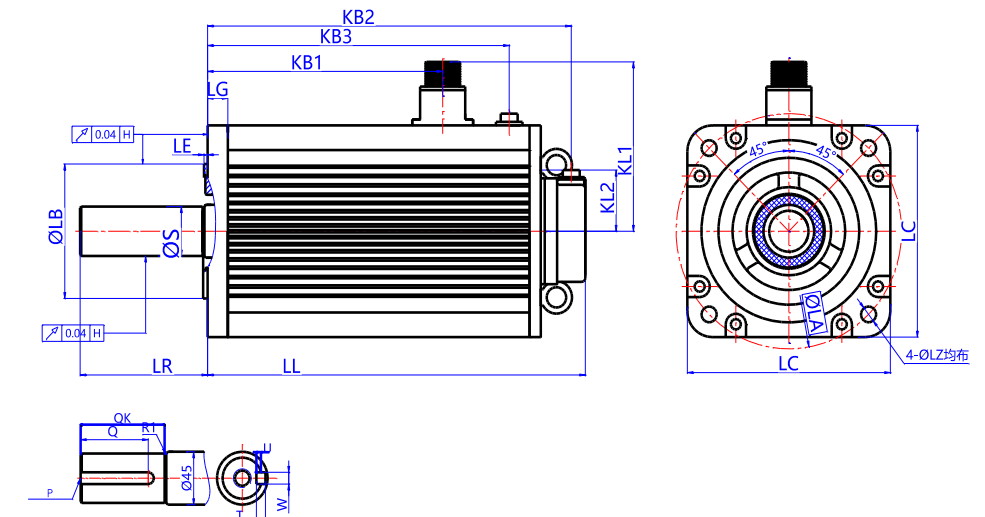


Note: “( )” refers to the specifications with brakes.

Type	LL	LR	KB1	KB2	Flange Size					
					LA	LB	LC	LE	LG	LZ
AM18-□-F4	167.5(215.5)	79	89	155 (203)	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	13.5
AM28-□-F4	194(242)	79	115.5	181.5 (229.5)	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	13.5

Type	Shaft Size		Keyway Size				Tapped Hole
	S	QK	W	T	U	Q	P
AM18-□-F4	35+0.01 0	25	10	8	5	60	M12*25
AM28-□-F4	35+0.01 0	25	10	8	5	60	M12*25

- S08-AM35-20-E12-□-F4
- S08-AM48-20-E12-□-F4

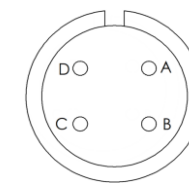


Note: “( )” refers to the specifications with brakes.

Type	LL	LR	KB1	KB2	Flange Size					
					LA	LB	LC	LE	LG	LZ
AM35-□-F4	220.5 (283.5)	113	142 (157)	208 (271)	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	13.5
AM48-□-F4	272 (335)	113	193.5 (208.5)	259.5 (322.5)	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	13.5
Type	Shaft Size		Keyway Size				Tapped Hole			
	S	QK	W	T	S	QK	W			
AM35-□-F4	42 <sup>0</sup> <sub>-0.016</sub>	110	12	8	5	90	M16*32			
AM48-□-F4	42 <sup>0</sup> <sub>-0.016</sub>	110	12	8	5	90	M16*32			

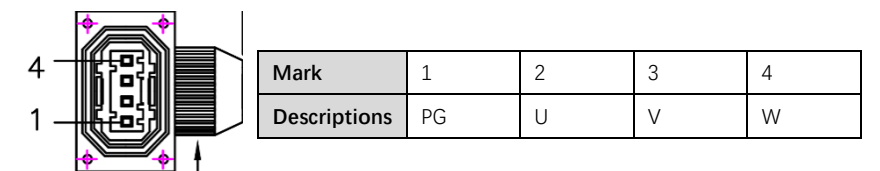
5. Connector Configurations

- Power cable connector
- S08-AM5-40-E12-□-F3      S08-AM18-40-E12-□-F4
- S08-AM8-40-E12-□-F3      S08-AM28-30-E12-□-F4
- S08-AM11-40-E12-□-F3      S08-AM35-20-E12-□-F4
- S08-AM11-30-E12-B-F3      S08-AM48-20-E12-□-F4
- S08-AM15-40-E12-□-F3      S08-AM8-50-E13-K-F1(AM15)

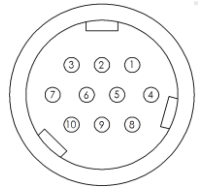


Mark	A	B	C	D
Descriptions	U phase	V phase	W phase	PG

S08-AM3-60-E12-□-F4

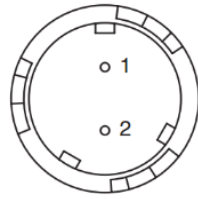


Encoder Connector



Mark	1	2	3	4	5
Descriptions	Data+	Data-	空	5V	BAT-
Mark	6	7	8	9	10
Descriptions	BAT+	空	空	0V	PG

Brake Connector

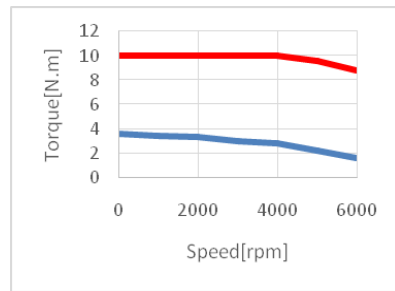


Mark	1	2
Descriptions	24V	0V

6. Torque and Speed Curves

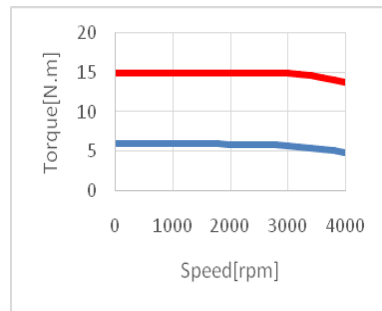
90 type

AM3-60-E12-□-F4

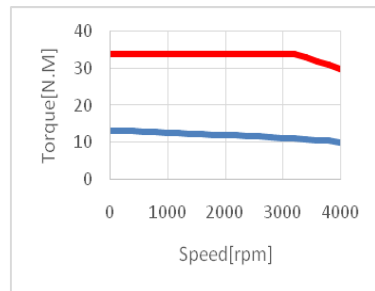


130 type

AM5-40-E12-□-F3

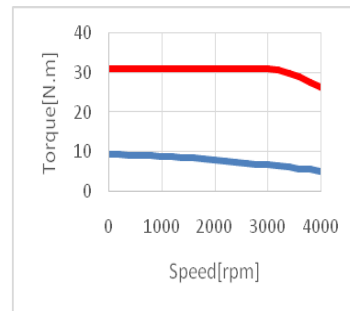


AM11-40-E12-□-F3

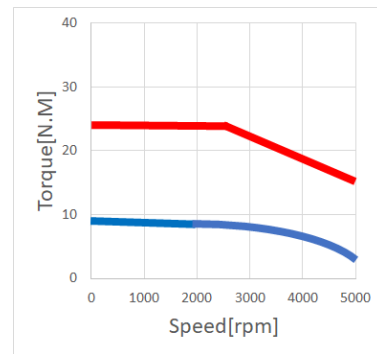
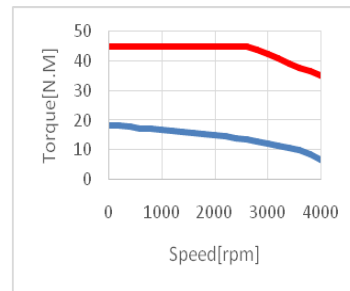


S08-AM8-50-E13-□-F1

AM8-40-E12-□-F3

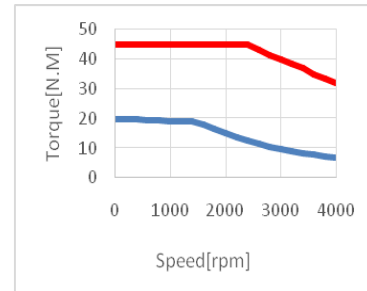


AM15-40-E12-□-F3

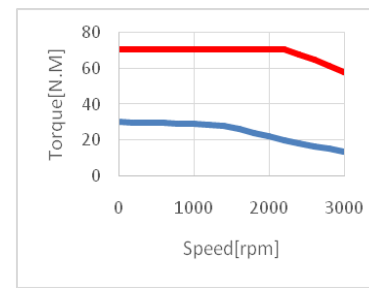


180 Type

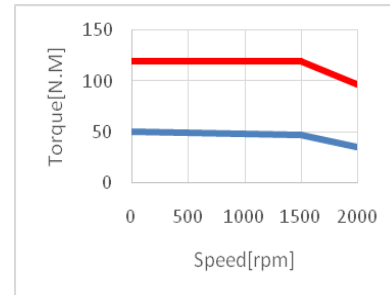
AM18-40-E12-□-F4



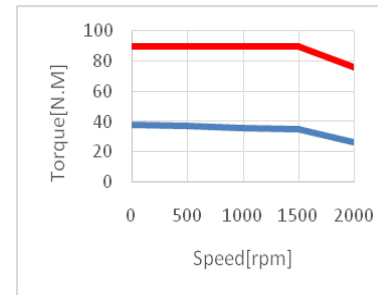
AM28-30-E12-□-F4



AM35-20-E12-□-F4



AM48-20-E12-□-F4

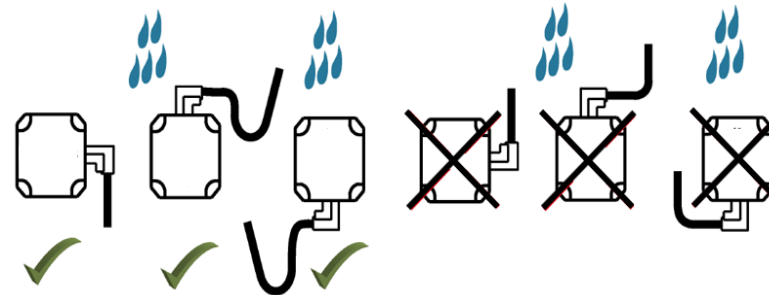


7. Power Cable Diameter

Type	STA09 (90*90)	STA13 (130*130)	STA18 (180*180)
Diameter	24AWG/0.5mm <sup>2</sup>	16AWG/1.5mm <sup>2</sup>	13AWG/2.5mm <sup>2</sup>

8. Oil-proof and Waterproof Installation Recommendation

\* The protection form of the motor is based on the IEC standard (IP classification), but this is only a short-term performance and cannot guarantee long-term protection. If oil or water gets on the motor, or if the motor is often submerged, additional protective covers are required. Besides, the IP classification does not indicate corrosion resistance. Please note that when installing the servo motor horizontally, place the power cable and detector cable downward. When installing vertically or obliquely, set cable elbows.



9. Grounding

\* There are terminals and mounting holes for each Protective grounding (PE) and frame grounding (FG). Please do single-point ground on the main grounding plate of the strong electric panel or the mechanical chassis. Besides, please comply with local regulations while grounding.

