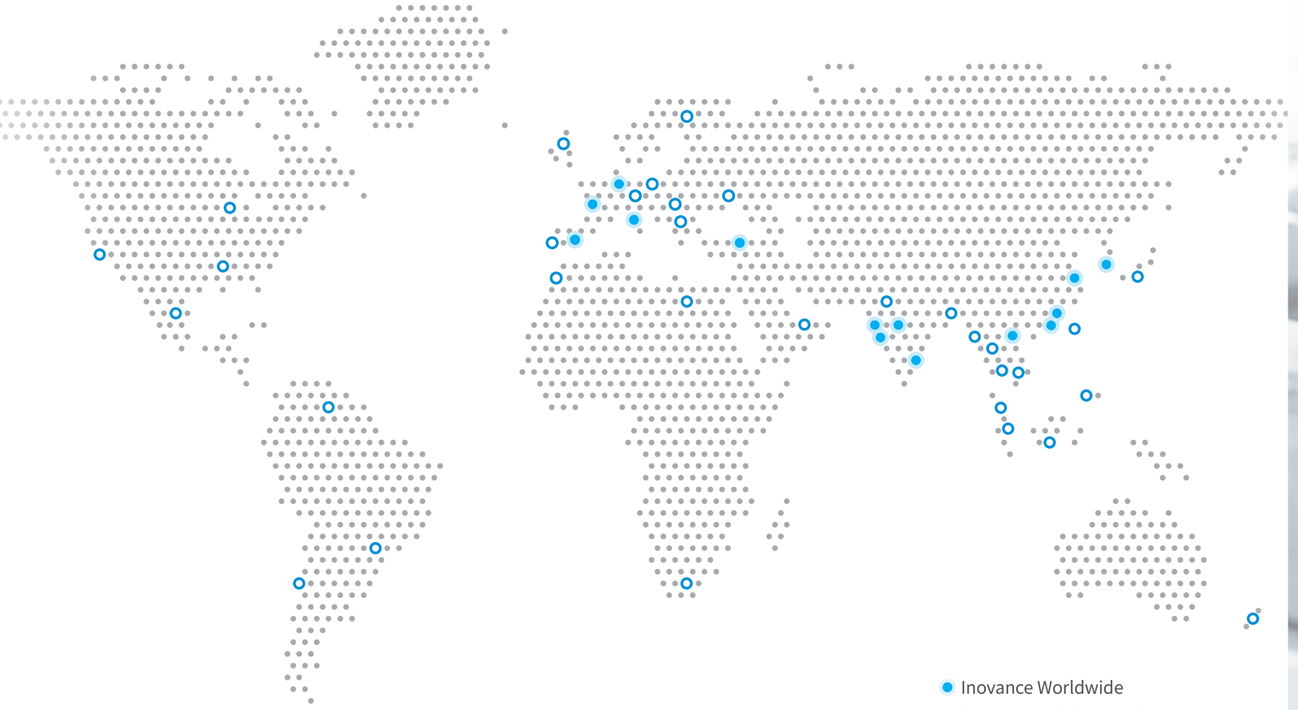
19120694 A00

This user guide is subject to change without notice.
Copyright©Shenzhen Inovance Technology Co.,Ltd.
Copyright Shenzhen Inovance Technology Co., Ltd.



- Inovance Worldwide
- Distribution & Service Partners

## Advancing industrial technology, for a better world


### Europe

**Germany-Stuttgart**
+49 (0) 7144 8990
sales.de@inovance.eu

**France-Bordeaux**
+33 (0) 5594 01050
sales.fr@inovance.eu

**Spain-Barcelona**
+34 93 504 94 48
sales.es@inovance.eu

**Italy-Milano**
+39 (0) 2268 22318
sales.it@inovance.eu

**Turkey-Istanbul**
+90 (216) 706 17 89
sales.tr@inovance.eu

### Asia Pacific

**India**
Chennai (Head Office) | +91 (0) 44 4380 0201
Ahmedabad | +91 794003 4272
Mumbai | +91 22 4971 5883
New Delhi | +91 11 4165 4524
Sales Network
Kolkata, Bengaluru, Pune, Coimbatore, Hyderabad, Vadodara, Jaipur

**South Korea-Seoul**
+82 (0)2 3489 8850
INOVANCEKR@inovance.eu

**China**
Shenzhen Inovance Technology Co., Ltd.
Suzhou Inovance Technology Co. Ltd.
4000-300124 (within China)
info@inovance.com
service@inovance.com

Hong Kong SAR (International Export Office)
+852 2751 6080
info@inovance.eu

**Vietnam - Hanoi**
+84 948118793
tiendinh@inovance.com


FOLLOW US

INOVANCE

# MS1-R Series

## High Performance Explosion-Protected Servo Motor




## Features & functions

### ATEX certification
- II 2 G Ex db IIC T5 Gb (explosive gas atmospheres)
- II 2 D Ex tb IIIC T100°C Db (combustible dust atmospheres)

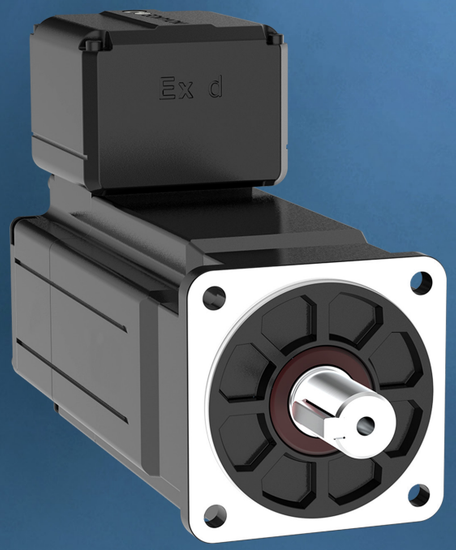
- TÜV 25 ATEX 9306 X
- IECEx TUR 25.0046 X

- IEC System for Certiffcation to Standards relating to equipment for use in explosive atmospheres

### Republic of Korea certification
- KC: National Radio Research Agency
- Certificate No. :26-AV4BO-0061X
  26-AV4BO-0089X
  26-AV4BO-0107X
  26-AV4BO-0108X

### China certification
- Highest protection level against gas explosion: Ex db IIC T5 Gb
- Highest protection level against dust explosion: Ex tb IIIC T100°C Db

# Overview




## Wide power range

- Covers power range from 0.2 kW to 7.5 kW
- Supports multiple models

## High speed

- Max. speed of H4 models **7000 rpm**
- Max. speed of H3 models **4500 rpm**

## High-standard temperature certification

- Provides models with surface temperature no higher than 100℃
- Provides models with surface temperature no higher than 135℃




## High performance

- Supports 23-bit multi-turn absolute encoder




## *Explosion-Proof Design*

Newly developed for use in flammable and explosive atmospheres that contain Zones 1, 2, 21, and 22




*Certificates of Suitability*

# Ordering code

**MS1 H4 - 20B 30C B - A3 3 1 R - INT - EX d T5**
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

| | | |
|---|---|---|
| ① MS1 series servo motor | ⑤ Voltage class (V)<br>B: 220<br>D: 380 | ⑨ Sub-series No.<br>R series |
| ② Inertia and capacity<br>H3: Medium inertia, medium capacity<br>H4: Medium inertia, small capacity | | ⑩ Type<br>INT: International |
| ③ Rated power (W)<br>One letter and two digits<br>B: x 10<br>C: x 100<br>Example, 20B indicates 200W | ⑥ Encoder type[1]<br>One letter and one digit<br>A3: 23-bit multi-turn absolute encoder<br>D3: 23-bit battery-less multi-turn absolute encoder | ⑪ Explosion proof<br>EX d T5:<br>Compliance with China CCC certification of Ex db IIC T5 Gb、Ex tb IIIC T100℃ Db IP67<br>Compliance with ATEX certification of II 2 G Ex db IIC T5 Gb、II 2 D Ex tb IIIC T100℃ Db IP67<br>EX d T4:<br>Compliance with China CCC certification of Ex db IIC T4 Gb、Ex tb IIIC T135℃ Db IP67<br>Compliance with ATEX certification of Il 2 G Ex db IIC T4 Gb、II 2 D Ex tb IIIC T135° C Db IP67 |
| ④ Rated speed (rpm)<br>One letter and two digits<br>B: x 10<br>C: x 100<br>Example: 30C indicates 3,000 rpm | ⑦ Shaft connection mode<br>3: Solid shaft, with key and threaded hole | |
| | ⑧ Brake, reducer, oil seal<br>1: With oil seal but no brake<br>4: With oil seal and brake | |

Note: [1] A3 encoder type motor can be used together with SV680*GINT and IS810N*INT drives.
D3 encoder type motor only can be used together with SV680*GINT.

# Explosion proof labeling description

## ATEX certification

### Gas Explosion Protection Certification

**II 2 G Ex db IIC T5/T4 Gb**
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| | | |
|---|---|---|
| ① Equipment group<br>II: Surface | ④ Ex marking<br>Ex: The equipment fulfils valid EN-standards, confirmed by an accreditated Test Lab | ⑦ Maximum surface temperature of the motor[1]<br>T5: Surface temperature of the motor ≤ 100℃<br>T4: Surface temperature of the motor ≤ 135℃ |
| ② Category of equipment<br>2: For use in areas in which explosive atmospheres are likely to occur | ⑤ Type of ignition protection<br>db: Prot<br>(Safety: db > ec > ic...) | ⑧ Equipment protection level (EPL)<br>Gb: High level, suitable for use in explosive gas environments of Zone 1 (or Gc Zone 2) |
| ③ Potentially explosive areas<br>G: Areas with explosive gas | ⑥ Explosion proof gas<br>IIC: Hydrogen, Acetylene<br>(Can cover IIB and IIA group) | |

Note: [1] The lower the maximum surface temperature of the motor, the safer it is in operation.

### Dust Explosion Protection Certification

**II 2 D Ex Tb IIIC T100℃ /T135℃ Db**
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| | | |
|---|---|---|
| ① Equipment group<br>II: Surface | ④ Ex marking<br>Ex: The equipment fulfils valid EN-standards, confirmed by an accreditated Test Lab | ⑦ Maximum surface temperature of the motor[1]<br>T100℃ : Surface temperature of the motor ≤ 100℃<br>T135℃ : Surface temperature of the motor ≤ 135℃ |
| ② Protection level<br>2: High level of protection | ⑤ Type of ignition protection<br>tb: Protection by enclosure<br>(Safety: tb > ic...) | |
| ③ Potentially explosive areas<br>D: Areas with explosive dust | ⑥ Explosion proof dust<br>IIIC: Permitted dust category, conductive dust (Also fulfill IIIA and IIB ) | ⑧ Equipment protection level (EPL)<br>Db: High level of protection |

Note: [1] The lower the maximum surface temperature of the motor, the safer it is in operation.

## CCC certification

### Gas Explosion Protection Certification

**Ex db IIC T5/T4 Gb**
① ② ③ ④ ⑤

| | | |
|---|---|---|
| ① Marking<br>Ex: Explosion protection marking | ③ Electrical equipment type<br>IIC: Gas category (hydrogen and acetylene supported)<br>Note: It applies to both IIA and IIB. | ⑤ Electrical equipment protection class<br>Gb: The gas explosion protection level is Zone 1.<br>Note: It also applies to Gc Zone 2. |
| ② Electrical equipment explosion protection level<br>db: Explosion proof | ④ Enclosure temperature[1]<br>(Lower temperature indicates better safety.)<br>T5: Max. motor enclosure temperature of 100℃<br>T4: Max. motor enclosure temperature of 135℃ | |

Note: [1] The lower the maximum surface temperature of the motor, the safer it is in operation.

### Dust Explosion Protection Certification

**Ex tb IIIC T100℃ Db**
① ② ③ ④ ⑤

| | | |
|---|---|---|
| ① Marking<br>Ex: Explosion protection marking | ③ Electrical equipment type<br>IIIC: Dust category supported (conductive dust)<br>Note: It applies to both IIIA and IIIB. | ⑤ Electrical equipment protection class<br>Db: The dust explosion protection level is Zone 21.<br>Note: It also applies to Dc Zone 22. |
| ② Electrical equipment explosion protection level<br>tb: Protection by enclosure | ④ Enclosure temperature[1]<br>(Lower temperature indicates better safety.)<br>T5: Max. motor surface temperature of 100℃<br>T4: Max. motor surface temperature of 135℃ | |

Note: [1] The lower the maximum surface temperature of the motor, the safer it is in operation.

## Degree of protection description

**IP 6 7**
① ②

| | |
|---|---|
| ① Protection against dust<br>6: Complete protection against accidental contact, protection against ingress of dust | ② Protection against water<br>7: Motor under specified pressure and time conditions under water<br>6: Powerful jet water from any direction<br>5: Jet water from any direction |

# Selection chart

## Motor type of explosion proof level

- ATEX: II 2 G Ex db IIC **T5** Gb, II 2 D Ex tb IIIC **T100℃** Db
- CCC: Ex db IIC **T5** Gb, Ex tb IIIC **T100℃** Db

| Servo motor | | | Recommended drive |
|---|---|---|---|
| Model [1] | Frame size (mm) | Capacity (kW) | Model |
| MS1H4-20B30CB-**3*R-INT-EX d T5 | 60 | 0.2 | SV680*S1R6I-GINT / IS810N*S(D)3R5INT |
| MS1H4-40B30CB-**3*R-INT-EX d T5 | | 0.4 | SV680*S2R8I-GINT / IS810N*S(D)3R5INT |
| MS1H4-55B30CB-**31R-INT-EX d T5 | 80 | 0.55 | SV680*S5R5I-GINT / IS810*S(D)5R4INT |
| MS1H4-75B30CB-**3*R-INT-EX d T5 | | 0.75 | |
| MS1H4-90B30CB-**3*R-INT-EX d T5 | | 0.9 | SV680*S7R6I-GINT / IS810*S(D)8R4INT |
| MS1H3-85B15CD-**3*R-INT-EX d T5 | 130 | 0.85 | SV680*T3R5I-GINT / IS810*S(D)3R5INT |
| MS1H3-13C15CD-**3*R-INT-EX d T5 | | 1.3 | SV680*T5R4I-GINT / IS810*S(D)5R4INT |
| MS1H3-16C15CD-**3*R-INT-EX d T5 | | 1.6 | SV680*T8R4I-GINT / IS810*S(D)8R4INT |
| MS1H3-29C15CD-**3*R-INT-EX d T5 | 180 | 2.9 | SV680*T012I-GINT / IS810*S(D)012INT |
| MS1H3-37C15CD-**3*R-INT-EX d T5 | | 3.7 | SV680*T017I-GINT / IS810*S(D)017INT |
| MS1H3-45C15CD-**3*R-INT-EX d T5 | | 4.5 | SV680*T026I-GINT / IS810*S(D)026INT |

Note: [1] The asterisk (**) indicates an optional for encoder type of A3 or D3, the (*) indicates an optional for motor with brake(code:4) or without brake(code:1).

- ATEX: II 2 G Ex db IIC **T4** Gb, II 2 D Ex tb IIIC **T135℃** Db
- CCC: Ex db IIC **T4** Gb, Ex tb IIIC **T135℃** Db

| Servo motor | | | Recommended drive |
|---|---|---|---|
| Model [1] | Frame size(mm) | Capacity (kW) | Model |
| MS1H4-20B30CB-**3*R-INT-EX d T4 | 60 | 0.2 | SV680*S1R6I-GINT/IS810*S(D)3R5INT |
| MS1H4-40B30CB-**3*R-INT-EX d T4 | | 0.4 | SV680*S2R8I-GINT/IS810*S(D)3R5INT |
| MS1H4-55B30CB-**31R-INT-EX d T4 | 80 | 0.55 | SV680*S5R5I-GINT/IS810*S(D)5R4INT |
| MS1H4-75B30CB-**3*R-INT-EX d T4 | | 0.75 | |
| MS1H4-10C30CB-**3*R-INT-EX d T4 | | 1.0 | SV680*S7R6I-GINT/IS810*S(D)8R4INT |
| MS1H3-85B15CD-**3*R-INT-EX d T4 | 130 | 0.85 | SV680*T3R5I-GINT/IS810*S(D)3R5INT |
| MS1H3-13C15CD-**3*R-INT-EX d T4 | | 1.3 | SV680*T5R4I-GINT/IS810*S(D)5R4INT |
| MS1H3-18C15CD-**3*R-INT-EX d T4 | | 1.8 | SV680*T8R4I-GINT/IS810*S(D)8R4INT |
| MS1H3-29C15CD-**3*R-INT-EX d T4 | 180 | 2.9 | SV680*T012I-GINT/IS810*S(D)012INT |
| MS1H3-44C15CD-**3*R-INT-EX d T4 | | 4.4 | SV680*T017I-GINT/IS810*S(D)017INT |
| MS1H3-55C15CD-**3*R-INT-EX d T4 | | 5.5 | SV680*T021I-GINT/IS810*S(D)021INT |
| MS1H3-75C15CD-**3*R-INT-EX d T4 | | 7.5 | SV680*T026I-GINT/IS810*S(D)026INT |

Note: [1] The asterisk (**) indicates an optional for encoder type of A3 or D3, the (*) indicates an optional for motor with brake(code:4) or without brake(code:1).

⚠ When use other types of drive, the PTC temperature control module must be used in conjunction with it. Otherwise, if the motor temperature cannot be monitored, there is a risk of explosion.



# Specifications

## Motor type of explosion proof level

- ATEX: II 2 G Ex db IIC **T5** Gb, II 2 D Ex tb IIIC **T100℃** Db
- CCC: Ex db IIC **T5** Gb, Ex tb IIIC **T100℃** Db

| Motor model [1] | Frame size (mm) | Rated power (kW) | Voltage (V) | Rated torque (N·m) | Max. torque (N·m) | Rated current (A) | Max. current (A) | Rated speed (rpm) | Max. speed (rpm) | Torque coefficient (N·m/A) | Moment of inertia (kg·cm²) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-20B30CB-**3*R-INT-EX d T5 | 60 | 0.2 | 220 | 0.64 | 2.24 | 1.3 | 5.3 | 3000 | 7000 | 0.46 | 0.22±10% (0.23±10%) |
| MS1H4-40B30CB-**3*R-INT-EX d T5 | | 0.4 | 220 | 1.27 | 4.45 | 2.4 | 9.2 | 3000 | 7000 | 0.53 | 0.44±10% (0.45±10%) |
| MS1H4-55B30CB-**31R-INT-EX d T5 | 80 | 0.55 | 220 | 1.75 | 6.13 | 3.3 | 13.2 | 3000 | 7000 | 0.49 | 1.16±10% |
| MS1H4-75B30CB-**3*R-INT-EX d T5 | | 0.75 | 220 | 2.39 | 8.37 | 4.4 | 16.9 | 3000 | 7000 | 0.58 | 1.52±10% (1.55±10%) |
| MS1H4-90B30CB-**3*R-INT-EX d T5 | | 0.9 | 220 | 2.86 | 9.54 | 5.85 | 24 | 3000 | 7000 | 0.46 | 1.96±10% (1.99±10%) |
| MS1H3-85B15CD-**3*R-INT-EX d T5 | 130 | 0.85 | 380 | 5.39 | 13.5 | 3.5 | 8.5 | 1500 | 4500 | 1.84 | 13.56±10% (15.8±10%) |
| MS1H3-13C15CD-**3*R-INT-EX d T5 | | 1.3 | 380 | 8.34 | 20.85 | 5.1 | 12.6 | 1500 | 4500 | 1.85 | 19.25±10% (21.5±10%) |
| MS1H3-16C15CD-**3*R-INT-EX d T5 | | 1.6 | 380 | 10.4 | 28.75 | 6.08 | 17.7 | 1500 | 4500 | 1.87 | 24.9±10% (27.2±10%) |
| MS1H3-29C15CD-**3*R-INT-EX d T5 | 180 | 2.9 | 380 | 18.6 | 46.5 | 10.5 | 29.75 | 1500 | 4500 | 1.94 | 44.7±10% (52.35±10%) |
| MS1H3-37C15CD-**3*R-INT-EX d T5 | | 3.7 | 380 | 24.2 | 71.1 | 13.6 | 42 | 1500 | 4500 | 1.96 | 64.9±10% (72.55±10%) |
| MS1H3-45C15CD-**3*R-INT-EX d T5 | | 4.5 | 380 | 29 | 119 | 15 | 65 | 1500 | 4500 | 2.13 | 127.5±10% (135.15±10%) |

Note: [1] The asterisk (**) indicates an optional for encoder type of A3 or D3, the (*) indicates an optional for motor with brake(code:4) or without brake(code:1).

# Specifications

## Motor type of explosion proof level

- ATEX: II 2 G Ex db IIC **T4** Gb, II 2 D Ex tb IIIC **T135℃** Db
- CCC: Ex db IIC **T4** Gb, Ex tb IIIC **T135℃** Db

| Motor model [1] | Frame size (mm) | Rated power (kW) | Voltage (V) | Rated torque (N·m) | Max. torque (N·m) | Rated current (A) | Max. current (A) | Rated speed (rpm) | Max. speed (rpm) | Torque coefficient (N·m/A) | Moment of inertia (kg·cm²) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-20B30CB-**3*R-INT-EX d T4 | 60 | 0.2 | 220 | 0.64 | 2.24 | 1.3 | 5.3 | 3000 | 7000 | 0.46 | 0.22±10% (0.23±10%) |
| MS1H4-40B30CB-**3*R-INT-EX d T4 | | 0.4 | 220 | 1.27 | 4.45 | 2.4 | 9.2 | 3000 | 7000 | 0.53 | 0.44±10% (0.45±10%) |
| MS1H4-55B30CB-**31R-INT-EX d T4 | 80 | 0.55 | 220 | 1.75 | 6.13 | 3.3 | 13.2 | 3000 | 7000 | 0.49 | 1.16±10% |
| MS1H4-75B30CB-**3*R-INT-EX d T4 | | 0.75 | 220 | 2.39 | 8.37 | 4.4 | 16.9 | 3000 | 7000 | 0.58 | 1.52±10% (1.55±10%) |
| MS1H4-10C30CB-**3*R-INT-EX d T4 | | 1.0 | 220 | 3.18 | 9.54 | 6.5 | 24 | 3000 | 7000 | 0.46 | 1.96±10% (1.99±10%) |
| MS1H3-85B15CD-**3*R-INT-EX d T4 | 130 | 0.85 | 380 | 5.39 | 13.5 | 3.5 | 8.5 | 1500 | 4500 | 1.84 | 13.56±10% (15.8±10%) |
| MS1H3-13C15CD-T33*R-EX d T4 | | 1.3 | 380 | 8.34 | 20.85 | 5.1 | 12.6 | 1500 | 4500 | 1.85 | 19.25±10% (21.5±10%) |
| MS1H3-18C15CD-**3*R-INT-EX d T4 | | 1.8 | 380 | 11.5 | 28.75 | 6.75 | 17.7 | 1500 | 4500 | 1.87 | 24.9±10% (27.2±10%) |
| MS1H3-29C15CD-**3*R-INT-EX d T4 | 180 | 2.9 | 380 | 18.6 | 46.5 | 10.5 | 29.75 | 1500 | 4500 | 1.94 | 44.7±10% (52.35±10%) |
| MS1H3-44C15CD-**3*R-INT-EX d T4 | | 4.4 | 380 | 28.4 | 71.1 | 16 | 42 | 1500 | 4500 | 1.96 | 64.9±10% (72.55±10%) |
| MS1H3-55C15CD-**3*R-INT-EX d T4 | | 5.5 | 380 | 35 | 87.6 | 20.7 | 52 | 1500 | 4500 | 1.92 | 86.9±10% (94.55±10%) |
| MS1H3-75C15CD-**3*R-INT-EX d T4 | | 7.5 | 380 | 48 | 119 | 25 | 65 | 1500 | 4500 | 2.13 | 127.5±10% (135.15±10%) |

Note: [1] The asterisk (**) indicates an optional for encoder type of A3 or D3, the (*) indicates an optional for motor with brake(code:4) or without brake(code:1).



# Technical Specifications

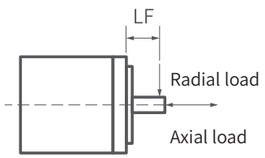
| Item | Description |
|---|---|
| Duty cycle | S1 (Continuous duty) |
| Vibration level | V15[1] |
| Insulation resistance | 500 VDC, above 50 MΩ |
| Excitation mode | Permanent magnetic |
| Mounting method | Flange |
| Heat resistance level | F (155℃ ) |
| Insulation voltage | 1500 VAC for 1 minute (220 V class); 1800 VAC for 1 minute (380 V class) |
| Ambient temperature | 0℃ to 40℃ (non-frozen) (Derate based on the derating curve for temperatures above 40℃ .) |
| Ambient humidity | 20% to 80% RH (without condensation) |
| Storage environment | Observe the following requirements for storing a de-energized motor.<br>· Storage temperature: -20℃ to +60℃ (non-frozen)<br>· Storage humidity: 20% to 80% RH (without condensation) |
| IP rating of the enclosure | IP67 (IP67-compliant within 500hours at shaft extension, IP65-compliant after 500hours) |
| Direction of rotation | Rotates counterclockwise (CCW) when viewed from the shaft extension side with the forward run command from servo drive.<br><br>CCW |
| Thermistor protection | PTC 130℃ |
| Vibration resistance[2] | 49 m/s² (flange side as standard) |
| Shock resistance [3] | 490 m/s² (flange side as standard); number of shocks: 2 |
| Altitude | < 1000 m (Derating is required for altitudes above 1000 m. For details, see the altitude derating curve.) |

Note:
[1] Vibration grade V15 indicates that the vibration amplitude is lower than 15 μm when the motor is operating at rated speed.
[2] The resistance for shock in the vertical direction when the servo motor is mounted with the shaft in a horizontal position is shown in the preceding table.
[3] The vertical, side-to-side, and front-to-back resistance for vibration in three directions when the servo motor is mounted with the shaft in a horizontal position is shown in the preceding table.
The vibration intensity applied on the motor varies with applications.

# Electrical Specifications of the Brake

| Frame size (mm) | Holding torque (N·m) | Power supply voltage (VDC)±10% | Rated power (W) | Coil resistance (Ω)±7% | Excitation current (A) | Release time (ms) | Apply time (ms) | Backlash (° ) |
|---|---|---|---|---|---|---|---|---|
| 60 | 1.5 | 24 | 7.6 | 75.79 | 0.32 | ≤ 60 | ≤ 20 | ≤ 1 |
| 80 | 3.2 | 24 | 10 | 57.6 | 0.42 | ≤ 60 | ≤ 40 | ≤ 1 |
| 130 | 16 | 24 | 24 | 24 | 1 | ≤ 120 | ≤ 60 | ≤ 1 |
| 180 | 50 | 24 | 31 | 18.58 | 1.29 | ≤ 200 | ≤ 100 | ≤ 1 |

# Radial and Axial Loads

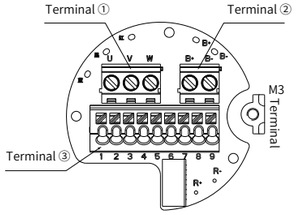



| Motor model | Frame size (mm) | Power class (kW) | LF (mm) | Allowable radial load (N) | Allowed axial load (N) |
|---|---|---|---|---|---|
| MS1H4-20B30CB<br>MS1H4-40B30CB | 60 | 0.2~0.4 | 25 | 245 | 74 |
| MS1H4-55B30CB<br>MS1H4-75B30CB<br>MS1H4-90B30CB<br>MS1H4-10C30CB | 80 | 0.55~1.0 | 35 | 392 | 147 |
| MS1H3-85B15CD<br>MS1H3-13C15CD<br>MS1H3-16C15CD<br>MS1H3-18C15CD | 130 | 0.85~1.8 | 55 | 686 | 196 |
| MS1H3-29C15CD<br>MS1H3-37C15CD<br>MS1H3-44C15CD | 180 | 2.9~4.4 | 79 | 1470 | 490 |
| MS1H3-45C15CD<br>MS1H3-55C15CD<br>MS1H3-75C15CD | | 4.4~7.5 | 113 | 1764 | 588 |



# Terminal Assignment

## Frame sizes 60 and 80

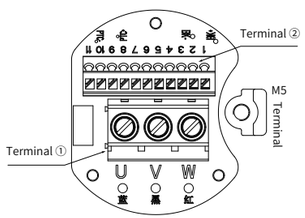



| Assignment of **power** cable wiring terminals | | | | | | |
|---|---|---|---|---|---|---|
| Connection position | Terminal ① | | | M3 terminal | Terminal ② | |
| Mark on motor PCB | U | V | W | - | B+ | B- |
| Mark on S6-L power cable | U | V | W | PE | BK+ | BK- |

| Assignment of **A3** encoder cable wiring terminals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection position | Terminal ③ | | | | | | | | |
| Mark on motor PCB | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Mark on S6-L cable | PS+ | PS- | BT- | BT+ | +5 V | GND | PE | PTC+ | PTC- |

| Assignment of **D3** encoder cable wiring terminals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection position | Terminal ③ | | | | | | | | |
| Mark on motor PCB | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Mark on S6-L encoder cable | DATA+ | DATA- | CLK- | CLK+ | +5V | GND | PE | PTC+ | PTC- |

## Frame sizes 130 and 180




| Assignment of **power** cable wiring terminals | | | | | | |
|---|---|---|---|---|---|---|
| Connection position | Terminal ① | | | M5 terminal | Terminal ② | |
| Mark on motor PCB | U | V | W | - | 1 | 2 |
| Mark on S6-L power cable | U | V | W | PE | BK+ | BK- |

| **A3** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection position | Terminal ② | | | | | | | | |
| Mark on motor PCB | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Mark on S6-L cable | PS+ | PS- | BT- | BT+ | +5 V | GND | PE | PTC+ | PTC- |

| Assignment of **D3** encoder cable wiring terminals | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection position | Terminal ② | | | | | | | | |
| Mark on motor PCB | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Mark on S6-L encoder cable | DATA+ | DATA- | CLK- | CLK+ | +5 V | GND | PE | PTC+ | PTC- |

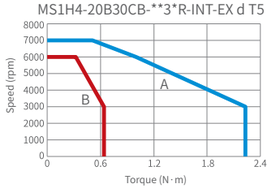
# Speed-Torque Characteristics

## Motor type of explosion proof level

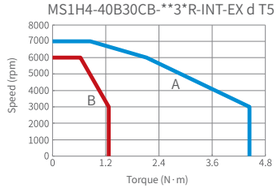
- ATEX: II 2 G Ex db IIC **T5** Gb, II 2 D Ex tb IIIC **T100℃** Db
- CCC: Ex db IIC **T5** Gb, Ex tb IIIC **T100℃** Db

**MS1H4 Medium inertia, small capacity**

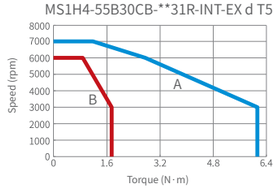
MS1H4-20B30CB-**3*R-INT-EX d T5



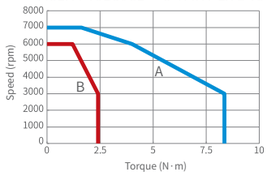

MS1H4-40B30CB-**3*R-INT-EX d T5



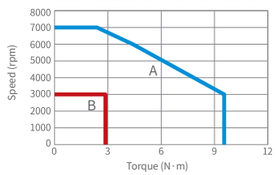

MS1H4-55B30CB-**31R-INT-EX d T5




MS1H4-75B30CB-**3*R-INT-EX d T5

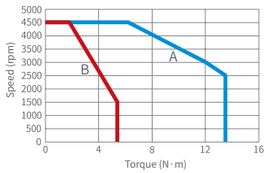



MS1H4-90B30CB-**3*R-INT-EX d T5

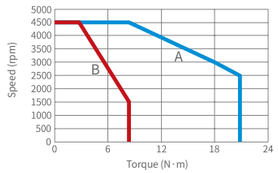



**MS1H3 Medium inertia, medium capacity**

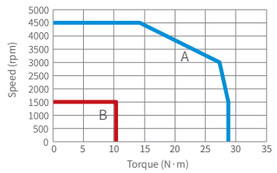
MS1H3-85B15CD-**3*R-INT-EX d T5



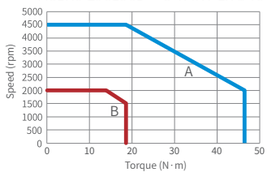

MS1H3-13C15CD-**3*R-INT-EX d T5



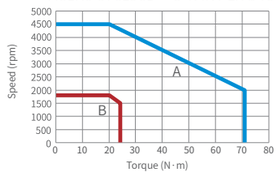

MS1H3-16C15CD-**3*R-INT-EX d T5



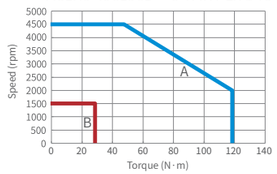

MS1H3-29C15CD-**3*R-INT-EX d T5




MS1H3-37C15CD-**3*R-INT-EX d T5




MS1H3-45C15CD-**3*R-INT-EX d T5




A: Continuous duty zone

B: Intermittent duty zone



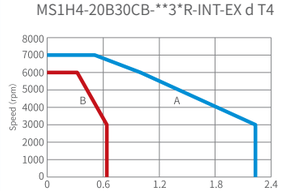
# Speed-Torque Characteristics

## Motor type of explosion proof level

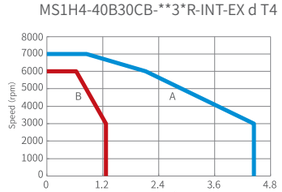
- ATEX: II 2 G Ex db IIC **T4** Gb, II 2 D Ex tb IIIC **T135℃** Db
- CCC: Ex db IIC **T4** Gb, Ex tb IIIC **T135℃** Db

**MS1H4 Medium inertia, small capacity**

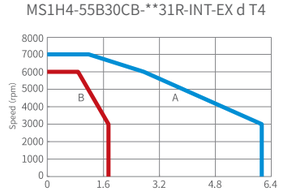
MS1H4-20B30CB-**3*R-INT-EX d T4



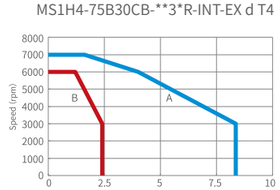

MS1H4-40B30CB-**3*R-INT-EX d T4



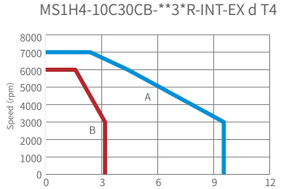

MS1H4-55B30CB-**31R-INT-EX d T4




MS1H4-75B30CB-**3*R-INT-EX d T4

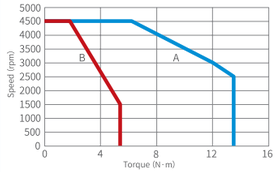



MS1H4-10C30CB-**3*R-INT-EX d T4

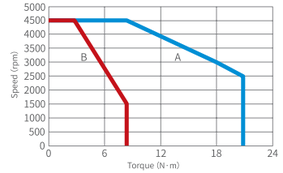



**MS1H3 Medium inertia, medium capacity**

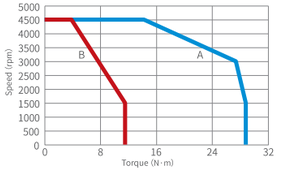
MS1H3-85B15CD-**3*R-INT-EX d T4



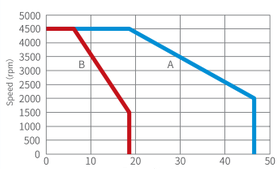

MS1H3-13C15CD-**3*R-INT-EX d T4



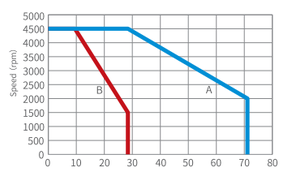

MS1H3-18C15CD-**3*R-INT-EX d T4



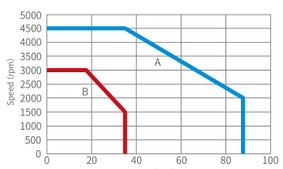

MS1H3-29C15CD-**3*R-INT-EX d T4



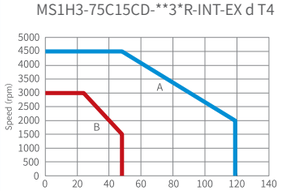

MS1H3-44C15CD-**3*R-INT-EX d T4




MS1H3-55C15CD-**3*R-INT-EX d T4




MS1H3-75C15CD-**3*R-INT-EX d T4

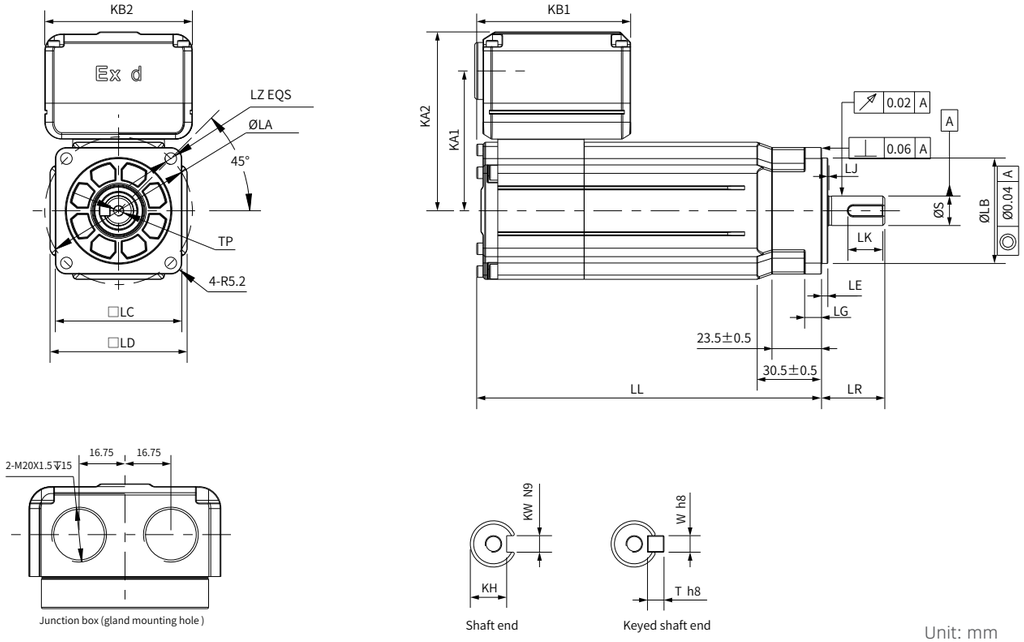



A: Continuous duty zone

B: Intermittent duty zone

# Dimensions

## Frame Size 60




Unit: mm

| Motor model | LC | LD | LL | LR | LA | LZ | LG | LE | LJ | LB | LK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-20B30CB-**3*R-INT-EX d T5 | 60±0.3 | 65±0.3 | 127.15±1 (145.2±1) | 30±0.35 | 70 | 4-Φ5.5 | 8±0.5 | 3±0.3 | 0.5±0.35 | 50 h7 $^{0}_{-0.025}$ | 16.5 |
| MS1H4-20B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-40B30CB-**3*R-INT-EX d T5 | 60±0.3 | 65±0.3 | 145.45±1 (163.5±1) | 30±0.35 | 70 | 4-Φ5.5 | 8±0.5 | 3±0.3 | 0.5±0.35 | 50 h7 $^{0}_{-0.025}$ | 16.5 |
| MS1H4-40B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |

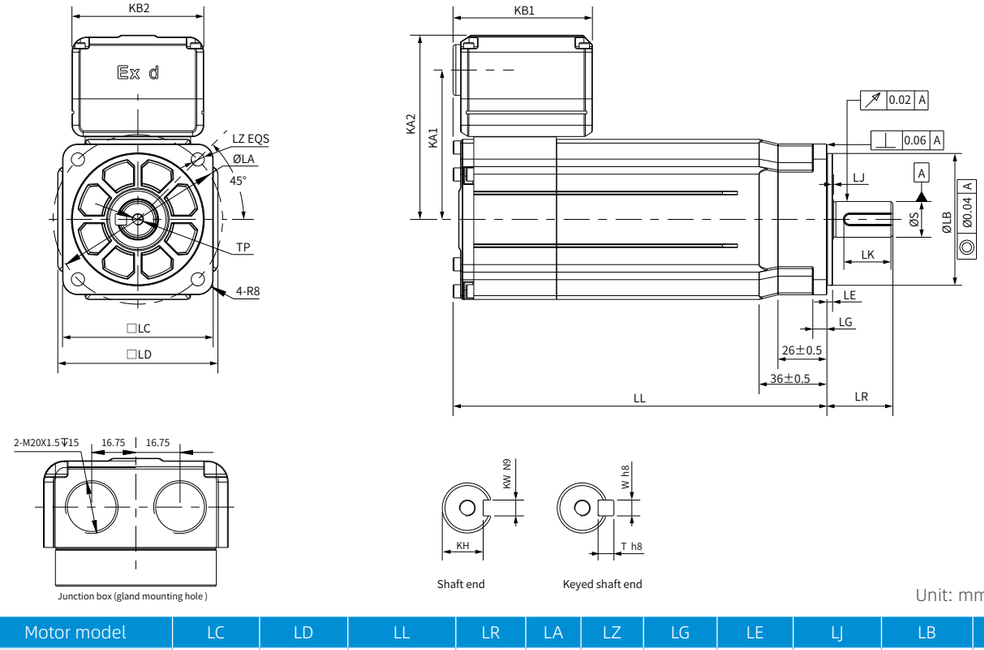
| Motor model | S | TP | KH | kW | W | T | KB1 | KB2 | KA1 | KA2 | Weight(kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-20B30CB-**3*R-INT-EX d T5 | 14 | M5×8 | 11 $^{0}_{-0.1}$ | 5 | 5 | 5 | 73±0.5 | 70±0.5 | 66.3±1 | 84.8±1 | 1.75 (2.1) |
| MS1H4-20B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-40B30CB-**3*R-INT-EX d T5 | 14 | M5×8 | 11 $^{0}_{-0.1}$ | 5 | 5 | 5 | 73±0.5 | 70±0.5 | 66.3±1 | 84.8±1 | 2.1 (2.45) |
| MS1H4-40B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |

Note: The asterisk (*) indicates an optional standard motor or motor with brake.The parentheses, (), encloses parameters of the motor with brake.



# Dimensions

## Frame Size 80




Unit: mm

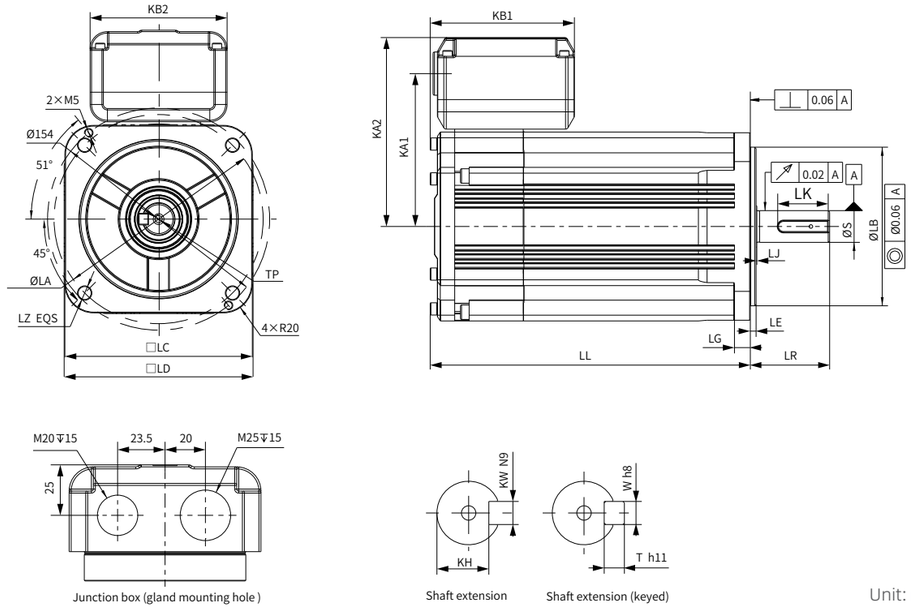
| Motor model | LC | LD | LL | LR | LA | LZ | LG | LE | LJ | LB | LK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-55B30CB-**31R-INT-EX d T5 | 80±0.3 | 85±0.3 | 154.3±1 | 35±0.5 | 90 | 4-Φ7 | 8±0.5 | 3±0.3 | 0.5±0.35 | 70 h7 $^{0}_{-0.025}$ | 25 |
| MS1H4-55B30CB-**31R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-75B30CB-**3*R-INT-EX d T5 | 80±0.3 | 85±0.3 | 164.4±1 (186.6±1) | 35±0.5 | 90 | 4-Φ7 | 8±0.5 | 3±0.3 | 0.5±0.35 | 70 h7 $^{0}_{-0.025}$ | 25 |
| MS1H4-75B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-90B30CB-**3*R-INT-EX d T5 | 80±0.3 | 85±0.3 | 176.3±1 (198.5±1) | 35±0.5 | 90 | 4-Φ7 | 8±0.5 | 3±0.3 | 0.5±0.35 | 70 h7 $^{0}_{-0.025}$ | 25 |
| MS1H4-10C30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |

| Motor model | S | TP | KH | kW | W | T | KB1 | KB2 | KA1 | KA2 | Weight(kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H4-55B30CB-**31R-INT-EX d T5 | 19 | M6×20 | 15.5 $^{0}_{-0.1}$ | 6 | 6 | 6 | 74±0.5 | 70±0.5 | 79.3±1 | 97.8±1 | 3.35 |
| MS1H4-55B30CB-**31R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-75B30CB-**3*R-INT-EX d T5 | 19 | M6×20 | 15.5 $^{0}_{-0.1}$ | 6 | 6 | 6 | 74±0.5 | 70±0.5 | 79.3±1 | 97.8±1 | 3.45 (4.35) |
| MS1H4-75B30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H4-90B30CB-**3*R-INT-EX d T5 | 19 | M6×20 | 15.5 $^{0}_{-0.1}$ | 6 | 6 | 6 | 74±0.5 | 70±0.5 | 79.3±1 | 97.8±1 | 4.15 (4.75) |
| MS1H4-10C30CB-**3*R-INT-EX d T4 | | | | | | | | | | | |

Note: The asterisk (*) indicates an optional standard motor or motor with brake.The parentheses, (), encloses parameters of the motor with brake.

# Dimensions

## Frame Size 130




Unit: mm

| Motor model | LC | LD | LL | LR | LA | LZ | LG | LE | LJ | LB | LK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H3-85B15CD-**3*R-INT-EX d T5 | 130±0.3 | 131±0.3 | 178.2±1 (192±1) | 55±1 | 145 | 4-Φ9 | 14 | 4 | 0.5±0.75 | 110 $h7^{0}_{-0.035}$ | 36 |
| MS1H3-85B15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-13C15CD-**3*R-INT-EX d T5 | 130±0.3 | 131±0.3 | 193.2±1 (207±1) | 55±1 | 145 | 4-Φ9 | 14 | 4 | 0.5±0.75 | 110 $h7^{0}_{-0.035}$ | 36 |
| MS1H3-13C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-16C15CD-**3*R-INT-EX d T5 | 130±0.3 | 131±0.3 | 208.2±1 (222±1) | 55±1 | 145 | 4-Φ9 | 14 | 4 | 0.5±0.75 | 110 $h7^{0}_{-0.035}$ | 36 |
| MS1H3-18C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |

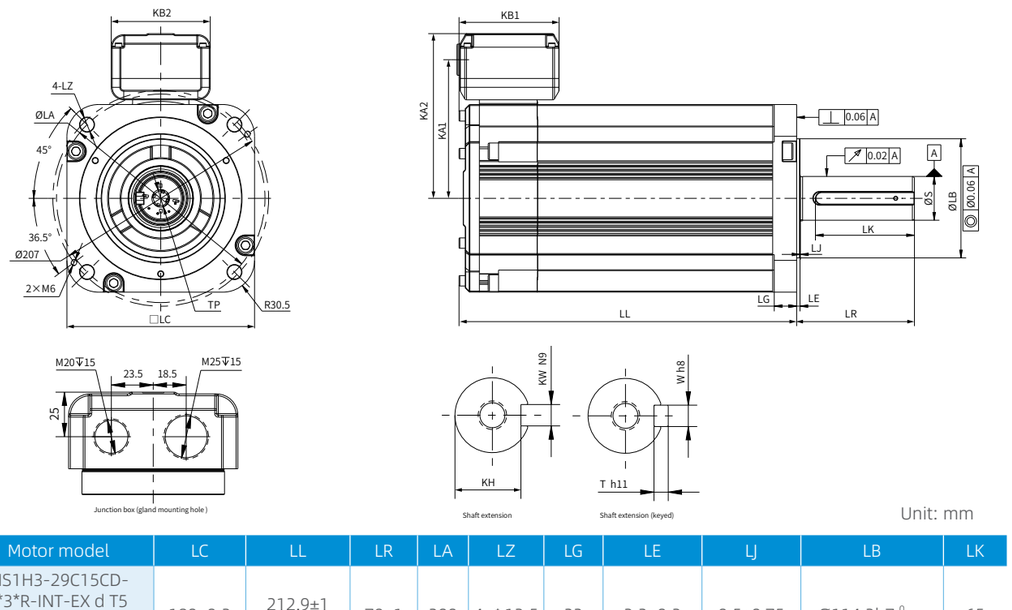
| Motor model | S | TP | KH | kW | W | T | KB1 | KB2 | KA1 | KA2 | Weight(kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H3-85B15CD-**3*R-INT-EX d T5 | 22 $h6^{0}_{-0.013}$ | M6 x 20 | $18^{0}_{-0.2}$ | 8 | 8 | 7 | 95±0.5 | 100±1 | 131 | 106 | 6 (8) |
| MS1H3-85B15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-13C15CD-**3*R-INT-EX d T5 | 22 $h6^{0}_{-0.013}$ | M6 x 20 | $18^{0}_{-0.2}$ | 8 | 8 | 7 | 95±0.5 | 100±1 | 131 | 106 | 7.5 (9.5) |
| MS1H3-13C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-16C15CD-**3*R-INT-EX d T5 | 22 $h6^{0}_{-0.013}$ | M6 x 20 | $18^{0}_{-0.2}$ | 8 | 8 | 7 | 95±0.5 | 100±1 | 131 | 106 | 9 (11) |
| MS1H3-18C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |

Note: The asterisk (*) indicates an optional standard motor or motor with brake.The parentheses, (), encloses parameters of the motor with brake.



# Dimensions

## Frame Size 180




Unit: mm

| Motor model | LC | LL | LR | LA | LZ | LG | LE | LJ | LB | LK |
|---|---|---|---|---|---|---|---|---|---|---|
| MS1H3-29C15CD-**3*R-INT-EX d T5 | 180±0.3 | 212.9±1 (229.9±1) | 79±1 | 200 | 4-Φ13.5 | 22 | 3.2±0.3 | 0.5±0.75 | Ø114.3h7 $^{0}_{-0.035}$ | 65 |
| MS1H3-29C15CD-**3*R-INT-EX d T4 | | | | | | | | | | |
| MS1H3-37C15CD-**3*R-INT-EX d T5 | 180±0.3 | 236.4±1 (253.4±1) | 79±1 | 200 | 4-Φ13.5 | 22 | 3.2±0.3 | 0.5±0.75 | Ø114.3h7 $^{0}_{-0.035}$ | 65 |
| MS1H3-44C15CD-**3*R-INT-EX d T4 | | | | | | | | | | |
| MS1H3-55C15CD-**3*R-INT-EX d T4 | 180±0.3 | 259.9±1 (276.9±1) | 113±1 | 200 | 4-Φ13.5 | 22 | 3.2±0.3 | 0.5±0.75 | Ø114.3h7 $^{0}_{-0.035}$ | 97 |
| MS1H3-45C15CD-**3*R-INT-EX d T5 | 180±0.3 | 306.9±1 (323.9±1) | 113±1 | 200 | 4-Φ13.5 | 22 | 3.2±0.3 | 0.5±0.75 | Ø114.3h7 $^{0}_{-0.035}$ | 97 |
| MS1H3-75C15CD-**3*R-INT-EX d T4 | | | | | | | | | | |

| Motor model | S | TP | KH | kW | W | T | KB1 | KB2 | KA1 | KA2 | Weight(kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MS1H3-29C15CD-**3*R-INT-EX d T5 | 35 $h6^{0}_{-0.16}$ | M12×25 | $30^{0}_{-0.2}$ | 10 | 10 | 8 | 96 | 95 | 133 | 158 | 19.25 (22.75) |
| MS1H3-29C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-37C15CD-**3*R-INT-EX d T5 | 35 $h6^{0}_{-0.16}$ | M12×25 | $30^{0}_{-0.2}$ | 10 | 10 | 8 | 96 | 95 | 133 | 158 | 22.75 (26.7) |
| MS1H3-44C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |
| MS1H3-55C15CD-**3*R-INT-EX d T4 | 42 $h6^{0}_{-0.16}$ | M16×32 | $37^{0}_{-0.2}$ | 12 | 12 | 8 | 96 | 95 | 133 | 158 | 27.5 (30.95) |
| MS1H3-45C15CD-**3*R-INT-EX d T5 | 42 $h6^{0}_{-0.16}$ | M16×32 | $37^{0}_{-0.2}$ | 12 | 12 | 8 | 96 | 95 | 133 | 158 | 34.8 (38.15) |
| MS1H3-75C15CD-**3*R-INT-EX d T4 | | | | | | | | | | | |

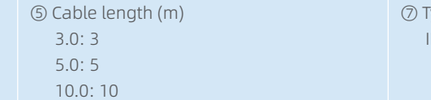
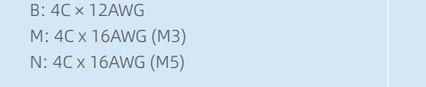
Note: The asterisk (*) indicates an optional standard motor or motor with brake.The parentheses, (), encloses parameters of the motor with brake.

# Applicable Cable Selection

## Power Cable

**S6-L-M 1 J K - 3.0 - T - INT**
① ② ③ ④ ⑤ ⑥ ⑦

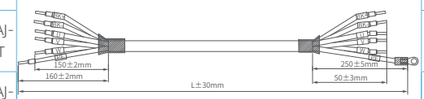
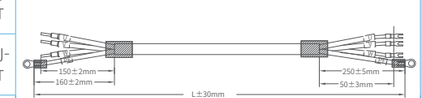
| | | |
|---|---|---|
| ① Cable type<br>S6-L-M: Power cable (without brake)<br>S6-L-B: Power cable (with brake) | ④ Connector type at motor side<br>J: Pin-type cable lug<br>K: O-type pre-insulated terminal | ⑥ Special requirements<br>T: Drag chain ≥ 10 million time |
| ② Connector type at drive side<br>1: Pin-type cable lug<br>3: Pin-type cable lug and OT terminal<br>4: U-type cable lug and OT terminal | ⑤ Cable length (m)<br>3.0: 3<br>5.0: 5<br>10.0: 10 | ⑦ Type<br>INT: International |
| ③ Cross-sectional area ($mm^2$)<br>2A: 4C × 12AWG + 1P × 18AWG<br>J: 4C x 16AWG + 1P x 22AWG (M3)<br>K: 4C x 16AWG + 1P x 22AWG (M5) | B: 4C × 12AWG<br>M: 4C x 16AWG (M3)<br>N: 4C x 16AWG (M5) | |

| Frame size(mm) | Cable/Outer diameter | Cable model | Appearance | Cable length | Applicable gland model | |
|---|---|---|---|---|---|---|
| | | | | | China CCC rules | ATEX rules |
| 60 & 80 | Power cables for motors with brake (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-B1JK-3.0-T-INT<br>S6-L-B1JK-5.0-T-INT<br>S6-L-B1JK-10.0-T-INT |  | 3 m<br>5 m<br>10 m | BST-Exd-SSF-M2012BR/ BST-Exd-SSFT-M2012BR | BST-Exd-SS-M2012BR/ BST-Exd-SST-M2012BR |
| | Power cables for standard motors (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-M1MJ-3.0-T-INT<br>S6-L-M1MJ-5.0-T-INT<br>S6-L-M1MJ-10.0-T-INT |  | 3 m<br>5 m<br>10 m | | |
| 130 | Power cables for motors with brake (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-B1KJ-3.0-T-INT<br>S6-L-B1KJ-5.0-T-INT<br>S6-L-B1KJ-10.0-T-INT |  | 3 m<br>5 m<br>10 m | BST-Exd-SSF-M2515BR/ BST-Exd-SSFT-M2515BR | BST-Exd-SS-M2515BR / BST-Exd-SST-M2515BR |
| | Power cables for standard motors (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-M1NJ-3.0-T-INT<br>S6-L-M1NJ-5.0-T-INT<br>S6-L-M1NJ-10.0-T-INT |  | 3 m<br>5 m<br>10 m | | |



# Applicable Cable Selection

## Power Cable

| Frame size (mm) | Cable/Outer diameter | Cable model | Appearance | Cable length | Applicable gland model | |
|---|---|---|---|---|---|---|
| | | | | | China CCC rules | ATEX rules |
| 180 (For 2.9kW motor) | Power cables for motors with brake (Three-phase pin-type terminal and grounding pin-type terminal) (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-B12AJ-3.0-T-INT<br>S6-L-B12AJ-5.0-T-INT<br>S6-L-B12AJ-10.0-T-INT |  | 3m<br>5m<br>10m | BST-Exd-SSF-M2515BR/ BST-Exd-SSFT-M2515BR | BST-Exd-SS-M2515BR/ BST-Exd-SST-M2515BR |
| | Power cables for standard motors (Three-phase pin-type terminal and grounding pin-type terminal) (Applicable to SV680*GINT and IS810N*INT drives) | S6-L-M1BJ-3.0-T-INT<br>S6-L-M1BJ-5.0-T-INT<br>S6-L-M1BJ-10.0-T-INT |  | 3m<br>5m<br>10m | | |
| | Power cables for motors with brake (Three-phase spade terminal and grounding OT terminal) (Applicable to SV680*GINT) | S6-L-B42AJ-3.0-T-INT<br>S6-L-B42AJ-5.0-T-INT<br>S6-L-B42AJ-10.0-T-INT |  | 3m<br>5m<br>10m | BST-Exd-SSF-M2515BR/ BST-Exd-SSFT-M2515BR | BST-Exd-SS-M2515BR/ BST-Exd-SST-M2515BR |
| | Power cables for motors with brake (Three-phase pin-type terminal and grounding OT terminal) (Applicable to IS810N*INT drives) | S6-L-B32AJ-3.0-T-INT<br>S6-L-B32AJ-5.0-T-INT<br>S6-L-B32AJ-10.0-T-INT |  | 3m<br>5m<br>10m | | |
| | Power cables for standard motors (Three-phase spade terminal and grounding OT terminal) (Applicable to SV680*GINT) | S6-L-M4BJ-3.0-T-INT<br>S6-L-M4BJ-5.0-T-INT<br>S6-L-M4BJ-10.0-T-INT |  | 3m<br>5m<br>10m | | |
| | Power cables for standard motors (Three-phase pin-type terminal and grounding OT terminal) (Applicable to IS810N***INT drives) | S6-L-M3BJ-3.0-T-INT<br>S6-L-M3BJ-5.0-T-INT<br>S6-L-M3BJ-10.0-T-INT |  | 3m<br>5m<br>10m | | |

Note: 1. The power cables for motor frame sizes 60, 80, 130, 180mm may vary due to differences in three-phase terminals or grounding terminals of the drive.
2. For applications with cable length exceeding 25 meters, please contact INOVANCE.
3. Select flexible cables with temperature resistance no lower than 105℃ .

# Applicable Cable Selection

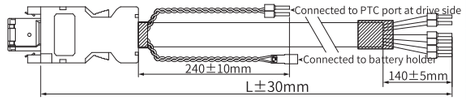
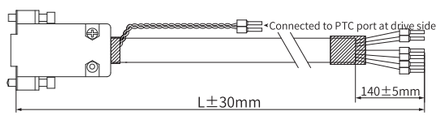
## Encoder Cables

**S6-L-P 1 2 U - 3.0 - T - PTC - INT**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

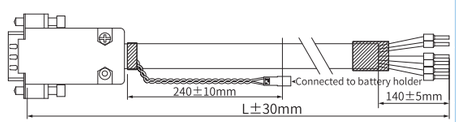
| | | |
|---|---|---|
| ① Cable type<br>S6-L-P: Encoder cable | ③ Cross-sectional area ($mm^2$)<br>2: Communication-type multi-turn absolute encoder | ⑥ Special requirements<br>T: Drag chain ≥ 10 million times |
| ② Connector type at drive side<br>0: DB9 Connector (9pin plug)<br>1: 1394 Connector (6pin plug)<br>2: DB15 Connector (15pin plug) | ④ Connector type at motor side<br>U: Pin-type cable lug | ⑦ PTC: with temperature control module<br>None: standard model |
| | ⑤ Cable length (m)<br>3.0: 3 10.0: 10<br>5.0: 5 100.0: 100 | ⑧ Type<br>INT: International |

## Encoder cable connection with SV680*GINT

| Encoder type | Cable model | Cable appearance diagram | Cable length | Applicable gland model | |
|---|---|---|---|---|---|
| | | | | China CCC rules | ATEX rules |
| A3: 23-bit multi-turn absolute encoder | S6-L-P12U-3.0-T-PTC-INT |  The de-energized cable length is 3250 mm. | 3m | BST-Exd-SSF-M2012BR / BST-Exd-SSFT-M2012BR | BST-Exd-SS-M2012BR / BST-Exd-SST-M2012BR |
| | S6-L-P12U-5.0-T-PTC-INT | | 5m | | |
| | S6-L-P12U-10.0-T-PTC-INT | | 10m | | |
| D3: Batteryfree mechani cal 23-bit multi-turn absolute encoder | S6-L-P22U-3.0-T-PTC-INT |  The de-energized cable length is 3250 mm. | 3m | | |
| | S6-L-P22U-5.0-T-PTC-INT | | 5m | | |
| | S6-L-P22U-10.0-T-PTC-INT | | 10m | | |

Note: Please connect the drive side connector of D3 type encoder cable with SV680*GINT terminal CN7.

## Encoder cable connection with IS810N*INT

| Encoder type | Cable model | Cable appearance diagram | Cable length | Applicable gland model | |
|---|---|---|---|---|---|
| | | | | China CCC rules | ATEX rules |
| A3: 23-bit multi-turn absolute encoder | S6-L-P02U-3.0-T-PTC-INT |  The de-energized cable length is 3250 mm. | 3m | BST-Exd-SSF-M2012BR / BST-Exd-SSFT-M2012BR | BST-Exd-SS-M2012BR / BST-Exd-SST-M2012BR |
| | S6-L-P02U-5.0-T-PTC-INT | | 5m | | |
| | S6-L-P02U-10.0-T-PTC-INT | | 10m | | |

Note: IS810N*INT only can be used together with A3 type encoder motor.



# Cable technical datasheet

## Power connection cable

| Power cable technical parameters | | | | |
|---|---|---|---|---|
| Motor type | Frame size 60mm/80mm | | Frame size 130mm/180mm | |
| Cable category | Without brake type | Without brake type | Without brake type | Without brake type |
| Cable types | Flexible installation | | Flexible installation | |
| Insulation material | Special elastomer PVC | | Special elastomer PVC | |
| Outer jacket | Special elastomer PVC | | Special elastomer PVC | |
| Cable model | S6-L-M1MJ-3.0-T-INT<br>S6-L-M1MJ-5.0-T-INT<br>S6-L-M1MJ-10.0-T-INT | S6-L-B1JK-3.0-T-INT<br>S6-L-B1JK-5.0-T-INT<br>S6-L-B1JK-10.0-T-INT | S6-L-M1NJ-3.0-T-INT<br>S6-L-M1NJ-5.0-T-INT<br>S6-L-M1NJ-10.0-T-INT | S6-L-B1KJ-3.0-T-INT<br>S6-L-B1KJ-5.0-T-INT<br>S6-L-B1KJ-10.0-T-INT |
| | | | S6-L-M1BJ-3.0-T-INT<br>S6-L-M1BJ-5.0-T-INT<br>S6-L-M1BJ-10.0-T-INT | S6-L-B12AJ-3.0-T-INT<br>S6-L-B12AJ-5.0-T-INT<br>S6-L-B12AJ-10.0-T-INT |
| | | | S6-L-M4BJ-3.0-T-INT<br>S6-L-M4BJ-5.0-T-INT<br>S6-L-M4BJ-10.0-T-INT | S6-L-B42AJ-3.0-T-INT<br>S6-L-B42AJ-5.0-T-INT<br>S6-L-B42AJ-10.0-T-INT |
| | | | S6-L-M3BJ-3.0-T-INT<br>S6-L-M3BJ-5.0-T-INT<br>S6-L-M3BJ-10.0-T-INT | S6-L-B32AJ-3.0-T-INT<br>S6-L-B32AJ-5.0-T-INT<br>S6-L-B32AJ-10.0-T-INT |
| No. of cores × conductor ross section | 4×1.3mm² | 4×1.3mm² + 2×0.75mm² (Braking wires) | 4×3.3mm² | 4×3.3mm² + 2×0.75mm² (Braking wires) |
| Colour of wire cores | U –Black 1,<br>V –Black 2,<br>W –Black 3,<br>PE –Green/ yellow-striped | U –Black 1,<br>V –Black 2,<br>W –Black 3,<br>BK+ –Black 4,<br>BK- –Black 5,<br>PE –Green/ yellow-striped | U –Black 1,<br>V –Black 2,<br>W –Black 3,<br>PE –Green/ yellow-striped | U –Black 1,<br>V –Black 2,<br>W –Black 3,<br>BK+ –Black 4,<br>BK- –Black 5,<br>PE –Green/ yellow-striped |
| Certifications | CE, UKCA, RoHS | | CE, UKCA, RoHS | |
| Test voltage | AC 2.0 kV | | AC 2.0 kV | |
| Conductor impedence ( 20℃ Ω/ km ) | ≤ 12.8 | ≤ 12.8 + ≤ 23.2 ( Braking wires ) | ≤ 5.4 | ≤ 5.4 + ≤ 23.2 ( Braking wires ) |
| Insulation resistance ( 20℃ MΩ/ km ) | ≥ 10 | | ≥ 10 | |
| Load capacity ( Ambient temperature 30℃ , single wiring in the air ) | 15.5A | 15.5A + 8.8A ( Braking wires) | 26A | 26A + 8.8A ( Braking wires) |
| Smallest bending radius | 10 × Outer diameter | | 10 × Outer diameter | |
| Number of bending cycles | Drag chain applications: 10 million | | Drag chain applications: 10 million | |
| Tensile load for permanently installed cable, max. | 20 N/mm² (2901 lbf/in²) | | 20 N/mm² (2901 lbf/in²) | |
| Outer diameter of the cable sheath | ø10.5±0.3 mm | ø11.5±0.3 mm | ø13.1±0.3 mm | ø14±0.3 mm |
| Shielded round | ≥ 85% Continuous mesh screen | | ≥ 85% Continuous mesh screen | |
| Color of the cable sheath | Color orange RAL 2003 | | Color orange RAL 2003 | |
| Operating temperature on the surface | -20° C ~ + 105 ° C | | -20° C ~ + 105 ° C | |
| Type of insulation | CFC/silicone-free | | CFC/silicone-free | |
| Flame-retardant | UL VW-1, EN 60332-1-1 to 1-3 | | UL VW-1, EN 60332-1-1 to 1-3 | |
| Oil resistance | UL758 60℃ ×168h, EN 60811-2-1 | | UL758 60℃ ×168h, EN 60811-2-1 | |
| Commodity code (For China export) | 8544422100 | | 8544422100 | |
| Estimated mass | 3m length: 84g<br>5m length: 140g<br>10m length: 280g | 3m length: 129g<br>5m length: 215g<br>10m length: 430g | 3m length: 195g<br>5m length: 325g<br>10m length: 650g | 3m length: 240g<br>5m length: 400g<br>10m length: 800g |

## Encoder connection cable

| Encoder cable technical parameters | | | |
|---|---|---|---|
| **Motor type** | **With A3 type encoder** | **With D3 type encoder** | **With A3 type encoder** |
| **Cable category** | **SV680** | | **IS810** |
| Cable types | Flexible installation | | |
| Insulation material | Special elastomer PVC | | |
| Outer jacket | Special elastomer PVC | | |
| Cable model | S6-L-P12U-3.0-T-PTC-INT<br>S6-L-P12U-5.0-T-PTC-INT<br>S6-L-P12U-10.0-T-PTC-INT | S6-L-P22U-3.0-T-PTC-INT<br>S6-L-P22U-5.0-T-PTC-INT<br>S6-L-P22U-10.0-T-PTC-INT | S6-L-P02U-3.0-T-PTC-INT<br>S6-L-P02U-5.0-T-PTC-INT<br>S6-L-P02U-10.0-T-PTC-INT |
| No. of cores × conductor ross section | 4×0.32mm² +<br>2×0.32mm²(PTC wires) +<br>2×0.32mm²(Battery lead wires) | 6×0.32mm² +<br>2×0.32mm²(PTC wires) | 4×0.32mm² +<br>2×0.32mm²(PTC wires) +<br>2×0.32mm²(Battery lead wires) |
| Colour of wire cores | PS+ –Blue, PS- –Purple,<br>+5V –Red, 0V –Orange,<br>Grounding PE;<br>PTC+ –Yellow, PTC- –Green;<br>BT+ –Brown, BT- –Black | DATA+ –Blue, DATA- –Purple,<br>CLK- –Black, CLK+ –Brown,<br>+5V –Red, 0V –Orange,<br>Grounding PE;<br>PTC+ –Yellow, PTC- –Green | PS+ –Blue, PS- –Purple,<br>+5V –Red, 0V –Orange,<br>Grounding PE,<br>PTC+ –Yellow, PTC- –Green;<br>BT+ –Brown, BT- –Black |
| Certifications | CE, UKCA, RoHS | | |
| Test voltage | AC 500V | | |
| Conductor impedence<br>(20℃ Ω/ km) | ≤ 130 | | |
| Insulation resistance<br>(20℃ MΩ/ km) | ≥ 10 | | |
| Load capacity<br>(Ambient temperature 30℃,<br>single wiring in the air) | 2.8A | | |
| Smallest bending radius | 10 × Outer diameter | | |
| Number of bending cycles | Drag chain applications: 10 million | | |
| Tensile load for permanently installed cable, max. | 20 N/mm² (2901 lbf/in²) | | |
| Outer diameter of the cable sheath | ø9.3±0.3 mm | | |
| Shielded round | ≥ 85% Continuous mesh screen | | |
| Color of the cable sheath | Color green RAL6018 | | |
| Operating temperature on the surface | -20° C ~ + 105 ° C | | |
| Type of insulation | CFC/silicone-free | | |
| Flame-retardant | UL VW-1, EN 60332-1-1 to 1-3 | | |
| Oil resistance | UL758 60℃ ×168h, EN 60811-2-1 | | |
| Commodity code<br>(For China export) | 8544421100 | | |
| Estimated mass | 3m length: 196g<br>5m length: 302g<br>10m length: 569g | | |



# Mandatory Accessories

## Gland Selection Compliance with CCC Standards

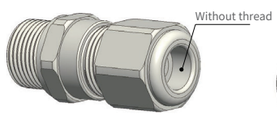
### Gland Selection

The frame size of 60/80mm motor must be equipped with two M20 x 1.5 explosion-proof glands with stuffing box, and the frame size of 130/180mm motor must be equipped with one M20 x 1.5 and one M25 x 1.5 explosion-proof glands with stuffing box. The gland can be selected by a regular type or a threaded type, according to the application scenario. Due to the cable outer diameter is different, please select the suitable gland.

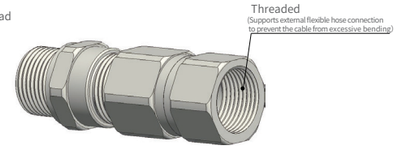
⚠ The customer must procure the gland type that is explosion-proof rated no less than the motor's explosion-proof rating, and it must be of the stuffing box style. Incorrect operation during use will result in the failure of the flameproof function.

**BST - Exd ① - SSF ② - M20 ③ 12 ④ BR**

| | | |
|---|---|---|
| ① Explosion protection marking | ③ Thread specification<br>M20: M20 x 1.5<br>M25: M25 x 1.5 | ④ Maximum outer diameter of the cable<br>12: Maximum outer diameter of the cable not exceeding 12 mm (M20 only)<br>15: Maximum outer diameter of the cable not exceeding 15 mm (M25 only) |
| ② Type<br>SSF: Regular explosion-proof gland with stuffing box<br>SSFT: Threaded explosion-proof gland with stuffing box | | |




Regular explosion-proof gland with stuffing box




Threaded explosion-proof gland with stuffing box

| Model | Thread specification | Type | Applicable cable diameter (mm) | Thread specification | Min. dose of sealing compound | Recommended brand |
|---|---|---|---|---|---|---|
| BST-Exd-SSF-M2012BR | M20 x 1.5 | Regular | 7.5 to 12 | - | 5 | Beisit |
| BST-Exd-SSF-M2515BR | M25 x 1.5 | | 9 to 15 | - | 10 | |
| BST-Exd-SSFT-M2012BR | M20 x 1.5 | Threaded | 7.5 to 12 | M20 x 1.5 | 5 | |
| BST-Exd-SSFT-M2515BR | M25 x 1.5 | | 9 to 15 | M25 x 1.5 | 10 | |

Note: When purchasing explosion-proof cable glands from non-recommended brands, the outer diameter of M20 gland must be ≤ 32mm, and the outer diameter of M25 gland must be ≤ 42mm, otherwise the gland will interfere with the motor housing and cannot be installed.

### Sealing Compound Selection

| Model | Dose | Initial Curing Conditions | Final Curing Conditions | Recommended Brand |
|---|---|---|---|---|
| Exd-AB | 50ml | 23° C@30min | 23° C@24h | Beisit AB glue/ Taison TS830 |

Note: 1 tube of AB glue can fill about 8pcs of M20 gland or 4pcs of M25 gland.

### Tightening Torque Requirements

| Part | Torque Requirements (N·m) |
|---|---|
| Terminal Box Cover Fastening Screw | 1.5±0.1 (60/80 frame, M3) /2.5±0.1 (130/180 frame, M4) |
| Cable Gland Body | 15±0.5 (M20 spec.) /35±1 (M25 spec.) |
| Cable Gland Compression Nut | 10±0.5 (M20 spec.) /30±1 (M25 spec.) |

Note: Failure to comply with the torque requirements specified in the table may result in explosion protection type failure.

# Mandatory Accessories

## Gland Selection Compliance with ATEX Standards

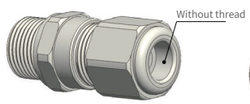
### Gland Selection

The frame size of 60/80mm motor must be equipped with two M20 x 1.5 explosion-proof glands with stuffing box, and the frame size of 130/180mm motor must be equipped with one M20 x 1.5 and one M25 x 1.5 explosion-proof glands with stuffing box. The gland can be selected by a regular type or a threaded type, according to the application scenario. Due to the cable outer diameter is different, please select the suitable gland. If customer purchase the gland by yourself, it can select the gland type without stuffing box, according to the ATEX rules.

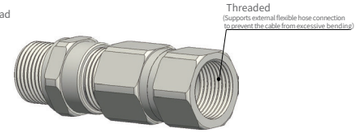
⚠ The customer must procure the gland type that is explosion-proof rated no less than the motor's explosion-proof rating, and it must be of the stuffing box style. Incorrect operation during use will result in the failure of the flameproof function.

**BST - Exd ① - SST ② - M20 ③ 12 ④ BR**

| | | |
|---|---|---|
| ① Explosion protection marking | ③ Thread specification<br>M20: M20 x 1.5<br>M25: M25 x 1.5 | ④ Maximum outer diameter of the cable<br>12: Maximum outer diameter of the cable not exceeding 12 mm (M20 only)<br>15: Maximum outer diameter of the cable not exceeding 15 mm (M25 only) |
| ② Type<br>DS: Regular explosion-proof gland without stuffing box, sealed form dual-sealing<br>SST: Threaded explosion-proof gland without stuffing box, sealed form single sealing | | |




Regular explosion-proof gland without stuffing box




Threaded explosion-proof gland without stuffing box

| Model | Thread specification | Type | Applicable cable diameter (mm) | Thread specification | Sealed type | Recommended brand |
|---|---|---|---|---|---|---|
| BST-Exd-DS-M2012BR | M20 x 1.5 | Regular | 7.5 to 12 | - | Dual sealing | Beisit |
| BST-Exd-DS-M2515BR | M25 x 1.5 | | 9 to 15 | - | Dual sealing | |
| BST-Exd-SST-M2012BR | M20 x 1.5 | Threaded | 7.5 to 12 | M20 x 1.5 | - | |
| BST-Exd-SST-M2515BR | M25 x 1.5 | | 9 to 15 | M25 x 1.5 | - | |

Note: When purchasing explosion-proof cable glands from non-recommended brands, the outer diameter of M20 gland must be ≤ 32mm, and the outer diameter of M25 gland must be ≤ 42mm, otherwise the gland will interfere with the motor housing and cannot be installed.

### Tightening Torque Requirements

| Part | Torque Requirements (N·m) |
|---|---|
| Terminal Box Cover Fastening Screw | 1.5±0.1 (60/80 frame, M3) /2.5±0.1 (130/180 frame, M4) |
| Cable Gland Body | 15±0.5 (M20 spec.) /35±1 (M25 spec.) |
| Cable Gland Compression Nut | 10±0.5 (M20 spec.) /30±1 (M25 spec.) |

Note: Failure to comply with the torque requirements specified in the table may result in explosion protection type failure.

### Gland explosion protection certification information

| Item | Description |
|---|---|
| ATEX certificate | TÜV 20 ATEX 8609X |
| IECEx certificate | IECEx TUR 20.0079X |
| China CCC certificate | 2021CCC2313010-017466 |
| China explosion protection certificate | CJEx21.1189U |

# NOTES

REMARKS

# NOTES

REMARKS