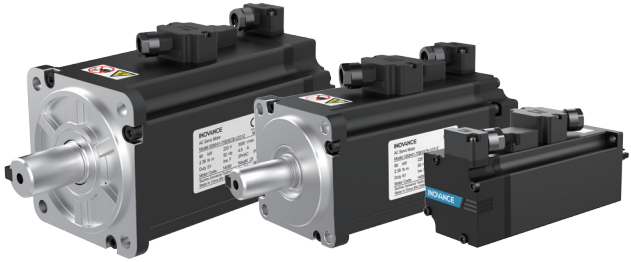
INOVANCE



Selection Guide

MS1 Series Servo Motor

User Guide

C00
Data code 19010786

Preface

Thank you for purchasing the MS1 series servo motor.

This MS1 series servo motor selection guide provides the product information, installation guide, wiring guide, and other necessary information. Contact our technical personnel if you have any question about functions and performance of the motor.

Inovance commits itself to continuously improving the servo motor. Therefore, this document is subject to change without notice.

The guide is delivered to the end user together with the servo motor.

Precautions
◆ The drawings in the guide are sometimes shown without covers or protective guards to help describe the product details clearly. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the guide. ◆ The drawings in the guide are for reference only and may differ from the actual product. ◆ The guide will be updated in time after product upgrades or specification changes, and for applicability and accuracy. ◆ If your guide is damaged or missing, contact our agent in your region or our Customer Service Center for a new one. ◆ In case of any question in use, contact our Customer Service Center.

Version History

Date	Version	Change Description
May 2018	A00	First edition
January 2019	A01	Added a note for the flexible cable
December 2019	B00	◆ Added with information related to MS1H2/MS1H3 motors. ◆ Updated information related to the matching servo drive and cable connections. ◆ Added with descriptions of the oil sealing and flat key disassembly. ◆ Updated outline drawings of the motor.
June 2020	C00	◆ Updated descriptions for the motor model. ◆ Updated electrical specifications. Added with derating curve diagrams for heat dissipation and optimized curve diagrams. ◆ Updated tables listing applicable motor cables. ◆ Optimized motor load diagrams and oil sealing removal diagrams. ◆ Updated tables for flange sizes. ◆ Added with descriptions for the energy efficiency label.

Contents

Safety Precautions

Safety Disclaimer

1) Read and follow the safety precautions when installing, operating, and maintaining the product.
2) To ensure your safety and prevent damage to the device, follow the marks on the product and safety precautions in this guide when installing, operating, and maintaining the product.
3) The "CAUTION", "WARNING", and "DANGER" items in the guide do not include all safety precautions that need to be followed; instead, they just supplement the safety precautions.
4) Use this product in environments that meet the design and specification requirements; otherwise, a fault may occur. Faults and component damages caused by noncompliance are not covered by the product quality warranty.
5) Inovance assumes no legal responsibility for any personal safety accidents or property losses caused by improper operations of this product.

Details of Safety Precautions

To use the product properly, read the Safety Precautions of High-Response Servo Motor (data code: 19010073) carefully.

You can visit www.inovance.com and choose Support > Download > Keywords "High-Response Servo Motor" to download the manual 19010073.

1 Product Information

1.1 Nameplate and Model

MS1 H1 – 40B 30C B – A3 3 1 Z

Mark	Series
MS1	MS1 series servo motor

Mark	Type
H	1:Low inertia and small capacity
	2: Low inertia and medium capacity
	3:Medium inertia and medium capacity
	4: Medium inertia and small capacity

Mark	Rated Power (W)
One number and one letter	
B	x 10
C	x 100
Example: 40B: 400W	

Mark	Rated Speed (RPM)
One number and one letter	
B	x 10
C	x 100
Example: 30C: 3000 RPM	

Mark	Wiring Mode
Z	Terminal-type
Z-S	Lead wire-type

Mark	Brake, Reducer and Oil Seal
0	None
1	Oil seal
2	Brake
4	Oil seal and brake

Mark	Shaft Connection Mode
3	Solid, keyed, with threaded holes

Mark	Encoder Type
One letter and one digit	
A3	23-bit Multi-turn absolute encoder
T3	18-bit multi-turn encoder

Mark	Voltage Class
B	220 V
D	380 V

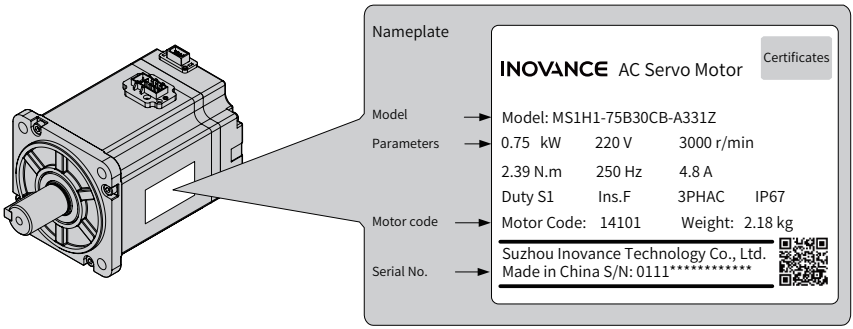


Figure 1-1 Model and nameplate

1.2 Component Description

■ See Figure 1-2 and Figure 1-3 for details on frame sizes 40, 60, and 80.

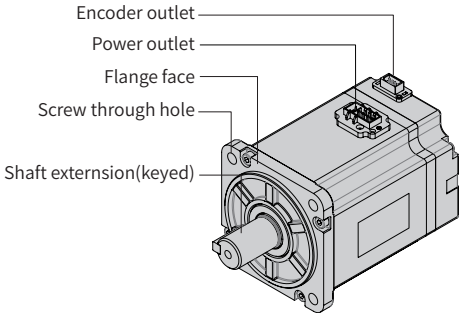


Figure 1-2 Components of terminal-type motors

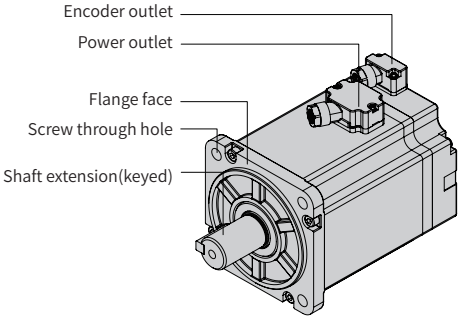


Figure 1-3 Components of lead wire-type motors

■ See the following figure for details on frame sizes 100, 130, and 180.

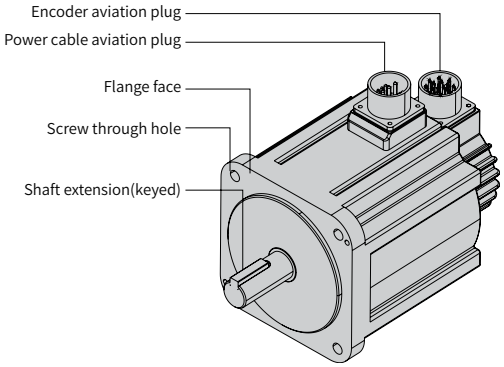


Figure 1-4 Components of high-power motors

1.3 Specifications

1.3.1 Mechanical Characteristics

Item	Description
Running mode	Continuous
Vibration level	V15
Insulation resistance	500 VDC, above 10 MΩ
Ambient temperature	0°C to 40°C
Excitation mode	Permanent magnetic
Installation method	Flanged
Heat-resistance level	Level F
Insulation voltage	1500 VAC 1 min (220 V) 1800 VAC 1 min (380 V)
Enclosure IP rating	IP67 (excluding shaft opening)
Ambient humidity	20% to 80% (no condensing)
Rotating direction	In forward RUN mode, the motor runs counterclockWise (CCW) when viewed from the load side.

1.3.2 Ratings

Model	Frame Size (mm)	Rated Output (kW)[1]	Rated Torque (N·m)	Maximum Torque (N·m)	Rated Current (Arms)	Maximum Current (Arms)
MS1H1-05B30CB	40	0.05	0.16	0.56	1.3	4.70
MS1H1-10B30CB	40	0.1	0.32	1.12	1.3	4.70
MS1H1-20B30CB	60	0.2	0.64	2.24	1.5	5.80
MS1H1-40B30CB	60	0.4	1.27	4.46	2.8	10.10
MS1H1-55B30CB	80	0.55	1.75	6.13	3.8	15.00
MS1H1-75B30CB	80	0.75	2.39	8.36	4.8	16.90
MS1H1-10C30CB	80	1.0	3.18	11.1	7.6	28.00
MS1H2-10C30CB	100	1.0	3.18	9.54	7.50	23.00
MS1H2-10C30CD	100	1.0	3.18	9.54	3.65	11.00
MS1H2-15C30CB	100	1.5	4.90	14.7	10.8	32.00
MS1H2-15C30CD	100	1.5	4.90	14.7	4.50	14.00
MS1H2-20C30CD	100	2.0	6.36	19.1	5.89	20.00
MS1H2-25C30CD	100	2.5	7.96	23.9	7.56	25.00
MS1H2-30C30CD	130	3.0	9.8	29.4	10.00	30.00
MS1H2-40C30CD	130	4.0	12.6	37.8	13.60	40.80
MS1H2-50C30CD	130	5.0	15.8	47.6	16.00	48.00
MS1H3-85B15CB	130	0.85	5.39	13.5	6.60	16.50
MS1H3-13C15CB	130	1.3	8.34	20.85	10.00	25.00
MS1H3-85B15CD	130	0.85	5.39	13.5	3.30	8.25
MS1H3-13C15CD	130	1.3	8.34	20.85	5.00	12.50
MS1H3-18C15CD	130	1.8	11.5	28.75	6.60	16.50
MS1H3-29C15CD	180	2.9	18.6	37.2	11.90	23.80

MS1H3-44C15CD	180	4.4	28.4	71.1	16.50	40.50
MS1H3-55C15CD	180	5.5	35.0	87.6	20.85	52.00
MS1H3-75C15CD	180	7.5	48.0	119	25.70	65.00
MS1H4-40B30CB	60	0.4	1.27	4.46	2.8	10.1
MS1H4-75B30CB	80	0.75	2.39	8.36	4.8	16.9

Model	Frame Size (mm)	Rated Speed (rpm)	Maximum Speed (rpm)	Torque Coefficient (N·m/Arms)	Rotor Inertia ($kg \cdot cm^2$)	Voltage (V)
MS1H1-05B30CB	40	3000	6000	0.15	0.026 (0.028)[4]	220
MS1H1-10B30CB	40			0.26	0.041 (0.043)[4]	
MS1H1-20B30CB	60			0.46	0.207 (0.220)[4]	
MS1H1-40B30CB	60			0.53	0.376 (0.390)[4]	
MS1H1-55B30CB	80			0.49	1.06	
MS1H1-75B30CB	80			0.58	1.38 (1.43)[4]	
MS1H1-10C30CB	80			0.46	1.75	
MS1H2-10C30CB	100	3000	6000	0.47	1.87 (3.12)[4]	220
MS1H2-15C30CB	100		5000	0.54	2.46 (3.71)[4]	
MS1H2-10C30CD	100		6000	0.89	1.87 (3.12)[4]	380
MS1H2-15C30CD	100		5000	1.07	2.46 (3.71)[4]	
MS1H2-20C30CD	100			1.14	3.06 (4.31)[4]	
MS1H2-25C30CD	100			1.11	3.65 (4.90)[4]	
MS1H2-30C30CD	130			1.16	7.72 (10.22)[4]	
MS1H2-40C30CD	130	3000	5000	1.16	12.1 (14.6)[4]	380
MS1H2-50C30CD	130			1.16	15.4 (17.9)[4]	
MS1H3-85B15CB	130	1500	3000	0.95	13.3 (14)[4]	220
MS1H3-13C15CB	130			0.95	17.8 (18.5)[4]	
MS1H3-85B15CD	130			1.87	13.3 (14)[4]	380
MS1H3-13C15CD	130			1.87	17.8 (18.5)[4]	
MS1H3-18C15CD	130			1.87	25 (25.7)[4]	
MS1H3-29C15CD	180			1.82	55 (57.2)[4]	

MS1H3-44C15CD	180	1500	3000	1.90	88.9 (90.8)[4]	380
MS1H3-55C15CD	180			1.74	107 (109.5)[4]	
MS1H3-75C15CD	180			1.99	141 (143.1)[4]	
MS1H4-40B30CB	60	3000	6000	0.53	0.657 (0.667)[4]	220
MS1H4-75B30CB	80			0.58	2 (2.012)[4]	

NOTE

- [1] The motor with oil sealing must be derated by 10% during use.
- [2]Values in () represent the maxiumum torque of the motor at a speed of 2000 rpm.
- [3]Values in () represent the maxiumum torque of the motor at a speed of 2000 rpm.
- [4] Parameters in () are for the motor with brake.

The parameters in the preceding table are the values when the motor works together with Inovance servo drive and the armature coil temperature is 20°C.

The preceding features are based on the cooling conditions when the following heatsinks are installed.

MS1H1/MS1H4: 250 x 250 x 6 mm (aluminum)

MS1H2-10C to 25C：300 x 300 x 12mm（aluminum）

MS1H2-30C to 50C：400 x 400 x 20mm（aluminum）

MS1H3-85B to 18C：400 x 400 x 20mm（iron）

MS1H3-29C to 75C：360 x 360 x 25mm（dual-layer aluminum plate）

1.3.3 Overload Characteristics

Load Ratio (%)	Running Time (s)
120	230
130	80
140	40
150	30
160	20
170	17
180	15
190	12
200	10
210	8.5
220	7
230	6
240	5.5
250	5
300	3
350	2

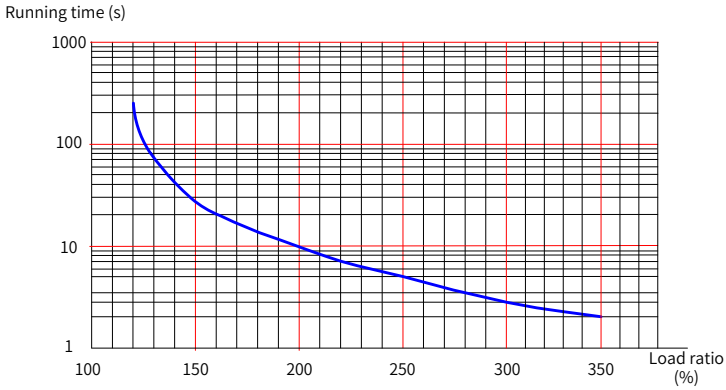


Figure 1-5 Overload curve

NOTE

- The maximum torque of an H1 or H4 motor is 3.5 times of the rated torque.
- The maximum torque of H2 models is three times the rated torque.
- The maximum torque of H3 models, except for those in 2.9 kW, is 2.5 times the rated torque.
- For the models in 2.9 kW, the maximum torque is two times the rated torque.

1.3.4 Radial/Axial Allowable Load

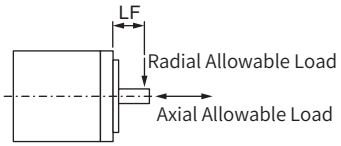


Figure 1-6 Diagram of radial and axial loads

Motor Model	Frame Size(mm)	LF(mm)	Radial Allowable Load (N)	Axial Allowable Load (N)
MS1H1-05B30CB	40	20	78	54
MS1H1-10B30CB	40	20	78	54
MS1H1-20B30CB	60	25	245	74
MS1H1-40B30CB	60	25	245	74
MS1H1-55B30CB	80	35	392	147
MS1H1-75B30CB	80	35	392	147
MS1H1-10C30CB	80	35	392	147
MS1H2-10C30CB	100	45	686	196
MS1H2-10C30CD	100	45	686	196
MS1H2-15C30CB	100	45	686	196
MS1H2-15C30CD	100	45	686	196
MS1H2-20C30CD	100	45	686	196
MS1H2-25C30CD	100	45	686	196

Motor Model	Frame Size(mm)	LF(mm)	Radial Allowable Load (N)	Axial Allowable Load (N)
MS1H2-30C30CD	130	63	980	392
MS1H2-40C30CD	130	63	1176	392
MS1H2-50C30CD	130	63	1176	392
MS1H3-85B15CB	130	45	686	196
MS1H3-13C15CB	130	45	686	196
MS1H3-85B15CD	130	45	686	196
MS1H3-13C15CD	130	45	686	196
MS1H3-18C15CD	130	45	686	196
MS1H3-29C15CD	180	79	1470	490
MS1H3-44C15CD	180	79	1470	490
MS1H3-55C15CD	180	113	1764	588
MS1H3-75C15CD	180	113	1764	588
MS1H4-40B30CB	60	25	245	74
MS1H4-75B30CB	80	35	392	147

1.3.5 Electrical Specifications of Motor Brake

Motor Model	Frame Size (mm)	Holding Torque (Nm)	Supply Voltage (Vdc) ± 10%	Brake Release Time (ms)	Brake Apply Time (ms)	Rotary Clearance (°)
MS1H1-05B/10B	40	0.3	24	20	35	<1.7
MS1H1-20B/40B	60	1.5		20	60	<1.5
MS1H1-75B	80	2.5		40	60	<1.7
MS1H2-10C/15C/20C/25C	100	8		30	90	<0.5
MS1H2-30C/40C/50C	130	16		60	120	<0.5
MS1H3-85B/13C/18C	130	12		60	120	<0.5
MS1H3-29C/44C/55C/75C	180	48		100	230	<0.5
MS1H4-40B	60	1.5		20	60	<1.5
MS1H4-75B	80	2.5		40	60	<1.7

NOTE

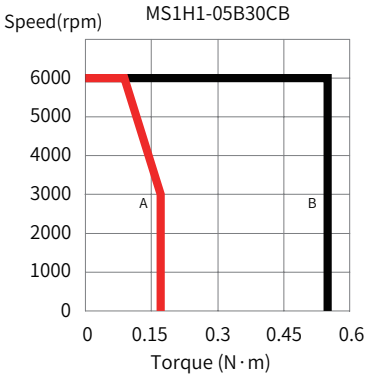
- The brake must not share power supply with other electrical devices. This is to prevent malfunction of the brake due to voltage or current drop when other electrical devices work.
- Cables thicker than 0.5 mm2 are recommended.

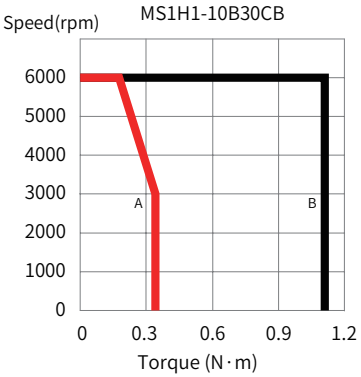
1.3.6 Torque/Speed Characteristics

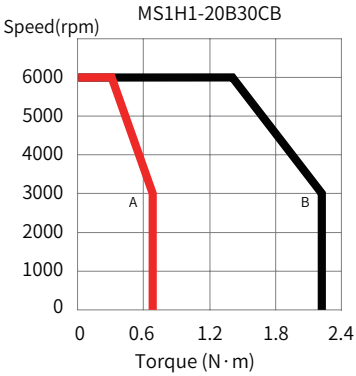
1 MS1H1 (low inertia and small capacity)

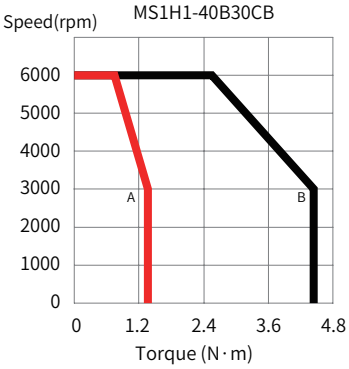
A Continuous operating area

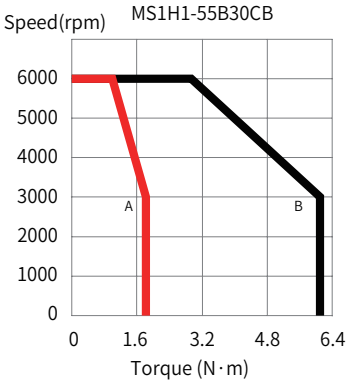
B Short time area

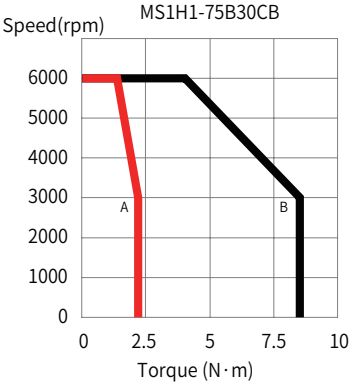


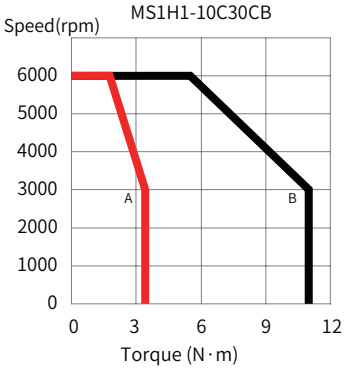








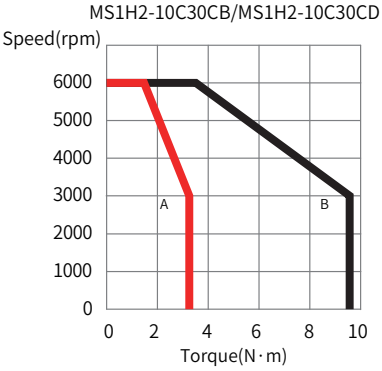


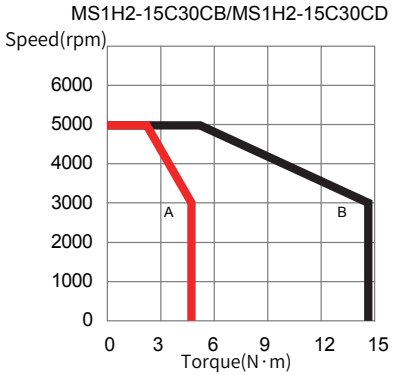


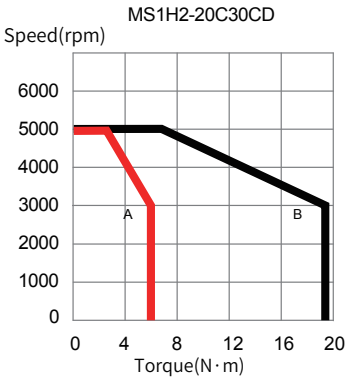
2 MS1H2 (low inertia and medium capacity)

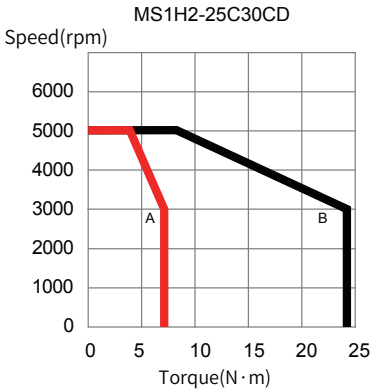
A ——— Continuous operating area

B ——— Short time area

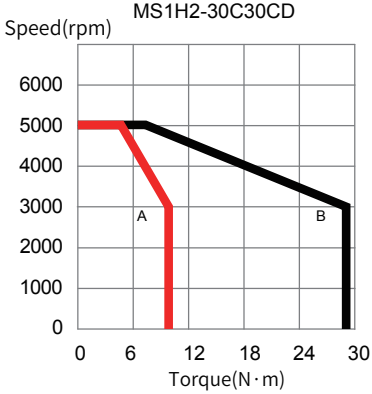




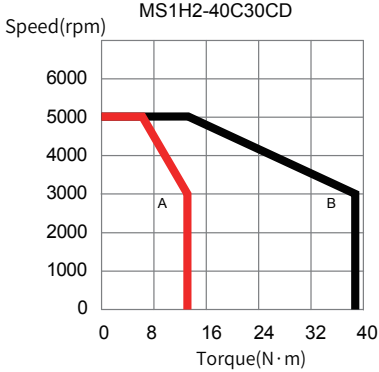




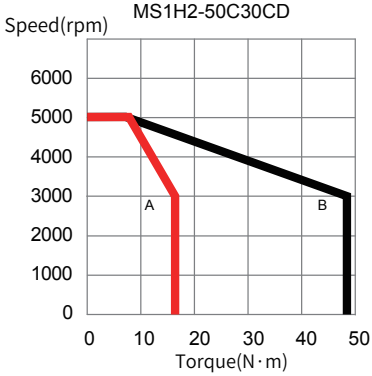
MS1H2-30C30CD



MS1H2-40C30CD



MS1H2-50C30CD

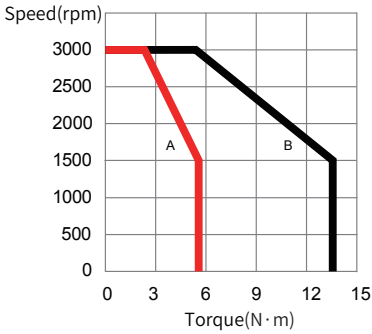


3 MS1H3 (medium inertia and medium capacity)

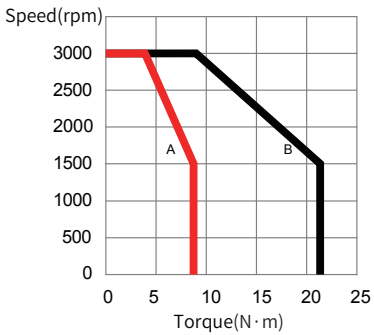
A ——— Continuous operating area

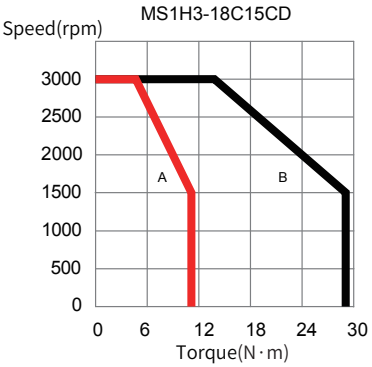
B ——— Short time area

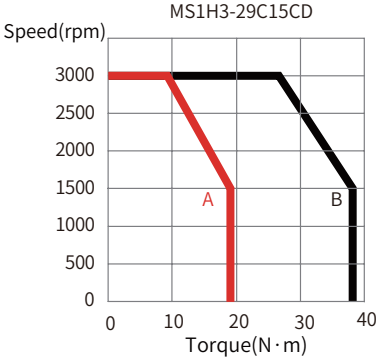
MS1H3-85B15CB/MS1H3-85B15CD



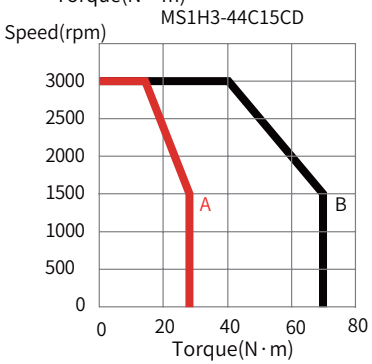
MS1H3-13C15CB/MS1H3-13C15CD

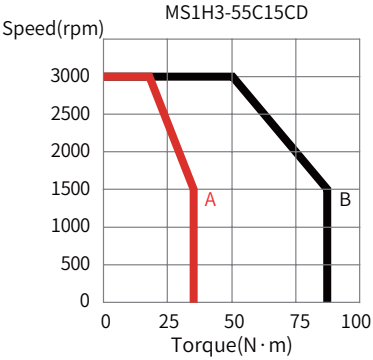


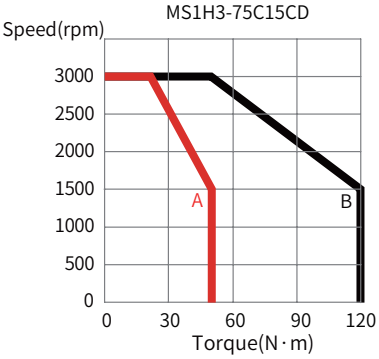




Torque(N・m)



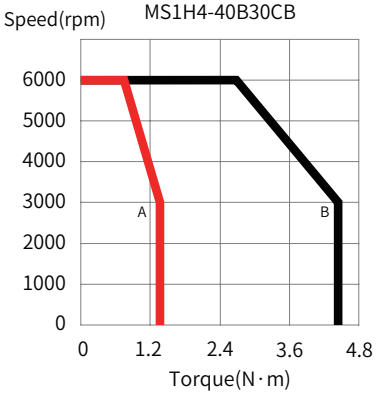


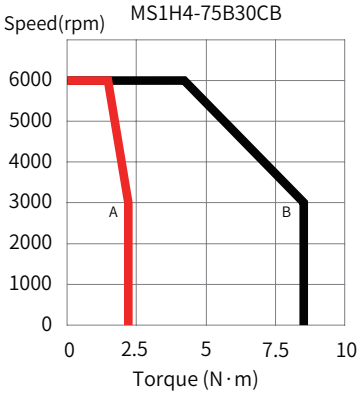


4 MS1H4 (medium inertia and small capacity)

A ——— Continuous operating area

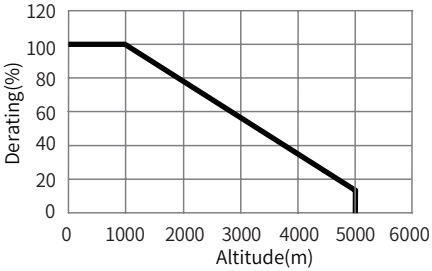
B ——— Short time area



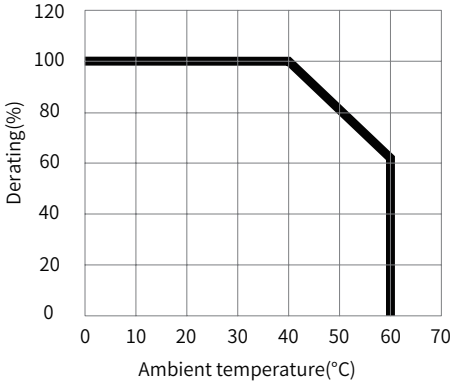


1.3.7 Derating Characteristics

■ Derating curve (altitude)

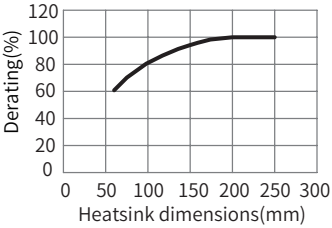


■ Derating curve (high temperature)

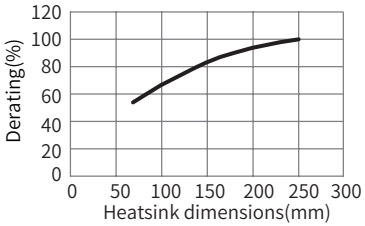


■ Derating curve(heat dissipation)

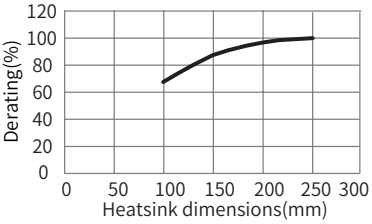
MS1H1-05B30CB/MS1H1-10B30CB



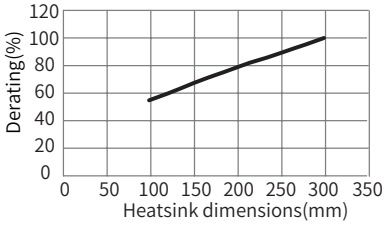
MS1H1-20B30CB/MS1H1-40B30CB
/MS1H4-40B30CB



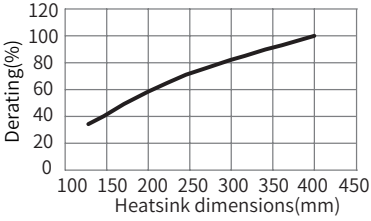
MS1H1-55B30CB/MS1H1-75B30CB
/MS1H1-10C30CB/MS1H4-75B30CB



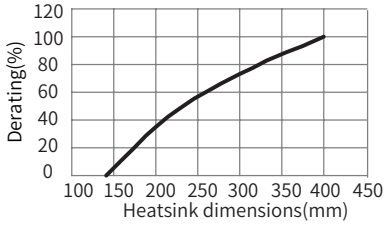
MS1H2-10C30C*/MS1H2-15C30C*
/MS1H2-20C30CD/MS1H2-25C30CD



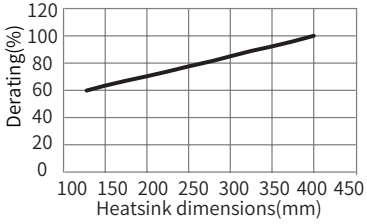
MS1H2-30C30CD



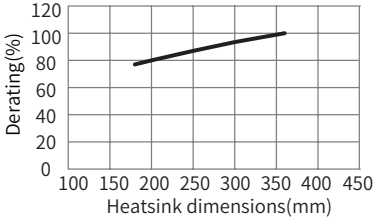
MS1H2-40C30CD/MS1H2-50C30CD



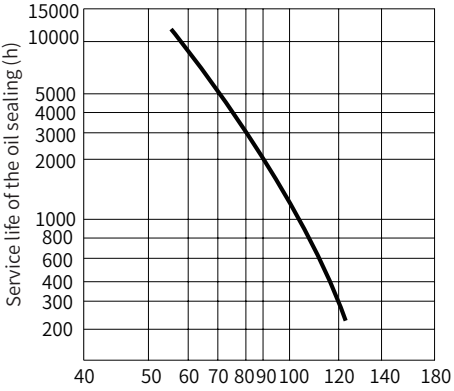
MS1H3-85B15C*/MS1H3-13C15C*
/MS1H3-18C15CD



MS1H3-29C15CD/MS1H3-44C15CD
MS1H3-55C15CD/MS1H3-75C15CD



1.3.8 Temperature Curve of the Oil Sealing



1.4 Cables

1.4.1 IS620

■ Frame size 40/60/80

Table 1-1 Cables for terminal-type (Z series) motors with front cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M007-3.0	S6-L-M007-5.0	S6-L-M007-10.0
Power cable (with brake)	S6-L-B007-3.0	S6-L-B007-5.0	S6-L-B007-10.0
Absolute encoder cable	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0
Incremental encoder cable	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0

Table 1-2 Cables for terminal-type (Z series) motors with rear cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M008-3.0	S6-L-M008-5.0	S6-L-M008-10.0
Power cable (with brake)	S6-L-B008-3.0	S6-L-B008-5.0	S6-L-B008-10.0
Absolute encoder cable	S6-L-P025-3.0	S6-L-P025-5.0	S6-L-P025-10.0
Incremental encoder cable	S6-L-P015-3.0	S6-L-P015-5.0	S6-L-P015-10.0

Table 1-3 Cables for lead wire-type (Z-S series) motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M000-3.0	S6-L-M000-5.0	S6-L-M000-10.0
Power cable (with brake)	S6-L-B000-3.0	S6-L-B000-5.0	S6-L-B000-10.0
Absolute encoder cable	S6-L-P020-3.0	S6-L-P020-5.0	S6-L-P020-10.0
Incremental encoder cable	S6-L-P010-3.0	S6-L-P010-5.0	S6-L-P010-10.0

NOTE

- Cables listed in preceding tables can be changed to flexible cables for use in motion parts such as manipulators. To order the flexible cable, add an extra "-T" at the end of its model number and indicate in the order your demands for flexible cables applicable to cable carriers.
- Terminal-type motor encoder cables shorter than 25 m require no adapter cables.
  Specification for cables between 10 m to 25 m: 1Px22AWG+2Px26AWG
  Specification for cables shorter than 10 m: 3Px26AWG
- The S6-C24 cable kit is required for terminal-type motor encoder cables longer than 25 m. Contact Inovance sales staff for details on the cable length.
- Specifications of swinging-type motor encoder cables:
  10 m to 25 m: 1Px22AWG+2Px26AWG below 10 m: 3Px26AWG
- Contact our sales staff for purchasing swinging-type motor encoder cables longer than 25 m.

■ Frame size100/130

Table 1-4 Cables for MS1H2/MS1H3 series motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M011-3.0	S6-L-M011-5.0	S6-L-M011-10.0
Power cable (with brake)	S6-L-B011-3.0	S6-L-B011-5.0	S6-L-B011-10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

■ Frame size180

Table 1-5 Cables for MS1H3 series motors (2.9kW)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M012-3.0	S6-L-M012-5.0	S6-L-M012-10.0
Power cable (with brake)	S6-L-B012-3.0	S6-L-B012-5.0	S6-L-B012-10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

Table 1-6 Cables for MS1H3 series motors (2.9kW above)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M022-3.0	S6-L-M022-5.0	S6-L-M022-10.0
Power cable (with brake)	S6-L-B022-3.0	S6-L-B022-5.0	S6-L-B022-10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

1.4.2 IS810N-INT

■ Frame size 40/60/80

Table 1-7 Cables for terminal-type (Z series) motors with front cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M107-3.0	S6-L-M107-5.0	S6-L-M107-10.0
Power cable (with brake)	S6-L-B107-3.0	S6-L-B107-5.0	S6-L-B107-10.0
Absolute encoder cable	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0
Incremental encoder cable	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0

Table 1-8 Cables for terminal-type (Z series) motors with rear cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M108-3.0	S6-L-M108-5.0	S6-L-M108-10.0
Power cable (with brake)	S6-L-B108-3.0	S6-L-B108-5.0	S6-L-B108-10.0
Absolute encoder cable	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0
Incremental encoder cable	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0

Table 1-9 Cables for lead wire-type (Z-S series) motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M100-3.0	S6-L-M100-5.0	S6-L-M100-10.0

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (with brake)	S6-L-B100-3.0	S6-L-B100-5.0	S6-L-B100-10.0
Absolute encoder cable	S6-L-P020-3.0	S6-L-P020-5.0	S6-L-P020-10.0
Incremental encoder cable	S6-L-P010-3.0	S6-L-P010-5.0	S6-L-P010-10.0

NOTE

- Cables listed in preceding tables can be changed to flexible cables for use in motion parts such as manipulators. To order the flexible cable, add an extra "-T" at the end of its model number and indicate in the order your demands for flexible cables applicable to cable carriers.
- Terminal-type motor encoder cables shorter than 25 m require no adapter cables.
  Specification for cables between 10 m to 25 m: 1Px22AWG+2Px26AWG
  Specification for cables shorter than 10 m: 3Px26AWG
- The S6-C24 cable kit is required for terminal-type motor encoder cables longer than 25 m. Contact Inovance sales staff for details on the cable length.
- Specifications of swinging-type motor encoder cables:
  10 m to 25 m: 1Px22AWG+2Px26AWG below 10 m: 3Px26AWG
- Contact our sales staff for purchasing swinging-type motor encoder cables longer than 25 m

■ Frame size 100/130

Table 1-10 Cables for MS1H2/MS1H3 series motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M111-3.0	S6-L-M111-5.0	S6-L-M111-10.0
Power cable (with brake)	S6-L-B111-3.0	S6-L-B111-5.0	S6-L-B111-10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

■ Frame size 180

Table 1-11 Cables for MS1H3 series motors (2.9kW)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M112-3.0	S6-L-M112-5.0	S6-L-M112-10.0
Power cable (with brake)	S6-L-B112-3.0	S6-L-B112-5.0	S6-L-B112-10.0

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

Table 1-12 Cables for MS1H3 series motors（2.9kW above）

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M122-3.0	S6-L-M122-5.0	S6-L-M122-10.0
Power cable (with brake)	S6-L-B122-3.0	S6-L-B122-5.0	S6-L-B122-10.0
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

1.4.3 IS810P

■ Frame size 40/60/80

Table 1-13 Cables for terminal-type (Z series) motors with front cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M007-3.0-810P	S6-L-M007-5.0-810P	S6-L-M007-10.0-810P
Power cable (with brake)	S6-L-B007-3.0-810P	S6-L-B007-5.0-810P	S6-L-B007-10.0-810P
Absolute encoder cable	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0
Incremental encoder cable	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0

Table 1-14 Cables for terminal-type (Z series) motors with rear cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M008-3.0-810P	S6-L-M008-5.0-810P	S6-L-M008-10.0-810P
Power cable (with brake)	S6-L-B008-3.0-810P	S6-L-B008-5.0-810P	S6-L-B008-10.0-810P
Absolute encoder cable	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Incremental encoder cable	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0

Table 1-15 Cables for lead wire-type (Z-S series) motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M000-3.0-810P	S6-L-M000-5.0-810P	S6-L-M000-10.0-810P
Power cable (with brake)	S6-L-B000-3.0-810P	S6-L-B000-5.0-810P	S6-L-B000-10.0-810P
Absolute encoder cable	S6-L-P020-3.0	S6-L-P020-5.0	S6-L-P020-10.0
Incremental encoder cable	S6-L-P010-3.0	S6-L-P010-5.0	S6-L-P010-10.0

NOTE

- Cables listed in preceding tables can be changed to flexible cables for use in motion parts such as manipulators. To order the flexible cable, add an extra "-T" at the end of its model number and indicate in the order your demands for flexible cables applicable to cable carriers.
- Terminal-type motor encoder cables shorter than 25 m require no adapter cables.
  Specification for cables between 10 m to 25 m: 1Px22AWG+2Px26AWG
  Specification for cables shorter than 10 m: 3Px26AWG
- The S6-C24 cable kit is required for terminal-type motor encoder cables longer than 25 m. Contact Inovance sales staff for details on the cable length.
- Specifications of swinging-type motor encoder cables:
  10 m to 25 m: 1Px22AWG+2Px26AWG below 10 m: 3Px26AWG
- Contact our sales staff for purchasing swinging-type motor encoder cables longer than 25 m

■ Frame size 100/130

Table 1-16 Cables for MS1H2/MS1H3 series motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M011-3.0-810P	S6-L-M011-5.0-810P	S6-L-M011-10.0-810P
Power cable (with brake)	S6-L-B011-3.0-810P	S6-L-B011-5.0-810P	S6-L-B011-10.0-810P
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

■ Frame size 180

Table 1-17 Cables for MS1H3 series motors (2.9kW)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M012-3.0-810P	S6-L-M012-5.0-810P	S6-L-M012-10.0-810P
Power cable (with brake)	S6-L-B012-3.0-810P	S6-L-B012-5.0-810P	S6-L-B012-10.0-810P
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

Table 1-18 Cables for MS1H3 series motors (2.9kW above)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M022-3.0-810P	S6-L-M022-5.0-810P	S6-L-M022-10.0-810P
Power cable (with brake)	S6-L-B022-3.0-810P	S6-L-B022-5.0-810P	S6-L-B022-10.0-810P
Absolute encoder cable	S6-L-P021-3.0	S6-L-P021-5.0	S6-L-P021-10.0
Incremental encoder cable	S6-L-P011-3.0	S6-L-P011-5.0	S6-L-P011-10.0

1.4.2 SV820N

Table 1-19 Cables for terminal-type (Z series) motors with front cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M107-3.0	S6-L-M107-5.0	S6-L-M107-10.0
Power cable (with brake)	S6-L-B107-3.0	S6-L-B107-5.0	S6-L-B107-10.0
Absolute encoder cable	S6-L-P124-3.0	S6-L-P124-5.0	S6-L-P124-10.0
Incremental encoder cable	S6-L-P114-3.0	S6-L-P114-5.0	S6-L-P114-10.0

Table 1-20 Cables for terminal-type (Z series) motors with rear cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M108-3.0	S6-L-M108-5.0	S6-L-M108-10.0
Power cable (with brake)	S6-L-B108-3.0	S6-L-B108-5.0	S6-L-B108-10.0
Absolute encoder cable	S6-L-P125-3.0	S6-L-P125-5.0	S6-L-P125-10.0
Incremental encoder cable	S6-L-P115-3.0	S6-L-P115-5.0	S6-L-P115-10.0

Table 1-21 Cables for lead wire-type (Z-S series) motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M100-3.0	S6-L-M100-5.0	S6-L-M100-10.0
Power cable (with brake)	S6-L-B100-3.0	S6-L-B100-5.0	S6-L-B100-10.0
Absolute encoder cable	S6-L-P120-3.0	S6-L-P120-5.0	S6-L-P120-10.0
Incremental encoder cable	S6-L-P110-3.0	S6-L-P110-5.0	S6-L-P110-10.0

NOTE

- The cables matching SV820N servo drives are re-named from SV82-L-** to S6-L-**.
- Cables listed in preceding tables can be changed to flexible cables for use in motion parts such as manipulators. To order the flexible cable, add an extra "-T" at the end of its model number and indicate in the order your demands for flexible cables applicable to cable carriers.
- Terminal-type motor encoder cables shorter than 25 m require no adapter cables.
  Specification for cables between 10 m to 25 m: 1Px22AWG+2Px26AWG
  Specification for cables shorter than 10 m: 3Px26AWG
- The S6-C24 cable kit is required for terminal-type motor encoder cables longer than 25 m. Contact Inovance sales staff for details on the cable length.
- Specifications of swinging-type motor encoder cables:
  10 m to 25 m: 1Px22AWG+2Px26AWG below 10 m: 3Px26AWG
- Contact our sales staff for purchasing swinging-type motor encoder cables longer than 25 m.

1.4.3 SV660P/N

■ Frame Size 40/60/80

Table 1-22 Cables for terminal-type (Z series) motors with front cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M107-3.0	S6-L-M107-5.0	S6-L-M107-10.0
Power cable (with brake)	S6-L-B107-3.0	S6-L-B107-5.0	S6-L-B107-10.0
Absolute encoder cable	S6-L-P124-3.0	S6-L-P124-5.0	S6-L-P124-10.0
Incremental encoder cable	S6-L-P114-3.0	S6-L-P114-5.0	S6-L-P114-10.0

Table 1-23 Cables for terminal-type (Z series) motors with rear cable outlets

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M108-3.0	S6-L-M108-5.0	S6-L-M108-10.0
Power cable (with brake)	S6-L-B108-3.0	S6-L-B108-5.0	S6-L-B108-10.0
Absolute encoder cable	S6-L-P125-3.0	S6-L-P125-5.0	S6-L-P125-10.0
Incremental encoder cable	S6-L-P115-3.0	S6-L-P115-5.0	S6-L-P115-10.0

Table 1-24 Cables for lead wire-type (Z-S series) motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M100-3.0	S6-L-M100-5.0	S6-L-M100-10.0
Power cable (with brake)	S6-L-B100-3.0	S6-L-B100-5.0	S6-L-B100-10.0
Absolute encoder cable	S6-L-P120-3.0	S6-L-P120-5.0	S6-L-P120-10.0
Incremental encoder cable	S6-L-P110-3.0	S6-L-P110-5.0	S6-L-P110-10.0

NOTE

- Cables listed in preceding tables can be changed to flexible cables for use in motion parts such as manipulators. To order the flexible cable, add an extra "-T" at the end of its model number and indicate in the order your demands for flexible cables applicable to cable carriers.
- Terminal-type motor encoder cables shorter than 25 m require no adapter cables.
  Specification for cables between 10 m to 25 m: 1Px22AWG+2Px26AWG
  Specification for cables shorter than 10 m: 3Px26AWG
- The S6-C24 cable kit is required for terminal-type motor encoder cables longer than 25 m. Contact Inovance sales staff for details on the cable length.
- Specifications of swinging-type motor encoder cables:
  10 m to 25 m: 1Px22AWG+2Px26AWG
  below 10 m: 3Px26AWG
- Contact our sales staff for purchasing swinging-type motor encoder cables longer than 25 m

■ Frame Size 100/130

Table 1-25 Cables for MS1H2/MS1H3 series motors

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M111-3.0	S6-L-M111-5.0	S6-L-M111-10.0
Power cable (with brake)	S6-L-B111-3.0	S6-L-B111-5.0	S6-L-B111-10.0
Absolute encoder cable	S6-L-P121-3.0	S6-L-P121-5.0	S6-L-P121-10.0
Incremental encoder cable	S6-L-P111-3.0	S6-L-P111-5.0	S6-L-P111-10.0

■ Frame Size 180

Table 1-26 Cables for MS1H3 series motors (2.9kW)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M112-3.0	S6-L-M112-5.0	S6-L-M112-10.0
Power cable (with brake)	S6-L-B112-3.0	S6-L-B112-5.0	S6-L-B112-10.0
Absolute encoder cable	S6-L-P121-3.0	S6-L-P121-5.0	S6-L-P121-10.0
Incremental encoder cable	S6-L-P111-3.0	S6-L-P111-5.0	S6-L-P111-10.0

Table 1-27 Cables for MS1H3 series motors (above 2.9kW)

Cable Type	Cable Length (m)		
	3.0	5.0	10.0
Power cable (without brake)	S6-L-M122-3.0	S6-L-M122-5.0	S6-L-M122-10.0
Power cable (with brake)	S6-L-B122-3.0	S6-L-B122-5.0	S6-L-B122-10.0
Absolute encoder cable	S6-L-P121-3.0	S6-L-P121-5.0	S6-L-P121-10.0
Incremental encoder cable	S6-L-P111-3.0	S6-L-P111-5.0	S6-L-P111-10.0

1.5 Connector Kit

Motor Model	Connector	Optional Battery Kit for Motor with Absolute Encoder
MS1H1-*******-U3*** MS1H4-*******-U3***	S6-C1 Kit contents: CN1 terminal, CN2 terminal, 6-pin connector, and 9-pin connector	-
MS1H1-*******-A3*** MS1H4-*******-A3***		S6 — C4(battery, battery box)
MS1H2-*******-U3***	S6-C2 Kit contents: CN1 terminal, CN2 terminal, 20-18 aviation plug (elbow), and 20-29 aviation plug (elbow)	-
MS1H2-*******-A3***		S6 — C4(battery, battery box)
MS1H3-*******-U3***	S6-C2 Kit contents: CN1 terminal, CN2 terminal, 20-18 aviation plug (elbow), and 20-29 aviation plug (elbow)	-
MS1H3-*******-A3*** (1.8 kW and below)		S6 — C4(battery, battery box)
MS1H3-*******-U3***	S6-C3 Kit contents: CN1 terminal, CN2 terminal, 20-22 aviation plug (elbow), and 20-29 aviation plug (elbow)	-
MS1H3-*******-A3*** (2.9kW)		S6 — C4(battery, battery box)
MS1H3-*******-U3***		-
MS1H3-*******-A3*** (2.9 kW and above)		S6 — C4(battery, battery box)

2 Installation and Wiring

2.1 Installation

1 Installation location

Install the servo motor in an environment free from corrosive or inflammable gases or combustible goods, such as hydrogen sulfide, chlorine, anmonia, sulphur gas, chloridize gas, acid, soda and salt.

- Use the servo motor with oil sealing when the motor is to be used in a place with grinding fluid, oil spray, iron powder or cuttings.
- Install the servo motor away from heat sources such as heating stove.
- Do not use the servo motor in an enclosed environment. Working in the enclosed environment will lead to high temperature of the servo motor, which will shorten its service life.
- Prevent water and foreign matters from entering the terminals to avoid impacts on installation and use of the product.

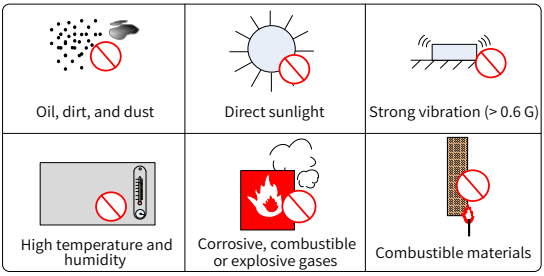


Figure 2-1 Installation environment requirements

2 Installation environment

Table 2-1 Installation environment

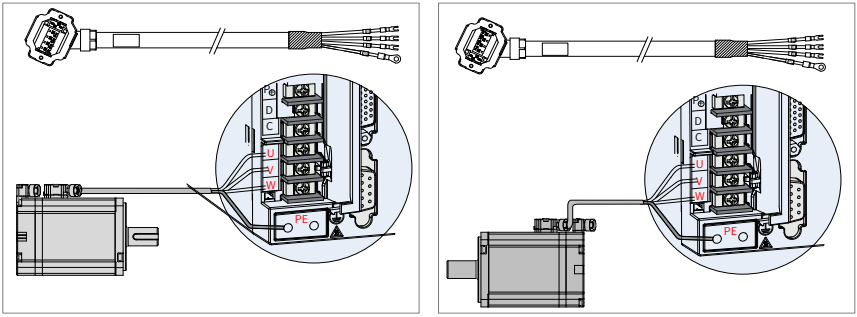
Item	Description
Ambient temperature	0℃ to 40℃ (no freezing)
Ambient humidity	20% to 80% RH (no condensing)
Storage temperature	-20℃ to 60℃ (maximum temperature and duration: 80℃, 72h)
Storage humidity	20% to 90% RH (no condensing)
Vibration	Below 49 m/s^2
Impact	Below 490 m/s^2
Ingress protection	H1, H2, H3 and H4: IP67 (except for shaft opening; connectors of power cables and encoder cables are in good connection)
Altitude	Below 1000 m (de-rated for altitude above 1000 m)

2.2 Wiring

- The frame size refers to flange width.
- The motor cable colors are subject to the actual. The cable colors mentioned in this guide are all Inovance cables.

2.2.1 Wiring of Power Cables

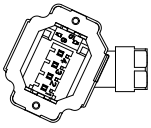
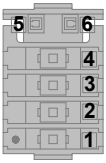
1 Connection to power cables of IS620 series servo drive



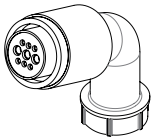
Direction of cable outlet: Front　　Direction of cable outlet: Rear

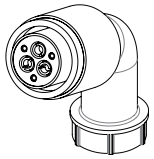
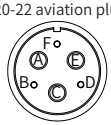
Figure 2-2 Diagram of connection to power cables of IS620 series servo drive

Table 2-2 Connectors of power cables on the motor side

<table>
<tr><th>Outline Drawing</th><th>Pin Layout</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>  </td><td>Black 6-pin connector
 

<table>
<tr><th>Pin No.</th><th colspan="2">Signal</th><th>Color</th></tr>
<tr><td>1</td><td colspan="2">PE</td><td>Yellow/ green</td></tr>
<tr><td>2</td><td colspan="2">W</td><td>Red</td></tr>
<tr><td>3</td><td colspan="2">V</td><td>Black</td></tr>
<tr><td>4</td><td colspan="2">U</td><td>White</td></tr>
<tr><td>5</td><td>Brake signal</td><td>Positive</td><td>Brown</td></tr>
<tr><td>6</td><td>Brake signal</td><td>Negative</td><td>Blue</td></tr>
</table></td><td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td></tr>
</table>

<table>
<tr><th>Outline Drawing</th><th>Pin Layout</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>  </td><td>20-18 aviation plug
 

MIL-DTL-5015 series 3108E20-18S aviation plug
<table>
<tr><th colspan="2">New Structure</th><th colspan="2">Old Structure</th><th rowspan="2">Color</th></tr>
<tr><th>Pin No.</th><th>Signal</th><th>Pin No.</th><th>Signal</th></tr>
<tr><td>B</td><td>U</td><td>B</td><td>U</td><td>Blue</td></tr>
<tr><td>I</td><td>V</td><td>I</td><td>V</td><td>Black</td></tr>
<tr><td>F</td><td>W</td><td>F</td><td>W</td><td>Red</td></tr>
<tr><td>G</td><td>PE</td><td>G</td><td>PE</td><td>Yellow/ green</td></tr>
<tr><td>C</td><td>Brake signal (Positive)</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>E</td><td>Brake signal (Negative)</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td>Size 100
Size 130</td></tr>
<tr><td>  </td><td>20-22 aviation plug
 

MIL-DTL-5015 series 3108E20-22S aviation plug
<table>
<tr><th colspan="2">Y Series Terminal Definition</th><th colspan="2">Z Series Terminal Definition</th><th rowspan="2">Color</th></tr>
<tr><th>Pin No.</th><th>Signal</th><th>Pin No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>A</td><td>U</td><td>Blue</td></tr>
<tr><td>C</td><td>V</td><td>C</td><td>V</td><td>Black</td></tr>
<tr><td>E</td><td>W</td><td>E</td><td>W</td><td>Red</td></tr>
<tr><td>F</td><td>PE</td><td>F</td><td>PE</td><td>Yellow/ green</td></tr>
<tr><td colspan="2" rowspan="2">-</td><td>B</td><td>Brake signal (Negative)</td><td rowspan="2">-</td></tr>
<tr><td>D</td><td>Brake signal (Positive)</td></tr>
</table></td><td>Size 180</td></tr>
</table>

2 Connection to power cables of SV820N or IS810 series servo drive

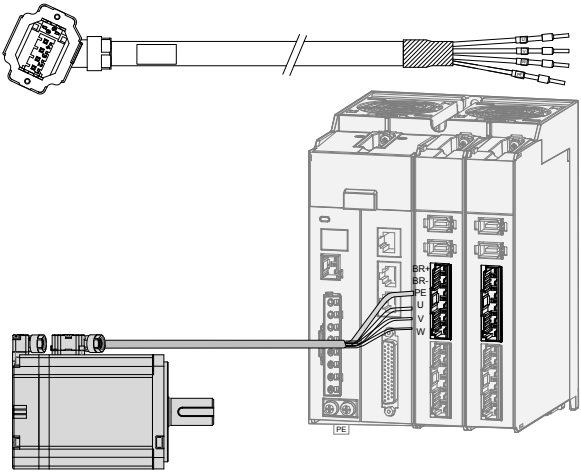
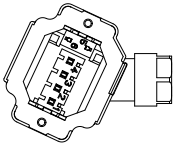
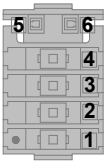


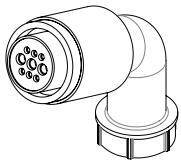
Figure 2-3 Diagram of connection to power cables of SV820N series servo drive

Table 2-3 Connectors of power cables on the motor side

<table>
<tr><th>Outline Drawing</th><th>Terminal Pin Arrangement</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>  </td><td>Black 6-pin connector
 

<table>
<tr><th>Pin No.</th><th colspan="2">Signal</th><th>Color</th></tr>
<tr><td>1</td><td colspan="2">PE</td><td>Yellow/ green</td></tr>
<tr><td>2</td><td colspan="2">W</td><td>Red</td></tr>
<tr><td>3</td><td colspan="2">V</td><td>Black</td></tr>
<tr><td>4</td><td colspan="2">U</td><td>White</td></tr>
<tr><td>5</td><td>Brake signal</td><td>Positive</td><td>Brown</td></tr>
<tr><td>6</td><td>Brake signal</td><td>Negative</td><td>Blue</td></tr>
</table></td><td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td></tr>
</table>

Table 2-4 Connectors of power cables on the motor side of IS810 series servo drive

<table>
<tr><th>Outline Drawing</th><th>Terminal Pin Arrangement</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>  </td><td>MIL-DTL-5015 series 3108E20-18S aviation plug
20-18 aviation plug
 

<table>
<tr><th colspan="2">New Structure</th><th colspan="2">Old Structure</th><th rowspan="2">Color</th></tr>
<tr><th>Pin No.</th><th>Signal</th><th>Pin No.</th><th>Signal</th></tr>
<tr><td>B</td><td>U</td><td>B</td><td>U</td><td>Blue</td></tr>
<tr><td>I</td><td>V</td><td>I</td><td>V</td><td>Black</td></tr>
<tr><td>F</td><td>W</td><td>F</td><td>W</td><td>Red</td></tr>
<tr><td>G</td><td>PE</td><td>G</td><td>PE</td><td>Yellow/ green</td></tr>
<tr><td>C</td><td>Brake signal (Positive)</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>E</td><td>Brake signal (Negative)</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td>Size100
Size130</td></tr>
</table>

3 Connection to power cables of SV660 series servo drive

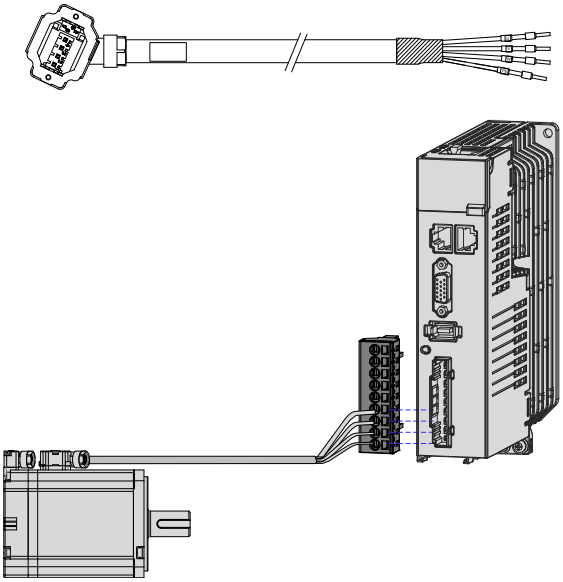
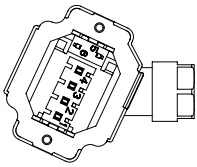
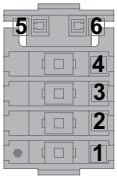


Figure 2-4 Diagram of connection between servo drive output terminals and the servo motor

Table 2-5 Connectors of power cables on the motor side

<table>
<tr><th>Outline Drawing</th><th>Terminal Pin Arrangement</th><th>Frame Size of Matching Motor</th></tr>
<tr>
<td>  </td>
<td>Black 6-pin connector
 

<table>
<tr><th>Pin No.</th><th colspan="2">Signal</th><th>Color</th></tr>
<tr><td>1</td><td colspan="2">PE</td><td>Yellow/ green</td></tr>
<tr><td>2</td><td colspan="2">W</td><td>Red</td></tr>
<tr><td>3</td><td colspan="2">V</td><td>Black</td></tr>
<tr><td>4</td><td colspan="2">U</td><td>White</td></tr>
<tr><td>5</td><td>Brake signal</td><td>Positive</td><td>Brown</td></tr>
<tr><td>6</td><td>Brake signal</td><td>Negative</td><td>Blue</td></tr>
</table>
</td>
<td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td>
</tr>
</table>

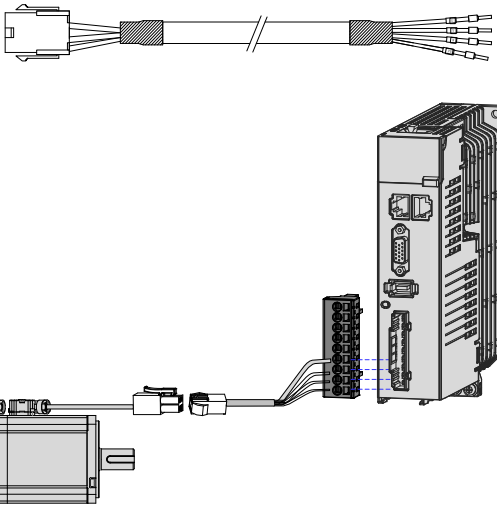
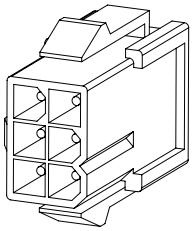
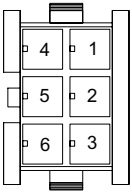


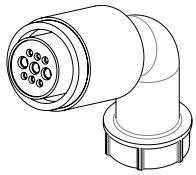
Figure 2-5 Diagram of connection between servo drive output terminals and the servo motor

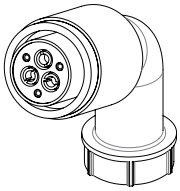
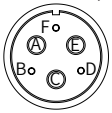
Table 2-6 Connectors of power cables on the motor side

<table>
<tr><th>Outline Drawing</th><th>Terminal Pin Arrangement</th><th>Frame Size of Matching Motor</th></tr>
<tr>
<td>  </td>
<td>Black 6-pin connector
 

<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th></tr>
<tr><td>1</td><td>U</td><td>White</td></tr>
<tr><td>2</td><td>V</td><td>Black</td></tr>
<tr><td>4</td><td>W</td><td>Red</td></tr>
<tr><td>5</td><td>PE</td><td>Yellow/ green</td></tr>
<tr><td>3</td><td>Brake signal (Positive)</td><td rowspan="2">-</td></tr>
<tr><td>6</td><td>Brake signal (Negative)</td></tr>
</table>
Recommendation:
Plastic housing: MOLEX-50361736
Terminal: MOLEX-39000061</td>
<td>Lead wire-type motor:
Size 40 (Z-S series)
Size 60 (Z-S series)
Size 80 (Z-S series)</td>
</tr>
</table>

Table 2-7 Connectors of power cables on the motor side

<table>
<tr><th>Outline Drawing</th><th>Terminal Pin Arrangement</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>  </td><td>MIL-DTL-5015 series 3108E20-18S aviation plug
20-18 aviation plug
 

<table>
<tr><th colspan="2">New Structure</th><th colspan="2">Old Structure</th><th rowspan="2">Color</th></tr>
<tr><th>Pin No.</th><th>Signal</th><th>Pin No.</th><th>Signal</th></tr>
<tr><td>B</td><td>U</td><td>B</td><td>U</td><td>Blue</td></tr>
<tr><td>I</td><td>V</td><td>I</td><td>V</td><td>Black</td></tr>
<tr><td>F</td><td>W</td><td>F</td><td>W</td><td>Red</td></tr>
<tr><td>G</td><td>PE</td><td>G</td><td>PE</td><td>Yellow /Green</td></tr>
<tr><td>C</td><td>Brake signal (Positive)</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>E</td><td>Brake signal (Negative)</td><td>-</td><td>-</td><td>-</td></tr>
</table></td><td>Size 100
Size 130</td></tr>
<tr><td>  </td><td>MIL-DTL-5015 series 3108E20-22S aviation plug
20-22 aviation plug
 

<table>
<tr><th colspan="2">Y Series Terminal Definition</th><th colspan="2">Z Series Terminal Definition</th><th rowspan="2">Color</th></tr>
<tr><th>Pin No.</th><th>Signal</th><th>Pin No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>A</td><td>U</td><td>Blue</td></tr>
<tr><td>C</td><td>V</td><td>C</td><td>V</td><td>Black</td></tr>
<tr><td>E</td><td>W</td><td>E</td><td>W</td><td>Red</td></tr>
<tr><td>F</td><td>PE</td><td>F</td><td>PE</td><td>Yellow /Green</td></tr>
<tr><td colspan="2" rowspan="2">-</td><td>B</td><td>Negative</td><td rowspan="2">-</td></tr>
<tr><td>D</td><td>Positive</td></tr>
</table></td><td>Size 180</td></tr>
</table>

2.2.2 Wiring of Absolute Encoder

1 Connection to encoder cables of IS620 or IS810N-INT series servo drive

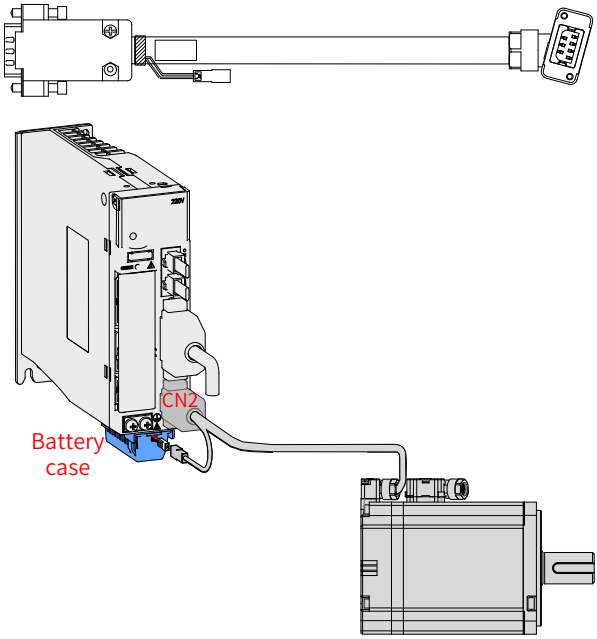


Figure 2-6 Diagram of connection to encoder cables of IS620 series servo drive

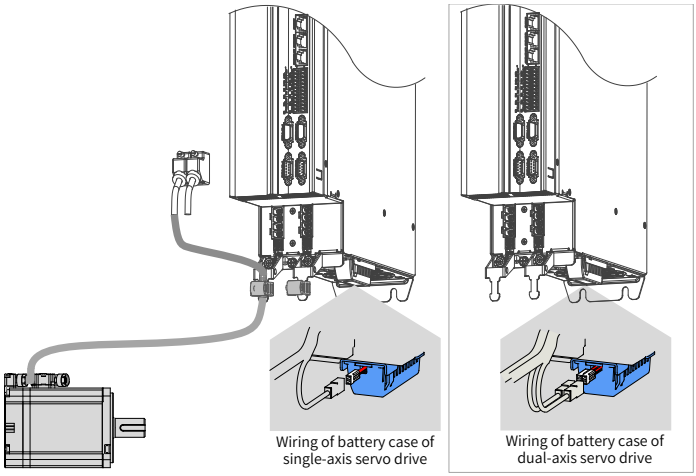
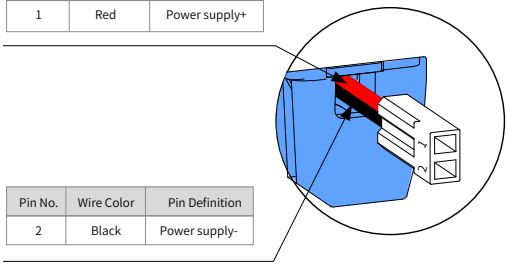


Figure 2-7 Diagram of connection to encoder cables of IS810N-INT series servo drive

Colors of external wires of the battery case:

Pin No.	Wire Color	Pin Definition
1	Red	Power supply+

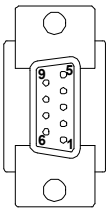


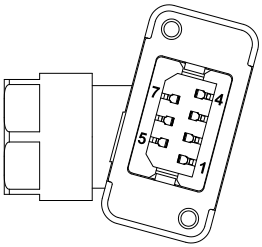
Pin No.	Wire Color	Pin Definition
2	Black	Power supply-

NOTE

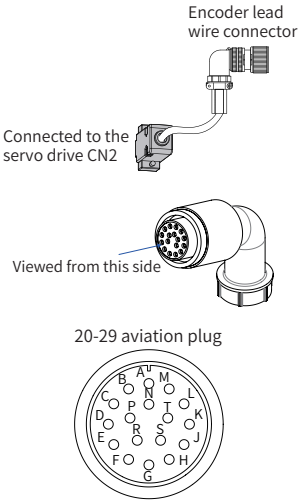
◆ Model of battery case (including batteries):
Battery case of single-axis servo drive: S6-C4
Battery case of dual-axis servo drive: S81-C4

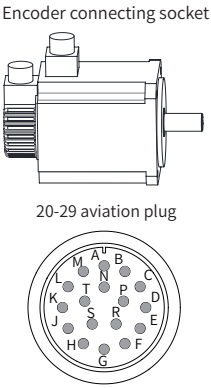
Table 2-8 Connectors of encoder cables

<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th rowspan="2">Frame Size of Matching Motor</th></tr>
<tr><th>On drive side</th><th>On motor side</th></tr>
<tr><td>DB9 male connector
 

<table><tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr><tr><td>1</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr><tr><td>2</td><td>PS-</td><td>Purple</td></tr><tr><td>7</td><td>+5 V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr><tr><td>8</td><td>0 V</td><td>Orange</td></tr><tr><td>Housing</td><td>PE</td><td>-</td><td>-</td></tr></table></td><td>7-pin connector
 

<table><tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr><tr><td>1</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr><tr><td>2</td><td>PS-</td><td>Purple</td></tr><tr><td>3</td><td>DC+</td><td>Brown</td><td rowspan="2">Twisted-pair</td></tr><tr><td>4</td><td>DC-</td><td>Black</td></tr><tr><td>5</td><td>+5 V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr><tr><td>6</td><td>0 V</td><td>Orange</td></tr><tr><td>7</td><td>PE</td><td>-</td><td>-</td></tr></table></td><td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td></tr>
</table>

<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th rowspan="2">Frame Size of Matching Motor</th></tr>
<tr><th>On drive side</th><th>On motor side</th></tr>
<tr>
<td>


<table>
<tr><th>Pin No.</th><th>Signal</th><th>Type</th></tr>
<tr><td>A</td><td>PS+</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td></tr>
<tr><td>G</td><td>+5V</td><td rowspan="3"></td></tr>
<tr><td>H</td><td>GND</td></tr>
<tr><td>J</td><td>Shield</td></tr>
</table>
</td>
<td>


<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>A</td><td>PS+</td><td>Yellow</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td><td>Blue</td></tr>
<tr><td>G</td><td>+5V</td><td>Red</td><td rowspan="3"></td></tr>
<tr><td>H</td><td>GND</td><td>White</td></tr>
<tr><td>J</td><td>Shield</td><td>-</td></tr>
</table>
</td>
<td>Size 100
Size 130
Size 180</td>
</tr>
</table>

2 Connection to encoder cables of SV820N series servo drive

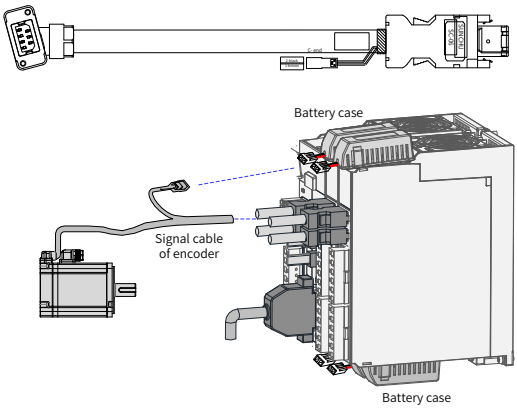
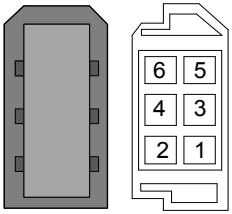
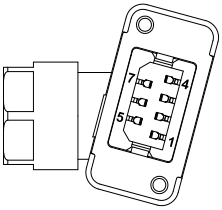


Figure 2-8 Diagram of connection to encoder cables of SV820N series servo drive

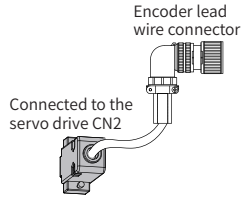
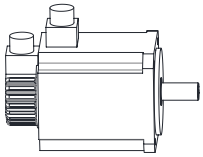
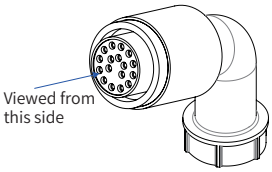
Table 2-9 Connectors of encoder cables (9-pin)

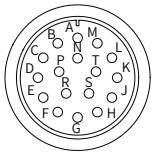
<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th rowspan="2">Frame Size of Matching Motor</th></tr>
<tr><th>On drive side</th><th>On motor side</th></tr>
<tr><td>6-pin male connector (left: connecting side; right: welding side)
 

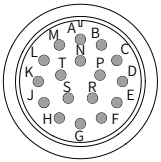
<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>1</td><td>+5 V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>2</td><td>0 V</td><td>Orange</td></tr>
<tr><td>5</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>6</td><td>PS-</td><td>Purple</td></tr>
<tr><td>Housing</td><td>PE</td><td>-</td><td>-</td></tr>
</table></td><td>7-pin connector
 

<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>1</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>2</td><td>PS-</td><td>Purple</td></tr>
<tr><td>3</td><td>DC+</td><td>Brown</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>4</td><td>DC-</td><td>Black</td></tr>
<tr><td>5</td><td>+5 V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>6</td><td>0 V</td><td>Orange</td></tr>
<tr><td>7</td><td>PE</td><td>-</td><td>-</td></tr>
</table></td><td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td></tr>
</table>

Table 2-10 Absolute encoder cable connector（MIL-DTL-5015 series 3108E20-29S aviation plug）

<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th>Frame Size of Matching Motor</th></tr>
<tr><td> 
</td><td> 
</td><td rowspan="2">Size 100
Size 130
Size 180</td></tr>
<tr><td> 

20-29 aviation plug


<table>
<tr><th>Pin No.</th><th>Signal</th><th>Type</th></tr>
<tr><td>A</td><td>PS+</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td></tr>
<tr><td>E</td><td>Battery+</td><td rowspan="2">-</td></tr>
<tr><td>F</td><td>Battery-</td></tr>
<tr><td>G</td><td>+5V</td><td rowspan="3">-</td></tr>
<tr><td>H</td><td>GND</td></tr>
<tr><td>J</td><td>Shield</td></tr>
</table></td><td>20-29 aviation plug


<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>A</td><td>PS+</td><td>Yellow</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td><td>Yellow/ Black</td></tr>
<tr><td>E</td><td>Battery+</td><td>Blue</td><td rowspan="2">-</td></tr>
<tr><td>F</td><td>Battery-</td><td>Blue/ Black</td></tr>
<tr><td>G</td><td>+5V</td><td>Red</td><td rowspan="3">-</td></tr>
<tr><td>H</td><td>GND</td><td>Black</td></tr>
<tr><td>J</td><td>Shield</td><td>-</td></tr>
</table></td></tr>
</table>

3 Connection to encoder cables of SV660N series servo drive

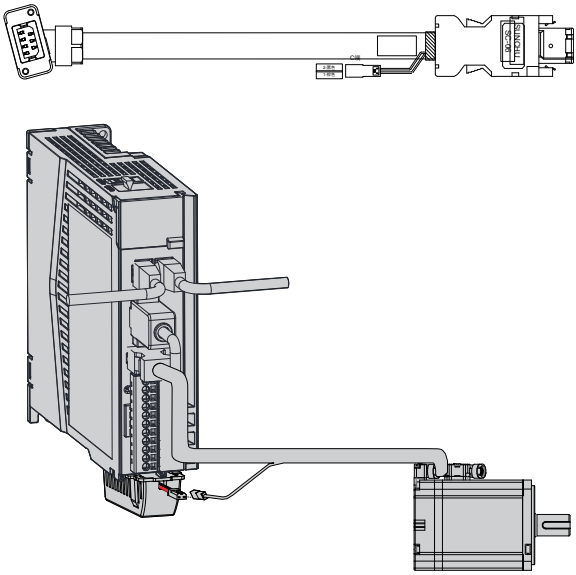
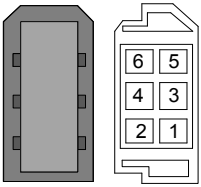
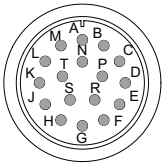


Figure 2-9 Diagram of connection to encoder cables of SV660N series servo drive

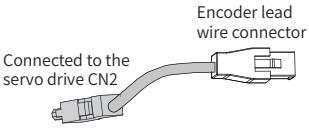
Table 2-11 Terminal-type motor encoder cable connector

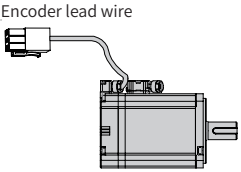
<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th rowspan="2">Frame Size of Matching Motor</th></tr>
<tr><th>On drive side</th><th>On motor side</th></tr>
<tr>
<td>6-pin male connector (left: connecting side; right: welding side)
 

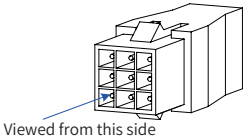
<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>1</td><td>+5V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>2</td><td>0V</td><td>Orange</td></tr>
<tr><td>5</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>6</td><td>PS-</td><td>Purple</td></tr>
<tr><td>Housing</td><td>PE</td><td>-</td><td>-</td></tr>
</table>
</td>
<td>20-29 aviation plug
 

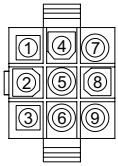
<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>1</td><td>PS+</td><td>Blue</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>2</td><td>PS-</td><td>Purple</td></tr>
<tr><td>3</td><td>DC+</td><td>Brown</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>4</td><td>DC-</td><td>Black</td></tr>
<tr><td>5</td><td>+5V</td><td>Red</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>6</td><td>0V</td><td>Orange</td></tr>
<tr><td>7</td><td>PE</td><td>-</td><td>-</td></tr>
</table>
</td>
<td>Terminal-type motor:
Size 40 (Z series)
Size 60 (Z series)
Size 80 (Z series)</td>
</tr>
</table>

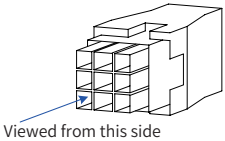
Table 2-12 Lead wire-type motor encoder cable connector (9-pin connector)

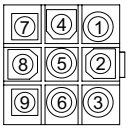
<table>
<tr><th>Outline Drawing and Pin Layout</th><th>Frame Size of Matching Motor</th></tr>
<tr><td>




9-pin connector


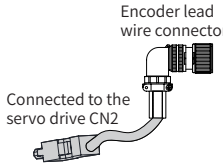
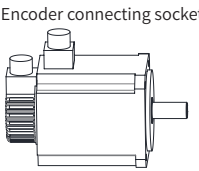
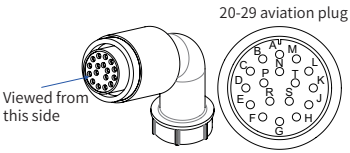


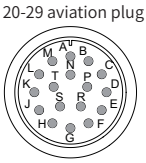
<table>
<tr><th>Pin No.</th><th>Signal</th><th>Type</th></tr>
<tr><td>1</td><td>Battery+</td><td rowspan="2">-</td></tr>
<tr><td>4</td><td>Battery-</td></tr>
<tr><td>3</td><td>PS+</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>6</td><td>PS-</td></tr>
<tr><td>9</td><td>+5V</td><td rowspan="3">-</td></tr>
<tr><td>8</td><td>GND</td></tr>
<tr><td>7</td><td>Shield</td></tr>
</table>
Recommendation:
Plastic housing: AMP 172161-1
Terminal: AMP 770835-1




<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th>Type</th></tr>
<tr><td>1</td><td>Battery+</td><td>Blue</td><td rowspan="4">Twisted-pair</td></tr>
<tr><td>4</td><td>Battery-</td><td>Blue /Black</td></tr>
<tr><td>3</td><td>PS+</td><td>Yellow</td></tr>
<tr><td>6</td><td>PS-</td><td>Yellow /Black</td></tr>
<tr><td>9</td><td>+5V</td><td>Red</td><td rowspan="3">-</td></tr>
<tr><td>8</td><td>GND</td><td>Black</td></tr>
<tr><td>7</td><td>Shield</td><td>-</td></tr>
</table>
</td><td>Lead wire-type motor:
Size 40
(Z-S series)
Size 60
(Z-S series)
Size 80
(Z-S series)</td></tr>
</table>

Table 2-13 Absolute encoder cable connector（MIL-DTL-5015 series 3108E20-29S aviation plug）

<table>
<tr><th colspan="2">Outline Drawing and Pin Layout</th><th>Frame Size of Matching Motor</th></tr>
<tr><td> 
</td><td> 
</td><td rowspan="2">Size 100
Size 130
Size 180</td></tr>
<tr><td> 

<table>
<tr><th>Pin No.</th><th>Signal</th><th></th></tr>
<tr><td>A</td><td>PS+</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td></tr>
<tr><td>E</td><td>Battery+</td><td rowspan="2">-</td></tr>
<tr><td>F</td><td>Battery-</td></tr>
<tr><td>G</td><td>+5V</td><td rowspan="3">-</td></tr>
<tr><td>H</td><td>GND</td></tr>
<tr><td>J</td><td>Shield</td></tr>
</table></td><td> 

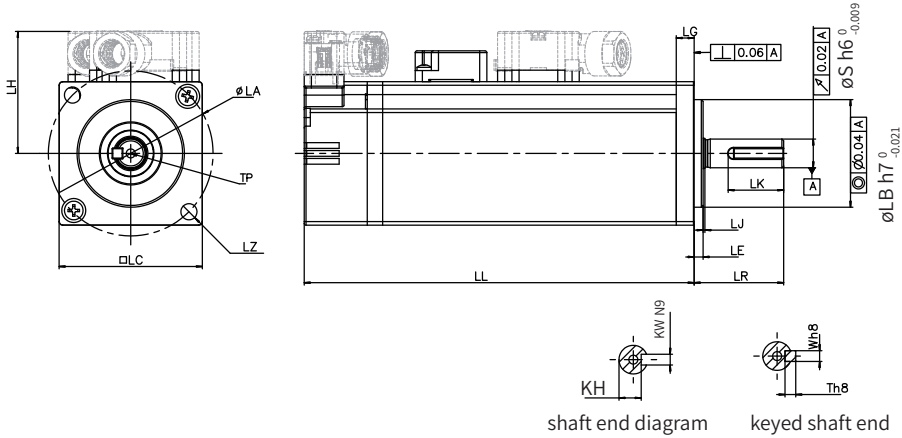
<table>
<tr><th>Pin No.</th><th>Signal</th><th>Color</th><th></th></tr>
<tr><td>A</td><td>PS+</td><td>Yellow</td><td rowspan="2">Twisted-pair</td></tr>
<tr><td>B</td><td>PS-</td><td>Yellow/ Black</td></tr>
<tr><td>E</td><td>Battery+</td><td>Blue</td><td rowspan="2">-</td></tr>
<tr><td>F</td><td>Battery-</td><td>Blue/ Black</td></tr>
<tr><td>G</td><td>+5V</td><td>Red</td><td rowspan="3">-</td></tr>
<tr><td>H</td><td>GND</td><td>Black</td></tr>
<tr><td>J</td><td>Shield</td><td></td></tr>
</table></td></tr>
</table>

3 Mounting Dimension Diagrams

- The dimensions are given in mm.
- Tighten the screws on the terminals with force 0.19 N · m to 0.21 N · m. Larger force may cause damage.
- Values inside the brackets "()" are for the motor with holding brake.

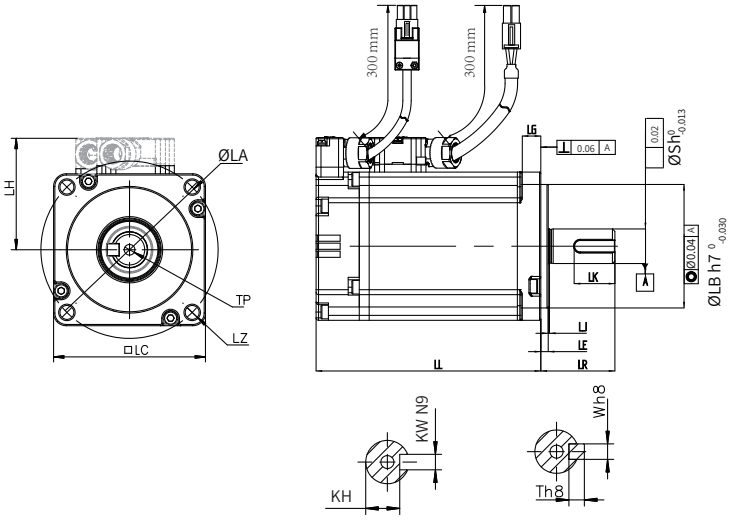
3.1 Flange Frame Size: 40

- Terminal-type motor



shaft end diagram keyed shaft end

- Lead-wire type motor

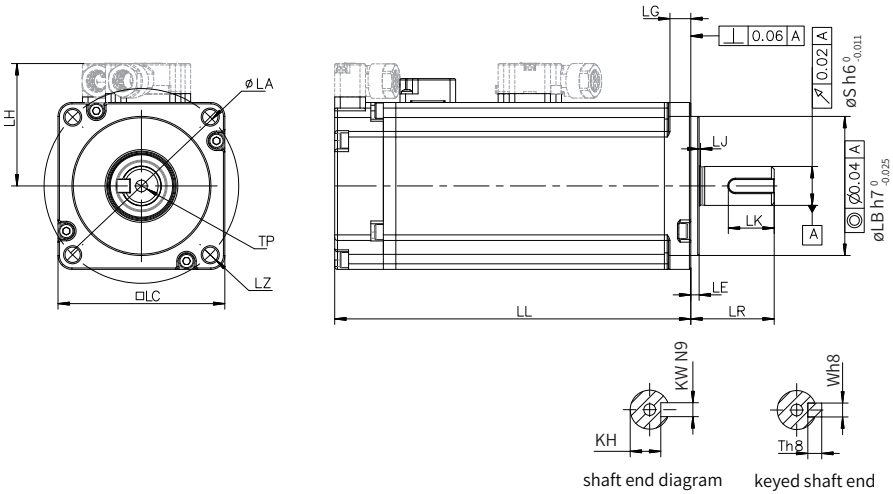


shaft end diagram keyed shaft end

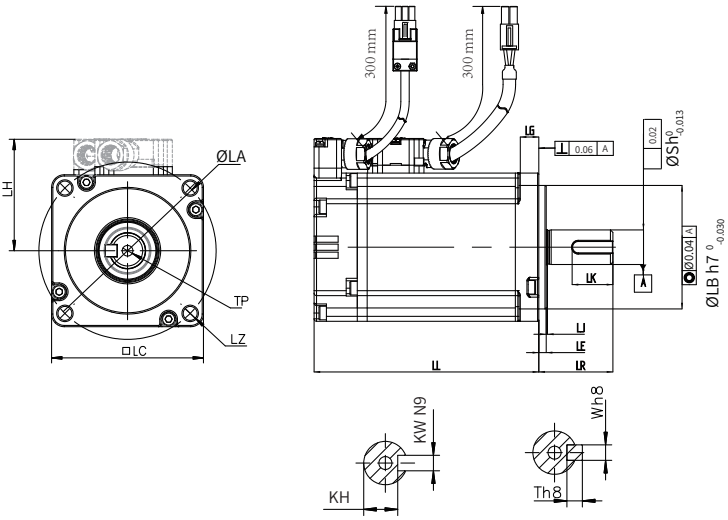
Motor Model	LL	LC	LR	LA	LZ	LH	LG	LE	LJ
MS1H1-05B30CB-*33*Z(-S)	65 (96)	40	25±0.5	46	2-φ4.5	34	5	2.5±0.5	0.5±0.35
MS1H1-10B30CB-*33*Z(-S)	77.5 (109)	40	25±0.5	46	2-φ4.5	34	5	2.5±0.5	0.5±0.35
Motor Model	S	LB	TP	LK	KH	KW	W	T	Weigh (kg)
MS1H1-05B30CB-*33*Z(-S)	8	30	M3×6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.39(0.50)
MS1H1-10B30CB-*33*Z(-S)	8	30	M3×6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.45(0.64)

3.2 Flange Frame Size: 60

■ Terminal-type motor



■ Lead-wire type motor

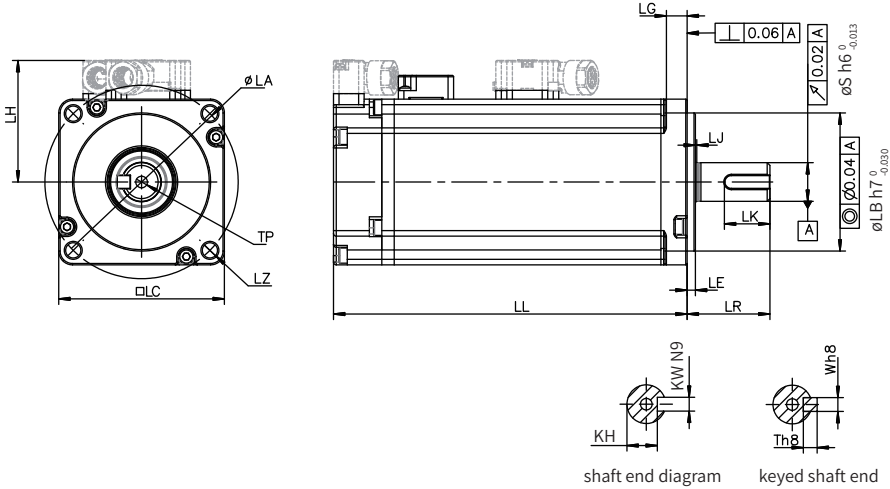


shaft end diagram keyed shaft end

Motor Model	LL	LC	LR	LA	LZ	LH	LG	LE	LJ
MS1H1-20B30CB-*33*Z(-S)	72.5(100)	60	30±0.5	70	4-φ5.5	44	7.5	3±0.5	0.5±0.35
MS1H1-40B30CB-*33*Z(-S)	91(119)	60	30±0.5	70	4-φ5.5	44	7.5	3±0.5	0.5±0.35
MS1H4-40B30CB-*3*Z(-S)	105(128)	60	30±0.5	70	4-φ5.5	44	7.5	3±0.5	0.5±0.35
Motor Model	S	LB	TP	LK	KH	KW	W	T	Weight (kg)
MS1H1-20B30CB-*33*Z(-S)	14	50	M5×8	16.5	11 0 -0.1	5	5	5	0.78(1.16)
MS1H1-40B30CB-*33*Z(-S)	14	50	M5×8	16.5	11 0 -0.1	5	5	5	1.11(1.48)
MS1H4-40B30CB-*3*Z(-S)	14	50	M5×8	16.5	11 0 -0.1	5	5	5	1.27(1.62)

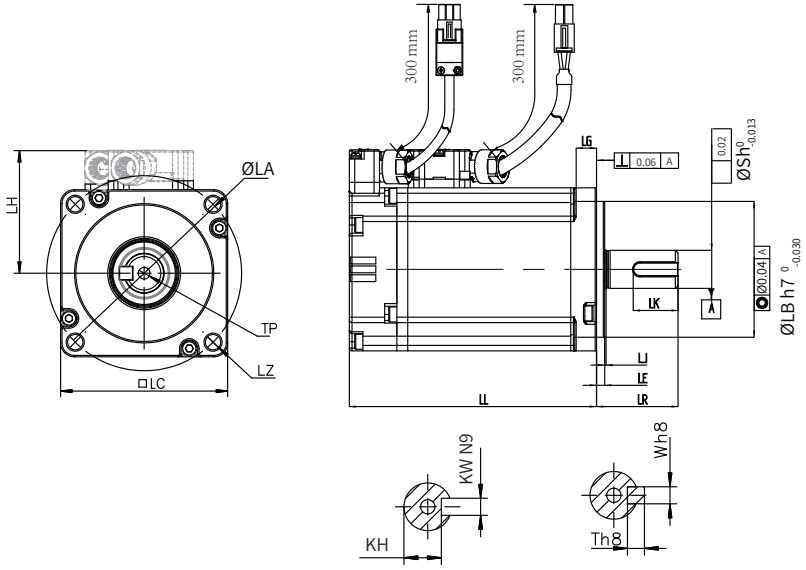
3.3 Flange Frame Size: 80

■ Terminal-type motor



shaft end diagram keyed shaft end

■ Lead wire-type motor

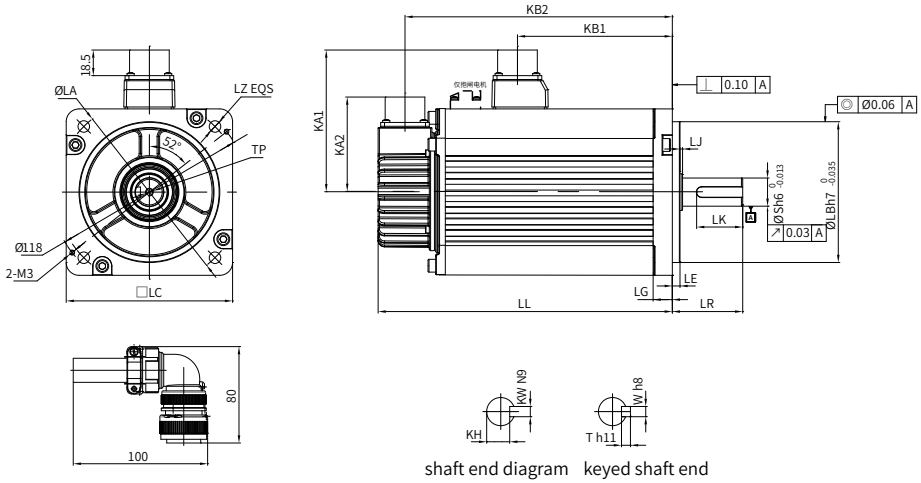


shaft end diagram keyed shaft end

Motor Model	LL	LC	LR	LA	LZ	LH	LG	LE	LJ
MS1H1-55B30CB-*33*Z(-S)	96.2	80	35±0.5	90	4-φ7	54	7.7	3±0.5	0.5±0.35
MS1H1-75B30CB-*331Z(-S)	107 (140)	80	35±0.5	90	4-φ7	54	7.7	3±0.5	0.5±0.35
MS1H1-10C30CB-*331Z(-S)	118.2	80	35±0.5	90	4-φ7	54	7.7	3±0.5	0.5±0.35
MS1H4-75B30CB-*33*Z(-S)	117.5 (147.5)	80	35±0.5	90	4-φ7	54	7.7	3±0.5	0.5±0.35
Motor Model	S	LB	TP	LK	KH	KW	W	T	Weight (kg)
MS1H1-55B30CB-*33*Z(-S)	19	70	M6×20	25	15.5 $^{0}_{-0.1}$	6	6	6	1.85
MS1H1-75B30CB-*331Z(-S)	19	70	M6×20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.18 (2.82)
MS1H1-10C30CB-*331Z(-S)	19	70	M6×20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.55
MS1H4-75B30CB-*33*Z(-S)	19	70	M6×20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.40 (3.04)

3.4 Flange Frame Size: 100

■ Dimension drawing for MS1H2 series motors in frame size 100



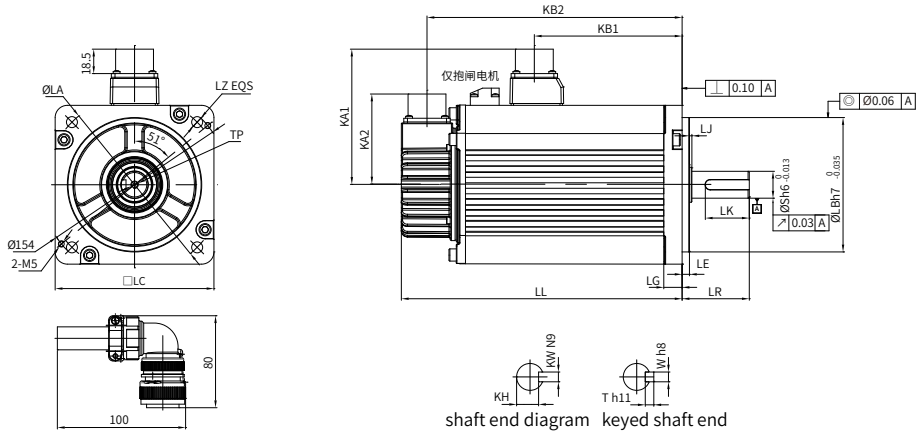
Motor Model	LL	LC	LE	LA	LZ	KA1	KA2	KW	LG	KB1	KB2
MS1H2-10C30CB(D)-*33*Z	164 (213.5)	100	5±0.3	115	4-Φ7	88	74	8	10	94.5 (101)	143.5 (192.5)
MS1H2-15C30CB(D)-*33*Z	189 (239)	100	5±0.3	115	4-Φ7	88	74	8	10	119.5 (128)	168.5 (219.5)

MS1H2-20C30CD-*33*Z(-S4)	214 (265)	100	5±0.3	115	4-Φ7	88	74	8	10	144.5 (153)	193.5 (244)
MS1H2-25C30CD-*33*Z(-S4)	240.5 (290)	100	5±0.3	115	4-Φ7	88	74	8	10	169.5 (178)	218.5 (269)

Motor Model	LR	S	LB	TP	LK	KH	LJ	W	T	Weight(kg)
MS1H2-10C30CB(D)-*33*Z	45±1	24	95	M8×16	36	20 $^{0}_{-0.2}$	2.5±0.75	8	7	5.11 (6.41)
MS1H2-15C30CB(D)-*33*Z	45±1	24	95	M8×16	36	20 $^{0}_{-0.2}$	2.5±0.75	8	7	6.22 (7.52)
MS1H2-20C30CD-*33*Z(-S4)	45±1	24	95	M8×16	36	20 $^{0}_{-0.2}$	2.5±0.75	8	7	7.39 (8.7)
MS1H2-25C30CD-*33*Z(-S4)	45±1	24	95	M8×16	36	20 $^{0}_{-0.2}$	2.5±0.75	8	7	8.55 (9.8)

3.5 Flange Frame Size: 130

■ Dimension drawing for MS1H2 series motors in frame size 130

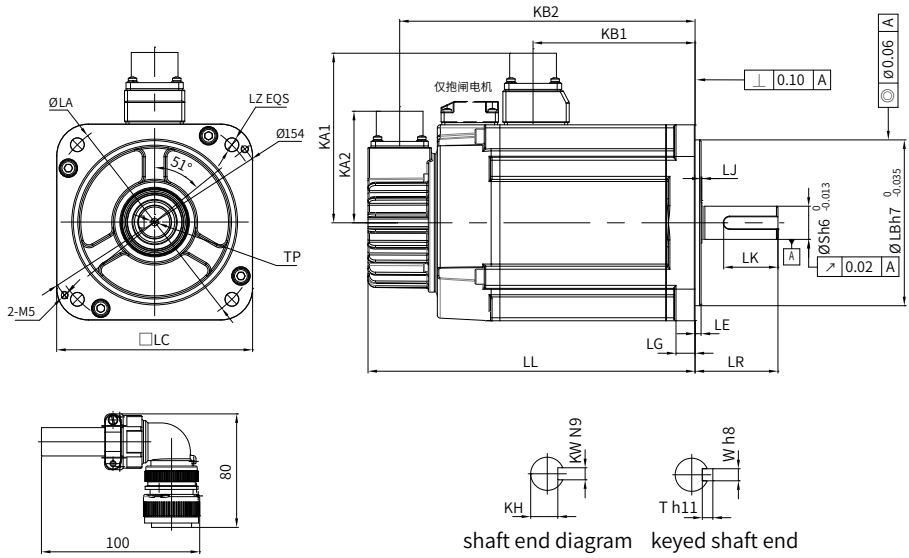


Motor Model	LL	LC	LE	LA	LZ	KA1	KA2	KW	LG	KB1	KB2
MS1H2-30C30CD-*33*Z(-S4)	209.5 (265.5)	130	6±0.3	145	4-Φ9	103	74	8	14	136 (139)	188.5 (244.5)
MS1H2-40C30CD-*33*Z(-S4)	252 (308)	130	6±0.3	145	4-Φ9	103	74	8	14	178.5 (181.5)	231 (287)
MS1H2-50C30CD-*33*Z(-S4)	294.5 (350.5)	130	6±0.3	145	4-Φ9	103	74	8	14	221 (224)	273.5 (329.5)

Motor Model	LR	S	LB	TP	LK	KH	LJ	W	T	Weight(kg)
MS1H2-30C30CD-*33*Z(-S4)	63±1	28	110	M8×20	54	24 $^{0}_{-0.2}$	0.5±0.75	8	7	10.73 (13.2)
MS1H2-40C30CD-*33*Z(-S4)	63±1	28	110	M8×20	54	24 $^{0}_{-0.2}$	0.5±0.75	8	7	15.43 (17.9)

MS1H2-50C30CD-*33*Z(-S4)	63±1	28	110	M8×20	54	24 $^{0}_{-0.2}$	0.5±0.75	8	7	16.2 (18.7)

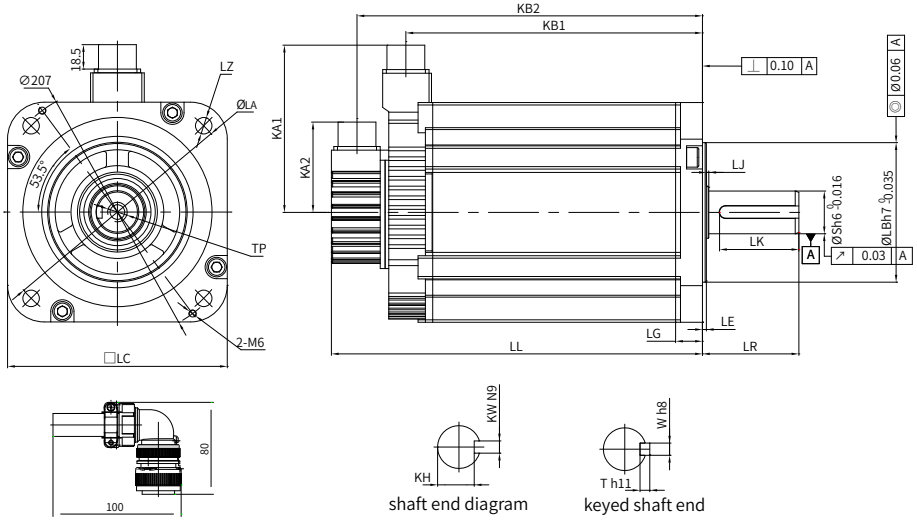
■ Dimension drawing for MS1H3 series motors in frame size 130



Motor Model	LL	LC	LE	LA	LZ	KA1	KB1	KA2	KB2	LG	KW
MS1H3-85B15CB(D)-*33*Z	146 (182)	130	4	145	4-Φ9	103	72.5	74	125 (161)	14	8
MS1H3-13C15CB(D)-*33*Z	163 (199)	130	4	145	4-Φ9	103	89.5	74	142 (178)	14	8
MS1H3-18C15CD-*33*Z	181 (217)	130	4	145	4-Φ9	103	107.5	74	160 (196)	14	8

Motor Model	LR	S	LB	TP	LK	KH	LJ	W	T	Weight(kg)
MS1H3-85B15CB(D)-*33*Z	55±1	22	110	M6×20	36	18 $^{0}_{-0.2}$	0.5±0.75	8	7	7（8）
MS1H3-13C15CB(D)-*33*Z	55±1	22	110	M6×20	36	18 $^{0}_{-0.2}$	0.5±0.75	8	7	8（9.5）
MS1H3-18C15CD-*33*Z	55±1	22	110	M6×20	36	18 $^{0}_{-0.2}$	0.5±0.75	8	7	9.5（11）

3.6 Flange Frame Size: 180



Motor Model	LL	LC	LE	LA	LZ	KA1	KA2	KW	LG	KB1	KB2
MS1H3-29C15CD-A33*Z	197 (273)	180	3.2±0.3	200	4-Φ13.5	138	74	10	18	136 (134)	177 (253)
MS1H3-44C15CD-A33*Z	230 (307)	180	3.2±0.3	200	4-Φ13.5	138	74	10	18	169 (167)	210 (286)
MS1H3-55C15CD-A33*Z	274 (350)	180	3.2±0.3	200	4-Φ13.5	138	74	12	18	213 (211)	254 (330)
MS1H3-75C15CD-A33*Z	330 (407)	180	3.2±0.3	200	4-Φ13.5	138	74	12	18	269 (267)	310 (386)

Motor Model	LR	S	LB	TP	LK	KH	LJ	W	T	Weight (kg)
MS1H3-29C15CD-A33*Z	79±1	35	114.3	M12×25	65	30 0 -0.2	0.3±0.75	10	8	15 (25)
MS1H3-44C15CD-A33*Z	79±1	35	114.3	M12×25	65	30 0 -0.2	0.3±0.75	10	8	19.5 (30)
MS1H3-55C15CD-A33*Z	113±1	42	114.3	M16×32	96	37 0 -0.2	0.3±0.75	12	8	28 (38)
MS1H3-75C15CD-A33*Z	113±1	42	114.3	M16×32	96	37 0 -0.2	0.3±0.75	12	8	32 (42)

4 Cable Information

4.1 Models with Front or Rear Cable Outlets

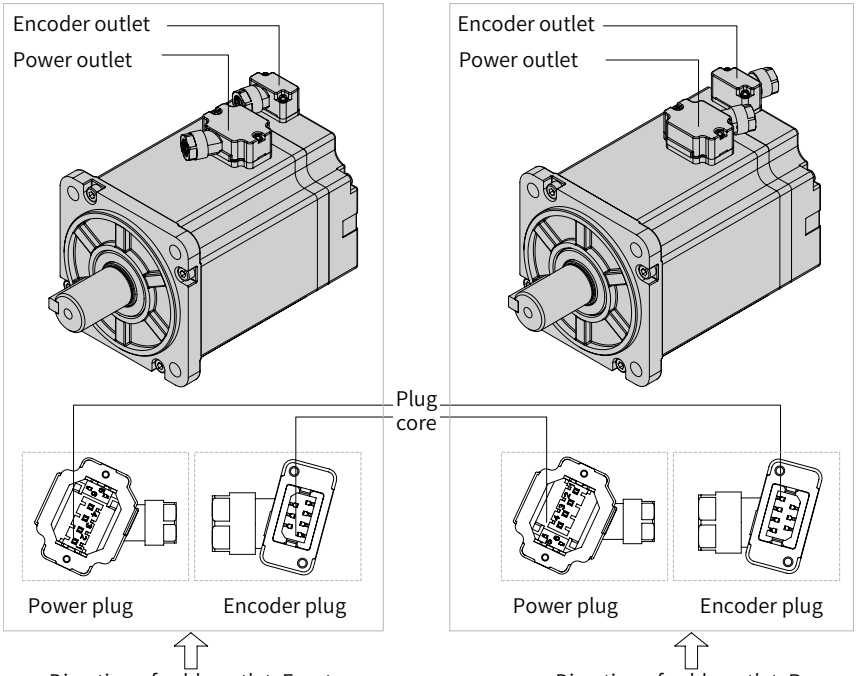
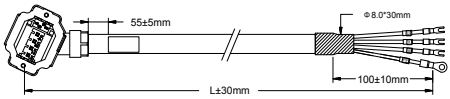
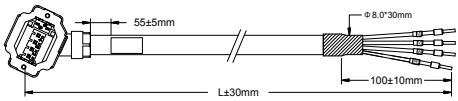
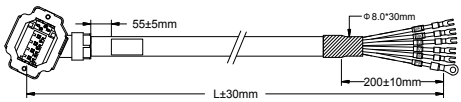
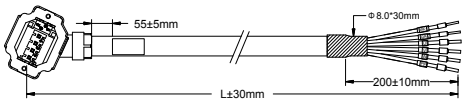
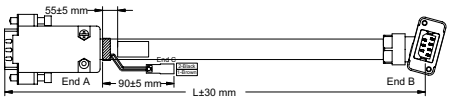
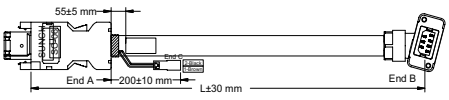
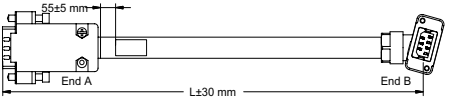
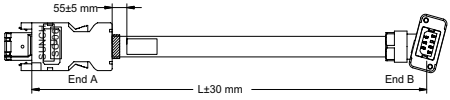


Figure 4-1 Models of Z series (terminal-type) motors with front or rear cable outlets

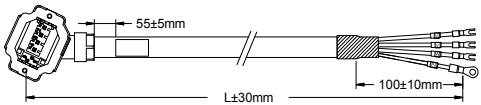
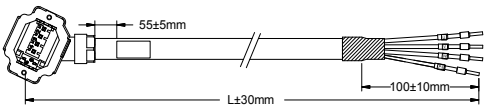
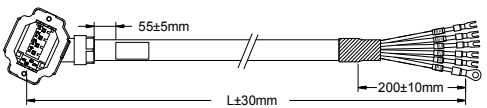
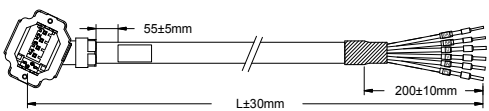
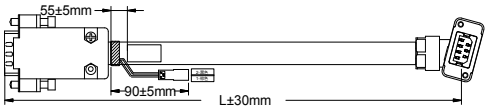
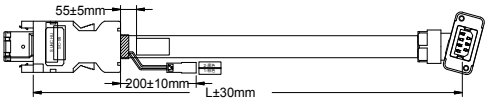
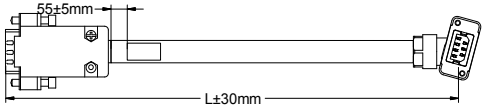
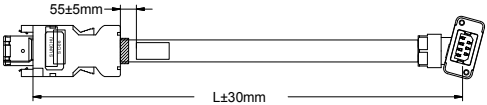
NOTE

◆ You can adjust the direction of the plug core to switch between front cable outlet and rear cable outlet. Determine the cable specifications in advance because the stripped length is different for front and rear cable outlets during wiring.

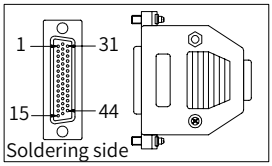
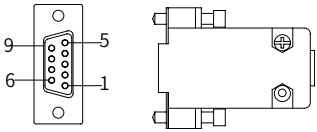
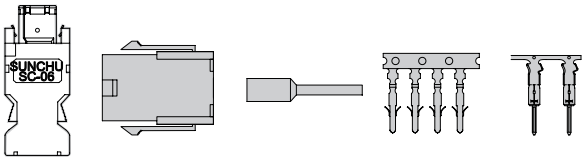
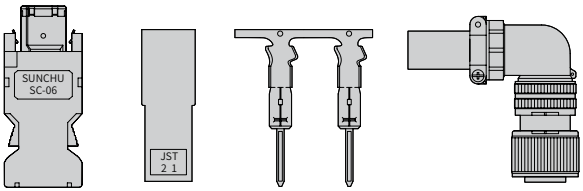
4.2 Outline Drawing of Cables with Front Outlets

Cable Type	Cable Model	Cable Length L (m)	Appearance
Power cable (without brake)	S6-L-M007-3.0	3.0	
	S6-L-M007-5.0	5.0	
	S6-L-M007-10.0	10.0	
	S6-L-M107-3.0	3.0	
	S6-L-M107-5.0	5.0	
	S6-L-M107-10.0	10.0	
Power cable (with brake)	S6-L-B007-3.0	3.0	
	S6-L-B007-5.0	5.0	
	S6-L-B007-10.0	10.0	
	S6-L-B107-3.0	3.0	
	S6-L-B107-5.0	5.0	
	S6-L-B107-10.0	10.0	
Absolute encoder cable	S6-L-P024-3.0	3.0	
	S6-L-P024-5.0	5.0	
	S6-L-P024-10.0	10.0	
	S6-L-P124-3.0	3.0	
	S6-L-P124-5.0	5.0	
	S6-L-P124-10.0	10.0	
Incremental encoder cable	S6-L-P014-3.0	3.0	
	S6-L-P014-5.0	5.0	
	S6-L-P014-10.0	10.0	
	S6-L-P114-3.0	3.0	
	S6-L-P114-5.0	5.0	
	S6-L-P114-10.0	10.0	

4.3 Outline Drawing of Cables with Rear Outlets

Cable Type	Cable Model	Cable Length L (m)	Appearance
Power cable (without brake)	S6-L-M008-3.0	3.0	
	S6-L-M008-5.0	5.0	
	S6-L-M008-10.0	10.0	
	S6-L-M108-3.0	3.0	
	S6-L-M108-5.0	5.0	
	S6-L-M108-10.0	10.0	
Power cable (with brake)	S6-L-B008-3.0	3.0	
	S6-L-B008-5.0	5.0	
	S6-L-B008-10.0	10.0	
	S6-L-B108-3.0	3.0	
	S6-L-B108-5.0	5.0	
	S6-L-B108-10.0	10.0	
Absolute encoder cable	S6-L-P025-3.0	3.0	
	S6-L-P025-5.0	5.0	
	S6-L-P025-10.0	10.0	
	S6-L-P125-3.0	3.0	
	S6-L-P125-5.0	5.0	
	S6-L-P125-10.0	10.0	
Incremental encoder cable	S6-L-P015-3.0	3.0	
	S6-L-P015-5.0	5.0	
	S6-L-P015-10.0	10.0	
	S6-L-P115-3.0	3.0	
	S6-L-P115-5.0	5.0	
	S6-L-P115-10.0	10.0	

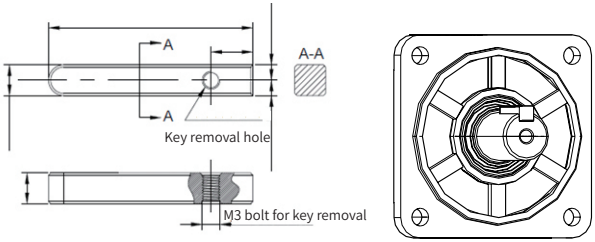
4.4 Outline Drawing of Connectors

Model	Appearance
S6-C8	 DB 44 connector kit
S6-C12	 Soldering side
S6-C26	 6-pin male Pin base insulated terminal Crimping terminal
S6-C29	 6-pin male Base Crimping terminal Aviation plug

Appendix: Disassembly of Flat Key and Oil Sealing

■ Removal of the motor flat key

Standard MS1 series motors in frame sizes 60, 80, and 130 adopt C-type flat keys. All the flat keys carry holes for easy key removal. To take the flat key out, select a proper bolt (inner hexagon bolt recommended) and an Allen wrench to screw down the bolt until the A-A end of the flat key is completely detached from the keyway, as shown below.



Specifications of bolts for key removal		
MS1 Motor Specifications	Dimensions of Flat Keys	Specifications of Bolts (Inner Hexagon Bolts) for Key Removal
Frame size 40	A-type flat key - A3x3x14	No key removal hole
Frame size 60	C-type flat key - C5x5x16.5	Length above M3X10
Frame size 80	C-type flat key - C6x6x25	Length above M3X15
Frame size 100	C-type flat key - C8x7x35	Length above M3X20
Frame size 130	C-type flat key - C8x7x35	Length above M3X20
Frame size 180	C-type flat key - C10x8x64	Length above M3X20

■ Removal of motor oil sealing

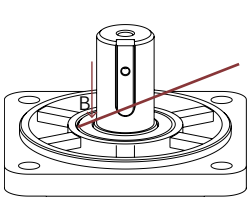
Tools needed: a needle-nose plier, a pair of slip-proof gloves, and a piece of cotton cloth

Operating steps:

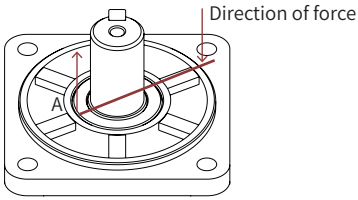
1) Put the cotton cloth on the support point B to avoid end cover scratches during removal.

2) Secure the motor and use the needle-nose plier to hold point A of the oil sealing lip.

3) Pry the oil sealing out Frame Sized on the support point B.



(Point B acts on the shaft extension stairs)



(Point A acts on the oil sealing lip)

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